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Smallholder oil palm value chain in Cameroon: a case study from the Department of Sanaga-Maritime

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Introduction

Palm oil, with an annual global production of 50 million tons, equating to 39% of world production of vegetable oils, has become the most important vegetable oil globally, greatly exceeding soybean, rapeseed and sunflower (Hoyle and Levang, 2012). More than 14 million hectares of oil palm have been planted across the tropics.
The first industrial plantations in Cameroon were established in 1907 under German colonial administration in the coastal plains around the Littoral Region (in the Department of Sanaga-Maritime). The crop was further developed under the Franco-British regime until 1960 when it had reached an estimated production of 42,500 tons (Hoyle and Levang, 2012). Besides the European plantations, colonial administrator encouraged the establishment of smallholder plantations by the local communities (Ndjogui et al., (Forthcoming)).After Independence, the government of Cameroon took over the production of palm oil with the creation of public sector companies like *Société des Palmeraies* (which later became SOCAPALM), PAMOL and CDC (Cameroon Development Corporation).In Cameroon, the production of oil palm is stratified in three sectors: an agro-industrial sector, smallholders in contract with agro-industries and traditional independent smallholders (Bakoumé et al, 2002; Hoyle and Levang, 2012).According to Ngom, (2011) smallholders represent more than 75% of oil palm growers, but most of them do not have access to good quality seedlings, use little inputs, and sell their fruits to artisanal millers. Consequently, the return to land of smallholdings is quite low compared to the Indonesian plantations with about 300 €/ha/year in Cameroon, against 800 to 2900 €/ha/year in Indonesia (Iyabano, 2013; Feintrenie 2012).

Material and Methods

Systemic approach, based on the farms typology was the method adopted in this study. Three main criteria were defined in classifying oil palm plantations: the geographical location of the farmers, the size of the farm and finally the cropping system employed. Moreover, only one criterion was used in the analysis of oil palm millers; this is the type artisanal press used which can be manual or motorized.
Data were collected through field survey that involved distribution of pre-structured questionnaires to a sample of 60 actors purposively selected (that is 30 farmers and 30 artisanal millers). The data collected were analysed using Olympe software. The Olympe software was developed by INRA/IAMM/CIRAD to model and simulate how farming systems function. It allows the simulation of the impact of crop choices and decisions on the attribution of the major production factors (land, labour, capital) over a period of 10 years and more.

This farms modeling tool allows the simulation of labour needs and the forward looking analysis on incomes (economic performances) according to the technical choices (Deheuvels and Penot, 2007).

Results and Discussion

- **Smallholding oil palm plantations**

Three types of village plantations were identified based on the above criteria, they are defined as: family farms (type 1) with less than 5 ha; rural investors' farms (type 2) where the size varies between 5 to 10 ha and finally urban investors' farms (type 3) with areas ranging from 10 to 200 ha).
Figure 1 shows the evolution of the productivity of a hectare of land in a family farm (type 1). The vertical axis represents the annual productivity of the land in FCFA/ ha, the x-axis represents the number of years after the establishment of the farm. The "Palm nuts" curve shows the productivity of the land for oil palm, the "Oil Palm" curve gives the productivity of red oil, and the 'Food crops' curve shows the result of land productivity for selling food crop.

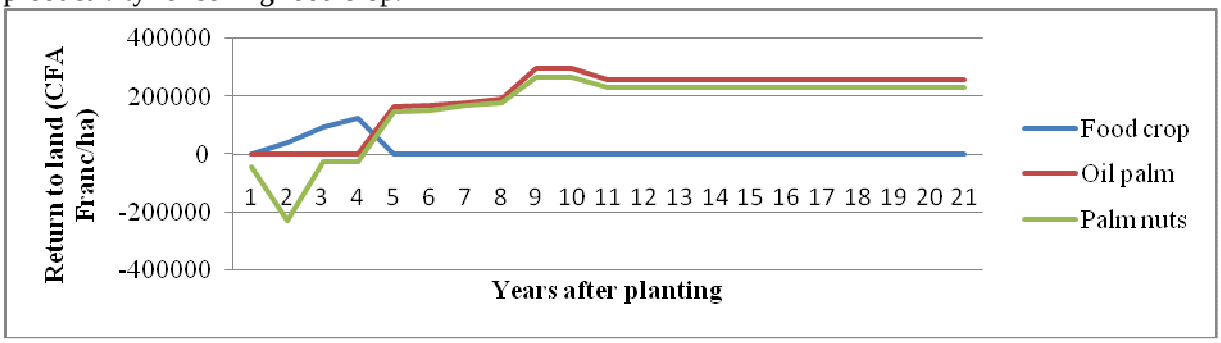

Fig.1. Evolution of the productivity of the land in a family palm (source: Iyabano, 2013)

The land productivity of oil palm and food crops undergoes a reverse trend in the sense that the first two years were marked by a positive productivity for food crops and negative regarding the palm trees. The positive value of food crop productivity is related to the production and marketing of these products. Associated crops allow farmers to diversify their source of income during the first two years after setting-up the farm and help to fight against weeds by covering free spaces in the plantations. The negative value of the productivity of palm in the first two years is linked to the cost involved in establishing oil palm trees (seedlings and labour costs) and the absence of nuts production due to the growth phase of oil palm trees. This productivity will follow an increasing trend from the fourth year till tenth year after planting (maturity of the oil palm trees).

The curve representing the land productivity of the oil palm in a family farms (type 1) can be divided into three main stages:
• An installation stage during the first three years after planting. It is at this stage that some farmers intercrop oil palm trees with food crops (mainly maize, cocoyam and cassava) for both household consumption and commercial purposes);
•The rapid growth stage of the oil palm production. It is marked by a rapid increase in the performance of palm trees (beginning of the nuts production) from the fourth to the tenth year;
•The third stage is the period of full maturity, with a stabilization of productivity (from eleven to thirty years). In general, the operating life of a palm can go beyond 30 years.
The average annual margins are 208,725 FCFA / ha (318 € / ha) and 235,630 FCFA / ha (€ 359 / ha) respectively for selling palm nuts and oil palm. For small farmers, selling oil palm thus provides an additional benefit of 26,905 FCFA / ha (41 € / ha).
Figure 2 compares the productivity of land in three types of smallholdings oil palm plantations.

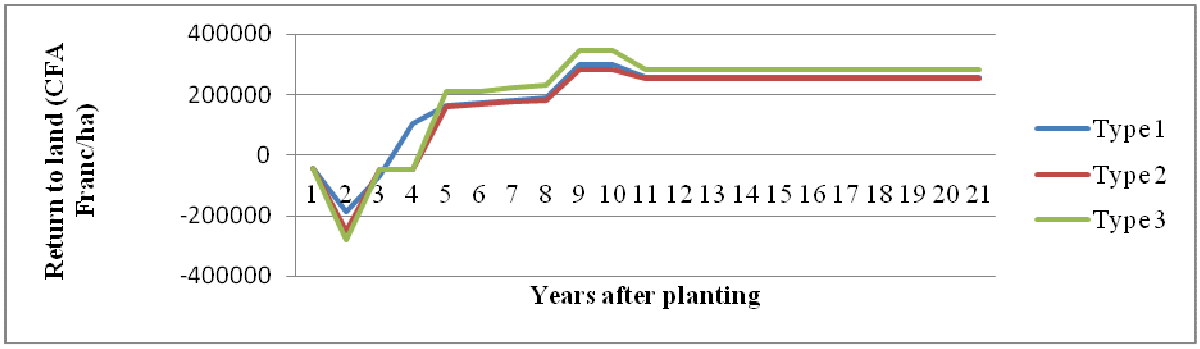

Fig.2. Comparison of the productivity of the land of the three types of plantations (source: Iyabano, 2013)

The curve representing the land productivity of the oil palm follow the main evolution path for all smallholdings oil palm plantations (types 1, 2 and 3): the installation stage, the rapid growth stage and finally the maturity stage.

The highest margins/ha are observed in type 3 plantations (urban investors), followed by family farmers (type 1), and finally rural investors (type 2). Margins of family farmers (type 1) are higher than those of rural investors (type2) due to the integration of sales revenue of food crops during the first three years as well as the sale of palm oil. When comparing the margins to average areas of oil palm plantations, we realized that investors (both types 2 and 3) have the highest margins as compare to family farms (type 1). Indeed, the average area of palm encountered is 2, 7 and 73 ha for farms types 1, 2 and 3 respectively.

- **Artisanal milling**

Before the advent of artisanal mills, smallholders had wild varieties that they processed using traditional methods, either by pounding cooked fruits in large wooden or concrete mortars with wooden pestles or by foot-trampling (Nchanji et al; 2013). The oil was extracted by pressing the pounded nuts with the aid of a bag and a stick. The agro-industrial corporations later introduced the improved variety wherein the smallholders had an agreement to supply their produce to them at a cost that varied with the area and corporation (Nchanji et al; 2013). As time went on, production increased and often the corporation could not meet up with the processing of all palm nuts from smallholder farms. This occurred because accessibility to some farms also hindered transportation. It became a cause for concern to the smallholders and they devised a means to curb the losses and generate more income from processing of palm nuts to palm oil. It was based on this precept that they resorted to artisanal transformation of palm nuts to crude palm oil using artisanal presses.

Two types of palm oil presses were identified in the study area: the manual press without a digester locally called *tournée tournée* and the motorized horizontal press. The manual vertical press was the most frequent type of processing equipment in the study area. The motorized horizontal press system is more economical in terms of labour and generates more revenue than the manual vertical press (high production capacity of pressing palm nuts per day). The extraction efficiency of artisanal presses was obtained by extrapolation from the quantity (in liters) of CPO (Crude Palm Oil) produced from 1 ton of palm nuts and the density of 1liter of palm oil 0.9 kg (Ngom pers. comm.). Therefore; Extraction efficiency (%) = (M*N). Where M = Quantity of oil in liters per ton of palm nuts and N = density (kg) in volume per ton of palm nuts. For example, if 1 ton palm nuts=200L of CPO, it implies160 x 0.9 = 140 kg = 14%. The extraction efficiency is 13.5% and 14% respectively for manual and motorized horizontal press. This extraction rate slightly differs according to the type of the press used.

The following activities were carried out in the artisanal processing of oil palm:

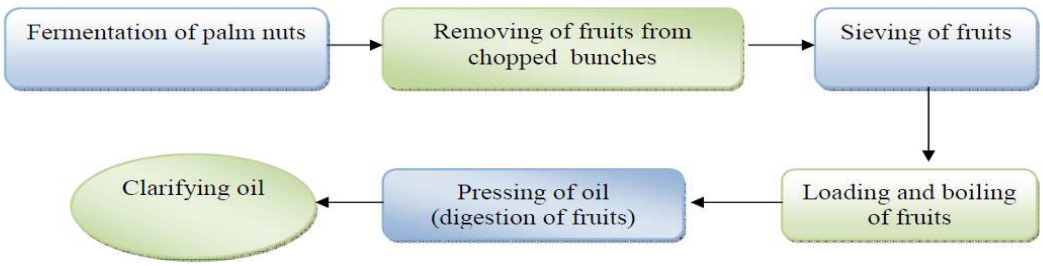

Fig.3. Schematic representation of milling activities
Source: Iyabano, 2013

Conclusions and Outlook

Cameroon is currently importing over 50,000 tons of crude palm oil (CPO), annually due to a deficit in production in relation to local demand (Hoyle and Levang, 2012). It is very important that Cameroon takes a strategic approach to overcome this production deficit by maximizing the economic benefits of the activity and minimizing the possible negative environmental impacts linked to the expansion of oil palm plantations.

The strategy for the proposed expansion of the sector could be developed by the following considerations:

- Invest in increasing the productivity and yield of the existing oil palm plantations (improved planting materials, improved inputs, improved management of harvesting);
- Ensure that all future palm oil expansion in Cameroon is developed in a sustainable way with minimum impact on carbon emission levels and biodiversity conservation, by focusing on degraded lands;
- Avoid as much as possible the overall reduction of the permanent forest estate with an emphasis on development of areas already deforested or degraded;
- All new oil palm developments in Cameroon should adopt and implement the principles and criteria of the Roundtable for Sustainable Palm Oil (RSPO – see www.rspo.org);
- Make sure smallholders benefit from development of agro industrial complexes, either by establishing out grower contracts following the current model in Southeast Asia or by establishing measures to support family farming (provision of selected seedlings, technical support, training, etc.).

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