Scaling-up Community Participatory Mapping and Land Use Planning to reinforce customary land governance for multi-stakeholder engagement on sustainable investments and trade on land in Southwest Cameroon.

Communities and integrated natural resource management

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ABSTRACT

Background and context

With the decentralization processes underway in most countries of the Congo Basin, community involvement in decision-making is becoming an imperative, particularly with regard to land and resource management (Beatty, M.T. et al. (1978). To ensure that this involvement results in a clear and sustained expression of community needs, it is important to think of an integrated, free and committed approach to communities in order to promote a dialogue between land management actors (Joe Watts, 1994).

Goal and objectives

The main goal is to enhance community involvement in the management of lands and natural resources for informed decision making on sustainable investments and trade. The specific objectives are to firstly depict the importance and approaches to conducting community participatory mapping and land use planning and secondly to showcase community's use of mapping and planning approaches to sustainably manage natural resources and protect their cultural values, effectively negotiate large scale investments, and make decisions on their lands and resources.

Methodology

Thus, through participatory mapping of community customary land use and tenure, a facilitating accompaniment to local land-use planning is made on the basis of an assessment of socio-spatial data. It is a cross-sectional analysis of land use data, agricultural-climatic-ecological factors and future needs that allows the establishment of scenarios based on development objectives through the use of participatory diagnostic tools (problem tree, venn diagram).

Results

The result shows that participatory planning is an approach dedicated to the sustainable management of resources by local communities. With the diversification of land uses due to the presence of large projects, traditional modes or visions of sustainable land management need to be maintained. The land tenure of the Upper Balong clan in the commune of Nguti is occupied by 65% of land allocations that conflict with the activities of local people. These land allocations do not integrate the local vision of land use with the changes in land use, the needs of the people for local development and those of future populations. There is a risk of land shortages for the conservation of cultural values and communities risk losing their potential biodiversity (NTFPs). The uses proposed in the scenarios for reorienting the allocation of resources beneficial to communities take into account regional and sectoral strategies for harmonization with national development needs.

Key words:

participatory mapping, participatory planning, dialogue, land tenure, sustainable management

1. INTRODUCTION

Local land-use planning is an indispensable support to the process of land and resource planning and management at both regional and national levels. Land use based on specific action plans drawn up in a participatory manner remains the ideal in an inclusive development process. In the absence of suitable tools to guide integrated governance, it is up to communities to set up the framework needed to coordinate the decision-making process affecting their land. In Cameroon, land use planning is carried out at different scales: macro (country or regional), meso (department or arrondissement) and micro (village/community), (Nguiffo, 2005). Depending on the planning scale, several factors are taken into account, such as mechanisms to ensure the participation of all stakeholders, the establishment of planning objectives by all parties, and a political will to promote participation and the consideration of everyone's interests.

In view of this organization, implementation remains critical. The only document in place is the regional zoning, which does not provide a framework for local visions and remains superficial for resolving land-use problems in community customary land. The parties, especially those of the communities, as regard to the age of land-use documents in Cameroon in general, communities need to inform decision-making about actions and land needs in their respective customary land Experience has shown that overlaps between state and community uses are mainly due to a lack of information on the sites that the state is seeking to use. With over 98% of customary land unregistered, it is therefore necessary for communities to present their space requirements through participatory land-use planning, so that these can be taken into account in the allocation of space for resource exploitation on a regional scale.

2. METHODOLOGY OF THE STUDY

2.1. The study area

The Nguti Council covers a large area, as the Upper Balong clan is one of 9 clans and accounts for almost 20% of the territory. This clan is 80% occupied by forestry allocations (the Nkwende Hills forest reserve, the Nguti communal forest, community forests, SGSOC oil palm plantations and one of FMU 11007). In fact, it represents the crux of the problem of shrinking space for communities' subsistence activities, and is threatened by various migrations due to the creation of the agro-industrial plantation. The Balong, from the Upper Balong clan (figure 1), are descendants of Ngoe. They settled in Mwekan in the western part of Mount Manengouba. As the population grew, it became necessary to expand into new areas to avoid internal conflicts over land and resources. As a result, hunting areas were gradually extended, leading to the displacement of some members from their original settlements (PNDP Nguti, 2009 and 2017). The Balong are the children of Kaahngoe, whose son "ELONGE" or "ELONG" opted to seek out new lands. While some of them settled in Manyemen, (Upper Balong), others moved south to Malende, Muyuka and both sides of the Mungo

River. History leads us to an understanding of community tenure and proposals for appropriate solutions (See Figure 1.).
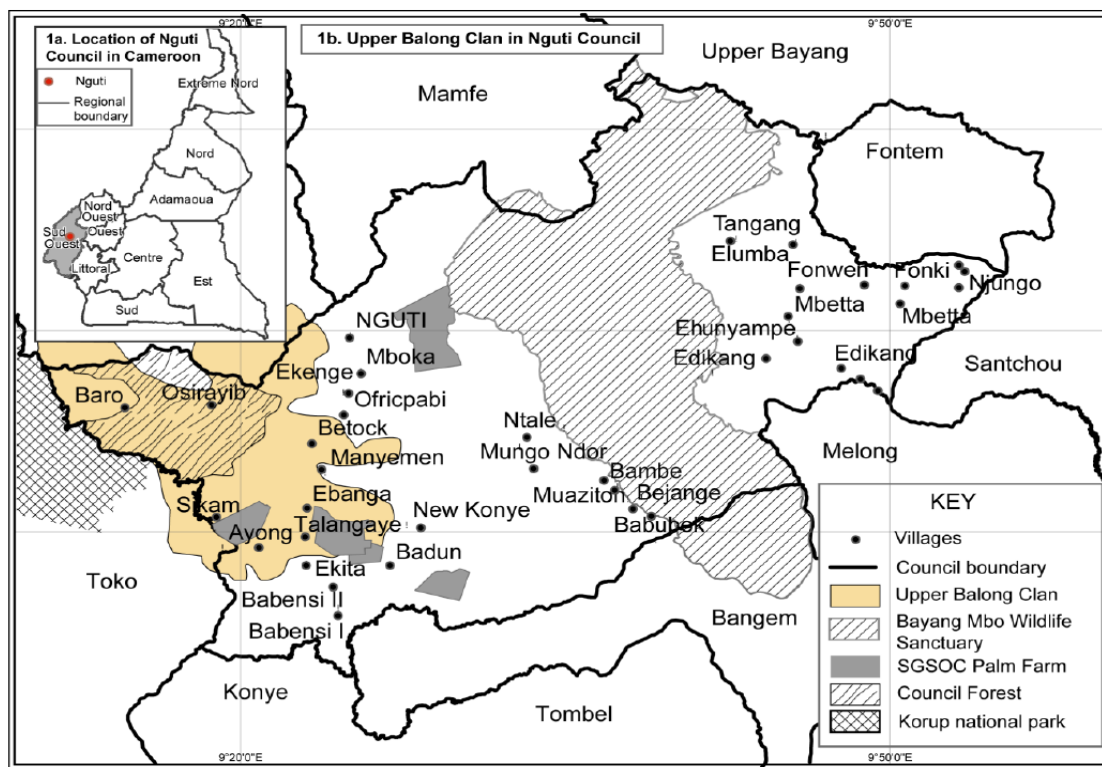

Fig 1: Location of study area

2.2 Methodology

2.2.1. Data collection participatory mapping and landuse planning

Participatory land-use planning involves taking into account socio-economic, environmental, ecological and spatial data on the uses and resources available on community land tenures. It begins with the elaboration of participatory maps based on FPIC (free, prior and informed consent). This is followed by the collection of data on local land management patterns, analysis of land use, socio-economic conditions and the impact of land allocations on local land tenure (Corker I., (1983)).

2.2.2. Methods for the implementation of the study

The method used here is based on MARP (Gueye B.,1 et al, 1991) accompanied by FPIC, which enables stakeholders to engage in a beneficial and integrated process. It involves data collection on the basis of specific questionnaires, data compilation (Lindgren D.T., (1985)), collected with the team of local facilitators, dissemination of information on the land-use planning process in the community (Diaw, C. et al 2001), restitution of the whole process to their communities and outside elites, participation in data analysis, production of scenarios, production and validation of land-use maps and restitution for validation in the communities during the workshop.

Informing and raising awareness in Upper Balong communities

The stakeholder consultation process in the clan's 7 villages (Ebanga, Betock, Talangaye, Sikam, Ayong, Baro and Osirayip) involves information meetings with chiefs or representatives to discuss planning issues, obtain FPIC and unfold the process. It's a time for discussion, awareness-raising and planning.

Raising community awareness, a means of integrating them into the process.

Community mobilization is a crucial stage in the UPWP. Once the community representatives have been informed, at least a month beforehand, the next step is to bring together the members of each community to raise awareness and obtain their support for the activities (FPIC). This mobilization was carried out by the various chiefs despite several timid and difficult meetings in certain communities such as Sikam, Betock and Ebanga. Awareness-raising meetings were held on various dates, and covered the concept of land-use planning, the stages of the methodology, data collection tools and the establishment of criteria for choosing community planners, such as availability, physical effort, level of education, knowledge of the village, being a volunteer and being in good health.

Overall, members must at least be able to read and write, be physically fit and have a good basic education. This community-designated principle responds to their environment, because in a context such as that of the Bakas in eastern and southern Cameroon, it would be difficult to find candidates meeting these criteria.

Training Community Planners

The aim of training Community Planners is to provide selected community members with the tools and arrangements for data collection. Among the elements of the training we have: the objectives of the training, the advantages of the PPUT, the stages, the role of community planners in the exercise, the types of data to be collected, the data collection tools (questionnaires, GPS and measuring tapes), the data collection process, household data collection and the use of the GPS tablet for household data collection. The training itself is divided into two phases: theoretical and practical.

Data collection and compilation in preparation for the planning workshop

The socio-economic and spatial data collected were validated with the community planners. Household information gathered through participatory observations, interviews and questionnaires was compiled using Microsoft Excel for each village and statistical data for each village for use in the planning workshop was analyzed (fig 2).

Photos Ndjounguep, October 2016

Fig 2. Data collection session by community planners

Data collection in the communities was based on household surveys (100%), interviews (5), focus group discussions (2) and the use of existing participatory mapping. The interviews enabled us to understand the history and social organization of each community. The latter enables us to understand the local land management system.
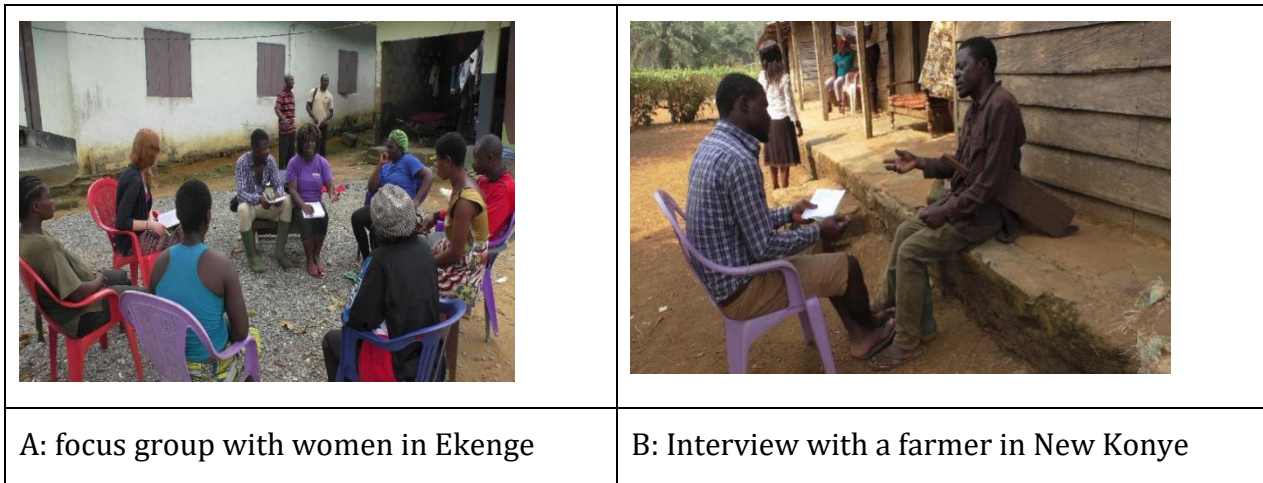

| A: focus group with women in Ekenge | B: Interview with a farmer in New Konye |

Fig 3: Focus group and interview with Upper Balong communities

3. RESULTS

Much more than participatory mapping, land-use planning is an inclusive process of informing decision-making on how local communities plan to use customary land in the future. The results of this process in the Upper Balong clan integrate the process contained in Cameroon's decentralization law.

3.1. Participatory identification of community concerns related to land management on their territory

3.1.1 Traditional clan organization and impact on resource management

The clan comprises eight communities (Ayong, Baro, Betock, Ebanga, Osirayib, Sikam, Talange and Manyemen[1]). The traditional organization of the Upper Balong clan is undefined and conflictual. Each community is governed by its own traditional system, headed by a chief and notables. The notables are grouped around an association called the Upper Balong Cultural and Development Association (UBACUDA), which plays a rallying role and promotes development. This structure will provide local support for the implementation of the local land-use plan resulting from the PPUT, as well as for the management of land-use conflicts between communities.

3.1.2 Conflict management in the Upper Balong clan : what place for local governance ?

Conflicts between natives and foreigners are handled by the traditional council, and if both parties are not convinced, the matter is referred to the Nguti administration. Each clan community has the same land management procedure. Each family has its own portion of land, acquired by inheritance. All land is controlled by the chief and the traditional council. Theoretically, the acquisition of land by a native within the community's lands requires information from the chief and his traditional council. Any able-bodied person can own land as long as they have the strength to "open the forest".

3.1.3. Determining the upper Balong clan problem tree

Participatory land-use planning, a process whereby communities work together to gather relevant information on the use and management of their land and make proposals to help decision-makers include them in the decision-making process. The reasons for community-led land-use planning are to provide the government with accurate information on how they use their land, to help the government allocate land without risk of conflict, to prevent and resolve future conflicts, and to enable Upper Balong communities to dialogue with decision-makers.

This is because the state allocates land from community tenure to other uses without their consent. These land allocations result in the loss of livelihood assets such as NTFPs, agricultural plots and usage rights. For this reason, the communities believe that the state should take community planning into account in land use plans; the government and NGOs should regularly monitor logging operations and promote economically viable reforestation. Open discussions with stakeholders should be carried out by companies prior to land acquisition. As Table 1 shows, there are a range of issues that have prompted the Upper Balong communities to start planning land uses.

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[1] Planning was done with 7 communities because one had not given its FPIC (Manyemen).

1. Land use	2. Social	3. Infrastructure
- Lack of improved agricultural techniques ; - Low crop production ; - Land acquisition without concern for stakeholders and illegal logging; - Corporate land grabbing; - Private sale of large plots of land; - Ignorance of good farming practices; - Reduction in agricultural production ; - The State leases land without current statistics on land use; - The rampant deforestation carried out by the logging company poses risks to the environment; - The use of community land under concession results in the loss of NTFPs and an increase in the level of financial problems. - Low production	- Lack of drinking water; - Lack of quality personnel and teaching staff; - Lack of higher institutions ; - No medical facilities in most villages; - School without furniture ; - Few or no teachers in a school.	- No maintenance of the farm road and market ; - Lack of road ; - Lack of electricity; - The vegetation cover of most communities is degraded.

Table 1: Problems encountered by Upper Balong communities

In the context of land use planning in the Upper-Balong clan, the main problem in the face of shrinking farmland and local land tenure remains poor agricultural practice, leading to low household incomes, famine and possibly loss of life. These problems are further exacerbated by the physical environment, which reduces accessibility.

3.1.4 Physical environment and local planning methods

Data on the physical environment helps in land-use planning. As farming is the activity that occupies the communities of Upper Balong, the planning emphasis is on agriculture. Planning orientations will emphasize the role of climate, relief, hydrography and soil on agriculture.

The soil consists of a comparatively thin layer of material covering the underlying rock, on which plants grow. It varies from a few centimeters to more than a metre. It is an essential component in land planning.

Manshar's 1996 studies show a dominance of kaolisol-type soils under fine-grained deep sapolite (60%) and acid red soils under old basalt (40%). The use of soil data in land planning enables agricultural activities to be directed towards favorable zones, in order to limit the expansion of fields in search of productivity. In this case, it's best to use the land suitability map, which shows favorable agricultural products by zone. This can increase farmers' yields, but it can also create huge conflicts if families find themselves on land that is not suitable for their farming activities. These data on the physical environment are combined with those on the socio-economic environment to understand the strategic orientations to be implemented.

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3.1.5 Analysis of socio-economic data and participatory land-use planning

Analysis of the socio-economic data collected within the clan has enabled us to understand infrastructure planning orientations in terms of priorities and the size of the space to be allocated. As each community has its own specificities, community needs must be assessed on the basis of the availability of this data.

There are 522 households with 3,175 people, i.e. 1,634 men and 1,551 women. The male population is greater than the female population. This is an indicator of the amount of dense forest that can be converted to agriculture in the clan in the future, as commercial agriculture is one of the biggest land users. Figure 4 shows the population distribution by community.
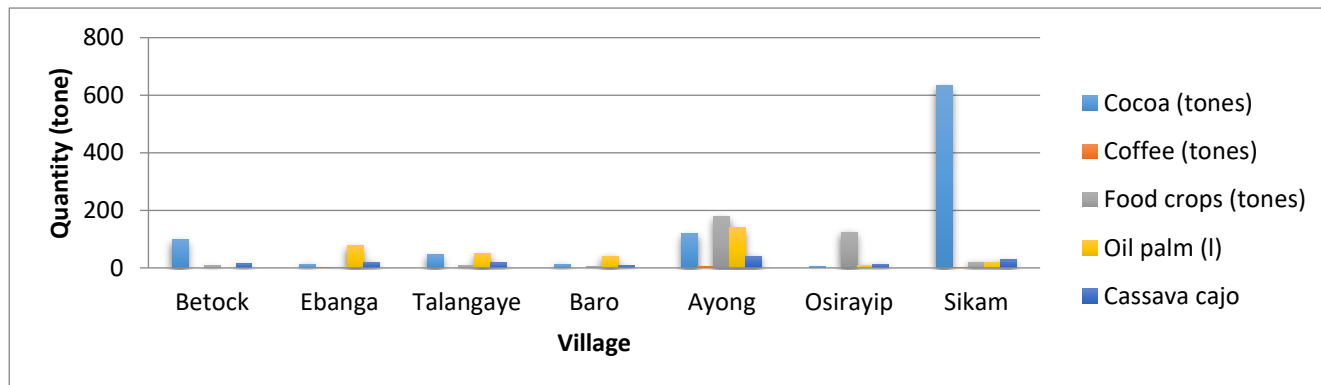

Fig 4: Distribution of agricultural speculations by village

Overall, cocoa remains the most widespread agricultural commodity, followed by food crops and oil palm. The former occupies more and more forest space, while the latter serves as a source of nutrition for the population.
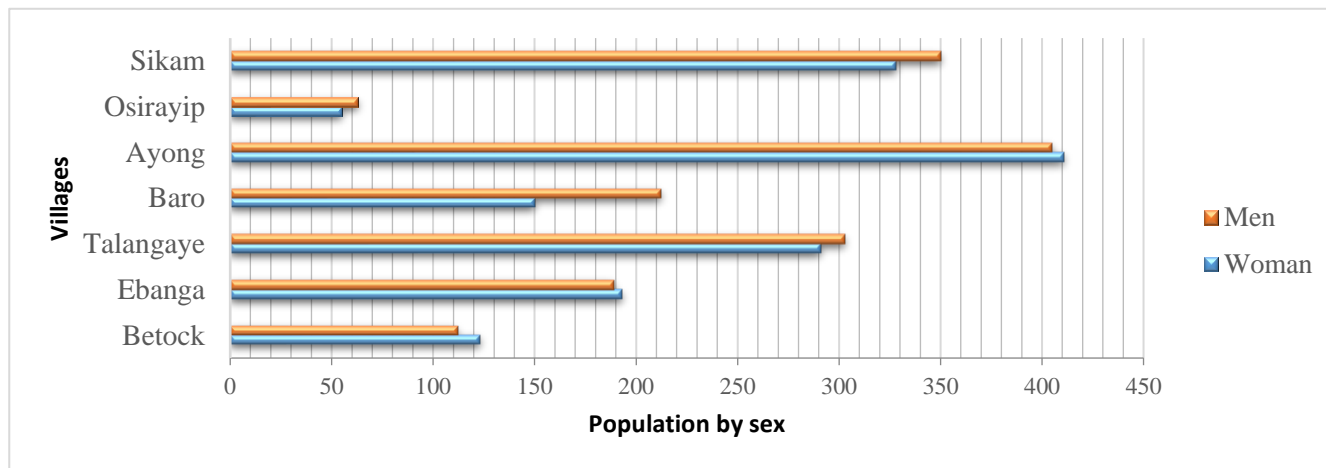

Figure 5: Population distribution by gender

Coffee is increasingly neglected due to its low market price. In Upper Balong, women outnumber men in these communities (figure 4).

There are more and more men in the clan. In the Ayong, Ebanga and Betock communities, women slightly outnumber men, while in the rest, men occupy first place. All this has an impact on agricultural production.

3.1.6. Agricultural production in the communities

Farming is the most important activity in these communities. Overall yields depend on existing farming techniques. It is noted that the communities use extensive techniques, with rudimentary tools and bush fires.

3.1.6.1 High yields from agricultural activities centred on cocoa and food products

There are three main agricultural products in the clan. Cocoa comes first, followed by food crops and palm oil. Communities spend more energy on cash crops. Food crops are relegated to second place, yet experience shows that they contribute to daily nutrition and are economically more profitable than cash crops, which depend on external processing and sales . Figure 5 shows the production rate and cost of agricultural products.
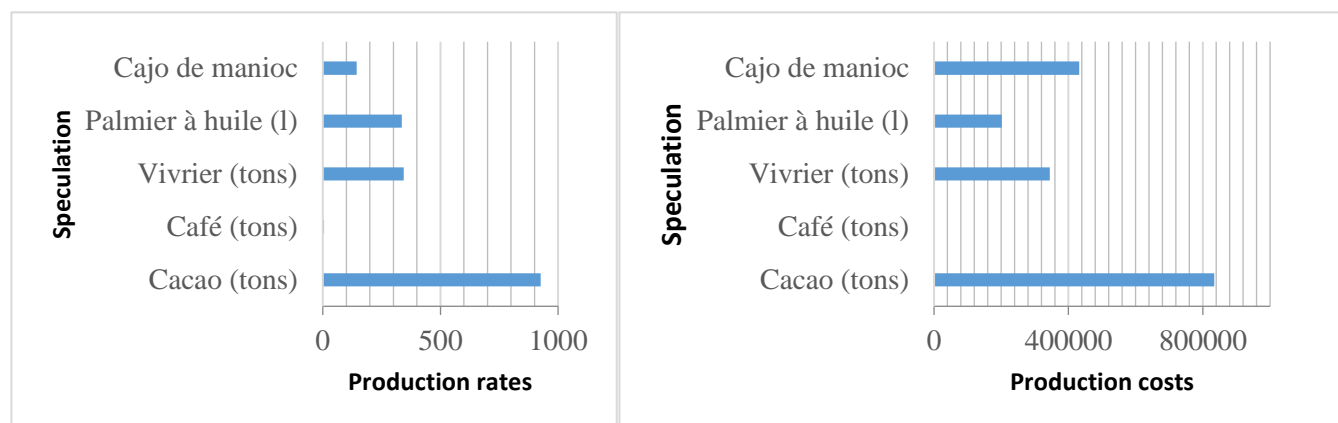

Figure 6: Agricultural products and marketing costs in the communities

Rewarded cocoa production is high compared with food crops. However, the cost ratio of cash crops approaches that of food crops. The proof is that the latter are more profitable than the former. In planning, it is necessary to understand why the economic take-off is slow. In fact, communities claim to receive temporary and individual capacity-building in cultivation techniques. It is necessary to boost the level of understanding and practice of agriculture in all communities. In recent years, the fall in cocoa prices has led to "acute poverty" in the communities, as expenditure on inputs and labour is increasingly high and exceeds expected profits (Beatty, M.T. et all 1978). Food crops and oil palm remain the preferred source of food, after hunting and gathering.

The communities consume mainly food products and palm oil. Efforts must be made in this area if they are to escape poverty. Cash crops contribute to their enslavement due to the lack of adequate techniques. Some are turning more and more to oil palm cultivation, with the arrival of the SGSOC agro-industry to facilitate processing. Over time, farmers will be overrun by small-scale oil palm growers, who consume a lot of space (figure 7).

Cocoa occupies more space than other crops in all communities. Food crops, increasingly threatened by oil palm, take second place. Yet it is food crops that are the mainstay of our diet. They are always on our markets and never lack for customers. The surface areas used for farming activities are on

average small, and with the rudimentary means used, production cannot meet household needs. Household production is boosted by the diversified output of small-scale producers.
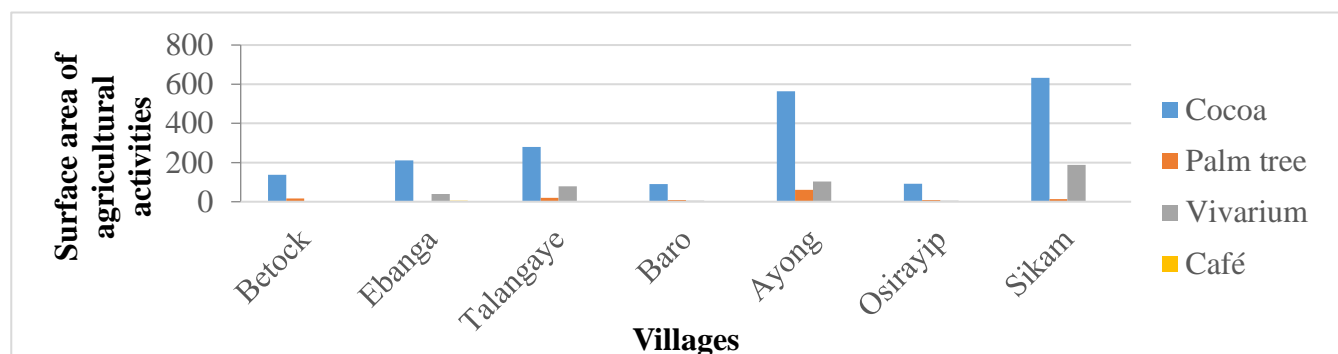

Figure 7: Area occupied by agricultural activities

3.1.6.2 An increasing number of smallholders engaged in semi-plantation agriculture in the Upper Balong clan

Existing smallholders in the clan cannot be excluded from land planning. They occupy large areas that can sometimes cover the activity zones of up to 20 households (figure 7).
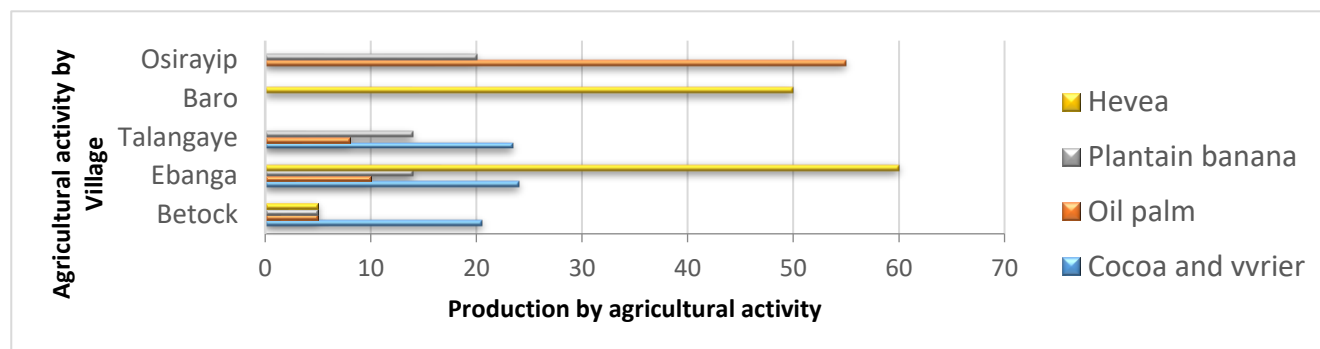

Figure 8: Farming activities of smallholders

In the Upper Balong clan, smallholders are more concentrated in Ebanga, Baro and Osirayib and grow oil palm, plantain banana and rubber. They have acquired the land through communities who claim to promote the development of their localities. However, they have a cordial relationship with the communities, and use 40% local labor and local techniques (table 2).

Village	number of employees	Technique used	Relationship	Possible extension	Means of acquisition
Betock	23	local	Fine	Possible	The leader, individuals, community
Ebanga	7	local	Fine	No	Individuals
Talangaye	14	local	80% good, 20% conflict	Possible	Community and individuals
Baro	7	local	Fine	No	Community
Osirayip	24	local	Fine	30%	Community

Table 2: Farming techniques and relations between smallholders and communities

On the whole, the relationship the communities had hoped for with smallholders, who were to contribute to economic development, seems to be taking shape. While the latter use local labor, they increasingly complain that the latter are lazy and prefer to import labor, generally from the North-West. Instead, they built temporary "bush houses" for workers to stay on the plantations. Crops are not marketed locally. As a result, their activities do not contribute to community development. It is vital to take these forms of land occupation into account in local development.

3.1.6.3 Unequal farming practices between households

In the Upper Balong clan communities, all households grow cocoa, with almost 60% concentrated in the Sikam, Ayong and Talangaye communities. Other activities, such as oil palm cultivation, are emerging, while food crops are in retreat (figure 8).
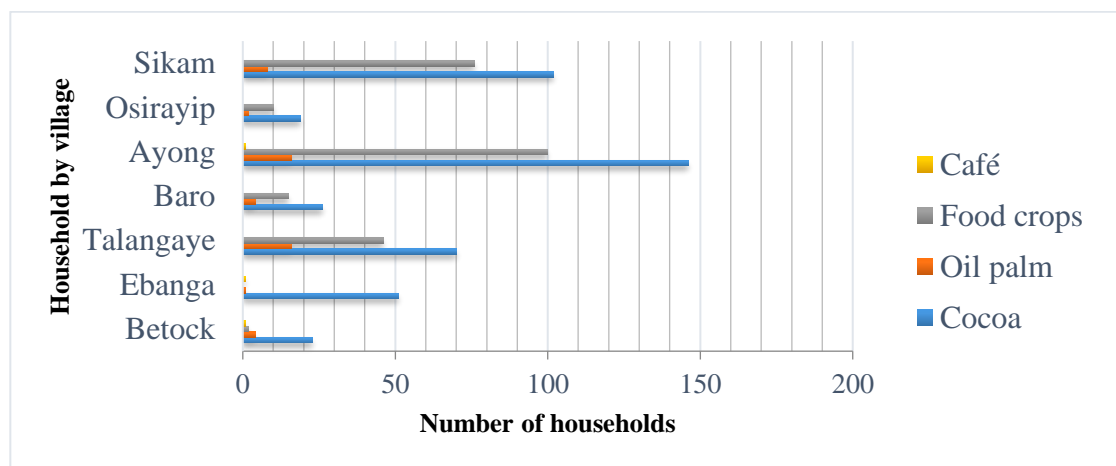

Fig 8. 1Number of households by activity

More than ever, cocoa farming is the main occupation of households. It is always followed by food crops, which shows the importance households attach to these two crop categories. The more the population grows, the further away from the household the agricultural extension areas are.

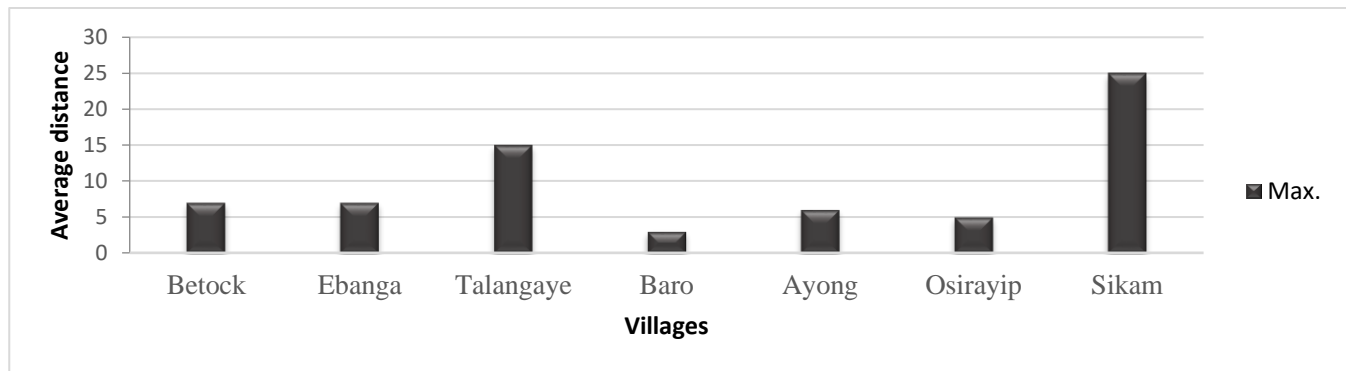Unequal distances and means of transport between communities for agricultural activities

Fig 9: Average distance travelled for subsistence activities

The distances used by households to reach the location of their farming activities have evolved over time. They have gone from an average radius of 2 km around the community in 2000 to over 20 km today. This depends on factors such as population change, the extent and increase in state forest allocations, and poor farming practices. Figure 85 shows the distances covered by the community in the Upper Balong clan (figure 9).

Households travel a long distance to Sikam (25 km), followed by Talangaye (15 km), Betock (7 km), Ebanga (7 km), Ayong (6 km), Osirayib (5 km) and Baro (3 km). In the case of the former, it can be seen from the surface area of their territory that they engage in farming activities beyond their tenure. Nevertheless, they travel long distances to farm. If the distances travelled are getting longer and longer, it's because of the scarcity of land for cultivation around the village. This problem is compounded by the means of transport used: 90% of households go to the fields on foot, 9% by motorcycle and 1% by car (table 3). This has an impact on agricultural production and its impact on community development.

	Betock	Ebanga	Talangaye	Baro	Ayong	Osirayip	Sikam
Motorcycle	6	9	44	3	88	1	15
On foot	28	51	91	45	140	30	175
4*4 car	1	1	1	0	1	0	0
Truck	0	0	0	0	40	0	0

Table 3: Means of transport used in Upper Balong

Means of transport are derisory and do not allow for efficient farming activities. As a result, the means of expansion and production are reduced.

The participatory distance map determines the distance traveled by clan households to access subsistence activities and socio-economic infrastructure. It is a tool for taking into account a community's needs in any infrastructure project.

The distance map identifies services and activity zones, each with its own average distance from the household dwelling to the location of these services and activity zones. The distances have been drawn in a straight line, but reflect the local situation. They reflect the average distance used by each community to access basic services and socio-educational infrastructure.

3.1.7 Land use in the Upper Balong clan dominated by state land allocations

Land use data show that the clan has a surface area of 40,988.02 ha, divided into the different land use classes: mountain vegetation, dense forest, secondary forest, habitat, agricultural zone and water (figure 10).
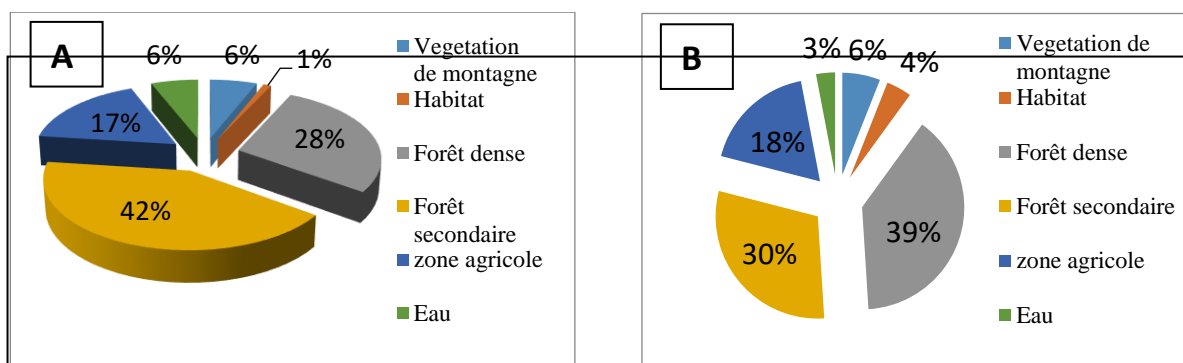

Figure 10: Land cover of the area occupied by concessions (A) and communities (B) in Upper Balong

This figure shows the land use of the part of the clan occupied by forest concessions or allocations and that occupied by communities. These data were obtained by processing the 2015 Landsat 8 image using true-color compositing and object-oriented classification (figure 10).
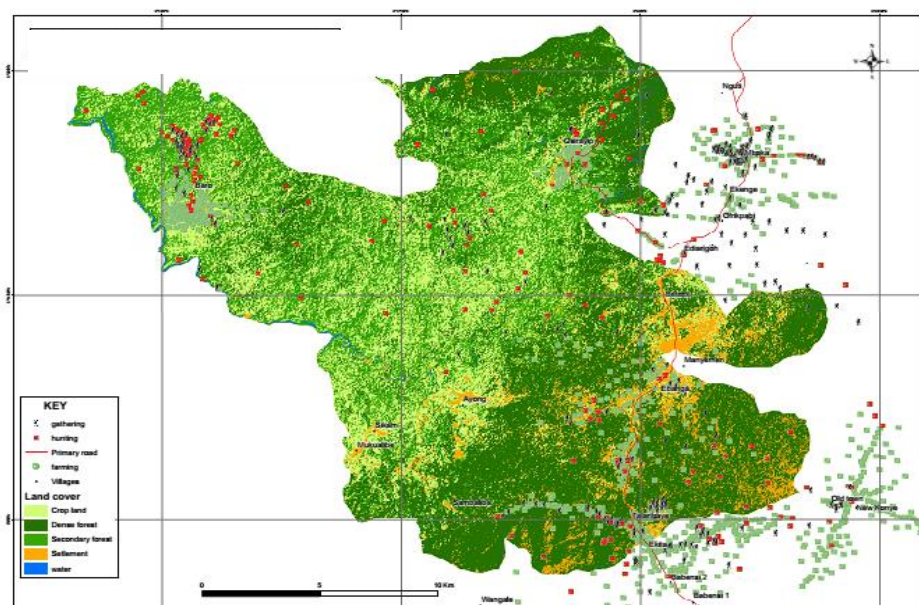

Figure 11: Land use and subsistence activities in Upper Balong

Analysis of this land use gives us an idea of how much land is already in use, and where it is located. This allows us to construct an initial situation on which to base new land allocations designed to solve the problems of each community and clan.

In this way, land-use statistics were used to describe the planning hypotheses, highlighting the initial situation and scenarios, and the choice of situation desired by the communities.

3.2. IMPLEMENTATION OF LAND-USE PLANNING WITH UPPER BALONG CLAN COMMUNITIES

This stage involves the organization of a discussion workshop, the identification of development objective orientations and the implementation of the land use plan.

Land-use planning is a participatory activity that enables forest communities to inform the state or other private actors about planned local uses of the non-permanent forest estate. In the Upper Balong clan, it began after data had been compiled in the 7 communities that had taken part in participatory mapping activities. The basic planning data we prepared were added to the household data to guide the communities in their planning objectives. So, the objective of the support for participatory land-use planning is to organize, equip and set up a committee to monitor and evaluate the use of space and resources. It also involves the production and validation of land-use maps for each community and clan.

3.2.1 Identifying specific planning guidelines

The hypothesis used for land planning defines the community's needs in the event of changes in current and future land use. It orients communities on the options they want for the socio-economic take-off of their terroir. The assumptions made with the Upper Balong clan stemmed from the observation that the clan was suffering from land grabbing and land allocations that had shrunk the land resource available for agricultural activities, the source of their income. So, as Malthus said, when it comes to the evolution of the world's population and resources, we have to deal with population growth. The latter, marked by the mass arrival of small-scale producers and other migrants, is diminishing resources and undermining local development. What is the future for the generations of a people who live essentially from agriculture? The ideas developed to help the communities of the Upper Balong clan plan the use of available land and resources are based on these observations:

1: Clan land is a static resource; it cannot be increased, yet the population is evolving and so are land requirements. It is therefore necessary to adapt current needs to available resources in order to avoid conflicts of use. How can planning help solve the clan's problems?

2: Given the current situation of state land allocations (VC, FC, FCom, SGSOC) on the Upper Balong clan's traditional tenure, which already covers almost half of the tenure, how can communities plan land use if 10% of the remaining land is again allocated to other state uses?

3: If the clan's overall problem is the scarcity of land for agriculture, and the State has taken the plea into account by responding favorably and deciding to declassify 10% of the land area on its forest allocations for the benefit of the communities, what uses will the communities make of this land so that their needs are met?

3.2.2 The concept of population growth at the heart of participatory land-use planning

To help stakeholders better understand these findings, an analysis of the evolution of their clan's population was established statistically after a brief understanding of the concept of land-use planning, based on the current national growth rate of 2.6% per year in Cameroon (figure 11).
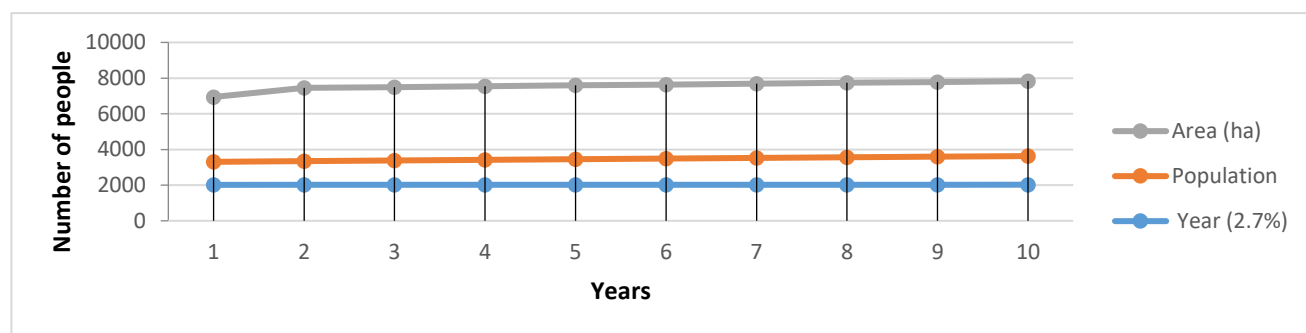

Figure 12: Population trends in the Upper Balong clan (2016-2025)

At local level, this figure varies from community to community, depending on their culture. Calculations with the population showed that the population of Upper Balong will increase from 1289 in 2016 to 1602 by 2025. The PC members were given an idea of the UPWP, the process, the objectives and its importance at a workshop held for this purpose (Plate 2).
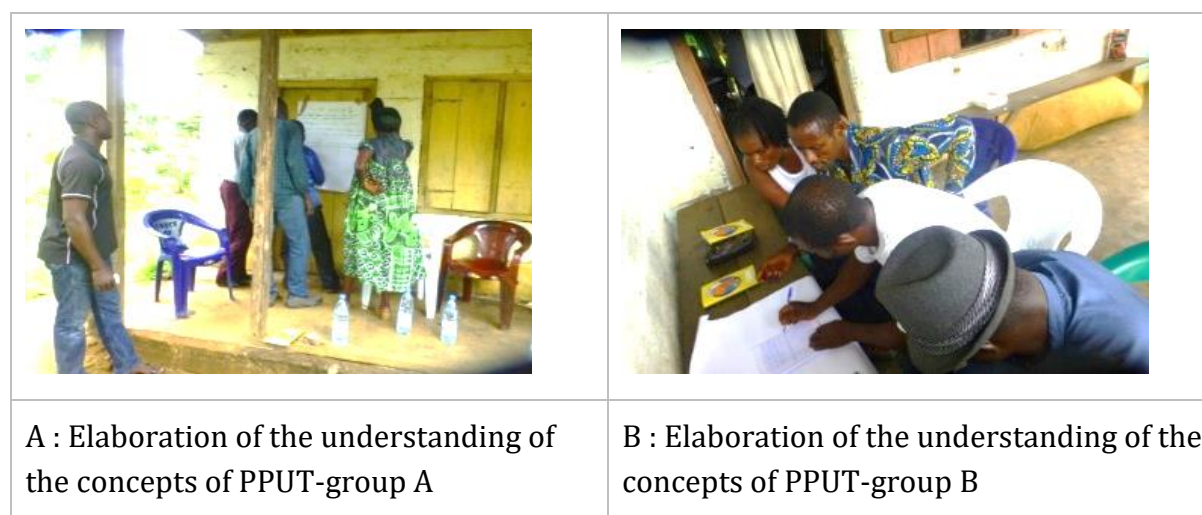

A : Elaboration of the understanding of the concepts of PPUT-group A	B : Elaboration of the understanding of the concepts of PPUT-group B

Fig.13: Land Use Planning Working Group

The plate shows the process of group activities. After developing an understanding of the LUPP concepts in groups (A and B), the PC members presented their ideas in plenary (C) so that the

facilitator (D) could provide feedback and guidance according to the clan's objectives and problems. This was done during a workshop in the Ebanga community.

After presenting the findings on possible forms of resource management, we explained the steps to be taken to implement the plan according to each finding. A grid of the initial situation was presented, showing the result of the clan's current land use. The methodology of this initial situation was presented for better understanding. The initial situation, presented on a grid of 100 cells, is the result of supervised processing of the 2015 landsat image (figure 83), so the value of a cell is equal to the clan's area divided by 100. A cell represents 1% of the clan's total area, and the clan's land use classes have been distributed on the grid (plate 3).

The planning process was organized in the Ebanga community and involved the members of the TUPP committee chosen by community. These members, made up of three people per community, included the chief, a man. The aim was to review the community land-use planning process.

3.2.3. Drawing up a planning grid based on identified findings

The planning grid is a form of land representation in grid form. It is guided by land use statistics derived from the analysis of satellite images and participatory maps. Indeed, after these analyses, we obtained the area of each type of land use, which has a proportion in the total area. Thus, the proportion of 1% represents 1% of 100% of the total area. The grid shows 100 cells representing 100% of the clan's area. These cells are cross-hatched according to the proportion of each land use type in the initial situation, and the same exercise is repeated in a participatory way with the statistics of the situations desired and imposed on the communities.

Following the presentation of these land allocation methodologies, we obtained the allocation grid for the initial situation, which represented the first scenario from which scenarios two and three were developed (figures 13 and 14).
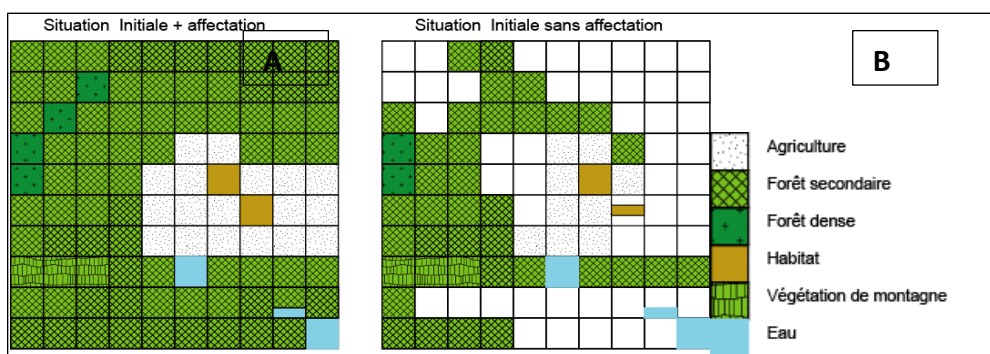

Figure 13 Initial situation grid land use

This initial situation of land use by the grid presents the situation of land use on clan tenure with state land allocations (a) and the other without state land allocations (b). It should be noted that the community has no right to plan a use on a space already planned by the state or other private actor.

It can only include them in the final planning map to show both the uses planned by the communities and those of other actors. This is why both situations are presented so that the communities can better understand how to elaborate scenarios 2 and 3 (figure 14).
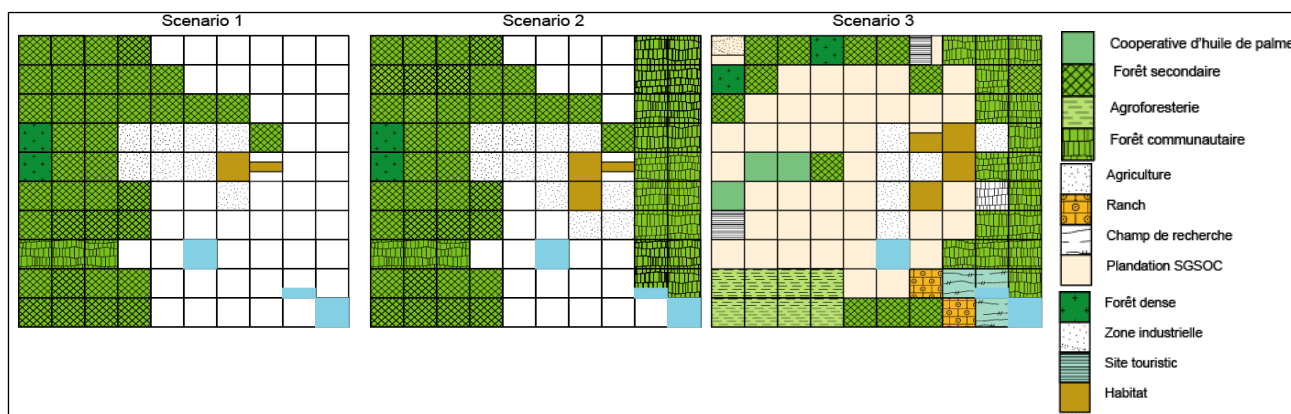

Figure 14: Land use planning grid

The representations of scenarios 2 and 3 show the changes in use from the initial situation. Following these changes, the communities were asked to choose the situation that would best address their concerns and contribute to their development. This led to the choice of scenario 2, which gives the clan the priority of counting on 10% more secure land.

The planning carried out using the grids made it possible to spatialize the allocations on the map according to the desired size. This spatialization was based on development projects designed to achieve sustainable development. These projects included modernization of the agricultural system, industrialization of agriculture, multiplication of income sources and promotion of culture and tourism. A summary of the spatialized land use projects is given in Table 4.

	Village	Micro zoning
1		- They want to extend their farmland to the limit of SGSOC's plantations.
		- The existing community forest will be strengthened by agroforestry and small-scale agriculture.
	Ebanga	- A forest reserve for future investors
		- Developing the secondary agricultural sector
		- Agricultural extension area
2	Ayong and Talangaye	development of tourist sites, promote forestry, set up community fish ponds, start exploring the mining area, promote cultural sites, setting up a community plantation, promoting agroforestry, modernize the market and make it attractive set up land reserves for the next generation, extension of agricultural land, implementation of strict land management rules
3	Baro	infrastructure development (school, community hut, forestry post), Land reserved for the next generation, Extension of agricultural land, make palm and rubber fields operational to secure jobs, safeguard the communal forest for future use, use the post-mining portion of FMU 11006 as a community field
4	Betock and Osirayib	- the extension of agriculture within the village, planning land for agroforestry
		- set up a community palm field produced to supply SGSOC, Infrastructure (community hall, proposed university),
5	Sikam	- Community fish pond, Land reserved for the next generation, Extension of agricultural land

Table 4: Result of the desired land use plan es by communities

All these land-use projects have been drawn up with the aim of finding solutions to the problems experienced by each community in the clan, since each community has its own specific characteristics. These projects can serve as basic documents for the communal development plan drawn up by the communes for the communities every 5 years.

For the purposes of data flexibility and use in updating the land-use map, we spatialized the data on the community maps and then aggregated the data from each to obtain the expected land use at clan level.

3.2.4 Cartographic data and participatory community land-use planning

The land-use plan maps for the Upper Balong communities are the result of micro-zoning carried out according to the planning grids decided by the communities, while taking existing issues into account. We presented the example of the Talangaye community's desired land-use map and that of the clan to show how we went from community to community to arrive at the clan scale.

The Talangaye community had to plan on the space of their traditional tenure, taking into account state forest allocations (UFA11007 and Vente de coupe) and the SGSOC plantation. The same exercise was carried out by the other six communities of the Upper Balong clan. This method made it possible to reduce conflicts with communities that were already showing early signs of knowing

who was going to use which sites for their projects. These maps were accompanied by statistics by land-use type and implementation strategies.

3.2.4.1 Planning at clan level

The entities used for micro-zoning were identified by representative members of each community. Each of these entities occupies a portion of the study clan's territory. Using cartographic data, we obtained a representation of these entities by area (Table 5).

Planning	Area (ha)	Percentage (%)
Agroforestry	764	2,21
Community forest	1 193	3,45
Community planting	6 000	17,33
Increasing fields	12 959	37,44
Cultural site	979	2,83
Fishing point	226	0,65
Industrial site	382	1,10
Infrastructure	156	0,45
Land reserves for investors	820	2,37
Ranch	90	0,26
Search site	387	1,12
Reserve land for the community	4 317	12,47
Residential areas	2 287	6,61
Tourist site	520	1,50
State-occupied zone	3 534	10,21
Total	34 614	100

Source: Adapted from Upper Balong Community Planning Plan, Oct. 2016.

Table 5: Zone area by allocation

Communities were most interested in expanding agriculture (37.44%), setting up community plantations (17.33%) and reserving land for communities. We note the concern for securing rights and modernizing agricultural production, as well as the advent of new sources of income such as fishing, tourism and agro-industry. Infrastructure and housing have also been modernized.

Figure 15 is a summary of the land use projects spatialized by the Upper Balong clan. This map presents the land allocations desired by communities and those planned by the State and other private players. It will enable the topographic maps used for land allocation by the various ministerial departments to be updated, protect usage rights and contribute to the sustainable development of communities. But this must first be respected at local level through a local monitoring plan and local resource management. All this has benefited from capacity-building for the PCs, leading to the implementation of the local strategy plan and action plans.
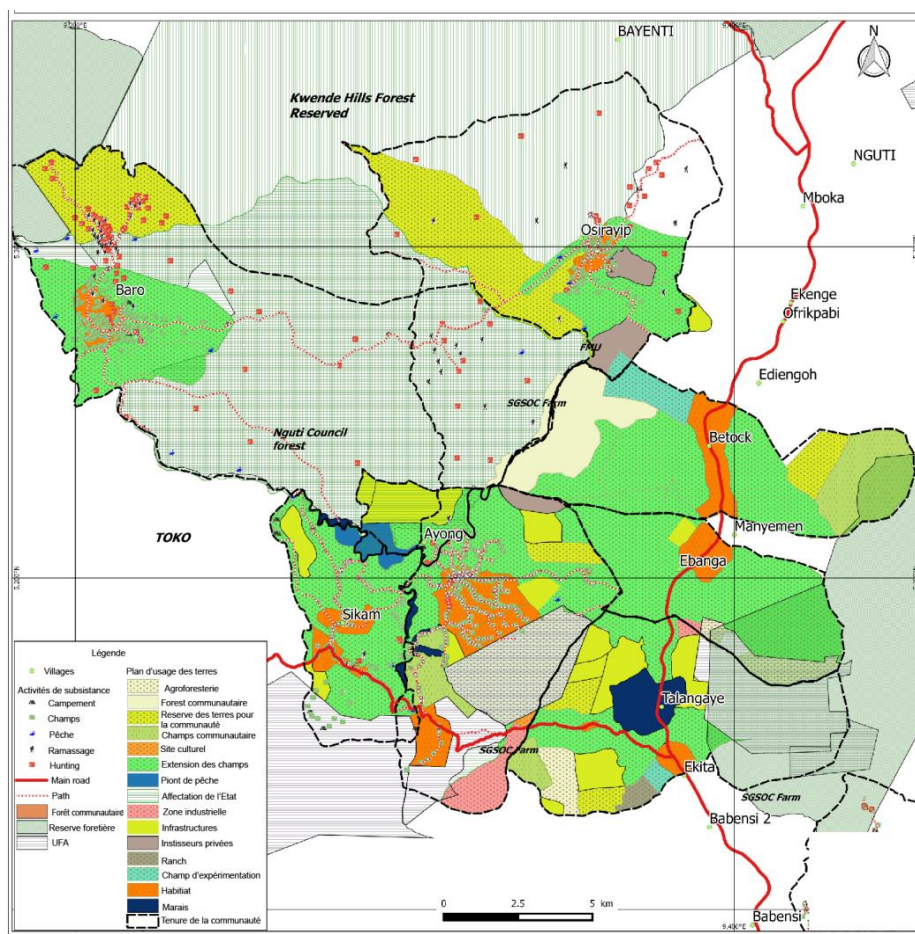
Figure 15: General planning for Upper Balong clan communities

4. CONCLUSION

Local land-use planning aims to inform and sensitize beneficiaries in order to obtain their FPIC. It is a necessary document for advocacy by communities to guide changes in land use on their tenure. It is a means of preventing land-use conflicts and contributing to poverty reduction, as well as providing an exhaustive overview of community concerns over a given geographical area. It is presented as a "Socratic maieutic", during which the aspirations and fears of communities are catalogued.

To achieve these objectives, the planning activities of the Upper balong clan communities in Nguti were inspired by the major orientations contained in the SDGs, Vision 2035, the DSCE in Cameroon as well as the various sectoral policies and strategies. On this basis, the planning carried out in Nguti did not include a plan for resource mobilization, activity programming, implementation and monitoring/evaluation, as shown in the PPUT diagram. A plan remains important, but its implementation, although not solely dependent on the government, is subject to numerous financial, management and monitoring bottlenecks. Local capacities in this area remain limited.

The methodology used requires a significant investment of time and resources. It also requires expertise and motivated communities. The problems posed by land use in Upper Balong were raised and possible solutions presented by the community land use planning committee. In addition to the problem, a distance map was drawn up to give the actual distance covered to accomplish their various activities. Demographic and socio-economic data show that the active population is around 80%. Land use planning in Upper Balong is likely to affect land use in the South West Region, given the increasing demographic pressure on land. This is likely to have a negative impact on the territory's agricultural productivity and could lead to further land-use changes: encroachment on classified forests, food insecurity and land-related conflicts. This LUPP approach is considered successful in its aim to provide a framework for land-use planning acceptable to all stakeholders, including communities. It integrates multiple stakeholders and is based on local data.

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8. REFERENCES

Beatty, M.T., Peterson G.W. & Swindale, L.D., eds. (1978). Planning the uses and management of land. Agronomy 21. Am. Soc. Agronomy 21. Am. Soc. Argon, Madison, USA. 1028 pages.

BUCREP, (2005). 3rd general population census in Cameroon.

Chambers R., (2006). Participatory cartography and geographic information systems: who owns the maps? Who comes out stronger, who comes out weaker? Who wins and who loses? The Electronic Journal on Information Systems in Developing Countries (EJISDC), pp. 1-14.

Corker I., (1983). Land use planning handbook, Tanzania, Land Resources Development Centre, Overseas Development Administration, Surbiton, UK. 178 p.

Diaw, C., OyonoP.R., Robiglio, R., (2001). Les dimensions sociales du classement et de l'aménagement des unités forestières de gestion. Theoretical lessons on the approach and experience of the Dimako "Forêts & Terroirs" Project. Unpublished report, CIFOR, p.53.

Forest Atlas of Cameroon (2017). World Resources Institutes.

Gemma H., and Mathijs L. (2009). la gouvernance foncière comme un moyen de renforcement de l'État au niveau local dans l'Est de la RDC, IS Academy Occasional Paper, 49 p.

Gueye B., Schoonmaker Freudenberger K., (1991) Introduction à la méthode accélérée de recherche participative: rapid rural appraisal, quelques notes pour appuyer une formation pratique, London, IITD.

Hache, É., (2012). Political ecology: cosmos, communities, environments. Paris. Éditions Amsterdam p47-52.

Hirt I., (2012). Mapping Dreams/Dreaming Maps: Bridging Indigenous and Western Geographical Knowledge, Cartographica: The International Journal for Geographic Information and Geovisualization, PP. 105-120.

Jardinet S., (2006). Capacity development and PGIS for land demarcation: innovations from Nicaragua. Participatory Learning and Action, 54: 67-73.

Landon, (1991), Booker tropical soil manual. Longman, Harlow, UK. 474 p.

Lindgren D.T., (1985). Land use planning and remote sensing. Part II. Remote sensing input to GIS. Nijhoff, London. 176 p.

MINFOF (2016). Article 18 du décret 1995/531 fixant les modalités d'application du régime des forêts http://www.minfof-psfe.com/ressources/doc9_doc473.pdf 02/5/2016.

Mollett J.A., (1984). Planning for agricultural development. Croom Helm, London. 384 p.

National Research Council, (1976). Systems analysis and operations research; a tool for policy and program planning for developing countries. United States National Academy of Sciences, Washington. 98 p.

Ngoumou H., (2005). Étude empirique de la fiscalité forestière décentralisée au Cameroun: un levier de développement local?, DEA dissertation, Ecole Nationale du Génie Rural, des Eaux et des Forêts, Montpellier, France, 94 p.

Nguiffo S., (1998). La perception de la forêt et conflits au Sud Cameroun, in The Congo Bassin-human and natural resources. IUCN, 85p.

Nguiffo. S, (2005) Loi, transparence, responsabilité et droits des citoyens dans les forêts camerounaises, in la transparence, la gouvernance et la loi; Étude de cas du secteur forestier en Afrique Centrale. 57 p.

Ostrom, E. (1990). Governing the Commons. The Evolution of Institutions for Collective Action. Cambridge University Press, p122.

Pearce, D.W, & Turner, R.K., (1990). Economics of natural resources and the environment.Johns Hopkins University Press, Baltimore, USA. 373 p.

Peter M., (2009). Rights Conflicts and Community Mapping in Cameroon, World Agroforestry Centre and Rights and Resources Initiative.

PNDP, (2009). Communal Development Plan (CDP), Nguti Council.

Project reports on forest mapping and governance in the Nguti district (2017).

Van H., Gemma & Heijke M., (2013). Conflict, governance and institutional multiplicity: Parallel governance in Kosovo and Chiapas, Mexico. In: D.J.M.Hilhorst (ed.), Disaster, Conflict and Society in Crises; Everyday politics of crisis response. London / New York: Routledge, p43.

http://www.minfof-psfe.com/ressources/doc9_doc473.pdf 02/5/2022.

9. KEY TERMS AND DEFINITIONS

Community Participatory mapping: is a map-making process that attempts to make visible the association between land and local communities by using the commonly understood and recognized language of cartography in association with the community members.

Land Use planning: is a method of analyzing land use patterns with the help of remote sensing technology like LiDAR and radar with the direct involvement of the communities and other stakeholders.

Community Dialogue: an interactive participatory communication process of sharing information on mapping and planning realized between people or groups of people aimed at reaching a common understanding and workable solution.

Community land tenure: a situation in which a group holds secure and exclusive collective rights to own, manage and/or use land and natural resources, referred to as common pool resources, including agricultural lands, grazing lands, forests, trees, fisheries, wetlands or irrigation waters.