Pathways for sustainable intensification and diversification of cocoa agroforestry landscapes in Cameroon

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Highlights

- Extensification of agriculture, including cocoa expansion, has been linked to deforestation and to the perpetration of poverty in Cameroon
- Sustainable intensification and diversification of cocoa landscapes could potentially increase productivity, incomes and biodiversity and save forests
- Identifying and assessing sustainable intensification and diversification options/pathways could help improve efficiency, effectiveness and equity in its contribution to REDD+ and broader green economy efforts
- The government policy supporting full-sun cocoa practices can potentially increase productivity but such practices can also lead to poor risk management, increased vulnerability and decreased biodiversity/environmental functions
- Realizing sustainable intensification and diversification requires policy, institutional, and technical capacity (e.g., incentive mechanisms) changes to come to fruition

1. Introduction

There is increasing recognition that rural landscapes possess a strong potential for Reducing Emissions from Deforestation and forest Degradation (REDD+; van Noordwijk & Minang, 2009). As an agroforestry option, cocoa systems have been widely cited as a potential climate-smart agricultural practice (FAO, 2010). More specifically, it has been suggested that with proper implementation of regulations to control illegal encroachment into the forest, the promotion of increased productivity in cocoa agroforestry landscapes (CALs), through proper intensification pathways, is a strategy for limiting cocoa expansion and agriculture in general (Minang et al., 2014). Within developing countries, agricultural expansion is a leading cause of deforestation (Achard et al., 2002; Robiglio et al., 2010) making such strategies all the more pertinent.

That said, minimal studies have been conducted to analyze sustainable intensification and diversification pathways of CALs in Cameroon. Although the suggestions for promoting
intensification and diversification pathways as a strategy for limiting encroachment into the forest and increasing cocoa productivity for farmers are increasing, no detailed account exists on the various pathways that could be used to accomplish this strategy. Focusing on Cameroon as a case study, this chapter critically analyses sustainable intensification and diversification pathways within CALs in Cameroon. Additionally, the feasibility of incentive mechanisms for sustainable intensification and diversification pathways are equally analysed.

2. Setting the stage, field sites and cocoa systems in Cameroon

2.1 Cameroon as a case study

Cameroon offers a credible a priori case for examination as 90% of the rural population is estimated to be engaged in small-scale agriculture (Robiglio et al., 2010) including cocoa production, and its government as well as key stakeholders have both proposed pathways to encourage sustainable practices within CALs. This study draws upon relevant literature and field work experience in three study areas, referred to as Efoulan, Ayos, and Muyuka, in the southern part of Cameroon where CALs are predominant.

The Efoulan municipality is located in the Mvila Division of the South Region of Cameroon. An estimated 95% of the municipality’s 250,000 people are currently engaged in shifting cultivation for small-scale traditional agriculture with cocoa being the main agricultural product (Feudjio et al., 2012). The municipality of Ayos is situated 123 kilometres from Yaoundé, the national capital of Cameroon. Its surface area is 1250 km² with an estimated population of 22,899 inhabitants (INS, 2005). It has been reported that almost the entire population of this municipality depends directly on subsistence farming for their livelihoods with cocoa being one of the principal agricultural products (CANADEL, 2012). The municipality of Muyuka is located in Fako Division of the South West Region of Cameroon. In 2012, its total population was estimated at 86,286 (INS, 2010) the majority of which were engaged in agriculture for income generation and subsistence purposes. Cocoa production is endemic in the municipality of Muyuka and annual production for 2013 was estimated at 14,844 tons (MINADER, 2013).

2.2 Cocoa farming in Cameroon: an overview

Cocoa has long played a vital role in Cameroon’s economic development (Armathé et al., 2013), and remains an important source of income for approximately 1.4 million people (KIT Royal Institute, AgroEco/Louis Bolk Institute, & Tradin, 2010). Annual production in Cameroon grew from 120,619 tons in 2000 to 225,000 tons in 2013 (NCCB, 2014), making Cameroon the fourth largest producer of cocoa in the world after Côte d’Ivoire, Ghana, and Indonesia (ICCO, 2014). This makes cocoa farming a major source of foreign currency, accounting for approximately 15% of total annual exports revenue in 2009 (KIT Royal Institute, AgroEco/Louis Bolk Institute, & Tradin, 2010), and 2.1% of Cameroon’s Gross National Product (Armathé et al., 2013).

Plantations are often created by cutting down large areas of forest to plant food crops for subsistence purposes and cocoa for cash on the same piece of land (Kimengsi & Tosam, 2013). Cocoa is cultivated on an estimated total surface area of 450,000 hectares by smallholders who usually farm on 1 to 3 hectares of land (ICCO, 2014). It is grown mainly in 7 out of the 10 regions of Cameroon, with the Centre Region producing the
most at approximately 90,000 tons per year. This is followed by the South with 48,000 tons, the South West with 46,000 tons, the East with 25,000 tons and the Littoral, West and the North West all contributing approximately 1,000 tons each (NCCB, 2014).

3. Why sustainable intensification of CALs?
Sustainable agricultural intensification has been defined by its goal of “… producing more output from the same area of land while reducing the negative environmental impacts and at the same time increasing contributions to natural capital and the flow of environmental services” (Pretty et al., 2011). Some have also called this it ‘ecological intensification’ emphasizing the process in reaching sustainable intensification versus the final destination alone (van Noordwijk & Brussaard, 2014). Sustainable intensification pathways can contribute in enhancing multifunctionality of CALs by providing mitigation, adaptation, conservation, and developmental benefits in the following ways:
1. First, it has been established that if intensification of CALs via the use of inputs as well as the integration of timber producing trees in the Guinean rainforest of Central and West Africa (Côte d’Ivoire, Ghana, Nigeria, Cameroon), was done in the late 1960s, an estimated 21,000 km² of forests would have been conserved, thereby contributing to a reduction in emissions of about 1.4 billion tons of CO₂ (Gockowski & Sonwa, 2011).
2. Second, the integration of timber and fruit producing trees into cocoa farms, as well as the use of farm inputs in tropical countries including Cameroon, can increase productivity and create multiple income streams for the farmer thus reducing their need to expand their agricultural activities thereby sparing the forests (Minang et al., 2014).
3. Third, intensification of CALs with shade trees can significantly improve soil fertility and supply the soil with organic input through litter as well as wastes from wild animals that use the trees as their habitat (Hartemink, 2005). Such roles improve soil quality and thus enhance cocoa productivity.
4. Fourth, Alemagi et al. (2014) argue that intensification of CALs in Cameroon with diverse tree species can also be an approach for farmers to adapt to or withstand climatic shocks. As an example, they note that if a pandemic wipes out cocoa plants, often the main source of cash income, a farmer with an intensified cocoa farm including timber and fruit producing tree species has alternative economic products to help buffer the cocoa-based income loss.
5. Finally, Eboutou (2009) showed that CALs in Cameroon’s forest-dependent communities, which, in general, are intensified with fruit producing trees, are more profitable than less diversified ones. As profitability or income within CALs increases, the demand for land reduces thus leading to a decrease in deforestation and forest degradation.

4. Pathways for sustainable intensification and diversification of CALs in Cameroon
In this section of the chapter, we analyse four possible intensification and diversification pathways or scenarios that can be used to enhance multifunctionality of CALs in Cameroon. These include, full-sun cocoa, tree-diversified cocoa agroforestry, and cocoa enhancement and diversification through vegetative propagation. These were chosen because they either represented current practices on the ground and or are part of government policy (e.g., full-sun cocoa).
4.1 Scenario 1: baseline (dominant current practice)

In the Southern Region of the country, growing fruit and timber producing trees within CALs is normal practice among farmers in the area. It is estimated that 30 tree species per hectare are planted within CALs for home use and/or commercialization (Jagoret et al., 2011). According to Alemagi et al. (2014), priority species include *Dacryodes edulis*, *Mangifera indica*, *Irvingia gabonensis*, and *Persea americana*. In the Efoulan municipality located in the Southern Region of the country, reports indicate that CALs in the region can produce about 340 kg of cocoa per hectare and are therefore non-profitable, with a negative Net Present Value (NPV) of ~500 USD (250,000 FCFA)1 (Eboutou et al., 2010; Gockwoski et al., 2010).

In terms of tree species richness, Bisseleua et al. (2009) note that there are usually 9 tree species in old cocoa forest homegardens while mature intensively managed cocoa forest gardens contain five tree species. With regards to richness in herbaceous species, there are 33 species in old cocoa forest homegardens and 26 species in mature intensively managed cocoa forest gardens. According to Gockowski and Sonwa (2011), the carbon sequestration potentials of these systems is 104 tons (t)/hectare (ha).

4.2 Scenario 2: full-sun cocoa growing

This is a cocoa growing system that is being promoted by the Government of Cameroon where little or no trees are integrated into the cocoa farms. In this method, cocoa production simply involves farmers eliminating the shade canopy in an effort to boost yields. Farmers utilize newer, more resistant hybrids and/or varieties whose vertical trunks are the primary fruit bearing areas of the plant, rather than the horizontal branches (Daniels, 2006). Considering that current productivity is about 340 kg/ha in Cameroon, through this system, the government aims at attaining a productivity of 1000 kg/ha. As Gockowski and Sonwa (2011) note, the carbon sequestration potential of this system is 67.7 t/ha. This scenario is possible under the following conditions:

- The application of 371 kg/ha of 0-18-23 Nitrogen (N) Phosphorous (P) Potassium (K) ratio fertilizer plus micronutrients in full-sun hybrid cocoa plantations (Gockowski & Sonwa, 2011).
- The application of at least two insecticide rounds per year against mirids and four fungicide rounds against black pod (Jagoret et al., 2011).
- Cocoa trees are planted at a distance of 3 x 3 m apart and cocoa tree density is 1,111 cocoa trees per hectare of land (Asare & David, 2011; Gockowski & Sonwa, 2011).
- Structural pruning (removal of branches and stem on a tree to give it the desired shape) is done 2 to 5 years after planting to make sure that the tree has the right shape and height so that field operations (such as harvesting and spraying) can be easily carried out. Thereafter, pruning is carried out every 5 to 7 years towards the end of the dry season to the early parts of the rainy season, before new growth starts.
- Non-cocoa tree canopy should not be more than 25% since this will only serve to starve the tree, causing them to develop fast growing, weakly attached sucker growths, which will increase maintenance costs and break off easily in strong winds (Asare & David, 2011).
Table 24.1 Tradeoffs in sustainable intensification and diversification pathways of CALs in Cameroon. Some values were not available for all practices indicated by ‘-’.

<table>
<thead>
<tr>
<th>Key features</th>
<th>Baseline (dominant current practice)</th>
<th>Full-sun cocoa</th>
<th>Tree intensified and diversified cocoa agroforestry systems</th>
<th>Cocoa enhancement and diversification through vegetative propagation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key practices</td>
<td>• Multi-storey cocoa with mostly fruit and non-timber trees maintained and managed when farm is established after clearing forest • Mostly old &gt; 25 years</td>
<td>• Cocoa is grown with little or no trees integrated into the system • Relatively few recently established medium sized plantations</td>
<td>• Multi-storey cocoa system which is intensified with planted fruit and/or timber tree species • Increased inputs-fertilizers, planting materials, pesticides, etc.</td>
<td>• Renewal of old cocoa plants using vegetative propagation techniques • Integration of grafted cocoa trees and fruit and timber species that are high yielding and more adapted and resilient</td>
</tr>
<tr>
<td>Cocoa productivity</td>
<td>340 kg/ha</td>
<td>1000 kg/ha</td>
<td>-</td>
<td>&gt; 400 kg/ha</td>
</tr>
<tr>
<td>Non-cocoa composition</td>
<td>30 trees/ha</td>
<td>0 trees/ha (in many instances)</td>
<td>12-15 trees/ha</td>
<td>-</td>
</tr>
<tr>
<td>Biodiversity – tree species richness (Bisseleua et al., 2009)</td>
<td>9 species in old cocoa forest home gardens to 5 species in mature intensively managed cocoa forest gardens</td>
<td>1-2 species</td>
<td>11 species</td>
<td>-</td>
</tr>
<tr>
<td>Biodiversity - herbaceous species richness (Bisseleua et al., 2009)</td>
<td>33 species in old cocoa forest home gardens to 26 species in mature intensively managed cocoa forest gardens</td>
<td>-</td>
<td>25 species</td>
<td>-</td>
</tr>
<tr>
<td>Carbon sequestration</td>
<td>131.3 t/ha (Wade et al., 2010); 104 t/ha (Gockowski &amp; Sonwa, 2011)</td>
<td>67.7 t/ha (Gockowski &amp; Sonwa, 2011)</td>
<td>40-70 t/ha (Wade et al., 2010; Gockowski &amp; Sonwa, 2011)</td>
<td>-</td>
</tr>
</tbody>
</table>
4.3 Scenario 3: tree intensified cocoa agroforestry system

This scenario involves a multi-story cocoa system, which is intensified with fruit and/or timber producing trees. Current CALs all fall into this scenario and as Wade et al. (2010) and Gockowski and Sonwa (2011) suggest, their carbon sequestration potential is 40-70 t/ha. This scenario is possible under the following conditions or assumptions:

- Timber and fruit producing trees, which are preferred by cocoa farmers, are integrated into the cocoa farm. Fruit producing trees include *Persea americana*, *Dacryodes edulis*, *Mangifera indica*, *Irvingia gabonensis*, *Citrus sinensis*, and *Cola spp* (Alemagi et al., 2014) while potential non-edible/timber species include *Terminalia superba*, *Triplochiton scleroxylon*, *Milicia excelsa*, *Ceiba pentandra*, and *Ficus mucuso* (Sonwa et al., 2014).

- The best possible planting distance between the cocoa and non-cocoa trees is respected. Depending on the tree type, Asare and David (2011) recommend planting timber trees at 12 x 12 m and nitrogen fixing trees at 6 x 6 m triangular spacing.

- Shade management is properly practiced. In order to provide a good and reliable permanent shade which protects the cocoa plants against pests, diseases, and drying out, Asare and David (2011) recommend that timber and fruit trees should be planted a year before the cocoa plants at a distance of 12 x 12 m triangular spacing that could later be thinned to 24 x 24 m if shade is perceived to be too much.

- The fruit and timber producing trees grow normally when integrated into the cocoa farm. Farmers’ preference for the tree species to be associated with cocoa is guided by economic importance and compatibility with cocoa. The compatibility with cocoa is assessed by farmers through the shade, rooting, microclimate and soil moisture characteristics (Sonwa et al., 2014).

- There is a market for fruits and timber obtained from these systems. Sonwa et al. (2014) estimated that the net returns to management in cocoa agroforests of *Dacryodes edulis*, *Ricinodendron heudelotii*, *Citrus sinensis*, *Citrus reticulata* (orange) and cocoa stood at 194 USD (96,913 FCFA), 42 USD (20,939 FCFA), 33 USD (16,698 FCFA), 125 USD (62,700 FCFA), and 328 USD (164,000 FCFA)/ha respectively in 2002/2003 in Southern Cameroon.

- Tree tenure is addressed. This is because all naturally growing trees that have not been planted in Cameroon belong to the State as well as those planted on private land without a land title (Foundjem-Tita et al., 2013).

- Insect and pests, which could attack cocoa plants and trees, are well managed. As Asare and David (2011) report, adequate shade, maintaining general farm hygiene by weeding, pruning, and mulching as well as spraying the recommended insecticides at the right time combats insects and pests that attacks trees in CALs.

4.4 Scenario 4: cocoa production enhancement through vegetative propagation

This is a cocoa production system, which emphasizes improving the productivity of the cocoa trees through vegetative propagation techniques. These techniques include seeding, cutting, marcotting, tissue culture (somatic embryogenesis), and grafting. Seeding consists of putting a healthy and physiologically sound seed in conditions that will favour its germination and growth into a full plant. Cutting involves putting pieces of stems, leaves or roots in conditions suitable to induce the regeneration of the missing parts into becoming a full plant. Marcotting is a method aimed at stimulating rooting of a branch on
a tree after which the rooted branch is cut from the mother tree, placed in a nursery where it develops leaves and becomes a copy of the mother tree. Somatic embryogenensis is a process by which somatic cells undergo bipolar development to give rise to genetically identical whole plants while grafting is a process in which two plant parts are joined together to form one plant. The technique aims at creating a new plant through the union of a suitable rootstock (which becomes the root system or part of the trunk) and an aerial part of another plant (scion) of the desired variety. All these techniques are possible under the following conditions or assumptions:

- Tree density within the cocoa farm remains constant and cocoa is renewed through vegetative propagation as described above. On average, a plant density of 1,111 cocoa plants per hectare is possible using a planting distance of 3 x 3 m (Asare & David, 2011).
- The strategies, which are put in place for the sourcing of the vegetative materials, are affordable and accessible to farmers. As reported by Asare and David (2011), improved planting materials can be obtained from sources such as farmlands, nurseries of district forest offices, commercial tree seed nurseries, and private tree seed nurseries.
- The appropriate planting distance between the cocoa plants are respected. For instance, Asare and David (2011) recommend a planting distance of 3 x 3 m in Ghanaian context, which, in many cases, has similar features (biophysical, climatic and socioeconomic settings) to that of Cameroon.
- Insects and pests, which could attack cocoa plants, are well managed and the recommendations are the same as the one for the full-sun cocoa growing scenario.
- Other management options (like pruning) within the cocoa farm are respected. Although pruning in mature cocoa farms is done once yearly in the Centre Region in Cameroon (Jagoret et al., 2011), Asare and David (2011) recommend that tree pruning to improve tree health, control growth, and enhance flowering, fruiting, and appearance should be done for the first time 2 to 5 years after planting and thereafter, every 5 to 7 years. Pruning should be carried out towards the end of the dry season to the early parts of the rainy season, before new growth starts while leaving at least 25% of the canopy.

A number of tradeoffs emerge from the scenarios. The baseline scenario is very poor on productivity, but very high overall in biodiversity and carbon sequestration potential. While the full-sun option, being promoted by the government, can have potentially high cocoa productivity and a moderate carbon sequestration potential, it is very poor on biodiversity, diversity of potential incomes sources and therefore farmers could be exposed to risks when cocoa prices drop, including possible vulnerabilities in case of crop failures/diseases. The tree diversified agroforestry systems scenarios, wherein improved tree planting and improved cocoa is done, show potentially moderate carbon sequestration potential, moderate performance for cocoa productivity, biodiversity, and potential tree product income sources. Farmers will choose these options based on their own individual circumstances on the ground.

5. Feasibility of sustainable intensification and diversification pathway choices: incentives analysis

In order to further understand the potential for growth and/or uptake of the options we review the performance of incentive mechanisms in Southern Cameroon. Incentive
mechanisms can be divided into direct and indirect incentives. As Enters (2004) explain, while direct incentives are formulated to have an immediate impact on resource users and to encourage returns to investment in a direct manner, indirect incentives are designed to have an indirect impact on resource users via a change in the overall framework conditions within and outside of a natural resource sector. Some common examples of direct and indirect incentive mechanisms are provided in Table 24.2.

Table 24.2 Examples of different direct and indirect incentive mechanisms (adapted from Enters, 2004).

<table>
<thead>
<tr>
<th>Direct incentives</th>
<th>Indirect incentives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grants</td>
<td>Training</td>
</tr>
<tr>
<td>Tax relief</td>
<td>Extension services</td>
</tr>
<tr>
<td>Subsidized loans</td>
<td>Secured land tenure</td>
</tr>
<tr>
<td>Specific provision of local infrastructure</td>
<td>Credit facilities</td>
</tr>
<tr>
<td>Goods and materials like seedlings and fertilizers</td>
<td>Farm-to-market roads</td>
</tr>
</tbody>
</table>

The purpose of the discussion that follows is to examine incentives mechanisms that have been designed and implemented by key stakeholders to promote sustainable intensification and diversification pathways within CALs in the three case study communities in Cameroon.

5.1 Credit schemes

Agricultural credit schemes assist farmers to acquire basic agricultural tools (like sprayers), improved planting material, and transport facilities. This was the basis for early credit schemes developed mostly for target farmers in Cameroon (Fonjong, 2004). Indeed, right back from the 1960s, through the 1980s, the government financed agriculture in Cameroon through the farmers’ bank, FONADER. FONADER supported small farmers by providing them with credit facilities for increasing agricultural production. The World Bank supported FIMAC (Investment Fund for Agricultural and Communal Micro Projects) scheme was also operational in the 1990s and gave out credit schemes to cocoa farmers operating in the country (Fonjong, 2004). Such incentive mechanisms are very instrumental to facilitate the input-based intensification processes particularly as most of the inputs required are to be purchased from the market either from normal traders or from supplies by the government.

The provision of credit schemes to support and motivate farmers in their quest for engaging in sustainable intensification and diversification pathways within CALs has not been successful in all the three case study areas. Due to financial mismanagement, the operations of the aforementioned financial institutions have all collapsed (Fonjong, 2004). This failure is owed largely to a dearth of understanding of the rural community dynamics in Cameroon, which greatly misguided the provision of these schemes. In the municipality studied, most cocoa farmers relied on the rotatory loan and saving groups (‘tontine’) which are owned and operated by the communities themselves. Therefore, introducing credit schemes, which are new in such areas, may be problematic to smallholder farmers to manage.
5.2 Training

Training and capacity building for the local communities is a key incentive mechanism for enhancing sustainable intensification and diversification schemes in Cameroon. For instance, if farmers are to be engaged in tree-based intensification and diversification schemes (Scenario 3) as well as vegetative propagation based intensification and diversification schemes (Scenario 4), it is crucial that farmers are educated on how to do it because the local extension workers may not always be there to assist. Experiences from the Efoulan municipality indicate that farmers are very interested to learn about such new dimensions of farm renewal as in the case of vegetative propagation for instance. Hence, providing such training would be a good incentive to make use of to bring lasting changes in the way people manage their cocoa farms.

Sponsored by the U.S. Agency for International Development (USAID), the World Cocoa Foundation, the Global Cocoa Industry, the U.S. Department of Agriculture (USDA), and the Food and Agricultural Organization (FAO), the Sustainable Tree Crops Programme (STCP) implemented (between 2007-2011) by the International Institute for Tropical Agriculture (IITA) provided training to cocoa farmers in Ayos and Owe in the municipality of Muyuka through the participatory farmer field school approach on topics related to integrated cocoa and pest management and the management of cocoa nurseries (IITA, 2012). With regards to the latter, the programme distributed improved planting materials to cocoa farmers, as well as cocoa pods to farmer cooperatives to enable them to develop their own nurseries. However, after providing a series of training meetings, they were abandoned with little or no monitoring. As an agricultural technician in the municipality of Muyuka stated, there was “… no real follow-up in the field after the training”.

It is also important that training be based on organized production, innovation, and improved marketing, not on replication alone, as is often the case in local communities with CALs in Cameroon. As Chupezi et al. (2009) explain, training in organized production, processing, and improved marketing of non-timber forest products (NTPFs), like fruits in African communities, can increase the revenue of forest-dependent communities, thus contributing to poverty alleviation.

5.3 Government extension services

Agriculture extension services of the Ministry of Agriculture and Rural Development (MINADER) provides extension workers who disseminate information to rural farmers about proper agricultural practices (like proper soil conservation and seed multiplication techniques), regeneration of old farms, and the importance of agricultural common initiative groups. However, as Fonjong (2004) establishes, the agriculture extension workers that provide extension services to farmers in Cameroon have not only decreased, but the few who are available, work under appalling conditions.

Government and other parastatal continue to overlook cocoa farmers in rural areas of the country and their association with poverty, and what implications this has for sustainable intensification and diversification of CALs. Perhaps nowhere has this been more evident than with the government parastatal SODECAO (Société de Développement du Cacao). In the South Region of Cameroon, SODECAO receives subsidies from the government to produce cocoa seedlings which are distributed to cocoa farmers at reduced prices in the city of Ebolowa situated 32 kilometres from the Efoulan municipality. Between 2012
and 2013, a total of 27,000 cocoa plants were supplied to the municipality of Efoulan. However, because most cocoa farmers in the case study municipality are poor and cannot afford the transport fares to travel to Ebolowa to procure these planting materials, the majority of those who were supplied with these materials were rich and/or average income earners of the public service who are only engaged in cocoa farming on a part-time basis.

5.4 Farm to market roads

If farmers do not have proper access to market for their produces they cannot reap the true potential of their efforts and often they are exposed to selling their products at cheap prices to middle-men (brokers) who take advantage of their efforts. If, for example, farmers chose to adopt vegetative propagation techniques for farm renewal (Scenario 4), their cocoa yield will increase significantly and there is a need for them to access markets to sell their products. This can only happen if there is proper road infrastructure in all three case study sites.

In general, the prevailing state of the roads in the municipality of Ayos, Efoulan, and Muyuka are deplorable. The only tarred road in the municipality of Ayos is a 123 kilometres road that links the municipality to Yaoundé. In Efoulan, all the roads are earth roads with most being seasonal due to poor maintenance. In such poor road conditions it becomes extremely difficult for transporting cocoa to market, which is produced in remote locations. This also discourages fruit tree planting, as products will be largely perishable and susceptible to post-harvest losses. This could, in turn, serve as a disincentive for farmers to intensify their CALs.

6. Summary

The objective of this chapter was to examine options for sustainable intensification and diversification of CALs in Cameroon as a means to reduce deforestation, making cocoa production climate-smart and contributing to Cameroon’s green growth ambitions. Three pathways and or options were identified and analyzed (with respect to the current baseline), namely full-sun cocoa, tree intensified and diversified agroforestry cocoa, and cocoa enhancement and diversification through vegetative propagation. Our analysis showed that cocoa farm renewal through vegetative propagation and the integration of trees (timber and fruits) could simultaneously generate moderate increases in cocoa farms productivity as well as moderate biodiversity benefits, carbon sequestration potential, and income from the cocoa plants and diverse tree products. The full-sun cocoa scenario, currently being promoted by government, could lead to moderate carbon sequestration and potentially double cocoa yields, but at the expense of biodiversity, and increased farmer exposure to risks and vulnerability in times of cocoa crop failures or low cocoa prices. Regardless of which pathways farmers choose, sustainable intensification and diversification will only work if it is accompanied by viable policy incentive mechanisms including technical capacity building, improved delivery of extension services, and improvements in market institutions and infrastructure.

Endnote

1 500 CFA Franc (FCFA) is almost equal to 1 USD
References


KIT Royal Institute, AgroEco/Louis Bolk Institute, & Tradin. (2010). Organic cocoa production in Cameroon and Togo. Amsterdam: KIT Royal Institute, AgroEco/Louis Bolk Institute and Tradin.


