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IASET

ANTHROPIC PRESSURE AND DEGRADATION OF THE OUÉMÉ BOUKOU CLASSIFIED FOREST (MUNICIPALITY OF SAVÈ) IN THE REPUBLIC OF BENIN

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ABSTRACT

This research analyzes the anthropic pressure and the impoverishment of the classified forest of Ouémé Boukou, especially at the level of the districts of Béssè, Offè and Okpara in the commune of Savè, due to the massive intrusion of farmers and other exploiters in the aforesaid classified forest in recent years.

The methodological approach includes socio-economic surveys of those living in or around this forest, the processing of socioeconomic data from the study area from 2002 to 2018. The analysis and discussion of the findings were done through the numbers of farmers, farms, charcoal manufacturers, firewood markets etc.

The results show that anthropogenic pressure deteriorates natural resources through agriculture (73%), livestock (13%), logging and other related forest degradation activities (14%), which are the main activities carried out by agricultural migrants who settled in and around the Ouémé-Boukou classified forest. The analysis shows a growing increase in farms in the classified forest. Likewise, farmers use harmful production techniques to natural resources. So, drastic measures for the efficient and sustainable management of natural resources deserve to be taken for the protection of the forest against anthropogenic actions.

KEYWORDS: Forest, Ouémé-Boukou, Anthropogenic Pressure, Degradation

INTRODUCTION

Forests are an important and strategic natural resource for the development and well-being of all countries. The world's forests occupy approximately 4,032,905,000 hectares and Africa has approximately 674,419,000 hectares of forest and woodland (FAO, 2011). Rural populations meet a large part of their food, health and energy needs from forests in several developing countries (Oloukoi, 2005). Besides this social function, forests also perform economic functions. Forests are useful and precious ecosystems for humanity.

The impoverishment of the natural environment is increasing in Benin. To meet their needs, the populations go in search of land for nearby crops and in classified forests. Thus the vegetation, consisting of tree savannah, covering 65% of the national territory, is deteriorating in a worrying way (Oloukoi et al, 2006).

Forest impoverishment is therefore, one of the major problems faced by African farmers and public authorities. For a number of years, an important activity of forest administrations, but also of international and non-governmental organizations have been devoted to restoring forest cover through the reforestation of resources which are becoming increasingly scarce (Akakpo et al, 2011).

Since the 1940s to 1956, Benin had classified 58 forest areas representing 25% of the national territory with the aim of vouching the forest heritage from the harmful effects of degradation and guaranteeing the ecological balance necessary for all life in general and to human life in particular (Djianou, 2009).

In Benin, the agriculture remains extensive and is characterized by a shortening of the fallow period (Bossou, 2001). Peasants and ranchers, all in search of fertile land for agriculture and / or fodder for livestock, are only destroying the forests. All these forms of occupation of forest land through agriculture, pastoralism and uncontrolled logging increasingly affect the balance of biodiversity in the classified forests of Benin.

The worrying of the environment destruction and its natural resources requires for rational management of flora and fauna.

Considering the speed of destruction of the Ouémé-Boukou classified forest, if nothing is done, the populations and agglomerations bordering may be subject in the very near future to serious social and ecological consequences:

- The complete deterioration of the living environment of the city's populations due to the disruption of ecological balance;

- There is no doubt that the gathering speed of water erosion is a reality.

- The loss of significant genetic potential located in the natural forest part.

The incivism, the demand for land for agriculture, the deforestation, the meeting of the diverse needs of local residents, the housing construction and other forms of human activity have reduced and / or fragmented natural habitats. That's why this study aims to study the threats of anthropogenic actions on the forest resources of the classified forest of Ouémé Boukou.

STUDY AREA, MATERIALS, METHODS AND DATA

The Area of Study

The Ouémé-Boukou forest (figure 1) is classified by decree n ° 5898 S.E. of August 13th, 1954. It covers a total area of 20,500 ha and is located between 7 ° 38 and 8 ° 03 north latitude and 2 ° 21 and 2 ° 42 east longitudes. It is located in the Commune of Savè in the Colline Department. It is limited to the North by the Igbodja-Savè track; to the south by the Yalé backwater; to the west by the Ouémé River and to the east by the Adjigbetiéré backwater and the Bessé River.
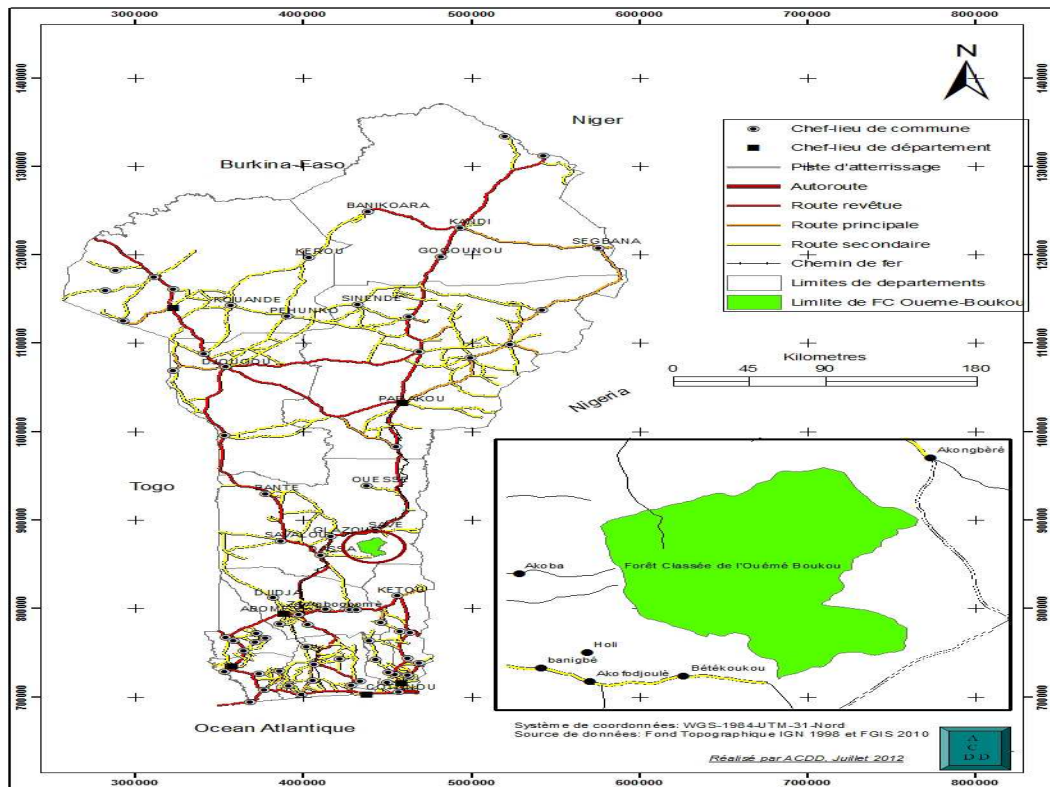
Figure 1: Geographical Location of the Ouémé-Boukou Classified Forest.

Physical environment

Climate

The Ouémé-Boukou classified forest is located in an area characterized by a subequatorial climate distincted by two rainy seasons and two dry seasons. The analysis of figure 2 shows that the dry period lies from November to March (P <FTE / 2) when plants have difficulty in getting water. This drought will fade from the end of April when the monthly rainfall is above ETP / 2; it's the growing season. In the period from July to October when P> FTE, plants find the conditions of abundance and humidity is maximum. Average annual precipitation is 1100 mm. It's a good time for reforestation.
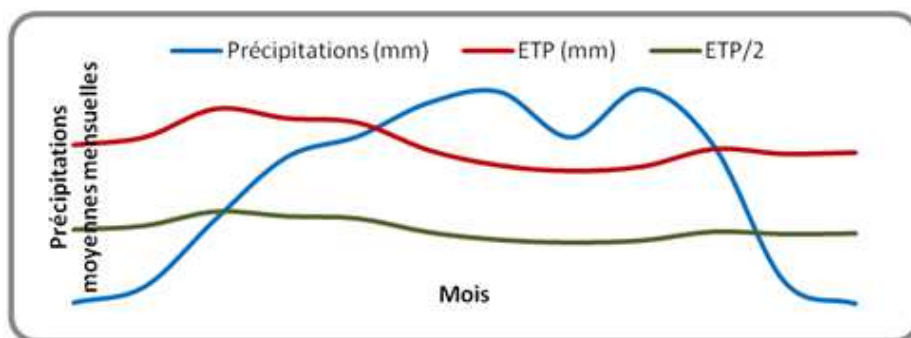
Figure 2: Climate diagram of Savè region (1971 to 2008).
Source: ASECNA data

The region's average temperature is about 27.37 ° C. The hottest time of the year is at the end of the dry season, between February and early April, with a maximum temperature of 36 ° C. On the other hand, August is the coolest month with a minimum temperature of 25.01 ° C. The climate is marked by the harmattan from December to February.

Vegetation

The vegetation of the massif forest is made up of mosaics of crops and fallows, open forests and wooded savannas, tree and shrub savannas, dense dry forests and forest galleries and then plantations. The following plant formations are distinguished:

- Gallery forests with Pterocarpus santalinoides and Cola laurifolia;

- Wooded savannahs with Isoberlinia doka and Pterocarpus erinaceus;

- Tree and shrub savannas with Terminalia macroptera and Vitellaria paradoxa;

- West Anacardium plantations;

Faune

The fauna (rich and diverse) of the Ouémé-Boukou massif forest is threatened by the destruction of its natural habitat and the pressure of hunting. According to the results of the enumeration carried out in 2010 by the PGFTR, thirteen (13) species of mammalian fauna have been inventoried of which the most represented are the harnessed guib (Tragelaphus scriptus), the warthog (Phacochoerus ethiopicus) and the patas (Erythrocebus patas) .

The avian fauna counts 25 species and the families with a high specific richness are the Accipitridae and the Columbidae.

Geology, Relief and Soils

The area of the massif forest lies on the precambrian plinth of the crystalline peneplain, composed of granite, biotite gneiss or pegmatite veins. The plinth is covered by sandy-clay formations whose thickness varies from a few meters to several tens of meters.

The relief of the area is characterized by alternating summits and more or less strong and elongated depressions.

The soils encountered are of tropical ferruginous type leached to concretion or without concretion on a crystalline base which, due to human exploitation, give way to infertile lateritic soils. Hydromorphic soils are also found in the shallows and river valleys and vertisols in the river and hill valleys.

Human Environment and Socio-Economic Aspects

Human Settlements

Table 1 presents the five (05) bordering administrative villages (Dani, Ayédjoko, Okpa, Igbodja and Akon) of the Ouémé-Boukou classified forest. These villages composed of more or less important hamlets are distributed in three districts of the Commune of Savè.

Table 1: Arrondissement, Villages and Hamlets Bordering the Ouémé-Boukou Classified Forest

Districts	Villages	Localities / Hamlets
OFFE	Dani	Dani-centre ; Bossikponn-gon ; Kotanmigan ; Kpoglassi-gon ; Sévérin-gon
	Ayédjoko	Ayédjoko-centre ; Aguessi-gon ; Ahokpo-gon ; Ayékossa
BESSE	Okpa	Okpa centre ; Sèhoungon ; Gobaix ; Dokon ; Trakègon ; Hootogon ; Agbondjèdo
	Igbodja	Igbodja centre ; Atchèguigon ; Kpakanmè ; Kinhagon Bessé-centre ; Nicolas-gon
OKPARA	Akon Gbèrè	Akon centre ;
Total	05	23

Ethnic Groups and Interethnic Relations

The Commune of Savè, bordering the classified forest of Ouémé Boukou, is very attractive and constitutes a welcoming land for almost all migrants in search of fertile land for agricultural production. These migrants come from Donga (Ouaké), Atacora (Boukoumbé, Tanguiéta, Kouandé), Plateau (Sakété and Kétou), Mono (Klouékanmè), Zou (Bohicon Za-Kpota, Djidja and Pays Agonlin) and Collines (Dassa-Zoumé, Savalou and Glazoué).

Several socio-cultural groups in the villages bordering the classified forest. These are: Nagot, Fon, Idaatcha, Adja, Ditamari, Fulfuldé and Holli. Their distribution is:

- The terroirs from the wave of migrants from Nigeria that are the villages of Akon and Bessé. Besides the founders Nagots in minority, we also have Fon, Ditamari and Fulfuldé;

- The terroirs from the raids of the kingdom of Dahomey that are: Okpa and Igbodja; The Mahi founders are the majority. They were joined by the Tchabè, Fon, Ditamari, Peulh and Holli.

- The areas populated by agricultural settlers in Dani and Ayédjoko. These are the cosmopolitan populations dominated by Fon and Idaatcha. The Ditamari, Yom and Adja are the minority.

Relations, although peaceful, are marked by mistrust between the Nagot and Fon. The dominant conflicts in the villages are those between herders and farmers.

Materials, Methods and Data

The methodological approach is based on data collection, useful information, their processing and the analysis of the results. The data used are: forest planimetry data, socioeconomic data, rainfall data, etc.

Documentary research and field surveys of populations are the main sources of data collection.

In order to collect as much data and information as possible, several techniques, tools and materials are used: direct observations (with observation grid), surveys of heads of household aged at least 30, officials of the Inspectorate Forest of Dassa-zoumè (with questionnaires), interviews (with interview guide), a digital camera for taking pictures and a sound recorder.

Field investigations are being carried out in the districts of Bèssè, Offè and Okpara in the commune of Savè. These districts have been chosen because they are motivated by the fact that they are the places of reception, of concentration of populations nearby the classified forest of Ouémé-Boukou.

The criteria for choosing the respondents can be summarized as follows:

- Be between thirty (30) and fifty (50) years old, in order to give concrete information on the classified forest of Ouémé-Boukou and its own activities;

- Having lived in the locality at least the last ten years, in order to describe the pressures that the classified forest undergoes as well as its importance for the populations.

The sampling was determined by reasoned choice and the statistical survey unit is the household represented by its head. Table 2 provides an overview of the households interviewed during the study.

Table 2: Distribution of households surveyed per borough and per district

Districts	Villages	Number of household in 2013	Proportion	Number
Besse	Igboja	298	0,22	43
	Okpa	198	0,14	28
Offè	Dani	292	0,22	43
	Ayédjoko	265	0,20	42
Okpara	Akon	305	0,23	46
Total		**1358**	**1**	**202**

A total of 202 households were interviewed. Added to these are resource people including:

- The municipal and local authorities (the Mayor, 3 heads of district and 5 heads of district or village);

- The Chief forest post of Save and two forestry agents;

- 03 managers (1 per service in charge of the land register, state and environmental affairs, technical service);

- 01 notable per village, i.e. five (05) people;

The various data and information collected or provided were processed, analyzed and made it possible the factors of degradation of the classified forest of Ouémé Boukou.

RESULTS AND DISCUSSION

The Factors of Anthropic Pressure and Degradation of the Classified Forest

Population Growth Around and in the Forest

The local population was estimated at 11,515 inhabitants, 51% of whom were men compared to 49% of women according to figures from the 2002 general population and housing census (INSAE, RGPH3, 2002). The density of the population is about 30 hbts / km2 and dominated by young people. This population increased to 16,568 in 2013 and reached approximately 19,090 in 2018 as shown in Tables 3.

The notified socio-professional groups are farmers, breeders, loggers, charcoal manufacturers, wood fuel researchers, researchers of medicinal plants, fishermen and hunters.

Table 3: Distribution by Sex and by Village of the Population Living Near the Ouémé Boukou Classified Forest in 2002, 2013 and 2018

Population in 2002						
Districts	**Villages**	**Male**	**%**	**Female**	**%**	**Total**
Bessè	Igboja	1552	13,48	1583	13,75	3115
	Okpa	778	6,76	799	6,94	1577
Offè	Dani	1399	12,15	1290	11,20	2689
	Ayédoko	1109	9,63	1044	9,07	2153
Okpara	Akon Gbèrè	1050	9,12	931	8,09	1981
Total		**5888**	**51**	**5647**	**49**	**11515**
Population in 2013						
Districts	**Villages**	**Male**	**%**	**Female**	**%**	**Total**
Bèssè	Igboja	2308		2197		4505
	Okpa	899		876		1775
Offè	Dani	2327		2376		4703
	Ayédoko	1518		1471		2989
Okpara	Akon Gbèrè	1409		1189		2598
Total		**8461**	**51,06**	**8109**	**48,94**	**16570**

Table 3: Contd.,

Population in 2018						
Districts	**Villages**	**Male**	**%**	**Féminin**	**%**	**Total**
Bèssè	Igboja	2686		2504		5190
	Okpa	960		915		1875
Offè	Dani	2791		2919		5710
	Ayédoko	1723		1685		3408
Okpara	Akon Gbèrè	1589		1318		2907
Total		**9749**	**51**	**9341**	**94**	**19090**
Source: INSAE: RGPH3,4, 2002, 2013 and 2018						

Most of these residents are farmers and their numbers are growing every year. Likewise, the number of farms has only grown over the years. Tables 4 and 5 present the socio-professional groups and the number of farms.

Table 4: Distribution of Socio-Professional Groups in and Around the Forest

Socio-Professional Groups	**Absolute frequency**	**Relative frequency**
Farmers	171	84,46%
Breeders	12	5,96%
Wood fuel researchers	08	3,96%
Hunters	01	0,49
Fishermen	01	0,49%
Charcoal manufacturers	03	1,48%
Loggers	04	1,98%
Researchers of medicinal plants	02	0,99%
Total	**202**	**100%**
Source: Data Analysis Results		

It is also noted the growth in the number of farms within the said forest from 2002 to 2018.

Table 5: Evolution of the Number of Farms in the Classified Forest

Years	**Number of Agricultural Exploitation (Fields and Plantations)**
2002	398
2013	546
2018	632
Source: Data Collection and Analysis Results	

The farms vary in size from a few plots to several hectares. The largest exploitation observed during the field investigations is a nine (9) hectare cashew plantation in Kpoglassigon.

Photo 1 shows a cotton field in the forest with the use of pesticides. The packaging of these pesticides is discarded without any environmental protection measures by the users.

Photo 1: Cotton Field Inside the Classified Forest.
Shooting: Tchaou, December 2018

Anthropogenic Actions, Sources of Forest Degradation

The fertile land, the abundance of natural resources and the massive migration of populations from several regions to the surrounding villages increase the actions of degradation in the Ouémé Boukou classified forest and its surroundings. The populations now living on the shore are those, who participate in the severe degradation of the forest in various survival activities such as agriculture, the clandestine exploitation of timber, overgrazing, the manufacture of charcoal, the search for wood. Heating to supply wood bundles markets, etc.

This picture shows the cutting and charcoal making.

Plate 1: Cutting Trees and Charcoal making in the Middle of a Classified Forest.
Shooting: Tchaou, December 2018

Plate 2: Collection and Transport of Firewood to Supply the Wood Markets.
Shooting: Tchaou, January 2019

Plate 3: Human Buildings (A Church Chapel and A Class Module) in the middle of the Classified Forest.
Shooting: Tchaou, December 2018

The slovenliness of the forestry administration is the core for the multiplication of hamlets and the enlargement of others in the forest. Kpoglasi-gon populations have even erected a Renaissance Union of Men in Christ (URHC) chapel in the forest.

Other anthropogenic facts are bush fires and hunting, the dumping in the forest of household waste and especially packaging of pesticide, cans of insecticide.

Herders and their herds open up several transhumance corridors and grazing areas through the forest. Overgrazing through the forest is the basis of conflicts between pastoralists and farmers. This state of affairs added to the actions of hunters is also at the core of the scarcity of animal species in the classified forest.

Still among the anthropogenic facts, each of the five (5) villages had their sack of charcoal and firewood.

DISCUSSION

In terms of its proximity or contiguity with the city of Save, the classified forest of Ouémé-Boukou is qualified as an urban forest. This coexistence with the city is very decisive in all development work. Thus, it results that an important part of the whole area of the classified forest of Ouémé-Boukou has been monopolized by the neighboring populations, for various uses, the main ones being the search for fuel wood, the search for agricultural land, cult rites and human housing constructions. The Ouémé-Boukou classified forest, like the heritages (natural spaces) saved by the colonial government in the 1940s and 1950s to resist the phenomenon of degradation of natural resources which impacted many protected areas such as the perimeters of reforestation of Tanekas and Natitingou which are almost completely occupied and the perimeter of reforestation of Kandi greatly degraded. In contrast, according to WWF (1993), the degradation of ecosystems and the disappearance of plant species have their origins in various combined anthropogenic facts. Then, the open environments are mostly exposed and easy to access. They are then subject to strong anthropic pressures. Indeed, many species are eliminated by the peasants during the clearings and constructions.

The 2008 cantonment report indicates that the populations have stopped the earthworks on this part of the classified forest. According to this report, the populations in their horde uprooted the seedlings planted on an area of two (02) hectares. Since then, the local populations have been in dispute over this portion with the forestry administration. During the study, some of this community warned us by "you have already been told not to set foot here; we leave the other part for you; this one is ours". The perpetrators of these threats showed themselves and were ready for anything whenever they utter these words. In short, the integrity of the classified forest is questionable and this difficulty must be overcome before undertaking a comprehensive management of the classified forest.

The presence of the sacred forest which shelters Didonou's water source is under the control of the Djagba community. The religious laughter often takes place at the level of this sacred forest. This activity, the management method and the sacred nature of this part of the classified forest makes any development work in the sacred forest and its immediate surroundings impossible.

The failure of the forest administration, the bad faith of the politicians of the area in search of suffrage, and the consequences engendered by the presence of the populations in the vicinity of the Ouémé-Boukou classified forest are numerous and bear the marks of irrational management of natural resources. These constraints and assets identified in the study environment are the same as those obtained by Oloukoi (2012) in his thesis on central Benin.

Development Axis

An operational model for developing the management plan was developed after validation. This model includes five fundamental steps which seek to coordinate in space and time all the activities related to the conservation of protected areas during an ongoing process (DGFRN, 2001). At first sight, this somewhat technocratic division must be considered in the form of an iterative process. Each step of the model has been operationalized through sub-steps. This model of participatory management plan corroborates well with that of Djianou, 2009 who worked on forests in the commune of Zogbodomey.

CONCLUSIONS

The Ouémé-Boukou classified forest has constraints that compromise any management initiative. The most important of these constraints are: the retreat of the boundaries of the classified forest, the land dispute over certain parts of the classified forest, the failure of the forest administration, the unfavorable political, legal and institutional context, the effect of urbanization and ignorance of the resources of the classified forest. However, the classified forest contains important assets favorable to its development. It is the Borassus aethiopium used the colonial administration to physically materialize the limits, the existence of a political will, the legal and institutional framework for the management of protected areas, the presence of small game, climatic factors favorable to the development of woody trees and the proximity of the classified forest with the town of Save.

The main objective, set within these different plant formations and the framework of participatory management of the classified forest, is the improvement of resources through different management activities such as reforestation, monitoring, development of PFNLs, the opening of tracks to allow good circulation in order to facilitate eco-tourism, the purchase and introduction of different targeted livestock species and to develop income-generating activities.

Owing to these observations which point to the decline of moral and civic values, it is still possible to save what exists. Hence, the following suggestions have been made to the forestry administration, which must:

- Sensitize the populations in general, the local elected representatives and the crowned heads in particular with regard to the importance of this reserve in the balance of biodiversity and the purifying and wind breaking role played by these units;

- Carry out specific additional studies on forest islands, namely the wildlife inventory and socio-economic studies;

- Seek funding for the implementation of an appropriate development plan for these islets in a participatory manner;

- Support in short term the sustained production of fuel wood and non-wood forest products (food products and medicinal plants) and that of timber in the long run,

- Encourage and support individuals to create private forests;

- Enforce participatory development plans,

- Create access roads and surround the classified forest by a fence or by clearly visible signs,

- Create an eco tourism area,

- Create beekeeping activities and other income generators,

- Shave all the old Anacardium plantations and windfall areas,

- Develop the plan with local residents and local elected officials, taking into account their wishes while preserving the vision of the DGFRN,

- Redefine the enrichment mode of the classified forest so that the spaces are reclaimed.

In order not to lose this useful and essential heritage, it is imperative that appropriate arrangements be made for the safeguard, material, visible delimitation and development of the remainder of the classified area. Development actions should be planned consensually to ensure their sustainability. On the other hand, it may be planned to remove all the illegal occupants from the unilaterally classified forest.

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