

What do humans eat when forests disappear?

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Summary

To study the evolution of the alimentary bolus in relation with the loss of forest cover in the Congo Basin, we conducted semi-structured surveys on the composition, origin and amount spent to prepare meals in three study sites with a contrasted forest cover gradient. At global level, the cost price of meals increases as the forest cover decreases. The share of the alimentary bolus in relation with the use of natural resources such as hunting, fishing and harvesting drops to the benefit of proteins from livestock and agricultural commodities. This leads to a translocation of the demand but also pressures on other anthropized ecosystems. The effects of deforestation are subsequently felt at local level but also in neighboring areas.

Introduction

Even though forests in the Congo Basin are part of the best preserved areas in the world (Sanderson *et al.*, 2002), the expansion of agriculture, the development of infrastructure, roads, cities and mining as well as forest logging lead to a loss in forest cover (Geist and Lambin, 2002). Even though the environmental impacts of deforestation have been well documented, few studies have been conducted on the effects of deforestation on human populations (Feintrenie *et al.*, 2015). In the context of this study, we attempted to ascertain whether the evolution of the forest cover could have an impact on the composition of the alimentary bolus as well as on the amount spent on meals in Central Africa during one of the production seasons.

Materials and Method

Over a period of 15 to 21 days during the dry season, we conducted semi-structured surveys on the composition of main meals as well as their origin and the amount spent to obtain the products, in continuous neighborhoods in 3 study sites located in Gabon and Cameroon. Thus, these surveys are representative of the dry season but do not

extend the results obtained to all the production seasons. Our three study sites were selected along a deforestation gradient. Located in the north-east of Gabon, the first study site is characterized by a very low population density (1.6 inhabitants/km²) and a forest cover hardly disturbed by human activities, with the closed forest representing 94.13% of the village communal territory. The scarce human presence as well as the high forest cover ratio makes it the reference site for this study. Income-generating activities are mainly geared towards the exploitation of natural resources. They include hunting, fishing, harvesting Non Wood Forest Products (NWFPs) as well as shifting agriculture. Located in the Eastern province of Cameroon, the second site has a 6.3 inhabitants/km² population density. There, the forest cover represents 85.51% of the village communal territory and is subjected to degradation through agricultural activities but also because of a local logging company. However, the lawful logging activities conducted by this company hardly destroys the forest cover. Rather, its presence has generated a massive inflow of labor that led to high work force migration towards that forest zone. Village incomes are then partly related to the use of natural resources but especially to salaries, considerably increasing their purchasing power. The third site is located north of Yaoundé - the capital city of Cameroon - in a densely populated region (71 inhabitants/km²). Income generating activities are essentially related to agriculture. Only 37.02% of the village communal territory is covered by a secondary forest.

Results

Table 1 provides the average amount actually spent to feed a person in each study site. We did not consider the cost related to collection of resources by the consumer. The first site presents the lowest amount and this result is related to a village production system strongly based on the use of natural resources and low in relative value even though Gabon has a high cost of living. The second site presents the highest amount related to a high purchasing power taken from incomes generated by the logging company. In the third site, the scarcity of game and fish, as compared to the first site, compels the population to buy animal proteins, resulting in an increase of the cost price of meals.

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Table 1. Summary of the number of meals studied, the number of persons fed and the amount spent per head and per day in the three study sites

	Site 1	Site 2	Site 3
Number of meals surveyed	1,254	1,666	1,034
Number of people fed	8,970	8,971	4,933
Average amount spent per person and per day in CFAF (standard deviation)	115.97 (104.85)	184.1 (177.79)	148.94 (83.1)
Equivalent in dollars	0.20	0.31	0.25

In Figure 1, we summarized the amount spent to acquire the main items making up meals and the amount saved by the family production system which could be fishing, hunting, livestock production, gathering or farming.

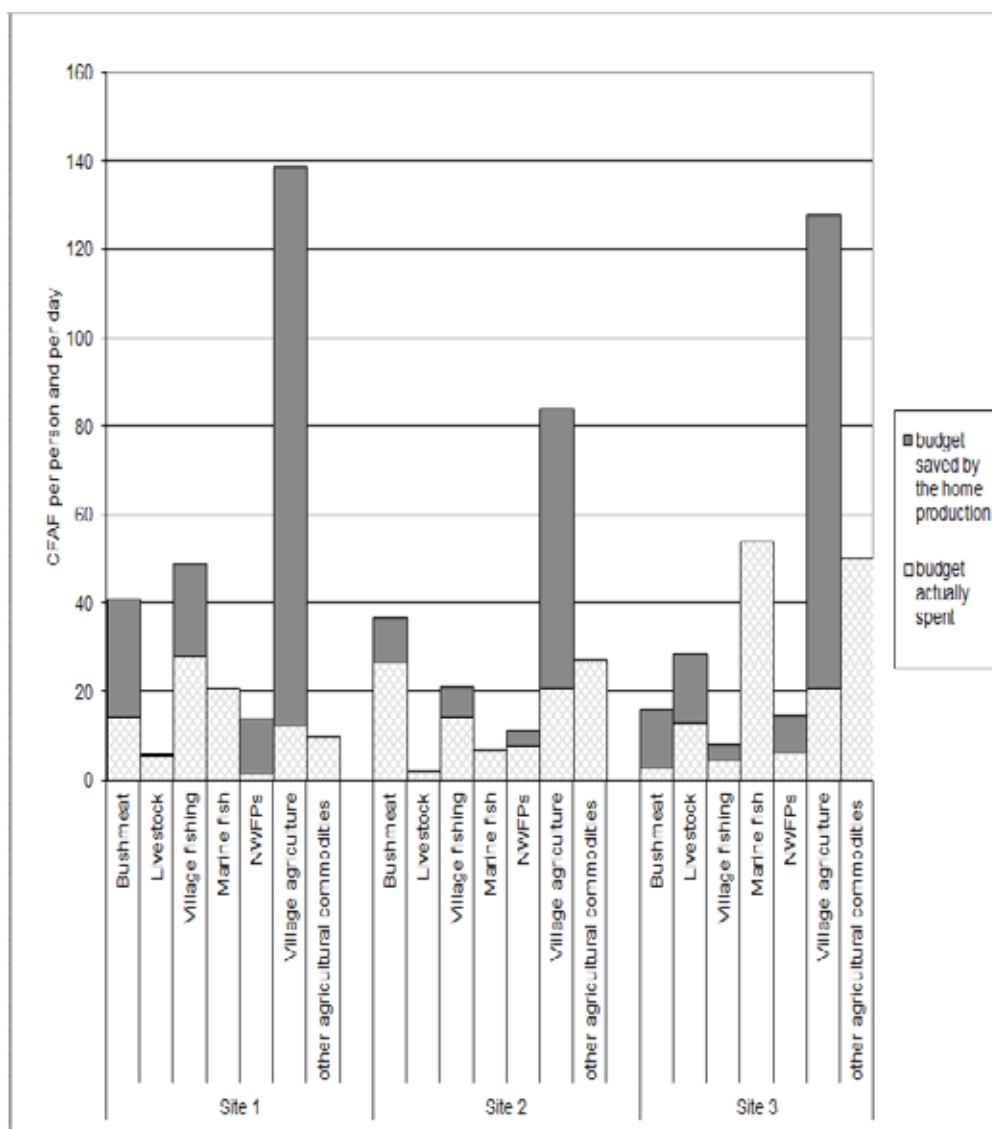


Figure 1. Distribution of budget actually spent or saved by the home production of meals components in the three study sites (CFAF per person and per day)

This figure shows that bushmeat is mostly consumed in the first study site. In addition to the protein intake, the sale of part of this venison to other village households brings in a significant cash income. It should be noted that the customary hunting of non-protected animals as well as the sale of venison to local communities are allowed by the Gabonese and Cameroonian laws. In the second site, despite a more degraded forest cover, the salaries paid by the logging company lead to a high increase of the purchasing power and the possibility for villagers to obtain bushmeat. The distance between the village and the hunting sites then considerably increases. Mostly hunters and the minority tribes (Baka pygmies) are the ones that consume part of the catches. In the third study site, bushmeat has almost disappeared from the alimentary bolus and hunting, an activity still practiced mostly by men, is mainly carried out through traps set on the edge of farms that occasionally catch very small preys. The protein gap is compensated consuming livestock. The same trend is observed for fishing in the three sites. The consumption of non wood forest products is quite low in the three sites (this could also be related to the season during which the study was conducted). These products are mainly collected by the communities, except in the second site, probably because of their high purchasing power. Agricultural foodstuffs are essentially produced in the village in the three sites. The other agricultural commodities bought are rice, pasta or processed tomatoes. These products are rarely consumed in the first site, contrary to the third site.

Discussion

The loss of forest cover leads to a decrease in the diversity of forest products available such as game, fish or Non Wood Forest Products. This decline is reflected in the composition of the alimentary bolus. In the sites currently degraded, salaries for the exploitation of natural resources (generated through the logging company in this case) results in an increase of the purchasing power for the local population. The demand for products from the use of natural resources highly increases despite their declining abundance. The distance to be covered to acquire these products then considerably increases and some villagers specialize in

one of these activities (hunting, fishing or gathering). These increasingly extractive activities exacerbate the effect of deforestation and result in highly anthropized ecosystems of which most of the goods and services generally associated with closed forests have disappeared. When the population enjoys a significant purchasing power, the products are imported from other producing regions, leading to a translocation of the demand, and pressures on the other anthropized ecosystems. The effects of deforestation are then felt locally but also in the neighboring regions. In order to restrict the impact of deforestation on the alimentary bolus directly correlated to the health of village communities, it is important to propose alternatives to the use of natural resources through the establishment of livestock production and the domestication of plants producing food traditionally consumed by the populations.

Conclusion

The loss of forest cover has a strong impact on the availability of proteins in the alimentary bolus. These are gradually being replaced with livestock and canned fish. We should expect, in all the zones subjected to deforestation pressure, a transfer of protein needs towards external sources of proteins, automatically leading to a translocation of the demand and pressures to other anthropized ecosystems. Thus, deforestation has not only local consequences, but also affects other regions, near and far. Deforestation is accompanied by a profound mutation of socio-ecosystems, namely production systems and modes of consumption. The study of the alimentary bolus has proved to be a strong indicator of such mutation.

References

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