Community Engagement in Protected Area Conservation and Livelihood Outcomes in the Dja Forest Reserve, Cameroon

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DOI: https://dx.doi.org/10.47772/IJRISS.2024.802095

Received: 19 January 2024; Accepted: 30 January 2024; Published: 14 March 2024

ABSTRACT

For several decades, perspectives on community engagement in protected area conservation has gained traction in scientific and policy circles especially in Sub Saharan Africa (SSA). Yet, qualitative analysis of the livelihood outcomes of community engagement around pristine protected areas account for only a very negligible part of the literature. To bridge this qualitative knowledge gap, this paper using the Dja Landscape to (i) explore the dimensions of community engagement, mirrored through the interventions of community based organisations, and 2) analyses the pattern of change in livelihood capitals for 4 communities in the Dja landscape. Data was generated through focus group discussion FGD (n=5) and interviews (n=32). The directed content analysis revealed the following:

Key words: community, protected area, assets, CIGs, conservation,

INTRODUCTION

Community engagement in protected area conservation has gained traction in policy and scientific circles particularly in Sub Saharan Africa (SSA), but the contribution of these engagements to livelihoods is still yet to be fully explored. In SSA, community engagements in such pristine environments are seen through conservation efforts in protected areas with development agencies. Conservationist have used a strict nature protection model, which evolved in the latter half of the 19th century applying restrictive top-down mandates with little to no input solicited from affected communities (Dovers et al. 2015, Infield and Tolisano, 2019). Different management models, which span through precolonial, colonial, and postcolonial periods have been applied in the sub-region (Ongolo et al., 2021; Nuesiri 2022). National parks and other protected areas using paramilitary policing became a mainstream strategy during the last century. This was the case for gazetted protected areas like Serengeti and Selous in Tanzania, Tsavo and Amboseli in Kenya in East Africa (Infield and Tolisano, 2019), the Korup, Waza, Campo and the Dja in Cameroon (Kimengsi et al., 2019, Ongolo et al., 2021). Conservation authorities and different nations in Sub-Saharan are developing programs with different strategies engaging communities in protected area conservation improving institutional capacities with a range of evolving interventions to link community livelihoods improvement and conservation.

Sub-Saharan Africa plays host to the Congo basin forest, the second largest forest ecosystem in the world with Cameroon holding the second largest share of this forest (Kimengsi et al., 2023). In its bid for conservation of forest and wildlife resources, several protected areas have been created across the country with different management models introduced over time with different outcomes. Cameroon has created over 37 protected areas wildlife reserves, national parks, and forest reserves have been created (MINFOF and WRI, 2020; Forje and Tchamba, 2022). Despite the many approaches tried since the 1980s, integrated

conservation centred around protected areas remains the model favoured by national policies and strategies (Busquet, 2006; Clarke, 2019) with the goal of reconciling conservation and development (Brooks et al., 2013).

Kimengsi et al.,(2019); Walters et al. (2021) and Manu et al. (2022) note that a myriad of international conservation agencies over the years have partnered with the Cameroon government and local NGOs to facilitate the conservation agenda in protected areas. Their activities have shaped protected area activities especially those related to community engagements vis-a-vis their livelihoods and conservation. This is the case of the International Union for Conservation and Nature (IUCN), the African Wildlife Foundation (AWF) the World Wide Fund for Nature (WWF), Birdlife International, and the German Development Agency (GIZ), and in different protected areas in Cameroon (Kimengsi et al, 2023). Cameroon's national conservation programs like other developing countries still favour the creation of protected area as a method of biodiversity conservation (Clarke, 2019). The problem has been the eviction of indigenous forest peoples from their lands or preventing them from accessing their resources (Watio and Nlom, 2020) without assurance on what to substitute for. This scenario made resource users predatory in nature and in conflict with conservation agencies with different sub-optimal outcomes. This therefore necessitated inclusion of indigenes powered with the Rio 1992 resolutions for more inclusive approaches with conservation agencies using different approaches. How community engagements make use of assets around their environments for livelihood improvements is a big question. Creation of CIGs by conservation agencies came in as one of such approaches. The creation of Common Initiative Groups with efficient participation and involvement of locals helps to boost productivity (Nyanchi and Olive, 2019).

Different forms and strategies of community engagements and motivations are adopted in protected area management (Dovers et al., 2015). The model of green business and cooperative formation was adopted in the Bakossi National Park and the Campo Ma'an National Park by the World Wild Fund (WWF) in Cameroon (Kimengsi et al., 2019). Community forestry was adopted in the Kilum-Ijim forest project (KIFP) by Birdlife international scaling-down outside intervention to mobilizing considerable energies of communities (Gardner, 2019). While these different approaches produce diverse results, the African Wildlife Foundation (AWF) adopted the model of Common Initiative Groups (CIGs) across the Dja forest reserve landscape. Objective 2 of Cameroon's forestry policy adopted in 1993 is to improve people's participation in the conservation and management of forest resources to enable these resources to help raise their standard of living. Nevertheless, gaps exist for instance, protected areas/forest reserves-managed hunting territories as conservation mechanisms. This was evident for Baka indigenous peoples and initial failure in conservation efforts. With the model of CIGs and participation by local communities in Dja forest reserve landscape, we therefore sought to:1) Explores community engagement, mirrored through the interventions of community based organisations (CBOs), and

ANALYTIC FRAMEWORK

Sustainable livelihood framework

Livelihood comprises of capabilities, assets and activities required for a means of living (DFID, 2000). It is also regarded as activities, assets and the access that jointly determine the living gained by an individual or household (Ellis, 2010). This study therefore embraces the sustainable livelihood framework to view assets and livelihoods through community engagements in the conservation scheme in the Dja landscape. Livelihood is viewed as capabilities, assets (stores, resources, claims and access) and activities required for a means of living (Chambers and Conway, 1992). In essence, livelihoods are considered to be sustainable when it can cope with and recover from stress and shocks and maintaining or enhance its capabilities and assets, both now and in the future without undermining the natural resource base (Ashley and Carney, 2010). The sustainable livelihood presents five capital assets which are; human capital, physical capital,

social capital, financial capital and natural capital. These assets are summarized as such:

- Natural (Environmental) capital: Natural resources (land, forest, water, wildlife, biodiversity, environmental resources).
- Physical capital: Basic infrastructure (water, sanitation, energy, transport, communication), housing and the means and equipment of production
- Human capital: Health, Knowledge, skills, information, ability to labour.
- Social capital: Social resources (relationships of trust, membership of groups, networks, access to wider institutions).
- Financial capital: financial resources available (regular remittances or pensions, savings, supplies of credit)

Capital assets identified in the Dja landscape, are notably natural, social, financial and human assets. Community engagement through common initiative groups-CIGs and alternative livelihoods to achieve wildlife conservation.

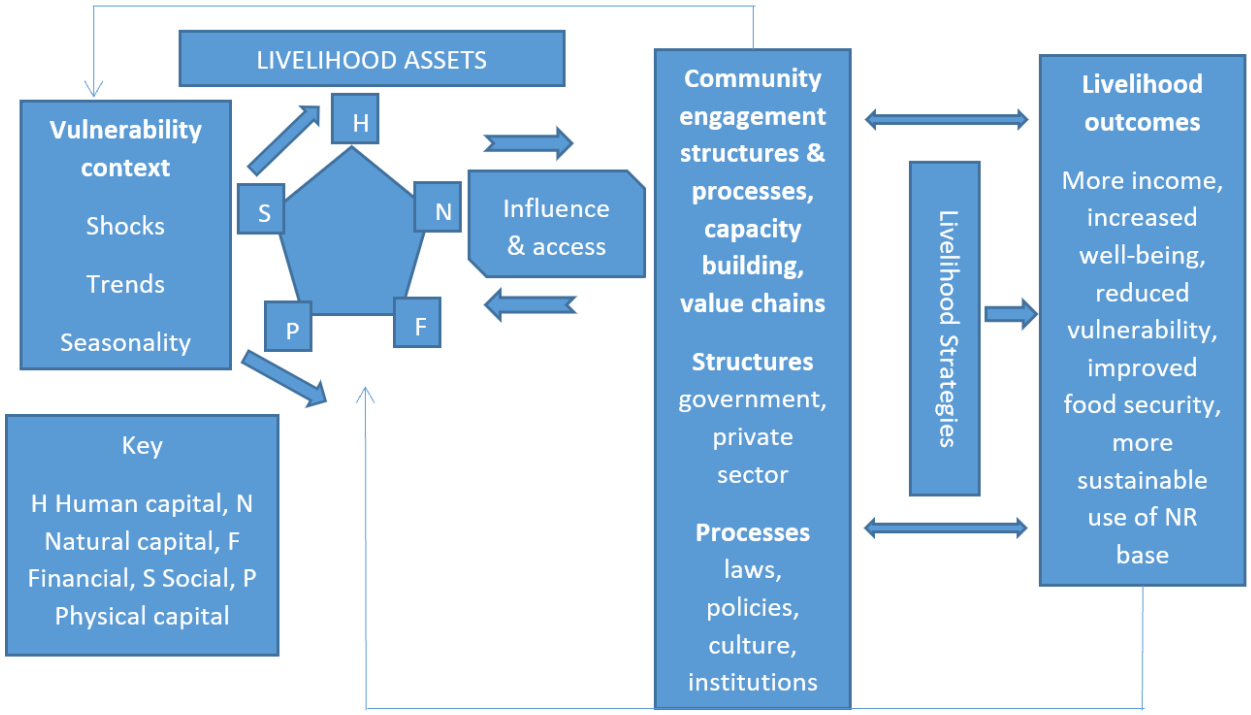

Figure 2: Sustainable Livelihoods Framework

Source: DFID

The rich biodiversity of the Dja constitutes the wealth of natural capital for livelihood in the area which over the years the population has been heavily relying on. Besides land used for agriculture, forest and wildlife-collection of non-timber forest products, water resources abound with the River Dja and its various tributaries across the landscape with fishery resources. Physical capital remains very little and challenging. . Social capital is one of the key assets of the area upon which CIGs are building on spanning from trust relationships with people grouping together in groups and accessing partners involved in conservation and development in their communities like AWF and Tropical forest, conservation service and others. Thrift and loan groups are evidences of these relationships that have spurred the creation and easy adhesion of members to build on social resources. Financial resources have been limited in the past with poverty and people relying on poaching to sell animals, the little money obtained from sell of farm products and savings in thrift and loan groups. The biggest capital assets of these landscape are natural and social capital upon CIGs are building upon to improve livelihoods and strategies of conservation.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume VIII Issue II February 2024

Community engagements in protected area activities or conservation activities is seen through the community based organizations that take the form of Common Initiative Groups set up across the Dja landscape to effectively take hold of interventions of the conservation agency the African Wildlife Foundation and its sub-contracting agency, Tropical Africa and Rural Development. These interventions are clearly oriented in defined paths 1) Agriculture, cocoa production and food crops 2) Non-timber forest product collection 3) Aquaculture and 4) Household accessories all geared towards improving livelihoods and conservation. Community engagements have therefore be axed in the aforementioned paths throughCIGs created by community members and harnessed by AWF.

METHOD

Study site

The Dja Fauna Reserve is one of the largest rainforests in Africa and the last major intact tropical forest in Cameroon, with 90% primary, undisturbed habitat. The Dja forest reserve was created in 1950 and is situated in the south eastern part of the South Cameroon low plateau (Figure 2) (2º40' – 3º23'N, 12º25' – 13º35'E). With average altitudes oscillating between 600m and 700m above sea levels (Sonk´ e and Couvreur 2014), it covers a surface area of 592,000 ha (Mbolo, 2004; Njouonkou et al. 2013). River Dja bounds the reserves on its north, west and south limits and empties in the Sangha River which is a major tributary of the Congo river. The Reserve is almost completely surrounded by a loop of the Dja River that acts as a moat, preventing illegal entry on most sides. The average monthly temperature lies between 23.5 ºC and 24.5 ºC, with an annual rainfall of between 1180 mm and 2350 mm (Sonk´ e and Couvreur 2014). By 1981, the Dja Reserve gained the status of a Biosphere Reserve and few years after in 1987, UNESCO selected it as a World Heritage Site. Cameroon's Ministry of Forestry and Wildlife (MINFOF) later classified in 2007 as a Fauna Reserve. Thanks to these developments, the Dja is the only reserve in Cameroon which holds the triple status of a Biosphere Reserve, a Wildlife Reserve, and a World Heritage Site. The Dja landscape makes part of the Guinea-Congolian tropical evergreen forest (Letouzey, 1985; Njouonkou et al. 2013). The high biological diversity in this part of Central Africa makes this area a hotspot for biodiversity conservation. It host more 320 bird species and more than 1,500 species of plants have been identified in this area (Mbolo, 2004; Njouonkou et al. 2013). There are over 100 mammal species, 14 of which are primates, including critically endangered species such as the western lowland gorilla and chimpanzee. The biodiversity also comprises of endangered species such as the grey parrot, forest elephant, leopards, the giant pangolin and the forest buffalo. Its rich biodiversity has over the years attracted and seen the interventions of several international NGOs. The African Wildlife Foundation and its sub-contractor Tropical Africa and Rural Development are the most recent intervening in the context of the execution of the Ecosystems of the Forests of Central Africa (ECOFAC 6)-Ecosysteme de Foret d'Afrique Centrale (ECOFAC) 6 programme. Its implementation began in 2017 in the Dja landscape with the target goal being to ensure that; in Central Africa, the Dja Reserve and its environs are an exceptional functioning reservoir of biodiversity and sustainable environment for its peripheral populations.

In its quest for wildlife conservation that involves wildlife monitoring and anti-poaching activities in the Dja landscape, the project took the option of supporting and providing alternative livelihood sources through community engagement especially related to their environments to the adjacent communities. In this light, support is provided to NTFPs (njangsang, moabi, mbalaka, bush mango) collection, processing and marketing, training on the production of home-made cosmetics (soap and lotion), the promotion of fish farming, and sustainable cocoa production and marketing. The African Wildlife Foundation adopted the model of Common Initiative groups created across the Dja landscape to facilitate alternative livelihoods sources and limit wildlife exploitation to attain conservation and sustainability. Somalomo, Bifolone, Schowam and Nkolekoul are key project intervention sites within the Dja landscape that are selected for this

study to identify and understand capital different assets within the CIGs framework for alternative livelihood in the conservation framework

Method

This study was carried out in the context of conservation efforts and community engagements in the Dja landscape. In the conservation drive in collaboration with the Ministry of Environment, Nature Protection and Sustainable Development, MINEPDEP, the conservation agency-AWF engaged communities in project interventions that valorized different capital assets. This study was carried out between June and August 2022 within the context of an evaluation study conducted to assess the effectiveness, efficiency, and relevance of conservation project interventions in the Dja Landscape to understand dynamics in different assets in the framework of alternative livelihoods and community engagements in the conservation scheme. This was especially considered for forest communities caught in the dilemma between their livelihood sustenance and the conservation of wildlife. In preparing the research instrument for the study, questions framed to inform this paper were solely in the context of a qualitative study. The paper therefore uses a qualitative approach employing the use of key informant and expert interviews and focus group discussions. The design of interview guides and focus group guides was done especially with inspiration from a review of some project documents related to its initiation annual reports of conservation activities, and from the "Forum des Acteurs" – a platform where conservation actors meet regularly to exchange experiences and strategize on the way forward in the interventions. The insights gathered from the review in terms of project objectives, intervention actions, stakeholders and partners helped to reshape key informant interview guide, expert interview guide, and a focus group discussion guides used in data collection. According to project interventions respondents and target communities were selected, Somalomo, Bifolone, Schowam and Nkolekoul. The livelihoods of households in these communities largely depend on forest resources. The key informant interview guide consisted of eleven open ended questions that focus on project interventions and community engagement, the changes in terms of livelihood strategies as a result of conservation interventions, the challenges and opportunities for improvement. Regarding the expert interview guide (open ended questions), emphasis was placed on the role of the state and other actors in supporting conservation interventions, aspects of conflict among actors, challenges and possible solutions. The focus group discussion guide was structured into twelve open ended questions that focused on the activities of the respective community based organizations in this case Common Initiative Groups (CIGs), their community engagement with AWF and its conservation sub-contractor, their knowledge about these interventions and dynamics around assets, the key changes in livelihood strategies that are linked to the project, challenges and the way forward. Respondents from the four selected communities of the Dja landscape were randomly selected based on possible respondents relating to the study. Considering certain information and criteria such as age, gender, length of stay in communities, and diversity of engagement in conservation and livelihood activities, raffle draws were performed based on numbers assigned to randomly select respondents. Respondent selection was also done based on engagement on CIGs, NGOs and livelihood activities – cocoa farming, Non Timber Forest Products (NTFP) collection, soap making, food crop cultivation and fish farming). This mostly involved those who had lived in the community for five years or more, enough time to gather useful information on interventions and community activities. A random selection across the different livelihood activities was made to ensure adequate representation for key domains such as cocoa farming, NTFP collection, soap making, food crop cultivation and fish farming. Data for this study was obtained in two phases (Fig. 2). Key informant and expert interviews were first conducted in mid-June, during a meeting for conservation stakeholders (Forum des Acteurs). During this phase five expert interviews were conducted with representatives of the Ministry of Environment, Nature Protection, and Sustainable Development (MINEPDED), Ministry of Agriculture and Rural Development (MINADER), Congo Basin Institute (CBI), the African Wildlife Foundation and TF-RD. Each interview lasted between 30 and 40 minutes. The research team continued with the later phase of data collection during the 3rd week of June, in the four earmarked communities of the Dja Landscape – Somalomo,

Bifolone, Nkolekoul, and Schowam. The data collection team conducted five focus group discussions; two in Schowam, one in Bifolone, one in Nkolekoul and one Somalomo (table 1). Considering community engagements, FGD participants were selected from the CIGs operating on livelihood activities in the Dja landscape. These FGDs involved two mixed group of NTFP collectors and soap producers, two FGDs for a mixed group of cocoa farmers, and one FDG for a mixed group of food crop cultivators. Most of the FGDs were organised in the morning with average sizes of eight participants with each lasting between 50 and 70 min. Moreover, selected representatives from 15 CIGs and the operating cooperative were drawn and 36 key informant interviews were conducted. These key actors provided useful insights from their engagements in cocoa farming, NTFP collection, processing and sales, cosmetic production, food crop cultivation and fish farming. Tape recorders were used to record data but before that the objectives were explained and consent sought before recording information to which participants were assured of the confidentiality in treatment. In sum seven expert interviews, 36 key informant interviews, and five focus group discussions were conducted. Also, some project sites were visited to ground truth livelihood activities such as cocoa farming, food crop production, fish farming, and soap production. These visits were extended to local markets to observe the sale of cocoa and NTFPs. The observations gathered provided useful insights for our analysis. The data obtained was transcribed and coded and based on the coded data, information was summarized in narratives presented in the results section. A directed content analysis was employed with a focus on the research questions. The outcomes were regarded relating to community engagements, dynamics of livelihood assets and sustainability. Therefore, we highlighted texts which contained data corresponding to these thematic sections and extracted them for interpretation. This approach was deemed relevant, considering that software extraction might miss out on salient details. The analysis led to the derivation of community engagements in protected area management and livelihoods outcomes in the case of the Dja Landscape.

Table 1: Data collection

Locality	**Key informant interviews KII and Expert Interviews EI**	**Focus Group Discussion FGD**
Nkolekoul	KII; Men (2), Women (3), Youth (1) EI AWF staff (2)	FGD (1) Mixed group of Cocoa producers and NTFP collectors; 4 women, 3 men, 2 youths
Showam	KII; Women (5), Men (3)Youth (3) EI; Tropical Forest and Rural Development (1) Zoological society of London (1) Congo Basin Institute (1)	FGD (2) Mixed group of Cocoa producers and NTFP collectors; 3 women, 3 men, 2 youths Mixed group of food cultivators, NTFP collectors and soap producers; 3 women, 2 men, 2 youths
Somalomo	EI: DO (1), Brigade commander (1) Conservation officers (2), Delegates of MINADER (1), and MINEPDED (1), KII Men (2), Women (3), Youth (1)	FGD (1) Mixed group of NTFP collectors and soap producers; women3, 3 men, 2 youths
Bifolone	KII: Men (4), Women (6), Youths (3)	FGD (1) Mixed group of NTFP collectors, cocoa farmers, fish farmers and soap producers; 3 women, 4 men, 2 youths

RESULTS

Community engagement in Conservation interventions

Capacity building and CIG engagements

In order to meet their demands and empower the actors to improve their performance through community engagement, conservation interventions explored a series of activities with capacity building as a main strategy accompanied by incentives. Community engagements in capacity building has been first seen through the training of trainers, and later enlarged community capacity training workshops. Capacity building have been successfully organised to accompany the population in cocoa production, NTFPs collection, processing and marketing and production of liquid and solid soap. The community is very much engaged in these alternative livelihoods creating options away from animal dependent livelihoods with acquired skills.

Across the Dja landscape, AWF in the conservation quest has succeeded in capacity building and communities have been able to mobilize efforts to create over 15 legalized Common Initiative Groups. These include FIESTA, Les Cultivateurs in Showam, LIMABE in Bifolone, COEUR-UNIS of Nkungulu, BENN of Ndengue, CODEDJO of Njolebum, Femmes Volontaire de Nkoe (FVN), AVENACD, DYPROEMADE, BON COEUR, FEDDE, MIMOA, FEMRES, NKOUBAR, FIERTE, and FEDDESKA (table 2). The model of CIGs is clearly adopted and embraced in the landscape in the conservation drive to improve livelihoods and reduce pressure on wildlife exploitation.

Table 2: CIGs in the Dja landscape

No	Village	CIG	Production specialization engagement
1	Schowam	Les Cultivateurs	cultivation; cocoa production, cassava, plantains and NTFPs and small commerce
2	Schowam	FEDDESKA	agriculture, NTFPs, livestock rearing and fishing
3	Schowam	FIESTA	Cocoa, NTFPs
4	Ndengue	BENN	agriculture on cocoa, groundnut and maize, NTFPs
5	Njolebum	CODEDJO	NTFPs-mbalaka, njansa, bush mango, moabi, rearing fowls, cultivation of maize
6	Nkoe	Femme Volontaire FCN	NTFPs and agriculture-cocoa, pepper
7	Bifolone	LIMABE	NTFPs, aquaculture, food crops-plantains, cassava
8	Nkungulu	COEUR-UNIS	NTFPs, cocoa production
9	Nkolekoul	NKOUBAR	NTFPs
10	Nkolekoul	AVENACD	NTFPs, cocoa
11	Somalomo	DYPROEMADE	NTFPs, food crops-plantains
12	Somalomo	FEMRES	Cocoa, groundnut, NTFPs
13	Nkolekoul	MIMOA	NTFPs
14	Nkolekoul	BON COEUR	NTFPs
15	Nkungulu	FIERTE	NTFPs

The main driving force for the conservation quest has been creating alternative livelihood strategies for households as a way of taking up the pressure in the forest especially on wildlife. AWF succeeded to reach out to communities of the Dja landscapeBy mobilizing community trust and engagements from just small social village groups to effective functioning newly created common initiative groups, the population has been able to embrace alternative livelihoods options introduced to them. This has particularly been in the

domain of agriculture; where some cash crops notably cocoa have been

Agriculture

One of the axis defined and prioritized in the conservation scheme has been agriculture with the cultivation of cocoa as the key crop. Community engagements are vivid in cocoa production and other food crop production. People are engaged in cocoa production and continue to embrace the practice creating new farms, refurbishing old farms and taking on new cultivation practices. These engagements are harnessed and coordinated with the technical and material support of AWF. According to project interventions between 2017 and 2022 there has been great increase in cocoa production in quantity and quality as well as revenue generated for communities through CIGs. In fact, the Dja landscape saw the creation of new cocoa plantations over 86 hectares and 56 hectares of old cocoa farms rehabilitated. Within this time period, over 200,000 cocoa plants, 5,500 oil palm trees and 1500 fruit trees were distributed from nurseries to cocoa farmers in communities of the Dja landscape. These actions have redynamized livelihoods. Much has been done to train farmers on farm preparation, nurseries, planting right up to harvesting. Some of the key informant attest that

"*In the domain of cocoa farming, AWF and its sub-contractee trains us and gives plastics for nurseries and cocoa seedlings to farmers. From nurseries they share seedlings to farmers to cultivate….Also, they provide materials like machetes and files at the beginning of the season, when it is time for harvest and sales, they cut the money from their sales".* KII 1, Nkoubar CIG 01-22/06/2022.

Following the activities of farmers, AWF brings in agricultural technicians to train personnel or farmers on how to nurse, intervals of planting, type of inputs to use and follow up implementation of strategies adopted. For each community and CIG, a certain number of cocopods/seedlinks are distributed to farmers according to the number of hectares cleared. Secondly

"AWF provides cocoa pods and plastic papers for nurseries. They make central demonstration nurseries in villages and distribute seedlings to farmers to cultivate. They ask farmers to clear farms and plants are distributed according to the number of hectares cleared. They even ask people to make their personal nurseries. Concerning cocoa production, they also provide materials to us at the beginning of the season and cut the money during sales. They also provide fungicides and show us how to spray." KII 2, 02-22/06/2022 GIC AVENAC. Most importantly, minority groups especially the pygmies have embraced the cultivation of cocoa as mainstay. A key informant from the pygmy village of Bifolone notes that

"*Most of us belong to CIGs and the projects involves us in several activities. They taught us to cultivate cocoa in order to be autonomous*" Baka FGD-Bifolone 24/06/2022

The role of AWF and CIGs in cocoa production has been very important with farmers embracing agriculture. In fact, according to project interventions from 2017 to 2022, more than 200,000 plants of cocoa, 1500 fruit trees, and 5,500 oil palm trees from the nurseries have been distributed to cocoa producers in the Dja and Bifolone to farmers through CIGs. About 56 ha of old cocoa farms rehabilitated and over 86 new hectares of cocoa plantations created on old fallows. Some of population are still dragging behind but a vast majority are increasingly engaged with some already having yields of the farms. According to a key informant of AWF, we make farmers understand that you can kill an animal today but not tomorrow but you can rely on cocoa production even your next generation and it is easier to mobilize efforts through CIGs. Cocoa production is gradually improving over the years. "*But there is need to train technicians among us to verify what we are doing because the project can end*" Baka FGD-Bifolone 24/06/2022. This is a plight that is already being addressed as farmers have resource persons that trained among the CIGs or the village to work with the community.

Some CIGs are engaging in food crop production; AVENAC is into groundnuts production, LIMABE cultivates plantains, cassava, groundnut while Les Cultivateurs of Schowam village are into cassava and plantains. Les Femmes Voluntaire cultivate pepper, BENN of Ndengue cultivate maize and groundnut, while CODEJO of Njolebum are into maize and cocoyams. This diversification into food crop is coming as a palliative in a way of developing alternatives that are short term while waiting for long term cocoa. This diversification of livelihoods sources also provides food sources and additional income for households that guarantees better food security. While CIGs working in collaboration with AWF strive to develop these assets especially in agriculture they also try to develop value chains to ensure the sale of their products.

Non-Timber Forest Products NTFPs assets development and transformation through CIGs

One of the main assets of the Dja landscape that was undervalorised has been the non-timber forest products due to lack of knowledge or ignorance, capital, markets, poor infrastructure amongst others. People in the Dja have through CIGs been able to valorize better ecosystem services notably NTFPs with information, sensitization and capacity building for collection, processing and drying for improved market quality. According to key informants, AWF through training of CIGs has significantly improved their knowledge on NTFPs. Every CIG in the landscape is focus on the production of NTFPs. The main products here include Njansa, Moabi, Bush mango, and Mbalaka. More importantly AWF provides market for their produce by buying through CIGs and bringing other buying partners. Interestingly, actors are motivated to act within the CIGs due to perceived benefits as human capital development and mutual beneficial relations are instilled in groups. Also, financial and material support greatly motivated NTFP collectors and with capacity building through training, skills have improved. The targets have been to get better quality and quantity with more improve market chains. As such the role of members has been to participate in capacity building workshops, participate in CIG activities; collection of NTFPs, processing and marketing. As such there has been an upsurge with over 150 Bantu and 25 Baka collectors of NTFPs within 15 legalized CIGs in the Dja landscape. This has been facilitated by AWF as views gathered through key informants note.

"We are into NTFPs-mbalaka, njansa, bush mango, moabi; TF trained us to get better quality under certain conditions; for Njansa we collect and ferment for a week and then we wash. We then boil for about an hour and remove and we crack and remove njansa, then dry afterwards. They ask us to collect Moabi, ferment, wash and dry under certain conditions with batches. With moabi we cut leaves and put moabi on for the peelings to rod and then we wash to become clean, We were given batches to dry with for three days, put in bags and then they come and measure and sell. As such we produce good quality" KII 11, CODEJIO CIG, Njolebum

"*We did not know much about NTFPs but today practically every woman goes for the collection and processing of products for sale. Now they give us modalities for gathering, processing and drying to get better quality"* KII 9 CIG Nkoubar

A majority of NTFP collectors are women and this has gone a long way to improve their household revenues and living conditions. Women are now more actively engaged in collection and processing improving their livelihoods and with good engagement implications in the community. The processing of these NTFPs Njangsa (*Rocinodendron heudolitti*), bush mango (*Irvingia gabonensis*), mbalaka and moabi give added value. So members produced collectively as they organize to go to the forest and collect, harvest and process together. But what group members collect individually at the level of households, they still present to the CIG to be sold according to quantity produced. Also, production has significantly improved over the years quantitatively and qualitatively as AWF/TF buys only through CIGs. This further enhances belonging and coordination within the group. This has been one activity that has help in the conservation agenda through livelihood diversification and alternative sources of income.

Reconciling NTFPs exploitation with conservation is gradually improving livelihood and conservation of wildlife. A key informant summarises

"When you are busy with cocoa and non-timber products you reduce forest activities…farm preparation, planting, mulching, spraying, collection and harvesting, cracking and peeling are activities that take a lot of time and takes our minds away from hunting and helps in conservation" KII7, Femme Voluntaire

Assets play a significant role in assisting the community sustain their livelihoods and most importantly implicating positively the population in the different communities in the conservation drive. Engaging the population in cocoa production, collection and sale of NTFPs, fisheries and production of household accessories has enormously reduced their pressure on the forest. These economic activities occupy the population with the time accorded to develop them, they provide income that helps the population meet their various needs and deter them from hunting and poaching as livelihood sources. Thus, alternative livelihood created through these activities is key in improving livelihood and reducing the pressure on forest. These alternative livelihood strategies harnessed through CIGs are succeeding in a sense to assist in the conservation drive as noted by some key informants

"*We can say the interventions are more than 50% efficient in helping conservation"* KII 12 BENN CIG

"*They intervene in conservation by engaging the population in alternatives to reduce activities in the forest. For example if we had 50 hunters, today we are about 26 because of the project activities which has improved livelihood*" FGD 1, Nkolekoul.

Following the perception of the population, it is evident that the actions of AWF in conservation through Common Initiative Groups is gradually succeeding.. According to views gathered from a focus group in the pygmy village of Bifolone, through the activities of AWF and TA, they are now settled with a mapped zone for their activities-agriculture, fishing and collection of NTFPs. They have been able to get training through their LIMABE CIG for aquaculture and are running a community fish ground with support in figgerlinks and management, in NTFPs collection and sell as well as the cultivation of cocoa and food crops. Though some of them express worries of the marketing, pricing and gaps between harvesting periods, they however hail the role of alternative livelihoods through CIGs in reducing poverty in the landscape and hunting in the forest.

Market value chains, a reinforcement of alternative livelihood assets

The role of AWF and TA through CIGs in improving value chains is seen through, training and capacity building, quality improvement and control, collection and transformation techniques and marketing channels. Through training key sectors are targetted, training on available NTFPs and market offers, collection and transformation techniques under defined conditions for better quality and marketing through CIGs. Trainings also cover agriculture especially cocoa production from nursery preparation, farm preparation and planting techniques, application of inputs, harvesting and drying. Trainings were organised in Showam, Nkolekoul and Bifolone for group members and for trainers even out of the landscape as they as guided to go out study markets and acquire skills. As marketing has improved through individual and collective products sold at CIGs, AWF also bring in partner buyers to improve marketing. Production and marketing has evolved over the years since 2017. Cocoa production saw an increase from 2450kg to 17637kg from 2017 to 2022 respectively following project interventions with a proportionate increase of revenue from 1,240,000 FCFA in 2017 to 15,450,305 FCFA in 2021. The dynamics of these alternative livelihoods has had very huge implications for livelihood improvements and conservation efforts with reduce

pressure on wildlife resources. Improvements in road networks can create better market access as well as AWF meeting up with buying promises.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume VIII Issue II February 2024

Table 3 Value chain production of NTFPs collected by TR-RD/AWF 2017–2021

Year	Type of NTFP	Bush Mango	Moabi	Njangsa	Mbalaka	Total amount
2017	Quantity (L)	250L	/	200L	50L	500L
	Amount (fcfa)	250 000	/	140 000	7500	397 500
2018	Quantity (L)	300L	1900kg	200L	70L	
	Amount (fcfa)	330 000	247 000	260 000	24 500	861 500
2019	Quantity (L)	2844L	/	350L	70L	
	Amount (fcfa)	2844 000	/	525 000	50 000	3419 000
2020	Quantity (L)	/	1229.5 kg	291	930	
	Amount (fcfa)	/	557 400	349 200	279 000	185 600
2021	Quantity (L)	1155	/	323	/	
	Amount (fcfa)	1603 500	/	254 800	/	1858 300

Source: AWF Report, 2022.

Fishing

Fish farming is one of the key economic activity sector of community engagements facilitated by project interventions. While some of available fish ponds had been abandoned by some communities, some people did not really see fishing as good livelihood activity. Nevertheless, with technical, material and financial support, the community has been able to revived the abandoned fish ponds and now managing it. This is especially the case of the Baka community of Bifolone that received over 2,500 fingerlings of Silure and Tilapia in 2019 that later rosed to over 3,5000 fingerlings between 2021-2022. They also saw their first sales realize over 128,000 FCFA after a first harvest in 2019. Community engagement of the Baka community to run fishing ponds has been growing especially with the training received. A key informant of LIMABE CIG from the Baka community affirms

" With support from AWF we were able to revive our abandoned fish ponds… they trained us to manage our fish ponds in Bifolone, gave us fingerlings and guided us to use feed and grow fish. The community manages the ponds and at harvest, it is distributed while some are sold"

Valorizing these fishing grounds is a key for the Baka community that formerly relied some much on wildlife for their livelihoods. In other communities like Schowam, the population expressed needs to get materials and technical support to practice fishing.

Social assets

Through conservation interventions, one of the sectors where women have been engaged is training for the liquid and solid soap production. This has been done through capacity building in the various communities. Firstly some selected women leaders or representatives or focal points were sent for training to come train the others and later capacity building workshop organised in Schowam, Nkolekoul and Somalomo permitted women to acquire soap production skills. By providing materials and the technical support, this has acted as an extra incentive and women today fabricate soap for household use and also for sale. The difficulty that most of these women face is to constantly access the materials required for the production of soap. Also, women received training to produce hair oil from Moabi seeds. These engagements have permitted women to diversify their livelihoods and improve on their household revenues and conservation activities. This goes

a long way to improve on livelihoods and community engagements in conservation interventions especially with the different CIGs formed across the landscape. There are changes in financial and social capital with revenue sources diversified and more community interaction through CIGs negotiating more in terms of acquisition of skills, marketing channels and value chains. With more perceived monetary benefits, community engagements through CIGs become effective community institutions skewed towards livelihood improvement and conservation outcomes.

DISCUSSION

The sustainable livelihood framework provides a useful analytical lens on how communities in a conservation site valorise their assets notably natural, social and financial capital for livelihood and conservation outcomes. This is especially considered for community engagements in resource use through communal structures in the Dja landscape-CIGs and the role of conservation agencies. This paper set out to qualitatively explore community engagement, mirrored through the interventions of community based organisations (CBOs), and analyse the dynamics of livelihoods, mirrored through changes in natural, social, and financial capitals in the Dja landscape.

We argue in this paper that capacity building through community engagement greatly facilitates livelihood improvement and conservation outcomes. Policy, institutions and processes also determine the degree to which an enabling or facilitating environment for livelihoods is in place, compared to an inhibiting or restrictive one (Hobley, 2001). To facilitate conservation international conservation agencies partnered with the government (Pretzsch et al., 2019; Walters et al. 2021; Manu et al. 2022). This suceeded for the Bakossi National Park and the Campo Ma'an National Park by the World Wild Fund (WWF) in Cameroon in the form of green business and cooperative formation (Kimengsi et al., 2019). Community forestry was adopted in the Kilum-Ijim forest project (KIFP) by Birdlife international. The Dja landscape present communities whose livelihoods were very much rooted in animal dependent livelihoods and limited in agriculture. Very little was valorised from their natural, and social assets mostly for household consumption. Compromised by limited technical, financial and institutional capacity, community engagement in protected area conservation only improve with these capacities brought it by AWF partnering with government conservation service. Community engagement through CIGs in the Dja landscape have affected livelihoods positively and conservation. While project interventions have harnessed community engagements, different key lessons are drawn. 1) through capacity building, several community base organisations or CIGs have emerged in the Dja with the zeal to better their livelihood strategies and participate in conservation objectives 2) through community engagements, individual and community activities for livelihood improvement are strongly felt in the domain of cocoa production, NTFPs collection and processing and production of soap. 3) community engagements in alternative livelihood options is largely improving household incomes and improving conservation outcomes by reducing animal dependent livelihoods. 4) these community engagements through CIGs produce value chains with market supply that symbolize a series of activities from production to supplies. The value chain process involves identification of capacities and incentives of the actors where intervention can be made to eliminate the bottlenecks (Matthias and Tapera, 2009). Moreover, quantifying the value chains, flow of revenues accruing, income and prices and quantities handled is important to consider (Bernstein 41 and Campling 2006; Ndegwa 2010) for the opportunities and constraints in the landscape.

Mbile et al. 2005 argue that the promise of provision of a livelihood support failed frustrating the community to trust state negotiation in the Korup park in Cameroon. How successful are the community engagements through project interventions with alternative livelihoods in the Dja. Grassroots interventions with a sub-contractee NGO penetrated the communities with incentive strategies and facilitated most people to embrace alternatives. Nevertheless, the concept of alternative livelihood and substitution have its limitations in effectiveness based on assumed community homogeneity (Wright et al., 2016). But the

bottlenecks identified by most communities seem to be more rooted with fears of sustainability that could be gradually eliminated with time. Nevertheless, Ezebilo (2011) notes that in Nigeria, economic incentives (incomes) from farming activities, NTFPs use and non-traditional employment shaped compliance. The compliance success of alternative livelihoods in the Dja is largely due to incentives derived from farming activities, NTFPs collection and processing, fish farming and household cosmetics facilitated by AWF project interventions. This approach reduced peoples dependence on wildlife and changed from the former state policing strategies on wildlife that made people behaviors predatory due to lack of alternative choices. Community adherence to institutional provisions is facilitated by alternative livelihoods. But (Southworth et al. 2006; Persson et al. 2021) still challenge this integrated conservation and development approach in that it still yet to fully address the livelihood problems of adjacent communities. Also due to problems of homogenity and divergence in livelihood types, (Persson et al. 2021) interrogate the capacities of communities to engage in market development while making the effects of enforcement pressures less severe with constraints of uneven distribution of costs and benefits,access and market linkages. However, the results of this study match that of (Muhammed et al. 2008; Harada and Wiyono 2014; Barnes and van Laerhoven 2015) in Asia that report positive outcomes on conservation due to substantial alternative contribution to local livelihoods and income. In Tanzania, due to augmentation of cash household income from alternatives, trust improved in institutions as a determinant of participation intensity of the households in forest management (Luswaga and Nuppenau 2020). This explains why emphasis on the need to craft an institutional levelling process characterized by the reconstitution of state and community driven institutions (and their actors) in a more meaningful bottom-up process has been the subject of much interest (Haller et al., 2016, 2018). We therefore argue that an integrated approach of state and community driven institutions facilitated by conservation agencies improve livelihoods through alternative and conservation outcomes.

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