

# **Influence of farming activities in the cross river gorilla conservation in the Tofala Hills Wildlife Sanctuary (THWS), South-West region Cameroon**

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## **Abstract**

The CRG is the most threatened taxon of great apes and deserve a particular attention for their survival. The greater threats faced by these animals are human induced. In an attempt to closely examine the situation, we identified one human induced threat faced by the CRG in the THWS, farming activities around the protected area.

To this end, 70 questionnaires were administered, a recce survey conducted. The results show that the farms were established anyhow in the forest, the common technique used was the slash and burnt method, no authority was in charge of farming activities regulation in the forest. The encounter rate of human pressure was higher than the one of gorilla presence, gorilla that was presented as a pest by farmers. In the forest, the farms represent 68.23% of human signs and 38.15% of all the recorded signs. Gorillas' signs were found mostly far from human activities with only 17.91% of great apes signs found in farmland. And the feeding signs representing 75% of signs encountered in forest.

**Key words:** farming activities, gorilla, Cross River Gorilla, conservation, Tofala Hills Wildlife Sanctuary, Cameroon

## **Résumé**

Le CRG est l'espèce la plus menacé des grands singes et mérite une attention particulière pour sa survie. Les plus grandes menaces qui pèsent sur ces animaux sont d'origine humaine. Dans une tentative d'examiner de près la situation, nous avons identifié une menace d'origine humaine. Dans le THWS, les activités agricoles se font en permanence autour de la zone protégée.

À cette fin, 70 questionnaires ont été administrés, suivis d'une enquête reconnaissance. Les résultats montrent que les fermes ont été établies dans la forêt, la technique couramment utilisée est la barre oblique et la méthode brûlée. Aucune autorité n'était en charge de la réglementation des activités agricoles dans ces sites de forêt. Le taux de la pression humaine rencontré a été plus élevé que celui de la présence des gorilles. Pour les agriculteurs, le gorille est présenté comme un ravageur des cultures. Dans la forêt, les fermes représentent 68,23%

des droits de singes et 38.15% de tous les signes enregistrés. Les singes de gorilles ont été souvent trouvés loin des activités humaines et représentent seulement 17,91% des grands singes, trouvés dans les terres agricoles. Et les singes d'alimentation représentant 75% de ceux rencontrés dans la forêt.

**Mots clés :** activités agricoles, gorille, Gorille de la Cross River, conservation, sanctuaire de faune Tofala, Cameroun

### **Introduction**

Gorillas' sanctuaries are biome protected areas with objectives the maintaining of natural conditions necessary for the preservation of threatened or close to extinction species or biologic communities. As most of the protected areas (national parks, zoos, reserves, natural monuments, natural landscapes, natural regions), sanctuaries are inviolable, and forbidden to any customary rights (**Vives-Avelines M., 2001**) [1]. Human activities constitute the main threat for these apes due among other to their habitat destruction, illegal hunting for bushmeat consumption, fetishism tools harvesting and illegal trade.

Influence of agro-pastoral activities, more and more diversified of local populations seems interesting to us and constitute the basis of the following study. The intended objective is to identify and present from an informal non structured field survey on the site of the Tofala Hills Wildlife Sanctuary the constraints and implications resulting from this socioeconomic process.

### **Materials and methods**

#### ***Study site***

The THWS is part of the Lebialem-Mone Forest Landscape in the mountainous northeastern part of South-West Region of Cameroon and constitutes the transitional zone from the rainforest to the savannah grassland (**Nkembi and Muh, 2012**) [2] and was classified by WWF as a biodiversity hotspot. The sanctuary is located between longitudes 598006 m and 609830 m and latitude 615778 m and 634006 m with an annual average rainfall of 2.000-3.000 mm that usually comes in torrential down pours. The area has a humid tropical climate with an average rainfall of about 3.500mm, and a distinct dry (November to February) and rainy (March to October) seasons. Daily temperatures vary between 20°C and 35°C, with the peak in March. The THWS has a surface area of over 8.000 ha between Bechati, Fossimondi and Besali and is situated in the Wabane and Alou Subdivisions of the Lebialem Division of South West Cameroon, and is about 60 km from the nearest known Cross River gorilla locality in northern Mone. The THWS is a new protected area created in 2014.

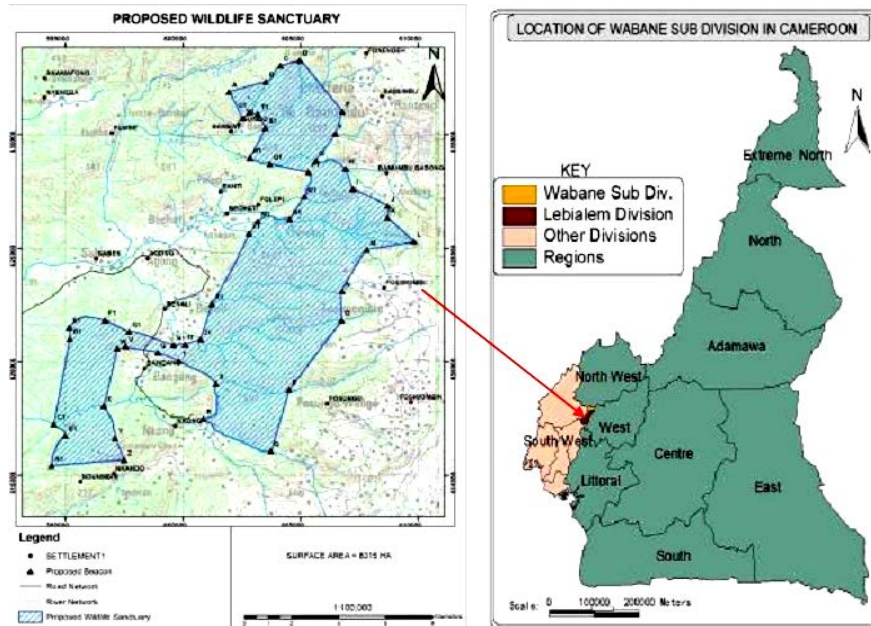


FIGURE 1: map of the Tofala Hills Wildlife Sanctuary

The area falls within the tropical lowland rainforests and varies from the lowland rainforest, through sub montane to a montane forest. The soil composition varies with altitude: humid volcanic soils with average fertility in the higher altitudes around Fossimondi and sandy soils with the lowest fertility around Bechati, in the lower altitudes. The soil composition has an important impact on the farming activity as it strongly influenced the yield of farms. Ten main human settlements surround and use the forest namely; Bamumbu, Egumbo, Banti, Folepi, Bechati, Besali, Bangang, Nkong, Fossungo, M’Mockbie, Sabis, Bambat, Nwametaw and Fossimondi. Surveys are planned to discover whether there is a potential corridor for gorillas between THWS and Mone (Oates and al, 2007) [3].

### Methods

To achieve the goals of our work, two methods were used. The first was the recce survey approach in the forest for direct observation of human and CRG (Cross River Gorilla) signs. The second was the administration of questionnaire to complete and confront the field observations and the perceptions of local populations.

With the recce survey method, easily accessible paths were consistently followed each day to collect signs of cross river gorillas and human signs. GPS points were noted for all gorillas’ related signs, human signs and other variables considered. The team moved averagely at a speed of approximately 1km per hour and care was take to ensure that nests and other signs were not missed. An average of 5 km walk was done daily during data collection generating a total distance of approximately 90 km being covered for 18 days of tracking. All human signs related to farming activities including Cutlass cut, regularly used human trails, camp sites, fire places, hunting, fishing, tree cutting. Data were recorded concerning the size of the farm, the crops produced in the farm, the age of the farm (age was estimated according to the creation of the farm or an estimation of the age of the trees remaining in the farm), habitat type in which the farm was found, GPS coordinates. All the measurements of distances were

accurately recorded with tapes to the nearest centimetre. The measures were taking by a 50 m fibre tape in measuring the length and width of farms. Cutting was restricted to the minimum necessary to facilitate passage.

The data collection was completed by the use of questionnaires on specific focused group: the farmers. A total of 70 questionnaires were administered in three different villages. During the administration of questionnaire, the face-to-face approach was utilized. This approach of questionnaire administration gives the advantage to have more precise answers by establishing a direct dialogue with the respondent. It also gives the possibility to verify some answers during the survey. Due to the scarcity of data available concerning the targeted population, a simple random survey approach was utilized. The survey objective being to assess the situation of the farming activities of the target population, their impact on the CRG population and their knowledge of these impacts, the sample size of the target population was not determine prior, but was depending to the availability of respondent on a basis of one hundred respondents. This approach permits scan with attention and study with a particular attention the concretes situations of the population in the management of their activities around and inside the THWS. The way the activities are carried out, the knowledge of potential prejudicial impact; the capability of change from the population was examined. Additional information was collected during the participation at focus group discussion organized by ERuDeF with the women and the men of the Besali village. There was also a direct conversation with the president of the forest management committee of some villages.

## Results and analysis

A total of 28 gorillas signs were recorded during the survey including 4 footprints, 12 feeding signs (picture 1), 9 nests, 1 track and 2 vocalizations. A total of 97 human signs were recorded with a total of 58 farms i.e. 59.79 % of human signs.



Picture 1: feeding sign of a gorilla on plantain (picture by Ngoufack Carlos)

The relative density of gorillas in the THWS was estimated at 0.31 signs per kilometre. It means that less than one gorilla sign was identified for every kilometre walked in the study area. The relative density of farming activities in the THWS was estimated to be 0.64 signs



per kilometre. It also means that less than one farming sign was identified for every kilometre walked in the study area.

As our objective was to assess the impact of farming activities on the CRG conservation, we focused on interaction between gorillas and farming signs starting by drawing up an inventory of gorillas signs recorded inside farms. The results show that just a few quantities of gorillas' signs are found inside farms. Only 9 gorillas' signs were found inside farms and represent 32.14 % of the gorillas' signs. One other thing is that the feeding sign is the most common sign found inside farm, representing 8 over 9 that is to say 88.88% of all the signs found in farms. On the 58 farms recorded during the survey 57 (98 %) were located inside a primary forest and only 1 (2 %) inside a secondary forest.

The farms encountered were relatively new with the oldest farm aged of 9 years and the newest just one day. The farms size were as different by their size as by their age with the smaller farm having an area of around 60m<sup>2</sup> and the largest 40.000 m<sup>2</sup>. The mean of the farms is 4017.8 m<sup>2</sup> and the median is 1581 m<sup>2</sup>. The difference between the mean and the median is due to the fact that most of the farm has a small size close to 1.500-2.000 m<sup>2</sup>. The farms recorded were mostly in use. Only 9 were empty without crops and represent 15.5% of all the recorded farms. All the remaining 84.5% contain crops. Among the crops, the more present were the banana/plantain, present in 48 of 58 farms representing 82.7% of all the recorded farms. The second most cultivated crop was the cocoa, present in 24 farms representing 41.3% of all the farms. The next more cultivated was the pepper present in 20 farms (34.4%), follow by cocoyam present in 16 farms (27.5%), palm oil trees and bitter leaf were encountered in 7 farms (12.06%). All the encountered farms were established using the slash-and-burn method. The majority of the respondents admitted they used the slashes and burnt techniques (87.1%) confirming the field observation. In the explanation, those who answer that they used the slashes and burnt techniques explain that to establish a new farm, they clear all the chosen area by cutting down all the trees and other plants, they let it dry and they burn all the dried plants. For those who do not use fire (12.9%), they also choose the space and clear it, but the difference is that they let the plants getting rotten.

Concerning the organization and the distribution of the farms inside the THWS, the majority of the respondents answer that there were no authority responsible for the organization and distribution. Only one of the respondents (1.4%) admitted that there were an authority responsible (the Fon) for the distribution of the farms. The 69 (98.6%) other say the establishment of new farms was unconditional. The only constraint presented by the respondents was to establish the farm giving the neighbor enough space to extend its own farm. 49 respondents (70%) say they have not change their way of working and 20 respondents (28.57%) say the contrary. In the concern of sustainable techniques of farming such as the orientation of furrows, the use of organic fertilizers, compost and manure, the respondents were not well informed. For instance, 62 of the respondents say they have no idea about the sustainable techniques of farming while 8 say they have an idea of these techniques. Furthermore, 5 respondents say these techniques are useless. The answers were closely the

same concerning the agro forestry, because 60 respondents have no idea about what is agro forestry and only 8 give a positive answer.

The farming activity is a matter of family. For 67 of the respondents, it is all the family who take care of the farms (95.7%), for 2 of the respondents it is the women who take care of the farm (2.9%) and only one use paid employees representing 1.4%. The destination of the production from farm is a good illustration of the farm care takers. Only 2 respondents say the production was to be used only as source of income (2.9%). All the 68 others respondents (97.1%) answer that the production was for the home use and the surplus can be sold. But a damper should be put on this answer because those who produce commercial crops such as cocoa are obliged to sell their production. Other thing is that there were no farm with only commercial crops but there were many with only subsistence crops. This situation illustrates the trend that the farming in the area is principally subsistence farming.

The respondents present the gorilla as destructive animals and if 31 respondents say their farm had not been destroyed by great apes, 36 admitted that their farm had been destroyed by gorillas, a situation that amplified the risk of direct confrontation between a gorilla and a farmer. To the question, 60 respondents say they have not been in direct confrontation with a gorilla, while 10 admitted a direct confrontation with a gorilla.

Concerning the impact of farming activities on the CRG, 2 do not have an opinion, 64 respond that their activities do not have an impact and 4 give a positive answer.

Concerning the management of the forest, 57 respondents (81.42%) answer that they don't know the status of the forest and only 13 (18.57%) answer positively. To the question about the forest management committee, institution that is supposed to organize and manage activities inside the forest, the answers were a little bit amazing. To this question, 37 respondents answer "No" and 33 respond "Yes". On the same way, about the utility of the forest management committee, 47 respond "nothing", 18 respond the committee is useless and no respondent answer useful.

Concerning the members of the forest management committee, only 12 respondents were members of the forest management committee. The 58 others were not members of the forest management committee of their village. About the probability of stopping farming to transform the forest to an economic asset, the majority of the respondents are not ready to give their consent. The results show that 63 of the respondents will not accept that the forest should be used to generated income for the community. Only 5 accept.

To the question "do you know your forest will completely disappear if nothing is done", 59 persons respond "No" and 9 respond "Yes". Among all the interviewees, 20 persons admitted they have already think about doing something else than farming. And 49 said they have never thought they can exercise other activity than farming.

## Discussion

The gorilla is presented by the populations among the more destructive animals in the farms. It puts down the problem of conflict between human and wildlife. If the others harmful animals are included in the category that can be hunted, it is not the case with gorilla which is strongly protected by Cameroon's law. If after the creation of the THWS the problem is not well handled and managed, with the reduction of probable farmland, and if the gorillas are still consider as pests, we can assist at some punitive strike against the apes. This situation can be fatal for the CRG in the THWS.

One other important aspect is the scarcity of gorillas signs closed to human activities. The permanent human sign being the farms, a total of 12 great apes signs were found inside farms representing 17.9% of all great apes signs and as said before was mainly feeding signs. A result going in the same way with the result presented by **Last and Muh (2013)** [4] showing that human predation and agricultural development appear to have a substantial impact on the location of chimpanzee nests. The situation can be corrected by an efficient land planning and management taking into consideration the presence of great apes and other wildlife. The farms can be establish progressively starting near the villages by sustainable crops, after commercial crops in a buffer zone and agro forestry trees close and even inside the forest. If plant like pears, bitter kola and other trees which can be domesticated by agro forestry are planted in the forest, it will transform this part of the forest in secondary forest and generate incomes. It is known that the CRG and other wildlife can easily survive inside secondary forest.

Subsistence farming is done within small size family farms jointly by men and women with a sex relationship in crops production. Farming is essentially for subsistence and in small portion to local market. Main crops produce are banana/plantain, groundnut, cassava, corn, yam, pineapple, pepper, bitter kola, bitter leaf, etc. The commercial crops are cocoa and palm tree, and were represent respectively in 88.5% and 67.1% of the visited farms. It is an extensive farming marked by four main characters:

- Itinerancy of culture and mobility of farms
- Using of fire in the clearance process
- The use of farming rudimental tools
- Absence of associative farming

Many types of crops are produced in the same space. But one of the main characteristics is the non use of fertilizers despite the poorer natural fertility. Subsistence crop's farms are sometime situated very far from the villages' sites deep inside the forest, making very hard the work in the forest. The maximum area of crops farms is 4 ha. But it represents exceptional cases, more regularly the subsistence farms' area is 1500m<sup>2</sup> with the minimum at 60 m<sup>2</sup>. The most part of the production from subsistence farms are used for family consumption and the surplus are sold in place due to the fact that the majority of villages do not have an organized market system. The majority of villages have periodical market. Barter is not a common practice for agricultural goods.

According to the survey, farming is the more important socioeconomic activity in term of subsistence food supply. In the study area, poor agricultural yields due to lack of inputs like fertilizers and pesticides, added to soil poverty encourage farmers to practice itinerancy of culture and particularly the mobility of farms. The new created farms are used for few years and abandoned, a new is created and the cycle restarts. Besides of that, unemployment obliges the jobless youths and even adults to follow their parents in forest depending activities that does not need a particular qualification and is easy to start.

The soil in the area is not fertile enough to provide good yields. The fertility increases with altitude. People are obliged to make farms deep in the forest and in altitude. The forests are destroyed mostly because the forest soil is rich in nutriments. The new farms created inside primary forest can provide good yields for two or three years. After this time, they abandoned the farm and created a new one. The creation of the THWS will inevitably reduce drastically the proportion of available land for farming. Combined with the population's growth and the poverty in the area, it will bring some tensions and conflicts with local peoples that can foster encroachment and illegal activities inside the new created protected areas as it is the case in the majority of other protected areas around the country.

In addition the local populations living around the THWS don't know and therefore don't practice farming in sustainable way. The soil is naturally poor and there is no incorporation of soils fertilizers. The improved seeds and seedlings that increase agricultural yields without increasing the size of the farms are not available. And even when it is available, the quantity is not sufficient. We encountered in Bangang a seed nursery to provide improved seedling of palm trees to local populations established by one NGO mostly focused on development achievement without a particular attention to wildlife conservation. The two aspects should be entwined to increase the chances to successfully mix the conservation and local development. Another thing is that the improved seeds promise a long time ago by ERuDeF, who is the main NGO exercising for the wildlife conservation in the area where not available when we left the field. Just like the bee hives promises to some villagers in Bangang and not yet delivered. This situation reinforces the criticism against ERuDeF and therefore the project of the CRG preservation in the area.

Because local populations think they are despoil from their ancestral land at the profit of the animals as nobody among the farmers agree with the conservation project, it can create social conflict with on one side the wildlife staff and conservation NGO such as ERuDeF and on the other side the local population. In this context, some alternative source of income project can be boycott making unsuccessful these initiatives. No mean should be spare to facilitate and encourage the involvements of local populations. The creation of a protected area does not guarantee the total protection of wildlife and more generally natural resources. **Ngandjui and Blanc (2001)** [5] show that the Dja reserve, one of the most important protected areas in Cameroon is seriously threaten by poaching, illegal hunting and farming activities inside. Now the reserve is more threaten by the construction of a hydroelectric dam.

The forest in the area seems to be an open access resource where everybody can act as he wants. The forest management committee that is supposed to be the regulator is ineffective,



inactive and mostly unknown. 81.42% of the farmers admitted they don't know the forest management committee of their village, and only 18.57% answer positively. The situation is not very different with the hunters/trappers where 55.55% know its existence, and 44.44% don't know the institution. Concerning the utility of the forest management committee, only 22.22% of the hunters think the committee is useful to them and the others do not have an opinion about it. A situation that is more drastic with the farmers with none of the farmers interviewed grants the forest management committee with any utility. 67.14% of the respondents said they don't have any opinion mainly and any idea of the role of the forest management committee 25.71 % answer the committee is useless. The most amazing was that 17.14% of the farmers were members of the forest management committee. It means that even those who are members of the committee don't grant any credibility and importance to the committee even though they are members. Furthermore, one of our translator and guide during the data collection was the president of the forest management committee of one village. Even his presence doesn't change the mind of people. The situation is very complicated in this time where the tendency is the Community Based Natural Resources Management encouraged by many international NGO such as IUCN [11]. There are many examples of CBNRM (Community Based Natural Resources Management) success as those presented by **Lepper and Schroenn Goebel (2010)** [6]. The non involvement of local people in the process of wildlife conservation and sustainable management of their resources is expressed by their lack of enthusiasm vis-à-vis forest management committee. The populations living around the THWS need a serious help in their organization to help implement a real and solid approach to be involved in the process to conserve the CRG.

There cannot be a serious and viable conservation plan for the CRG if the local populations are not involved. A study by **Nawir and Santoso (2005)** [7] shows that one important way to gain the participation of local populations is to establish a mutually benefit partnership. The study shows that among thing that complicated the partnership we have the lack of mechanisms to build trust; challenges to commercial viability of projects due to inadequate management planning and consequently poor implementation because projects are planned far from the populations without their participation; inadequate assessment of community needs and resulting waste of funds when developing income generating packages, etc.... Even if the study was not oriented in a conservation point of view, it can easily be transposed to our study area. Because Cross River gorillas inhabit a region that is a biodiversity hotspot, in which there is high species richness combined with very high levels of endemism, measures that conserve the gorillas' habitat will protect many other range restricted and endangered species (**Oates and al, 2007**) [8].

## Conclusion

Results of survey in the area suggest that even with the high rate of deforestation in the area, considerable potential gorilla habitat remains within the range of the Cross River gorilla and each gorilla locality is at least tenuously connected by forest (**Bergl and Vigilant, 2006**) [4]. The situation should encourage the implementation of conservation strategies for the survival of the CRG in all its range and particularly in the THWS. The need for development of local population should also be take into account to ensure a long term survival of projects

implemented, and local populations should also be involved both in the conservation and the development processes.

Great apes habitats are rich in biodiversity and crucial to maintain the ecological security and a support to local populations and native adjacent communities' lives (food, fuel, medicine). If they are well managed, these ecosystems mainly forested can offer enormous advantages both for communities depending, the great apes and the rest of the wild fauna (**Anonymous, 2012a**) [9]. Moreover, the perceptions of most indigenous people toward the long-term objectives of conservation as a threat for their activities and in consequence their survival are one of the main reasons why they are not willing to support conservation. The conservationists efforts is not yet sufficient to capture their attention and fill the existing gap between indigenous people views and conservation views. In reality, the participative management of protected areas is indicated. It constitutes the kind of management that permit to different stakeholders implicate in the nature protection to share functions, rights and responsibilities of the management of a territory or a range of resources benefiting of particular state of protection (**Grazia, 1997**) [10].

The farming activities represent a serious threat for the long term survival of the CRG, and if the creation of the THWS is the miracle solution, it is a very important step for the conservation of the CRG. But it represent a new beginning in the conservation process and need to be handle with care to avoid the situation faced by the Santchou Wildlife Sanctuary.

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