

OIL CROPS AND SUPPLY CHAIN IN AFRICA
LA FILIÈRE OLÉAGINEUSE EN AFRIQUE

Strengths and weaknesses of the smallholder oil palm sector in Cameroon

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Abstract – The present study is an evaluation of the current strengths and weaknesses of the oil palm smallholder sector in Cameroon, or more precisely of the non-industrial sector, as some holdings owned by elites can reach hundreds of hectares. A randomized sample of oil palm producers was chosen after categorization into elites, migrants, natives and company workers (past and present) in four palm oil production basins in the Southern part of the country. 176 semi-structured questionnaires were administered. The production basins included: Eseka, Dibombari, Muyuka, and Lobe. Results from the study revealed that elites owned larger average areas (41.3 ha) than the other categories of oil palm producers. All categories recorded low average plantation yields, ranging from 7 to 8.4 t FFB/ha/year (with minimum yields of 3 t FFB/ha). Though the elites showed better bargaining power and higher income, all categories of producers faced similar problems such as the high cost of inputs with no governmental subsidies, the difficulty in accessing loans with low interest rates and the use of rudimentary working tools. Despite such weaknesses, the sector also demonstrates some strengths such as the ability to impose little threat to the primary forest when compared to agro-industrial plantations, the availability of a domestic and sub-regional market for red palm oil, the availability of artisanal mills with low extraction rates although able to generate more income for the producers. There is a need for governmental policies that will strengthen partnership between small and medium oil palm producers and agro-industries as it was the case during the Fonader period, in order to converge with the poverty reduction strategy initiated by the government of Cameroon.

Keywords: Oil crops / family farming / Fonader / poverty alleviation

Résumé – **Forces et faiblesses du secteur des petits producteurs d'huile de palme au Cameroun.** Cette étude propose une évaluation des forces et faiblesses du secteur des petits producteurs d'huile de palme au Cameroun, ou plus précisément du secteur non-industriel, puisque certaines exploitations appartenant à des élites peuvent atteindre plusieurs centaines d'hectares. Un échantillon aléatoire de producteurs d'huile de palme a été choisi après une catégorisation en élites, migrants, autochtones et employés des compagnies (passés et présents) dans quatre bassins de production d'huile de palme dans le sud du pays. 176 questionnaires semi-structurés ont été traités. Les bassins de production étudiés sont ceux de : Eseka, Dibombari, Muyuka et Lobe. Les résultats de l'étude ont révélé que les élites possédaient en moyenne de plus grands domaines (41,3 ha) que les autres catégories de producteurs d'huile de palme. Toutes les catégories ont des rendements moyens faibles, compris entre 7 et 8,4 t FFB/ha/an (avec un rendement minimum de 3 t FFB/ha). Bien que les élites montrent un meilleur pouvoir de négociation et un revenu plus élevé, toutes les catégories de producteurs sont confrontées aux mêmes difficultés : le coût élevé des intrants en l'absence de subventions gouvernementales, la difficulté d'avoir accès à des prêts à de faibles taux d'intérêt ou l'utilisation d'outils de travail rudimentaires. Malgré ces faiblesses avérées, le secteur montre aussi quelques forces comme sa capacité à peu menacer la forêt primaire comparativement aux plantations agro-industrielles, l'existence d'un marché domestique et sous-régional pour l'huile de palme rouge et de moulins artisanaux avec des taux d'extraction bas mais néanmoins capables de générer davantage de revenu pour les producteurs. L'intervention publique s'avère nécessaire pour renforcer le partenariat entre les producteurs de petite et moyenne taille et les agro-industries – comme ce fut le cas pendant la période Fonader – afin d'atteindre l'objectif de réduction de la pauvreté affiché par le gouvernement du Cameroun.

Mots clés : Huile de palme / agriculture familiale / Fonader / réduction de la pauvreté

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1 Introduction

The oil palm (*Elæis guineensis* Jacq) originates from the gulf of Guinea, where it grows spontaneously in the wild. Palm oil and kernel oil are two products from oil palm with a range of uses in both the cottage and downstream industries and almost all the oil palm by-products are known to be utilized. The hybrid *tenera* type produces the highest oil yield, up to eight times higher than other vegetable oil crops like soybean, sunflower or rapeseed (Jacquemard, 2012).

For centuries, farmers in the forest zone of Cameroon have been harvesting wild oil palm groves with the purpose of producing palm oil, kernel oil and palm wine. Some farmers collected oil palm seedlings (of *dura* type) that germinated spontaneously in the forest to plant them in their farmland. It is only in the late 1970s that the government of Cameroon came up with a policy to develop the smallholder oil palm sector with some funding assistance from the World Bank. The fund controlled by Fonader (National Fund for Agriculture and Rural Development) provided cash to CDC, Socapalm and Pamol companies; these were the three agro-industrial companies selected by the government to develop 2 to 5 ha of oil palm plantations for land owners who met the selection criteria for the project. The companies were responsible for developing these plantations with quality planting material, the timely supply of inputs and permanent technical advice. In return, smallholders were supposed to supply their harvested fresh fruit bunches (FFB) to the agro-industries in order to pay back the development cost. Between 1978 and 1990, a total area of 35 000 ha of oil palm plantations were developed for oil palm smallholders (Carrere, 2010). After the collapse of Fonader in the early 1990s, the financial support of the smallholder oil palm sector was left in the hands of agro-industries only. With the hit of the economic crisis, the devaluation of the Franc CFA and the structural adjustment program instituted by the international monetary fund (IMF), such agro-industries were no longer able to provide the necessary assistance to smallholders.

Though the Fonader program targeted smallholders, the project was most often diverted by elites who managed to develop large private estates. Therefore, the usual term “smallholder plantation” is misleading in Cameroon as it includes individually owned holdings ranging from 1 to 500 ha or more. Even if RSPO (the Roundtable on Sustainable Palm Oil – www.rspo.org) defines smallholders as farmers with less than 50 ha of oil palm, other studies consider the smallholder upper limit with a 5 ha threshold. The usual French term of “*plantations villageoises*” is equally misleading as it infers that the plantations are owned by the village or the villagers. Thus, the most appropriate wording would be “non-industrial oil palm plantations”. For greater convenience we will hereafter use “palm oil producers” when referring to all kinds of non-industrial plantations. A new generation of palm oil producers emerged during the 1990s. These independent producers used to self-sponsor the development of their plantations, on larger planting areas as compared to the first generation of smallholders developed by Fonader (Elong, 2003; Bakoumé, 2006; Levang and Nkongho, 2012). From this period to date (*i.e.* 23 years) these two generations of palm oil producers have been left alone with very little support from both the government and the private sector.

Despite the favorable agro-ecological conditions of the country, Cameroon is only sitting at 13th world rank in terms of oil production, with a total production of 230 000 t of crude palm oil (CPO) from 190 000 ha exploited by both agro-industries and small and medium holdings. Two thirds of this area are in the hands of individuals but they provide only half of the total production because of very low oil yields (<1 t CPO/ha/yr). Such low yields are not restricted to the non-industrial sector only. For various reasons companies like CDC and Pamol cannot produce more than 2 t CPO/ha/yr. In Indonesia, smallholders reach much better yields (3 to 3.5 t CPO/ha/yr) with guaranteed purchase ensured by agro-industries (Feintrenie 2012a; Hoyle and Levang, 2012).

Cameroon has a huge domestic and sub-regional market for crude palm oil, but the country is still a net importer of CPO (50 000 t in 2011). According to Ngando *et al.* (2011), 80% of Cameroonians consume red palm oil of which 30% is produced by artisanal mills. According to Carrere (2010), the advantages of these oil palm smallholdings are numerous, since they can guarantee producers a stable income, they foster land tenure security and they strengthen the monetization of the rural areas, thus generating development. The present study aims at assessing the sector with special emphasis on its present strengths and weaknesses and it proposes ways to overcome/solve the problems.

2 Methodology

Our field survey was carried out in four of the seven industrial mill supply basins carved out during the Fonader-sponsored development project, which were selected after a preliminary field study. The four palm oil industrial mills considered in this study cover the two public companies (Pamol and CDC) and two mills of the Socapalm private group, which is for the time being the only private industry of the sector in Cameroon with productive plantations and mills. Thus our sample covers the variety of situations of the industrial palm oil sector in Cameroon. The four studied zones are namely: 1 = Eseka; 2 = Dibombari; 3 = Muyuka and 4 = Lobe (*Cf.* Fig. 1). They are located in the Centre (Eseka), Littoral (Dibombari) and Southwest regions of Cameroon. These regions show the densest presence of oil palm, thus the sampling can be considered as representative of oil palm production in the littoral belt of Cameroon.

Previous studies have stressed the massive involvement of elites and company workers in oil palm development, especially after the collapse of the Fonader-sponsored scheme in the 1990s (Elong, 2003; Obam and Tchongang Goudjou, 2011; Levang and Nkongho, 2012). Under this framework we decided to categorize producers into, namely: villagers (or natives); non-natives (or migrants); company workers (past and present); elites (internal and external) according to the following criteria: income level; social status; place of origin, past and present work with any of the oil palm agro-industries. A check-list provided by the agro-industries was used to generate a stratified and randomized sample in each of the visited zones. This sampling method was found to be necessary because the population of palm oil producers is heterogeneous and

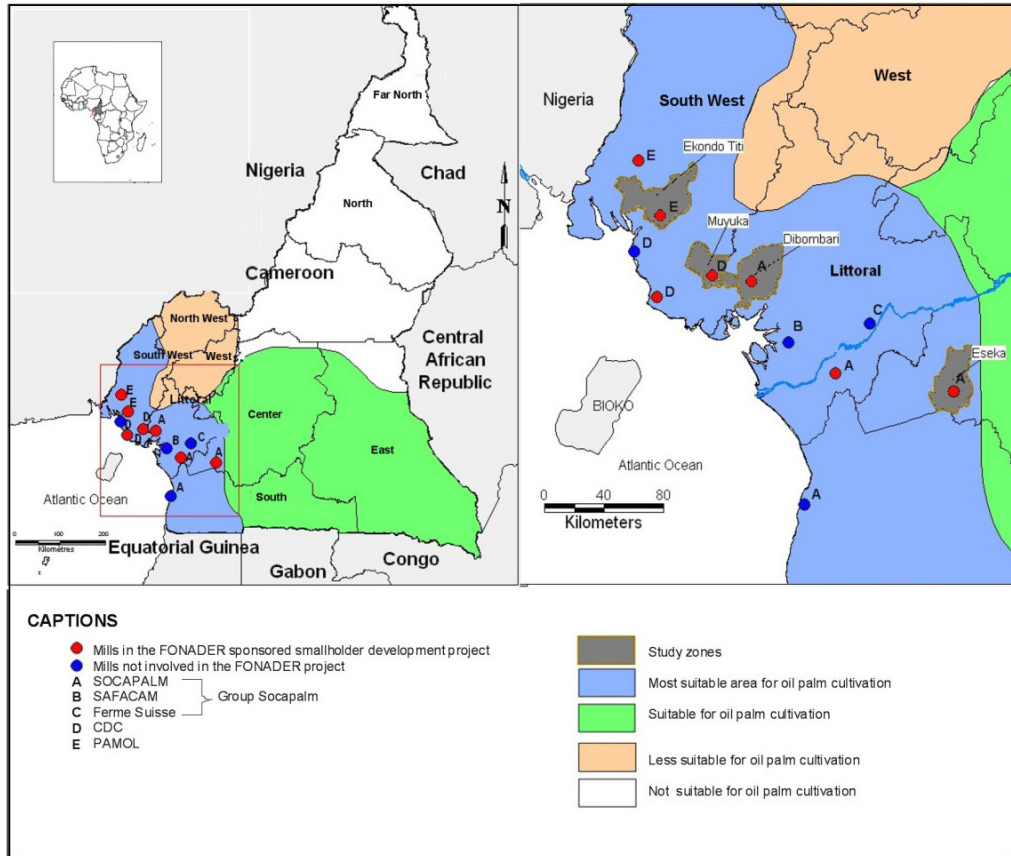


Fig. 1. Localisation of study sites in Cameroon (map by Mamadou Farikou, CIFOR).

as such, we needed to divide the population into subgroups. Once each subgroup was determined, a randomized sampling strategy was designed independently. The collection of primary data was performed through semi-structured individual interviews, as well as semi-guided discussions. A total of 176 individual interviews were undertaken among the four categories of palm oil producers and they were distributed as follows: villagers (natives): 44 interviews, non-native (migrants): 51, company workers (past and present): 40, and elites: 41. Secondary data were collected from Cameroon development corporation (CDC), Pamol and Socapalm companies, together with semi-guided discussions with 45 company officials from the rank of supervisor to managerial staff whether in active service or retired, researchers in Pamol and La Dibamba (IRAD) research stations, the non-industrial oil palm department in the Ministry of Agriculture and Rural Development (Minader), as well as from literature review.

3 Results

3.1 Characteristics of palm oil producers

We found that 97.2% of the sampled producers were household heads, 2.8% being non-household heads, with 93.8% of males and just 6.2% of females owning oil palm plantations. A few younger and a majority of older persons made up the population of palm oil producers under study

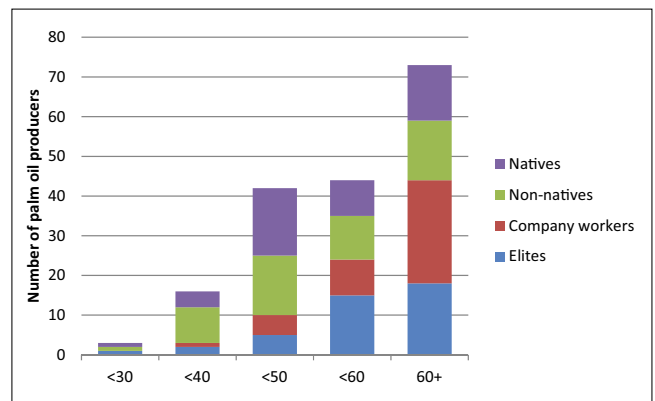


Fig. 2. Age distribution of different types of palm oil producers.

as shown in Figure 2. Access to capital and customary rights to land are major constraints to the younger and female populations. As far as educational level is concerned, 52.2% of the respondents were primary school leavers, 9% had reached secondary school, 15.7% high school, and 23.1% were university graduates. The distribution of educational level per type of palm oil producer is shown in Figure 3. Thus educational level was not a limiting factor in the owning of an oil palm plantation, although it could play an important role in terms of access to information for a better management of the plantation.

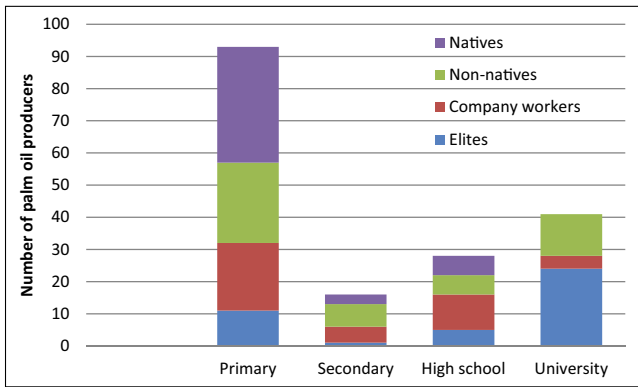


Fig. 3. Educational level of different types of palm oil producers.

3.2 Sources of income for palm oil producers

The main occupation of palm oil producers under study was found to be distributed as follows:

- Farming: 45.5%.
- Salaried worker: 19.7%.
- Retired worker: 21.3%.
- Trade: 7.3%.
- Others: 6.2%.

3.3 Differentiated access to land

The elites recorded the largest average area under oil palm per household (41.3 ha), with the natives recording the least (8.7 ha). With respect to undeveloped land, elites still recorded the highest average surface per household (15.1 ha), with the non-natives recording the least (3.9 ha) as shown in Table 1. The elites category, when compared to others was found to benefit from customary rights, more income and better bargaining power, not only to develop plantations but also to acquire more land in their area of origin.

3.4 A limited conversion of primary forest

Previous land cover refers to the original vegetation cover that existed before the land was converted into oil palm plantation. The previous land cover before conversion to oil palm cultivation was distributed as follows:

- Primary forest: 3.9%.

- Secondary forest: 66.9%.
- Former plantation land: 17.4%.
- Former food crop land: 19.1%.

In the sampled population, 68% of the respondents bought land for the cultivation of oil palm, 33.1% got land through inheritance and 2.2% through donation. The price for a hectare of land in the major oil palm production basins ranged from 304.9 to 609.8 €/ha in Mundemba/Lobe, 510.7 to 762.25 €/ha in Dibombari, 533.57 to 838.47 €/ha in Eseka and 1 143.37 to 3 353.88 €/ha in Muyuka. Concerning the origin of capital for the cultivation of oil palm, 83.6% of the respondents got their capital through personal savings, 28.8% through bank loans, 4% through cooperatives and 3.4% through government grants.

3.5 Management of oil palm plantation

Apart from the cost incurred to purchase a piece of land, the producer needs 1295 to 1733 € for the establishment and upkeep of one hectare of oil palm plantation during the first 4 years before the plantation enters into production. The nursery could either be a “single” or “double” stage nursery. In a single stage nursery, seeds are planted in large polyethylene bags and cultivated until maturity in bare sunlight. While a double stage nursery involves the sowing of seeds in small polyethylene bags usually placed under shade and after 3–4 months the seedlings are transferred to larger polyethylene bags and then they are gradually acclimatized to bare sunlight. Nursery operations include filling of polyethylene bags, sowing of seeds, daily watering, weeding, monitoring of pests and diseases, culling, application of inputs (fertilizers, insecticides and fungicides). Field operations performed during the establishment phase (first 4 years) include: forest under-brushing, felling and burning, lining and holing, purchase of oil palm seedlings, transportation of seedlings to planting site, planting and protection of plants from rodents with the use of either wire mesh, bamboo, or used milk containers. Burning is still the rule, because it reduces the cost of field establishment and helps to reduce the population of *Oryctes* beetles during replanting (Jacquemard, 2012). Globally, burning practices release carbon into the atmosphere with very detrimental effects on global warming. Field maintenance activities include: strip slashing and eradication of harmful weeds, ring weeding, purchase and application of inputs (fertilizer, fungicide, pesticide, and herbicide), ablation of early bunches to foster vegetative growth, harvesting and pruning, collection and transportation of fresh fruit bunches.

Table 1. Average surface areas (ha) per category of producer.

	Average oil palm plantation surface area (ha/household)					
	Young palms	Mature palms	Old palms	Developed land	Undeveloped land	Total land ownership
Elite	6.8	21.1	13.4	41.3	15.1	56.4
Company worker	1.4	5.4	18.0	24.8	6.7	31.5
Non-native	2.0	10.1	8.6	20.7	3.9	24.6
Native	1.7	3.5	3.7	8.7	12.5	21.2

Source: 2011 field survey (Nkongho).

Only 35% of the respondents have declared using certified planting material only, the remaining 65% planted a mixture of both *tenera* and native unselected oil palms in their plantation. In Cameroon, two institutions (IRAD La Dibamba and Pamol Lobe) are specialized in the production of quality planting material for both agro-industries and individual producers, with selling price ranging from 0.3 to 0.45 € for dry seeds and from 2.29 to 4.34 € for seedlings. “*Fusarium* wilt tolerant” seeds are available although they are more expensive (at Pamol research unit in Lobe it is sold at 0.38 €/seed, while at La Dibamba research center it is sold at 0.45 €/seed).

From the palm oil producers’ population under study, 68% of the respondents could not afford to use fertilizers on their farms, 30.9% did uneven applications, and 1.1% only undertook timely fertilizer application. With respect to the different types of palm oil producers, only 4% of elites actually used timely fertilization.

Weed control represents an additional cost for the palm oil producer during both the immature and productive stage of plantation. From the sampled population, 99.4% undertook weed control at the pre-productive stage of their plantation manually, 65.7% through intercropping with other food crops, and 19.7% through the use of herbicides. The recorded total was higher than 100% because producers used more than one strategy for weed control. At mature stage, 100% of the sampled producers did control weeds manually, while 51.7% were able to occasionally use herbicides. Contact herbicides are preferably utilized when the palms are immature and systemic herbicides when palms are already mature. The cropping system adopted by a majority of producers also differs from that of agro-industries, which is monospecific only.

Major diseases affecting nursery palms included *Cercospora* leaf spot, Anthracnose and Blast, all of fungal origin. Field palms were most affected by *Fusarium* wilt, *Ganoderma* bud rot, and the leaf miner (*Coelaenomenodera minuta* uh.). Rodents could also ravage juvenile oil palms if care was not taken. We found that 46.6% of respondents reported the occurrence and severity of pests and diseases in their plantation to be insignificant, 49.4% reported the incidence and severity to be moderate and just 2.8% reported the incidence and severity to be high.

Palm oil producers responded positively on the availability of some rudimentary working tools, but they complained about the sharp increase in prices and the conspicuous unavailability of quality “Malaysian” knives for harvesting bunches. This has forced palm oil producers to rely on the use of locally-made harvesting knives, which can be purchased at 121.1 to 152.45 € when mounted on a pole.

Production yields from non-industrial plantations were found to range from 3 to 11 t of fresh bunches per hectare per year as the palms enter their maturity period. The yield range mentioned above was calculated from the age of the palm, an estimate of the number of bunches harvested each month during the peak (from January to June) and low production seasons (July to December), as well as the average bunch weight. The average yield recorded from field survey for the different types of producers was found as follows:

- Elites: 8.4 t FFB/ha/yr.
- Current/Former company workers: 8.1 t FFB/ha/yr.

- Non-native (migrants): 7.3 t FFB/ha/yr.
- Native (villagers): 7.0 t FFB/ha/yr.

Elites and company workers generated slightly better yields reaching 8.4 t and 8.1 t, respectively as compared to the migrants and natives. Such a difference is possibly due to an easier access to quality planting material and a better plantation management. Recorded differences per type of producers were not that big, probably because of the absence of timely fertilization.

3.6 Labor

Regarding labor, 24.2% of the producers used family labor, 29.8% hired native workers, and 94.4% hired migrant workers originating from other regions of the country, with a total exceeding 100% because more than one type of labor was used. The Northwest followed by the Northern regions of the country were found to supply most of the migrant workers in non-industrial plantations throughout the country, while 3.4% hired foreigners (mostly Nigerians). The family labor (which comprises the head of household, his wife, children and extended family) is mostly used when the size of the farm is relatively small (0 to 5 ha). Family labor undertakes almost all the farm operations except the most sensitive ones, such as harvesting and pruning which need to be devoted to hired labor if proper know-how is not available in the family. As the farm gets bigger, the producer recruits a permanent work force. Temporary workers are hired occasionally when the workload in the farm is excessive, in order to perform specific operations especially during the peak season.

When the stability of work force was considered, we found that 90.4% of palm oil producers used non-permanent work force, 9.6% used permanent work force and only 1.1% of this permanent work force was officially registered to the national social insurance fund (CNPS) in order to benefit from social security and pension schemes. The absence of social security and fluctuations in farm operational costs from one plantation to the other resulted in a high mobility of workers. Indeed, workers are always ready to move from one farm to another, looking for better and prompt wages. This trend is observed amongst both the native and non-native categories of workers.

A total of 41.6% of the sampled producers were registered members of cooperatives or common initiative groups (CIG), but the bargaining power of most of these groups for quality planting material, fertilizers and pesticides, as well as the possibility to obtain loans from financial institutions was not felt by most of the respondents.

3.7 Economic performance

From the sampled population, only 25.6% of the producers sold their fresh fruit bunches (FFB) exclusively to an industrial mill; 27.3% either sold their FFB to industrial mills or to artisanal mills depending on the season and quantities harvested; 47.2% exclusively processed their FFB in artisanal mills (personally owned or not). Given that one ton of FFB, which is sold for between 64.03 to 76.22 € to an industrial mill can

Table 2. Variable costs incurred for the processing of one ton of oil palm FFB in an artisanal mill.

Operations		Peak season (in €/t FFB)	Low season (in €/t FFB)
FFB purchase		61 €/t	76 €/t
Transportation		11 to 18.1 €/t	11 to 18.1 €/t
Labour charge		2.3 × 5 drums=11.5 €/t	2.3 × 5 drums =11.5 €/t
Milling charge		3.04 × 5 drums=15.2 €/t	3.04 × 5 drums=15.2 €/t
Total expenditure		98.2 to 106 €/t	114 to 121.2 €/t
Price of palm oil/Liter		0.76 €/L red oil	1.22 €/L red oil
Gross profit		114.4 €/t FFB	183 €/t FFB
Net	Middleman	8.4 to 16.0 €/t FFB	61.7 to 69.4 €/t FFB
Profit	Palm oil producer	69.4 to 77 €/t FFB	138 to 146 €/t FFB

Source: Field survey 2012 (Nkongho).

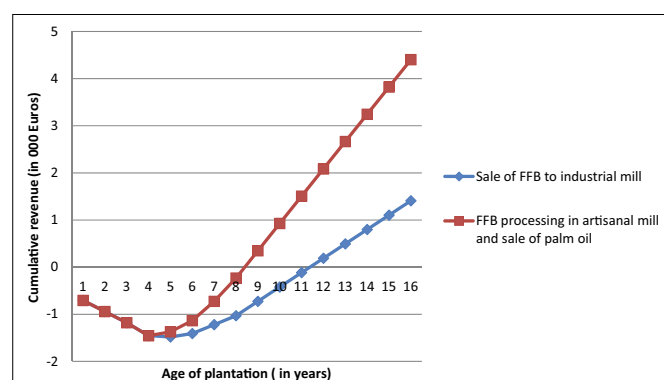


Fig. 4. Cumulative revenue (€/ha) derived from the sale of FFB and red palm oil.

also be processed in an artisanal mill into 150–200 L of crude palm oil, at a price of 0.76 and 1.22 €/L (during peak and low season, respectively), a middleman can incur 121.2 € as total expenditure (FFB purchase, transportation, labor and milling charge) for one ton of processed FFB during the low production season and mills 150 L; if he happens to retail during this period at 1.22 €/L, he is then able to make a 182.94 € gross profit, or a net profit of 61.74 €/t FFB. Meanwhile the palm oil producer who also performs the same activity in an artisanal mill will get a lot more profit (69.36 to 145.59 €/t FFB) than the one who decides to sell his FFB to any of the aforementioned companies (Tab. 2). This explains why most of the producers prefer to process their FFB in an artisanal mill especially during the low production season. Most artisanal millers do not sell their palm oil when prices drop, they prefer to keep it and sell when market prices are up.

Results presented in Figure 4 show that palm oil producers who harvest their FFB and process it in an artisanal mill are able to get some net positive income from the 8th year and that they also make a higher profit. Meanwhile, their counterparts who supply FFB to the industrial mill exclusively are able to earn money as from the 11th year with comparatively lower income.

4 Discussion

4.1 The strengths of the sector

The oil palm non-industrial sector in Cameroon provides a potential source of income, employment and development especially in the rural settings. The cropping system adopted by most producers which involves the intercropping of oil palm together with some food and cash crops at the early plantation stages helps to minimize environmental changes induced by artificial monospecific systems; it prevents soil erosion, optimizes the utilization of different soil nutrients and enhances food security (Bakoume, 2006; Tonye *et al.*, 2004). But this intercropping system does not last long as the plantation finally recovers its monospecific status when productive stage is reached. Worst still, if a better intercropping method is not implemented (which takes into account the choice of crops to intercrop with oil palm, temporal and spatial design in planting, as well as best management practices), this might have a negative effect on the yield of oil palm at production stage, mainly because of competition for water and soil nutrients.

Palm oil producers can achieve better profit margins especially when value is added to their FFB through the artisanal extraction of oil. Fournier *et al.* (2000) showed that artisanal milling of FFB is one of the most profitable activities for Beninese women. According to Feintrenie (2012b) the artisanal transformation of FFB also provides an opportunity for income to widows and single women, who have poor access to land.

The sector benefits from the presence of a domestic and sub-regional market even if some fluctuations in the market price occur for palm oil, depending on the season of production. The price of crude palm oil from agro-industries to downstream industries is regulated by the government at 0.69 €/L, whereas there is no regulation on red palm oil produced from the artisanal sector.

Today the non-industrial oil palm sector is believed to cause little threat to the primary forests, although very limited regulation have been put in place by the government in order to mitigate the effect of oil palm development on the environment. A majority of producers' holdings are located in areas which were formerly occupied by secondary forest.

4.2 Weaknesses of the sector

The dominant aging population in the sector is a concern. Oil palm cultivation should be made more attractive to young farmers and entrepreneurs through the provision of land and financial incentives, and the formulation of better policies that would help in limiting rural exodus. Fonjong (2004) reckons that the fight against poverty and the drive towards food sufficiency by the Government of Cameroon remains a fallacy given the collapsing state of agricultural infrastructures in the country.

The availability of a capital to invest in oil palm plantation remains a major obstacle, as very few smallholders are able to collect such a huge amount of money (1 295.82 to 1 733.35 €/ha), excluding the price for the purchase of a hectare of land. Furthermore, very few institutions are willing to lend money to producers at low interest rates with a no-refund period of 3 to 4 years which is necessary before the palms give fruits (Bakoumé *et al.*, 2002; Rafflegeau, 2008). The absence of any specialized bank (for agricultural investment which would lend money to farmers in Cameroon is a major problem (Nghah, 2011). According to Dimelu and Anyaiwe (2011) the bulk capital utilized by palm oil producers comes from personal savings or informal sources, and this capital is inadequate for sustainable production. International and domestic banks provide large loans to agro-industries, but they do not target private palm oil producers.

The lack of an appropriate policy from the Government also reveals the stagnation in productivity of the sector. At present, no fertilizer manufacturing plant exists in the country, thus there is heavy reliance on imports with no subsidy in the cost of inputs. Most producers record very low yields in their plantations (Lebailly and Tentchou, 2009; Ngom, 2011). Rafflegeau *et al.* (2010) described oil yields ranging from 2 to 14 t of FFB/ha/year in non-industrial plantations in Cameroon depending on the age and management capacity of the producer. Such low yields are also partly a consequence of the four months of drought experienced in the course of the year (Ngoko *et al.*, 2004).

The relationship between palm oil producers and agro-industries is no longer the same as it was during the first oil palm development plan in the late 1970s. Today, because of the success of artisanal mills and the profit margin obtained from processing fruits, very few producers are depending on the agro-industries for the supply of FFB. More, such companies now provide very little assistance to attract producers. This is in conformity with previous studies by Hirsch (2000), which revealed that producers prefer to process part (or all) of their FFB in order to make more profit. Under fair partnerships between palm oil producers and companies, oil palm could be of more benefit (Skurtis *et al.*, 2010).

4.3 Learning from other countries

The FONADER scheme is very similar to the nucleus estate and smallholders scheme (NES) developed in Southeast Asia and more specifically in Indonesia. The same criticisms are made on the bad treatment reserved to migrant workers living in the estates or working for sub-contracted companies,

and on the smallholders in partnerships who are often considered as captive producers assuming all the risks related to agricultural production (Elong, 2003; Carrère, 2010; Feintrenie *et al.*, 2010). In Indonesia, there is no traditional knowledge of artisanal oil production, thus oil palm growers are dependent on industrial mills to buy and process their FFB, which makes the main difference with Cameroon (Feintrenie, 2012a). In the regions where several palm oil industrial mills are present, FFB producers and middlemen can negotiate FFB price at mill gate, benefiting from the competition among mills. On the opposite, in regions where one oil palm company has a monopoly for buying FFB, the price is decided by the mill, even though based on a formula taking into account the CPO price on the world market and validated by the provincial authorities. In the Indonesian NES model, credits proposed to contracted-smallholders are paid back through a direct withdrawal by the company on the payment of FFB. If under a mill monopoly there is no chance for a smallholder to escape from his debt, although in situations where there are several mills, this risk is limited by the organization of contracted smallholders as cooperatives closely working with the company. On the opposite, the presence of the artisanal palm oil sector and the domestic oil production in Cameroon opens a window for contracted-farmers not to respect their contract, and sell their production out of the mill without paying back their debt (Feintrenie, 2012a).

Another pattern of industry-smallholders partnership is being developed in Colombia under the name of "Alianzas". Alianzas are based on a joint-venture between an oil palm company which builds a mill and owns an industrial plantation, and individuals who join the partnership with their own land and become shareholder of the mill in proportion to the surface of their land. The involved company benefits from both some financial help under favorable conditions under the supervision of the government and from a secure supply of FFB. The individual FFB producers benefit from technical assistance, access to credit, access to inputs at better prices, and the organized collection of FFB at plantation gate (FEDEPALMA, 2010). In this business model, the joint-venture covers both the plantation and the mill, which creates an interest for the contracted producer in the economic results of the mill, and thus a motivation not to sell his/her FFB to another mill. This model opens new areas of interest in the search for an adequate business model for Cameroon's oil palm development.

4.4 What can be improved upon?

According to Bakoumé (2006) the non-industrial oil palm sector in Cameroon needs assistance from the Government and planters must organize themselves into active groups/cooperatives in order to overcome many constraints that limit oil palm profitability, and thus their contribution to the increase of national production.

Donough *et al.* (2009) and Jannot (2010) emphasized the need for better management practices and the use of degraded land as ways to improve yield and avoid further encroachment into the forest. Durand-Gasselín *et al.* (2010) advised plant breeders to focus on yield and life cycle improvement of the plantation and selection for resistance to diseases as

factors that improve the sustainability of the crop. Caliman *et al.* (1994) stressed the need for precise, accurate and reliable leaf and soil analyses as a prerequisite for better and smarter fertilizer use. According to Etta *et al.* (2007) the composting of palms with empty fruit bunches and the concomitant decrease in the use of inorganic fertilizers can greatly improve oil yields while maintaining soil physico-chemical properties.

The recent interest of large oil palm companies from Southeast Asian countries to the Congo Basin and particularly in Cameroon can be a blessing or a curse for the village plantation sector. If the Government allows these companies to settle while following an agro-industrial classic model with no integration of individual growers to plantation projects, family farmers, villagers and elites will be quickly marginalized because they are unable to compete with efficient agro-industries. On the contrary, if the Government submits the granting of land to companies with the integration of a large number of contracted palm oil producers following a business model adapted from the Nucleus Estate and Smallholders scheme and the Alliances, it will use palm oil production at its full potential for poverty reduction and agricultural development.

At the Government level, urgent measures will be to subsidize the cost of quality planting materials and inputs for oil palm smallholders and to make loaning opportunities affordable for farmers.

At the R&D level, there is a need for further studies on yield improvement, on better ways of associating oil palm and other food and perennial crops that will not limit the yield of oil palm at production. Research must also focus on ways of fostering better working relationship between oil palm smallholders and agro-industries and on the effects of land grabbing for oil palm cultivation by local elites.

5 Conclusion

In Cameroon, the strengths of the non-industrial oil palm sector include the provision of income, jobs and the monetization of the rural setting, the installation of artisanal mills which add value to FFB, the availability of a domestic and sub-regional market for the sale of red palm oil, intercropping for subsistence and income, with little threat imposed by the sector to primary forests if compared to the agro-industrial sector.

The weaknesses of the sector include the dominance of an ageing population, the absence of loaning opportunities, high cost of inputs with no subsidy from the Government and the absence of ruled and balanced partnership between oil palm producers and the agro-industries.

Our study recommends the establishment of public policies that will not only address the burning issues presented above, but also should be able to meet up with the poverty reduction strategy put in place by the government of Cameroon for 2035, without jeopardizing the conservation of environmental resources.

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