# Socio-economic study on cashew nut producers in the area of Bouake in Côte d'Ivoire

November, 2012

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**Introduction**

This study was requested by OLAM in 2012 in order to understand the socio-economic conditions of cashew nut producers in the Ivory Coast.

The study was undertaken by the non-governmental organization RONGEAD that has carried out rural development projects in the cashew nut sector in the Ivory Coast since 1999. As such, RONGEAD has many years expertise in not only the cashew nut market chain but also the living conditions of cashew nut producers. RONGEAD guarantees their neutrality in the carrying out of this study.

The study occurred in the month of November 2012. Even though it was harvesting season, and complete availability of the producers was thus not possible, the study went well overall.

**Methods**

In order to avoid bias during the interviews with the producers, the questionnaires did not focus on the cultivation of cashew nuts. The producers were not informed that one of the aims of this study was to understand how cashew nuts fit into their farming system. On the first page of the questionnaire, the question "do you have tree plantations?" allowed the interviewer to understand quickly which producers had cashew nut plantations: if they did not, the questionnaire was cut short in order to focus on producers who cultivate cashew nut trees.

The initial objective of the study was to carry out surveys with 50 producers in 2 villages. Limiting the number of villages ensured surveys took place with as many producers as possible in each village. This was to gain a better understanding of the overall diversity of the living conditions and of the farms in the villages. This was also to avoid interviewing only the "big producers" who are often the first people who are met when strangers come to villages.

The final objective was to do 80 interviews in order to maximize the amount of data collected, and to anticipate the fact that not all producers interviewed would have cashew nut trees.

The study sites were selected both by RONGEAD and by the field coordinators of OLAM-Ivory Coast SARL. The criteria of selection are as follows:

- Villages within the supply zone of the OLAM factory of Bouaké
- Villages at least 30km from Bouaké in order to avoid potential influence from proximity to a big city
- Villages at least 10km from the sub-disctrict in order to avoid potential influences from proximity to a small village
- Villages that have important cashew nut production, in OLAM's workers experience
- If possible, villages situated in two different agro-ecological zones.

The study was realized in 3 of 6 villages that fit this criteria: Abolikro and Dieviessou, two villages West of Bouaké in the sub-disctrict of Béoumi, and Sodefel, a village North-West of Bouaké in the sub-district of Mrabadiassa.


Bouandougou
Bandama
Katiola
Sodefel
Marabadiassa
Abolikro
Bouaké
Béoumi
Dieviessou
10 miles
10 km


Kankan
Wa
Dida Forest
Ferkessédougou
Odienné
Kérouané
Korhogo
Mole National Park
Damongo
Parc National de la Comoé
Bui National Park
Katiola
Séguéla
Bondoukou
Kintampo
Ghana
Côte d'Ivoire
Bouaké
Wenchi
Nzérékoré
Man
Vavoua
Techiman
Danané
Sunyani
Parc national de la Marahoué
Dormaa Ahenkro
Duayaw Nkwanka
Duékoué
Daloa
Bouaflé
Yamoussoukro
Abengourou
Mankranzo
Sinfra
Issia
Dimbokro
Kumasi
Gagnoa
Adzopé
Obuasi
Agboville
Soubré
Divo
Twifo Praso
Parc national de Taï
Anyama
Sapo National Park
Abidjan
Port-Bouet
Dabaasi
Sassandra
Grand-Lahou
Cape
San-Pédro
Sekondi-Takoradi
50 miles
100 km

**Calendar of activities:**

| | |
|---|---|
| 22 Oct 2012 | Signing of the contract |
| 25-26 Oct 2012 | Preparation of the questionnaire |
| 29-30 Oct 2012 | Discussion of the questionnaire as a team |
| 30 Oct 2012 | Proposal of the questionnaire to OLAM for discussion |
| 10 Nov 2012 | Identification of the villages and training of the interviewers |
| 11 Nov 2012 | Start of the interviews |
| 19 Nov 2012 | End of the interviews |
| 21 Nov 2012 | Beginning of data entry |
| 24 Nov 2012 | End of data entry |
| 25 Nov 2012 | Beginning of data analysis |
| 28 Nov 2012 | Beginning of the writing of the report |
| 10 Dec 2012 | Handing in of the study report to Olam Ivoire |

**Limitations of the methodology**

- The sampling size is 81 farmers, of which 76 are cashew nut producers. As such, the study cannot claim to represent the socio-economic situation of all cashew nut producers in the Ivory Coast. However, the results obtained from the study are comparable to those found and observed in other socio-economic studies undertaken by RONGEAD. The results can thus be considered as a good baseline study to understand the living conditions of cashew nut producers in the Ivory Coast.

- Time constraints prevented us from measuring the area of cultivated fields. Producers rarely know the area of their fields so data regarding cultivated areas should be taken with caution. In light of RONGEAD's knowledge about the average yield of different crops and the volumes commercialized by producers, we have rejected data that seem "absurd". However, due to the limited number of interviews, area measurements cannot be considered exact.

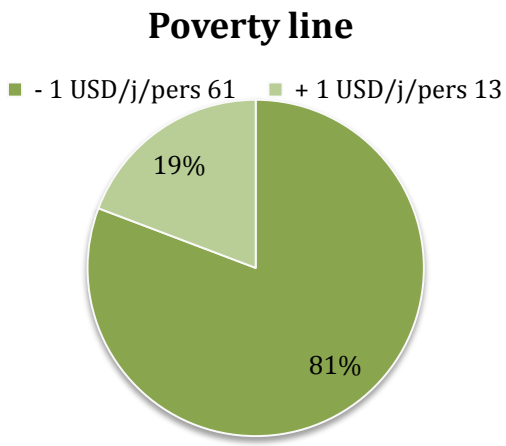
## Chapter 1: Sociology of the interviewed cashew nut producers: analysis of living conditions

One of the initial hypotheses of this study is to show that there is a great diversity of cashew nut producers and to construct a typology that reflects this diversity.

This hypothesis is, for the most part, verified by the results of the study. However, this diversity measures magnitudes that do not correspond to the economies of developing economies, even within urban areas of developing countries. As such, of the 81 interviewed producers, 75 provided information that was sufficiently detailed to allow us to estimate their revenues and farm expenses with only a small margin of error. Among these 75 households, 63 have revenues that fall below the poverty line and only 12 make more than 1 USD/day/person. Only 3 households, all cotton producers, are above the line of 2 USD/day/person[1].

However, among these "poor" households, the differences in revenues are non negligible. The 25% poorest producers earn less then 18 804 FCFA/person/year (36,52 USD), while the richest 25% earn more then 102 395 FCFA/person/year (199 USD), which gives them a far greater purchase power and capacity to invest.

| Net income/person/year | FCFA | USD |
|---|---|---|
| **Minimum** | 0 | 0 |
| **Maximum** | 641 786 | 1246 |
| **Average** | 91 450 | 177 |
| **Average reduced by -10%** | 78 516 | 152 |
| **Median** | 40 656 | 79 |

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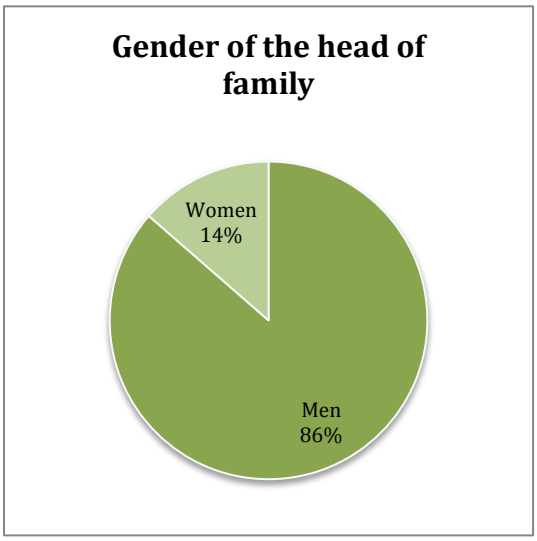
Before continuing with a more in depth look at the revenues of the cashew nut producing households, we will first present further information on the household organization.

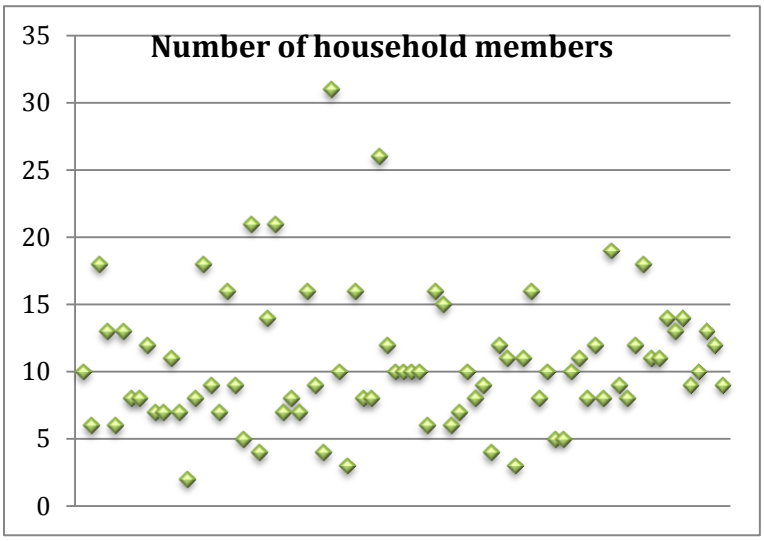
[1] The change rate between Franc CFA (XOF) and US Dollar use dis 1 USD = 515 FCFA, average rate during the 2d half of the year 2012.

**Number and gender of household members**

First of all, it is important to emphasize the fact that cashew nut producers are primarily men. Indeed, in traditional societies of Central and Northern Ivory Coast, like in many other societies, land ownership and management are primarily the work of the men. The only women who were household heads were widowed or divorced. Amongst the 81 heads of households met, 70 were men and only 11 were women.

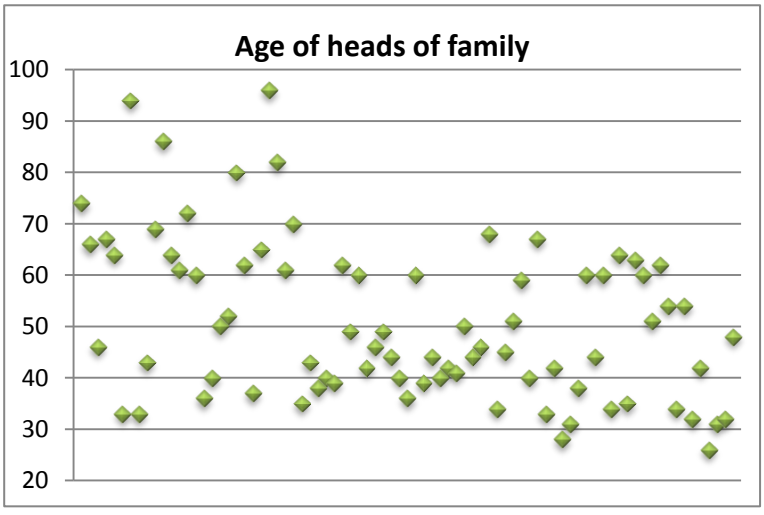
Families tend to be large, with the exception of some older villagers whose children no longer live in the village. The average household size is 10,59 people/household. The smallest household was of 2 people (an old man and his grandson) and the largest household included 31 people. The graph below shows that 50% of households have between 7 and 12 members.



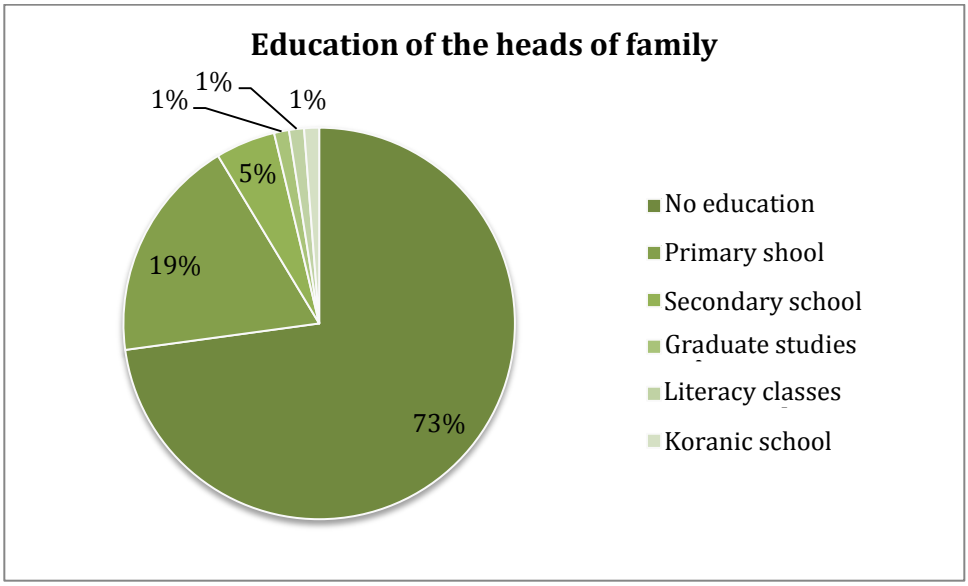

**Age**

The age of the head of the family is relatively high: the average age is 51 years old and 75% of the heads of households are over 39 years old. This point can be explained by the fact that young men become independent relatively late in life. In addition, once they marry and become independent, the land they are assigned by their father, or more often by the village chief, must be initially used only for food crops. In general, it is only once the chief of family passes away that the eldest child or more then one son will gain access to more land and will be able to use some of it for tree plantations. Indeed, within traditional land tenure systems, trees are considered a way of claiming land. As such, younger householders or foreigners who are not considered landowners are rarely authorized at planting trees.

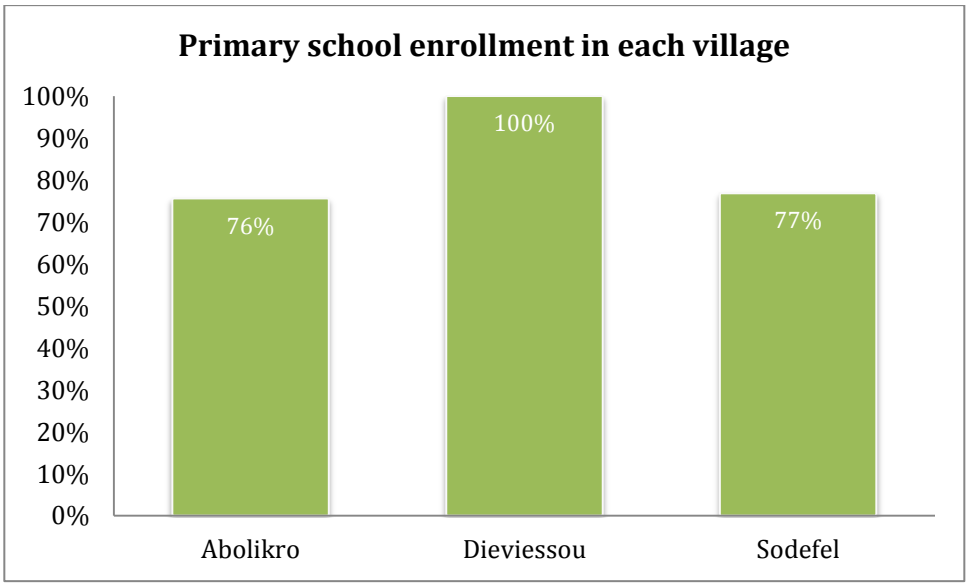


**Education**

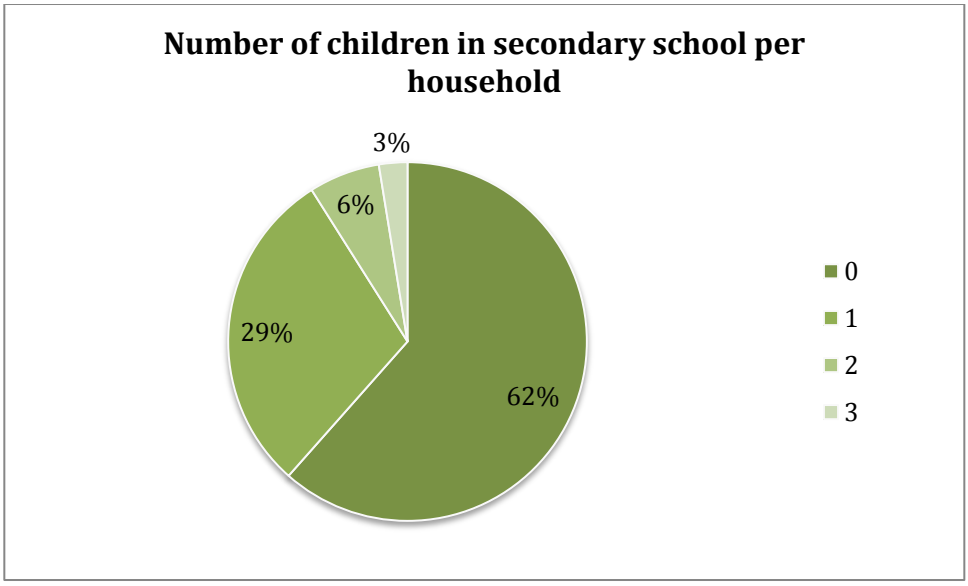
Few heads of families have had access to any education, as is represented in the following graph.




However, many heads of family seem to understand the importance of education for the future well being of their family. The rate of primary school attendance of children is relatively high in part due to the presence of primary schools in the three villages. Since the beginning of this school year, the villages of Dieviessou and Sodefel have benefited from having many government employed teachers: 13 in Dieviessou for 678 attending children and 5 in Sodefel for 261 attending children. In Abolikro however, the villagers themselves had to organize themselves to build a school and to provide an education for the village children: the parents themselves compensate 3 teachers to educate the 146 children. The availability of government-employed teachers seems to have a marked impact on enrollment numbers, as is visible in the following graph.



On the other hand, secondary school education is more rare. Only 37% of the producers have 1 or more children attending secondary school.



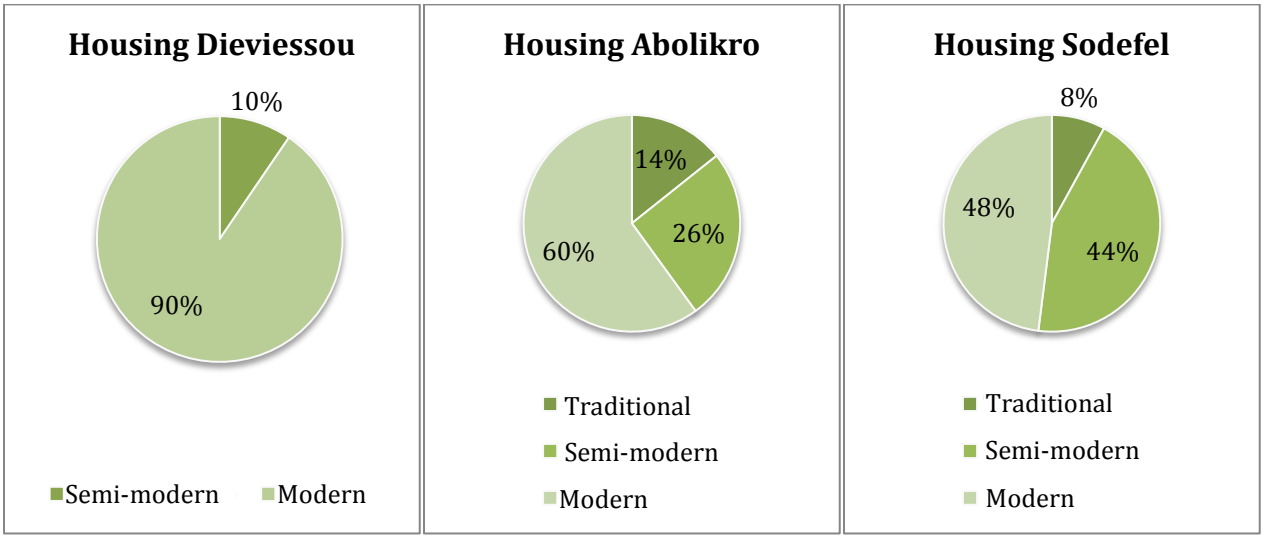

This small percentage has, *a priori,* two explanations: first of all, middle and high schools are too far from home for children to be able to walk home on a daily basis: the nearest middle schools are within 35km of Abolikra, 15km of Dieviessou and 37km of Sodefel, respectively. Without a school transportation system, a tutor or a boarding school must be found where the child can stay. Second of all, and perhaps of more importance, the cost of a secondary school education is much greater than for primary school: primary school education, including the purchase of school materials, costs 5000 FCFA/child/year (9,7 USD), while the cost varies between 45 000 and 100 000 FCFA/child/year (87,3 to 194,1 USD) in secondary school.

It is thus not surprising that households having a child attending graduate studies are very rare. Only 6 heads of family out of the 81 producers, or 7% of interviewees, have children doing graduate studies.

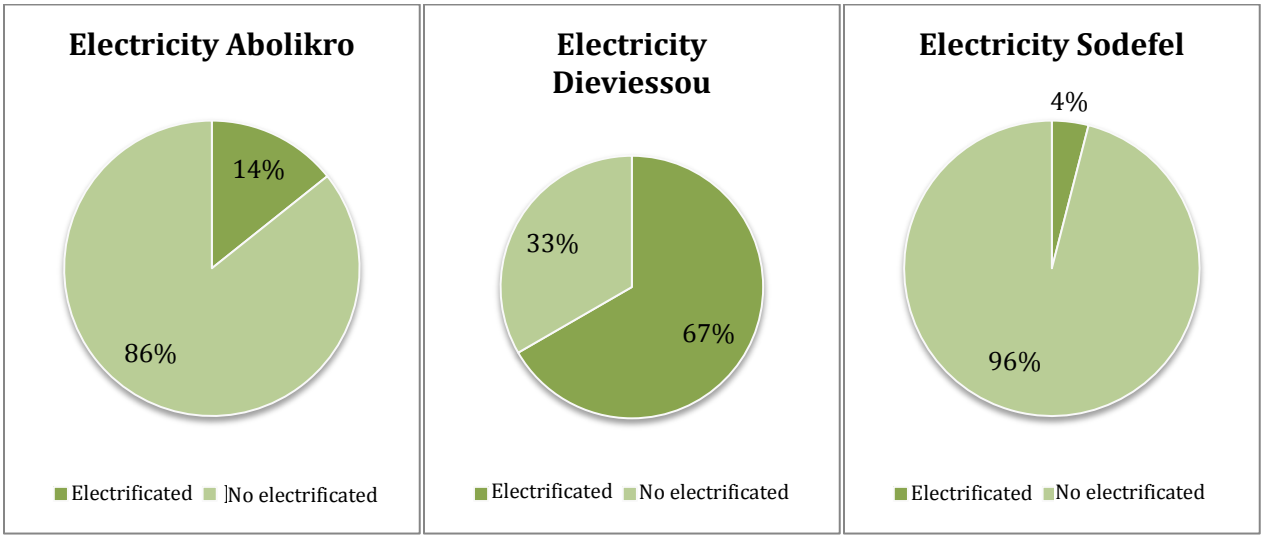
The data do not allow us to make a correlation between school attendance of children and the level of education of the heads of family because the majority of the heads of family are illiterate and the majority of children attend school.

**Housing**

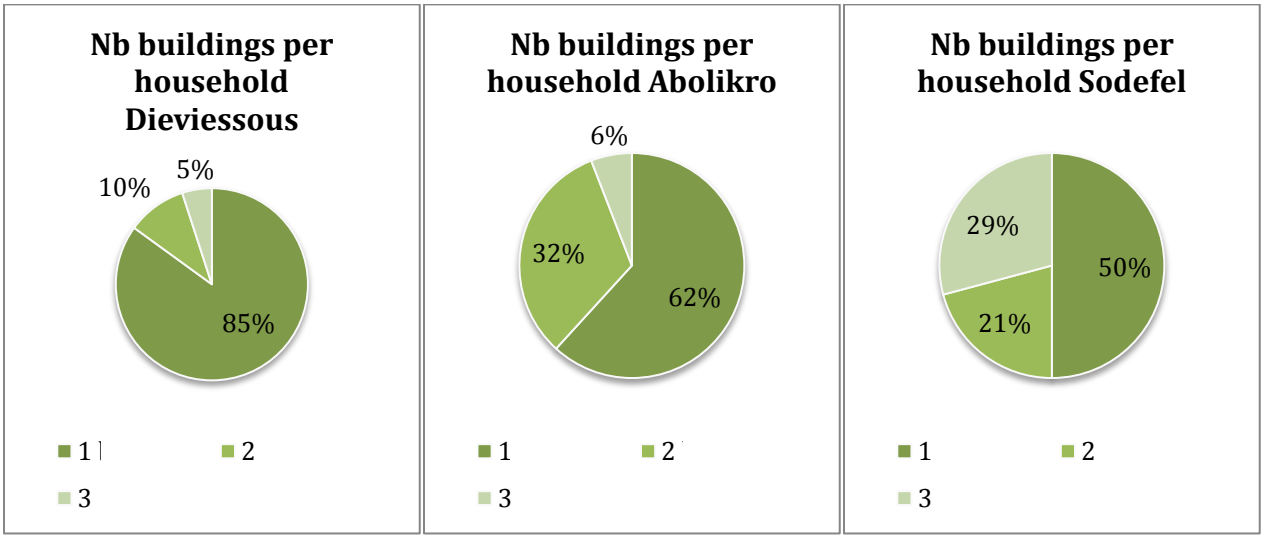
Housing conditions vary greatly between the village of Dieviessou and the other two villages. Dieviessou has benefited from an *Aménagement de la Vallée du Bandama* (AVB) program, where 90% of houses are made of cement, and between the two other villages, which are more representative of the villages of Central and Northern Ivory Coast. Indeed, in these villages, the majority of the producers live in traditional houses made of banco or in semi-modern houses, which consist of plastered mud and/or cement foundations, which reduces erosion of the walls during the rainy season.




In addition, electrification is much more advanced in Dieviessou then in the other two villages where only the villages equipped with generators or solar panels have access to electricity. Cashew nut producing villages in the Ivory Coast tend towards the latter.

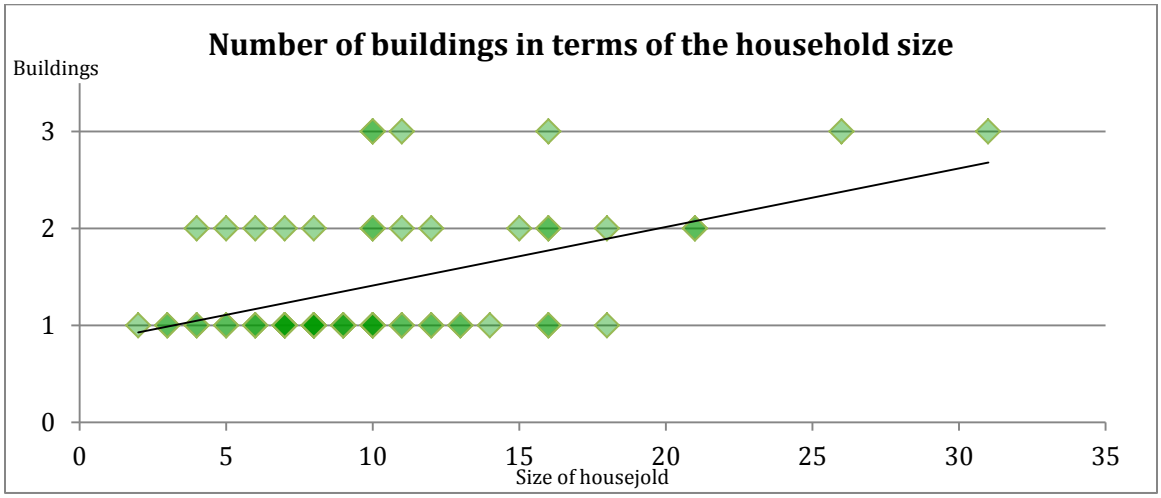


On the other hand, the number of buildings per family is low in all three villages. The majority of producers have only one building of 2 or 3 rooms.

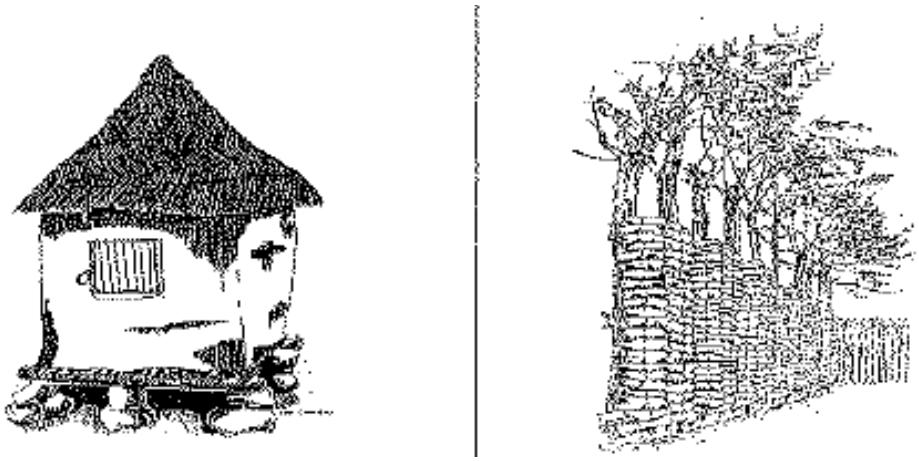



The families that produce cashew nuts live in tight quarters with an average of 8 people, but a maximum of 18, living in a single building.

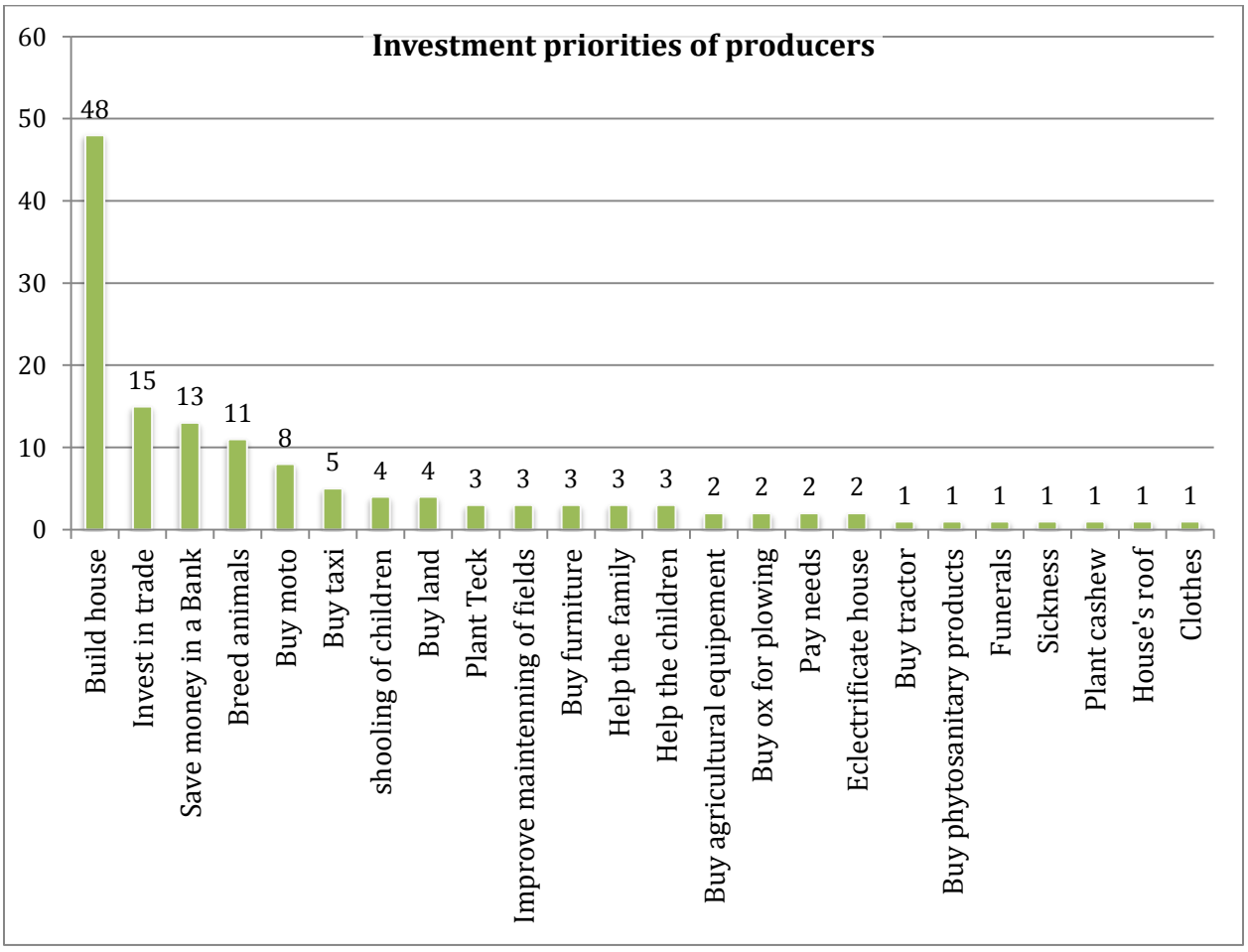
Even if the number of people living in a single building varies greatly, a correlation between the size of the household and the number of buildings was found.




The majority of agricultural products are stored in the houses, with the exception of cotton (mainly stored in the cotton cooperative facilities) and of yam (stored in the fields under an “appatame”, in a storage unit or more often a “grange” – a sort of wall of yams fortified with wood where the tubers are layered in the shade, see image below-). This occurs because of lack of storage facilities but also to avoid burglary. Producers’ houses are thus often full of bags of cereals, cashew nuts and condiments: storage capacity is very limited.

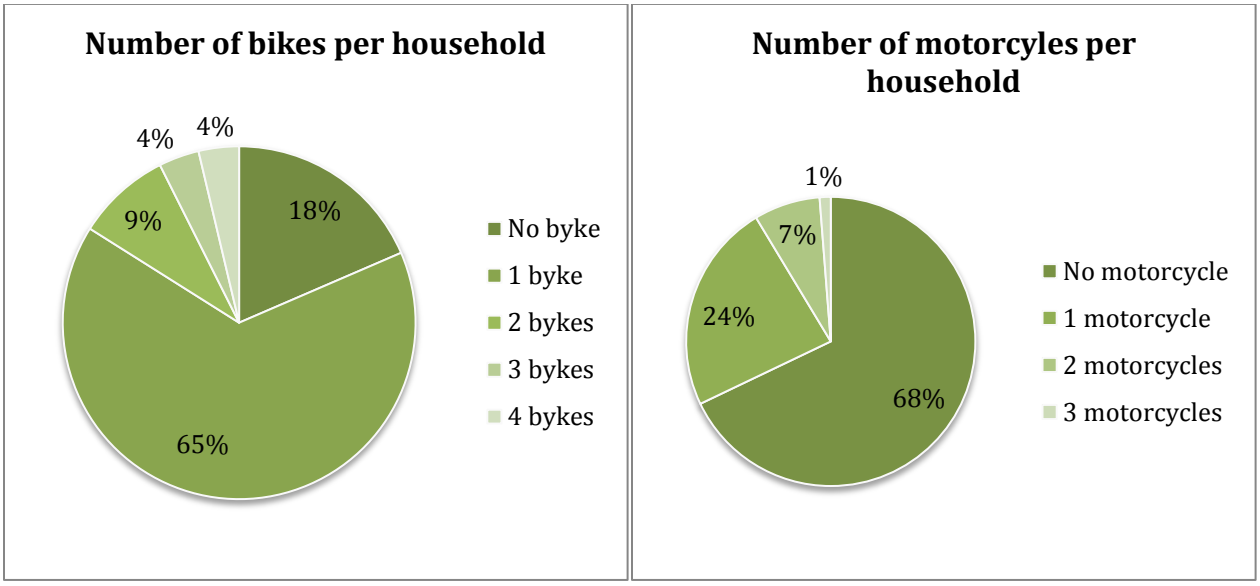


As such, the construction of additional building is the investment most often mentioned by heads of families, as is visible in the following graph.



**Transportation**

The main transportation method is bikes and 65% of producers have one. Bikes are used primarily for moving between the village and fields, but it can also be used to go to the sub-districts, about an hour from Dieviessou and 2 hours from Abolikro and Sodefel. Having a bike is thus a significant economic advantage because public transport is relatively expensive. It costs 1300FCFA/trip (2,5 USD) minimum in Dieviessou to go to the sub-district of Béoumi with a bush taxi, the only public transportation available in the village. From the village of Sodefel to the sub-district of Marabadiassa, it costs 500FCFA/trip (0,97USD) minimum by Bakka, a small 22 person bus. From Abolikro to Béoumi or Bouaké in bus, it costs 200 FCFA/trip (0,38 USD). Bikes, however, are rarely used to transport goods, which limits their commercial use for producers.




32% of producers own a motorcycle. This mode of transport is thus relatively present in the villages but is reserved for more wealthy producers. Indeed, even if motorcycles allow for easier transportation of goods and reduce the time it takes to get to the cities, they are also more expensive not only to buy but also to upkeep and to fuel-up. The producers who have a motorcycle spend approximately 10 950FCFA/month (21,26 USD) for transportation while the producers who do not have one spend about 2 994FCFA/month (5,81 USD).

Only one producer owns a car, but he uses it as a taxi in Bouaké and does not keep it for personal use. In the year 2012, his taxi earns him a turnover of 40 000 FCFA/month (77,6 USD) but the investments in repairs and upkeep amount to approximately 300 000 FCFA/year (582 USD). As such, the annual benefits amount to only 180 000 FCFA (349,5 USD).

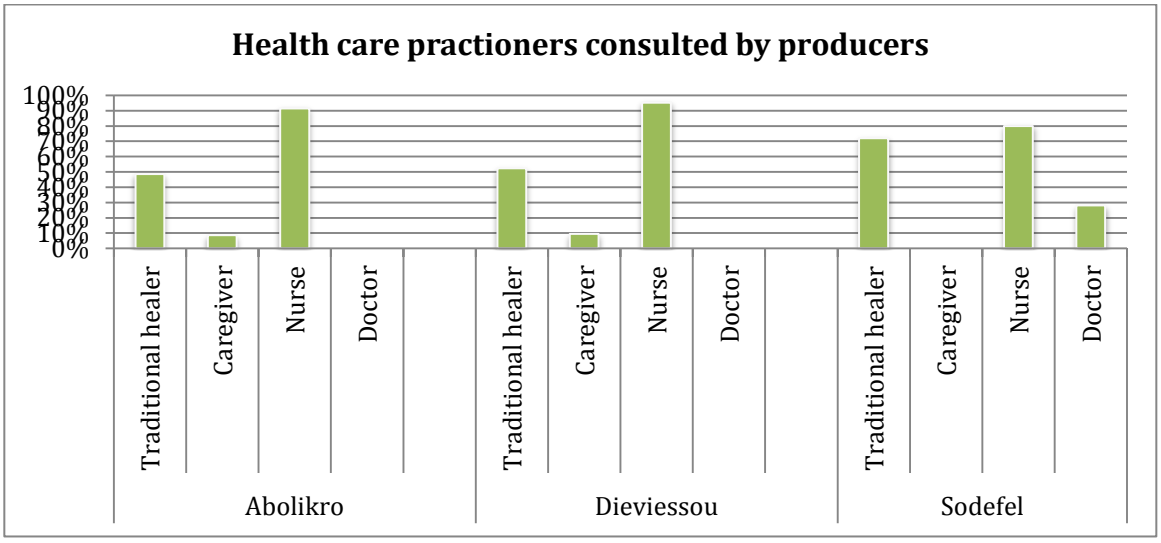
**Health and access to health care:**

There is a dispensary in the villages of Abolikro and Dieviessou, where a nurse and a caregiver work. The village of Sodefel has received help from an NGO called *Espoir Pour la Santé* (EPS) that provides access to health care and a nurse.

As such, the primary health care practitioner to whom producers have access is a nurse, as it is visible in the following graph.

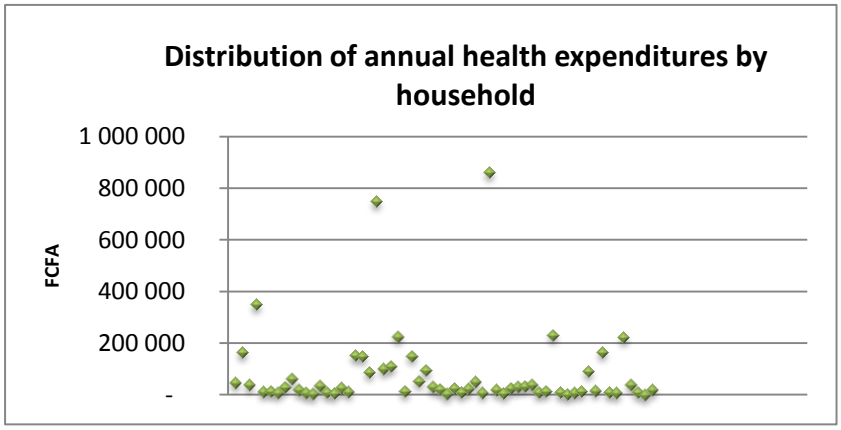
Producers also often consult "*marabou*", it means a traditional healer. *Marabou's* medicine is plant-based and generally much cheaper than modern medicine, even if the effectiveness of this kind of medicine can sometimes be debated. *Marabou* are also consulted when modern medicine does not seem to be working and if the health issue is attributed to magic, which it often is.

Only 6 producers, 4 of which are relatively wealthy cotton producers, consult a doctor if they have health problems.



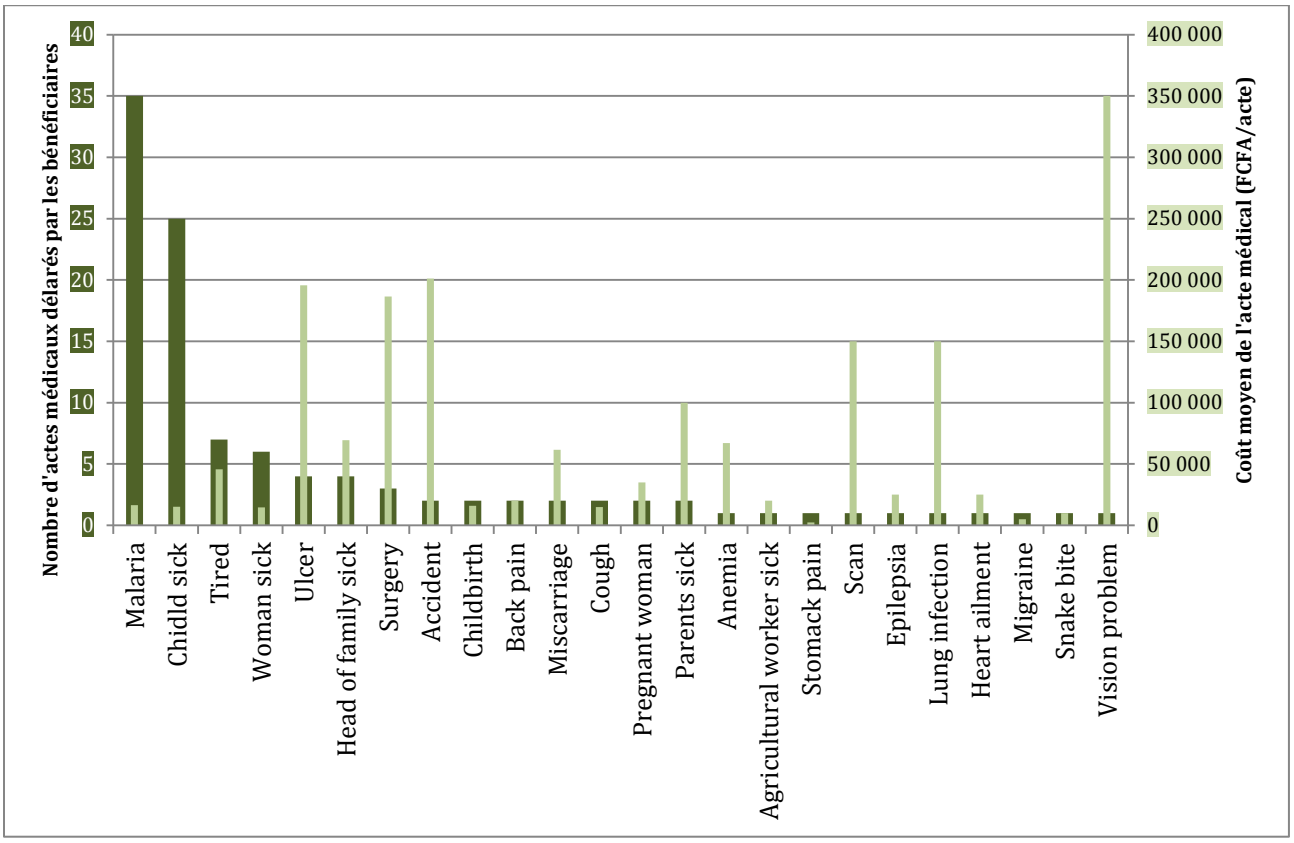

Health expenses vary greatly depending on the situation. 20% of producers claim that they did not have any health expenses. Of the 80% that did, the 25% that spent the least, spent only 10 000 FCFA (19,41 USD) within the year while the 25% who spent the most spent an average of 87 500 FCFA (170 USD).

| | Health expenditures | |
|---|---|---|
| **Quartile** | FCFA | USD |
| **Q1 (25%)** | 10 000 | 19 |
| **Q2 (25%)** | 24 000 | 47 |
| **Q3 (25%)** | 87 500 | 170 |
| **Q4 (25%)** | 862 000 | 1 674 |



Due to the sensitivity of the subject, the sicknesses that caused the majority of the health related expenses could not be identified. However, data collected did show that malaria was the primary cause of medical consultations.

In the following graph, the principal causes of medical consultations are shown in relation to how often they were mentioned by producers (dark green) and how expensive the combined cost of the consultation and medicine is (light green).



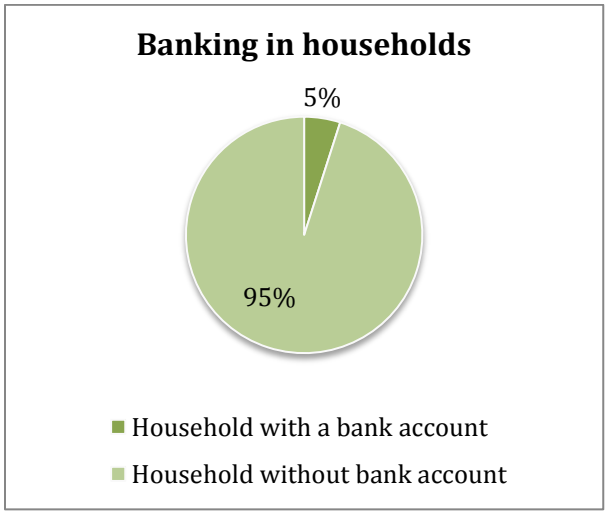

The analysis of this graph shows that “benign” medical consultations cost between 5 000 and 15 000 FCFA/visit (9,7 and 29 USD) for both the consultation and the treatment. This is a relatively high cost relative to the average household income. “Complex” medical visits generally cost more then 100 000 FCFA (194 USD) and can thus easily consume a large part of a family’s annual income.

**Banking**

Only 4 out of 81 households have a bank account. One is a retired government official, two are relatively wealthy households with more then 800 000 FCFA in annual income, and the fourth is not a cashew nut producer so information on his activities and income sources was not collected.

Banking support is very limited which contributes to explain the low percentage of bank accounts among producers. The closest bank to Abolikro and Dieviessou, the Banking Cooperative COOPEC, is in the sub-district Béoumi. The closest bank to Sodefel is the COOPEC in Mankono, 100km from the village. In order to have more options, producers must go to Bouaké where branches of most of the banks of the Ivory Coast can be found. Another factor limiting banking is the absence of savings books. Savings accounts with the COOPEC are expensive to set up, relative to the producers' income: 500 FCFA/month (0,97USD), or 6000 FCFA/year (11,65 USD) to which one must add 9000 FCFA (17,4 USD) to open up the account.

This high cost is found throughout the Ivory Coast where there are no banking services available that target the specific needs of rural households.

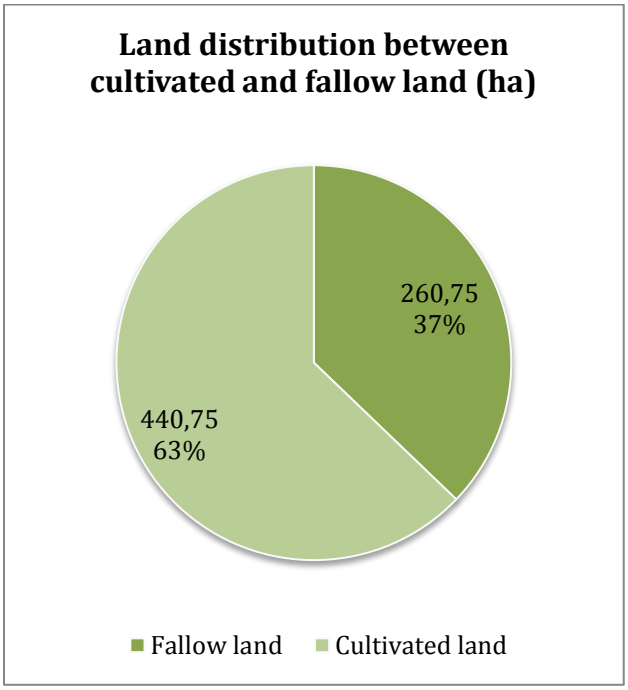


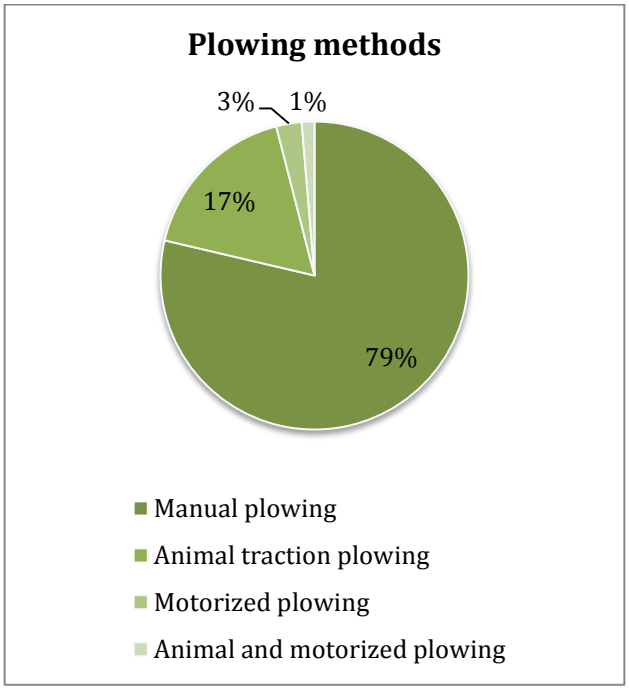
## CHAPTER 2: Cashew nuts within the agricultural activities and incomes of producers

In this chapter, we have tried to understand the organization of producers' farming systems and to establish a typology of these farming systems through this categorization.

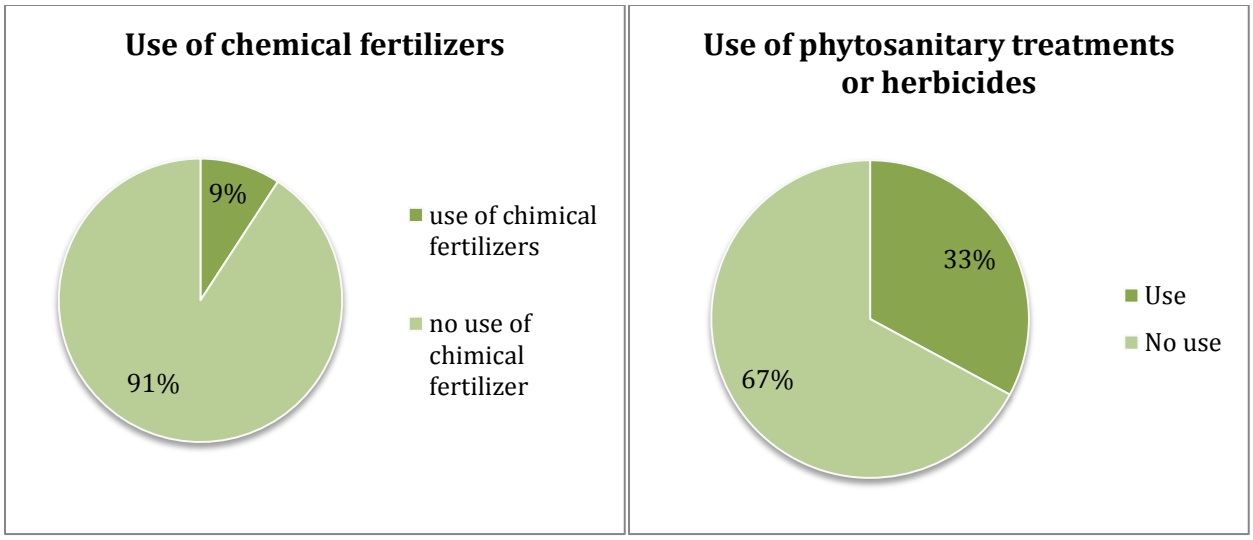
**Farming system**

First of all, it is important to note that the extent of agricultural production system is vast. Manual family farming is most common. Few producers use organic or chemical fertilizers. More then 90% of the producers leave a part of their land fallow and the total area of fallow land represents more than a third of the cultivated area.



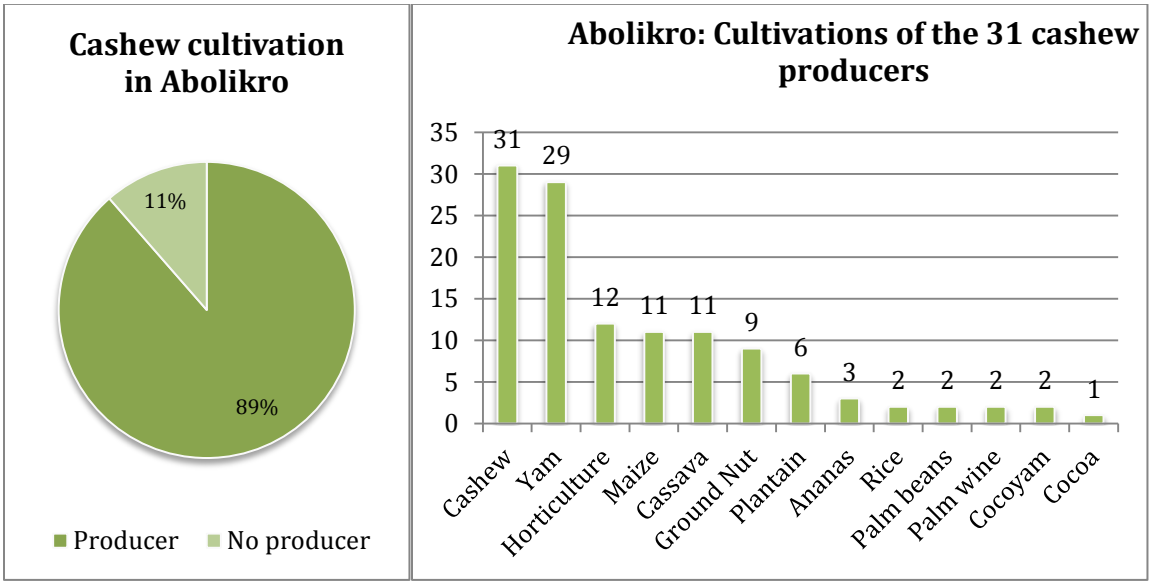

Cotton producers are the main users of animal and mechanized traction, as well as the main user of chemical fertilizers and plant-based treatments. Some cashew nut producers also use pesticides on rice and horticulture crops or they may use herbicides on cashew nut plantations.



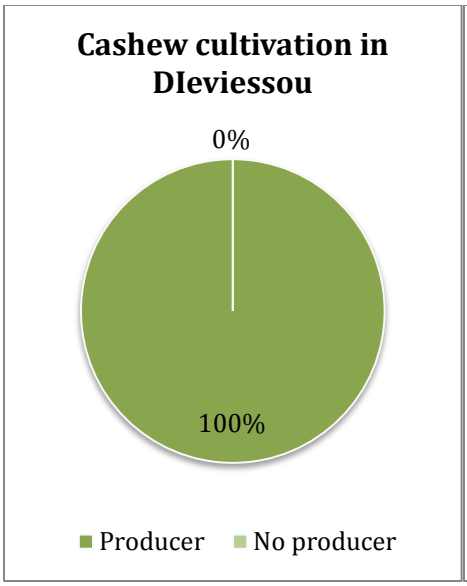

Cashew nut and yam are the most cultivated crops in the region.

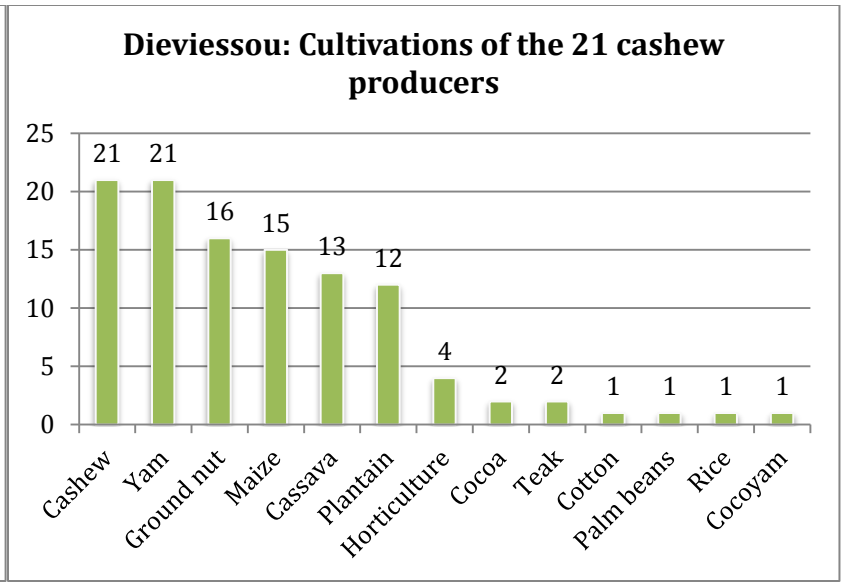
The interviews were not targeted towards cashew nut producers, but even so, 76 out of a total of 81 heads of family stated that they own a cashew nut plantation. This result surprised us, even with our experience within this sector, but it can be explained by the fact that many farmers who did not grow cashew nuts 5 years ago, have since decided to include this cash crop in their production system.

The following shows the diversity of crops being grown in each village that were found during the interviews.

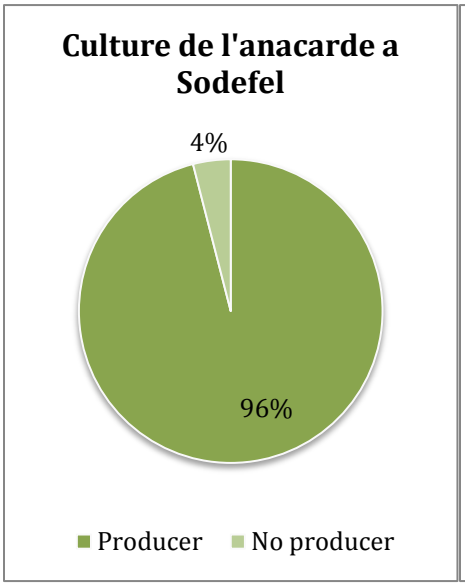


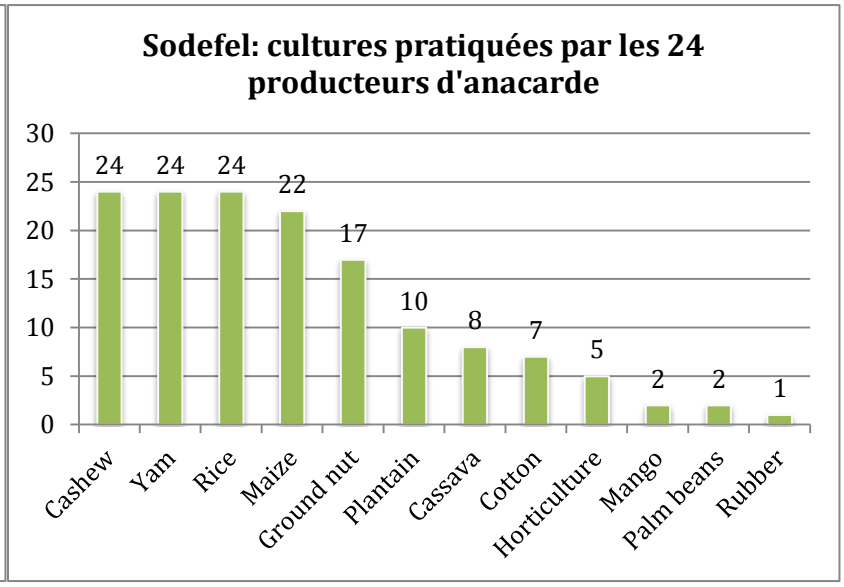

The village of Abolikro has the particularity of having a high proportion of households practice semi-intensive horticulture for commercial purposes. This could be explained by the fact that Abolikro is near a paved road and relatively close (35km) to two cities. In addition, the market of one of them, Bouaké, has a market, which has a high demand for fresh vegetables. As such, producers who do horticulture can more easily commercialize their product due to proximity to the road and to the market.




In the village of Dieviessou, the main cultivated crops are yam, cashew nuts and corn along with peanuts, cassava and plantains in rotation. This is representative of the most common farming system in the region.

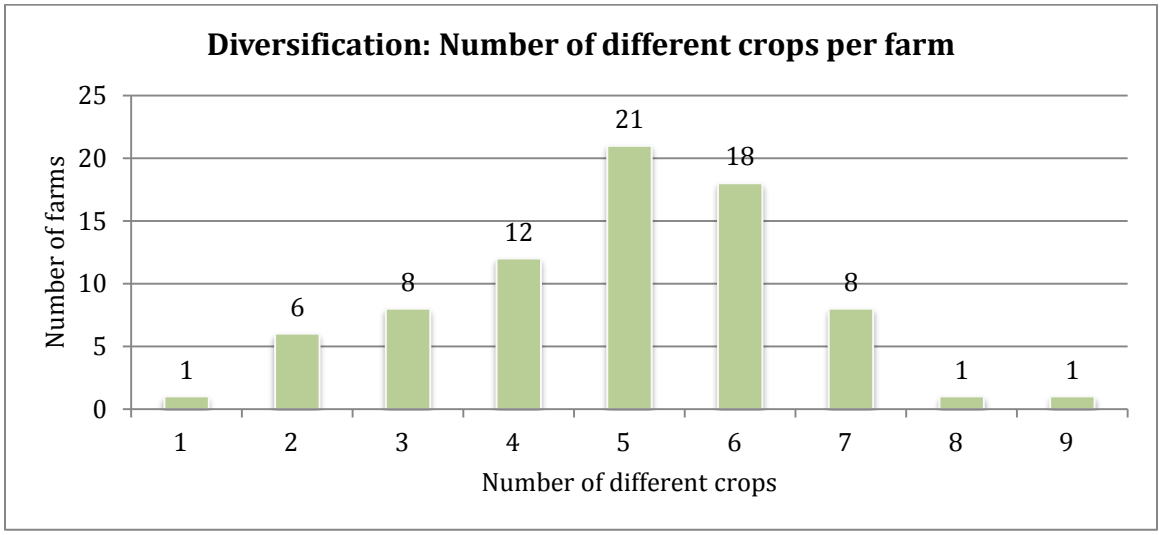


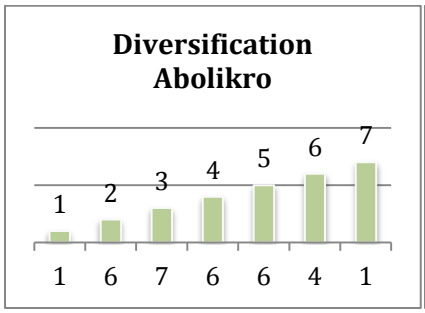



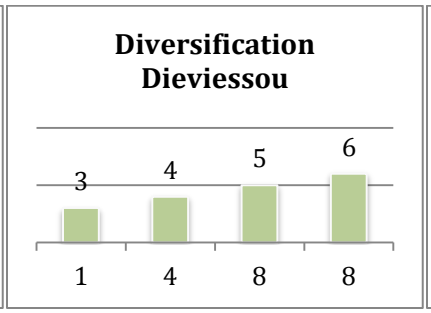

The farming system in the region of Sodefel varies slightly from the other two villages for two reasons. All three villages are within an area that transitions between tropical forest and savanna, called *forêt clair (light forest)*. On the one hand, Sodefel is slightly more to the North than the other two villages and as such, the climate tends to be more like that of savannas, with less, albeit more concentrated, annual rainfall. On the other hand, contrary to the other two villages where the majority of the population is Baoulé, which is the ethnic group of the middle of the country, the population of Sodefel is mainly Malinké, an ethnic group of North-West Ivory Coast, which culturally undertakes more rice than cotton cultivation.

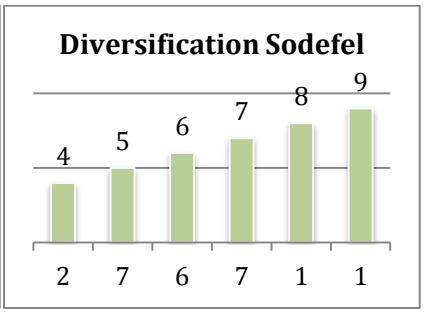
**Crops diversity**

Cashew nut producers have relatively diverse farms: the majority of them cultivate between 4 and 6 crops.



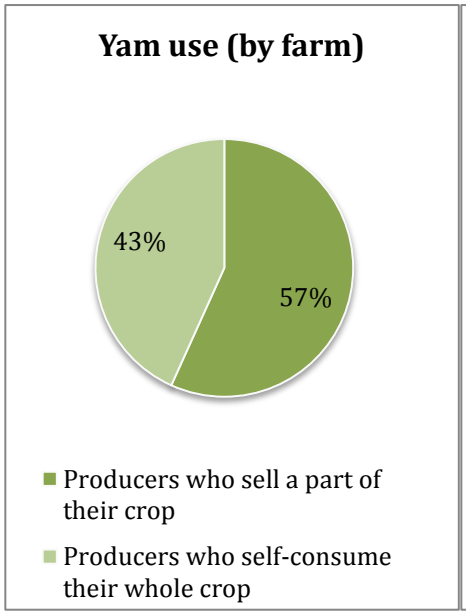



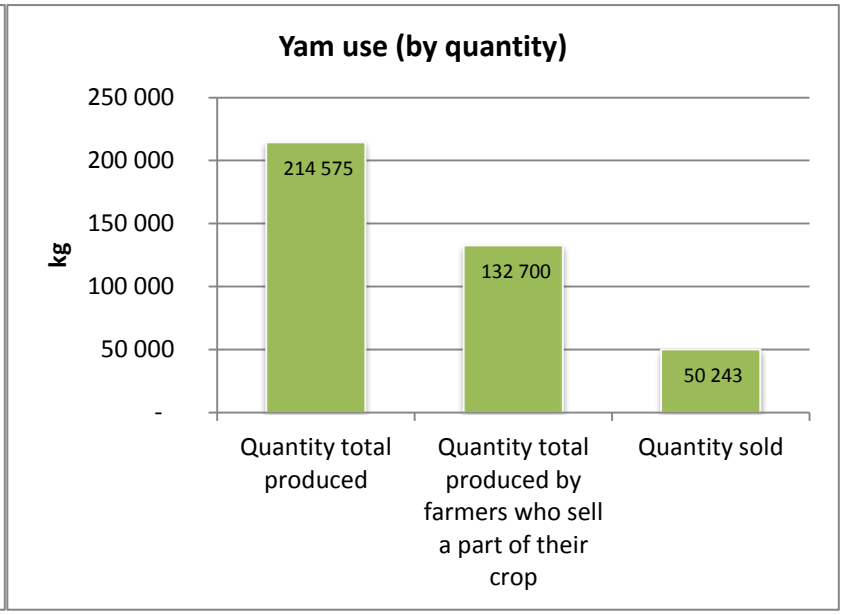

All three villages show diverse farming systems. However, some of the farms of Abolikro tend to be less diversified than those of the other two villages. It is also important to note that the only household that cultivates only one crop (cashew nuts) is the household of a widow who is financially supported by her children who work in the city: this is thus an extremely rare case.

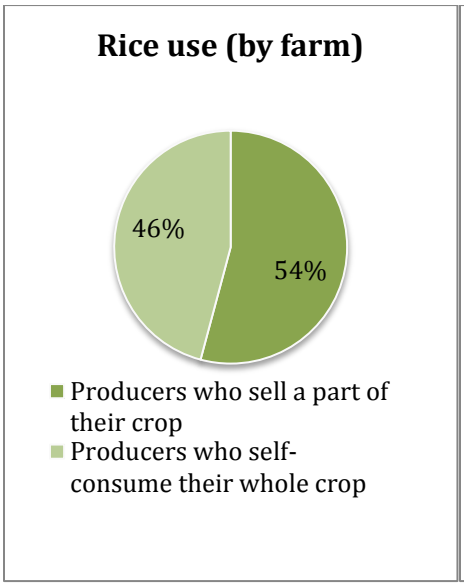
This diversification of crops is first and foremost a way to limit risks associated with production (both climatic and ecologic) but also risks linked with commercialization (price fluctuations).

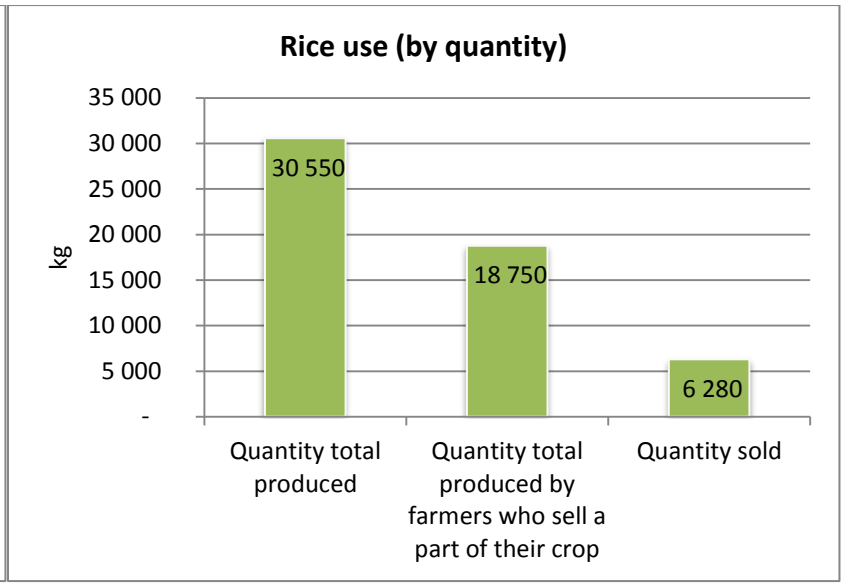
**Use of the different crops**

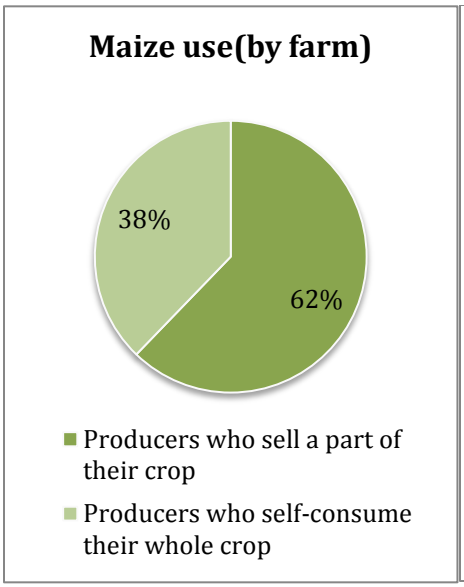
The main subsistence crops are yam, rice, cassava and plantains. For these crops, producers commercialize only excess production. Maize and peanuts are also important subsistence crops but they tend to also be sold more often as cash crops.

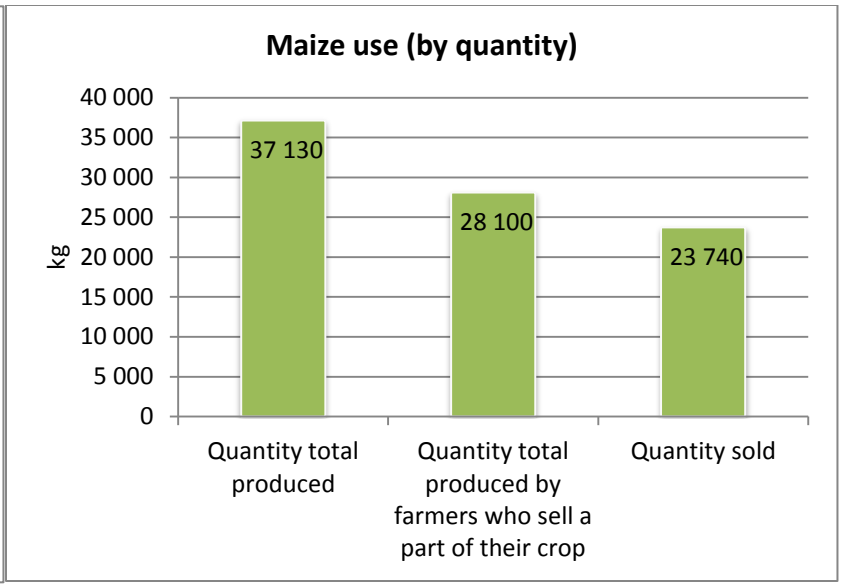


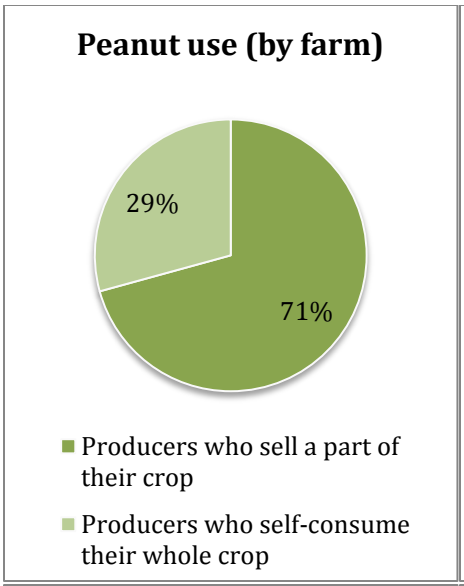



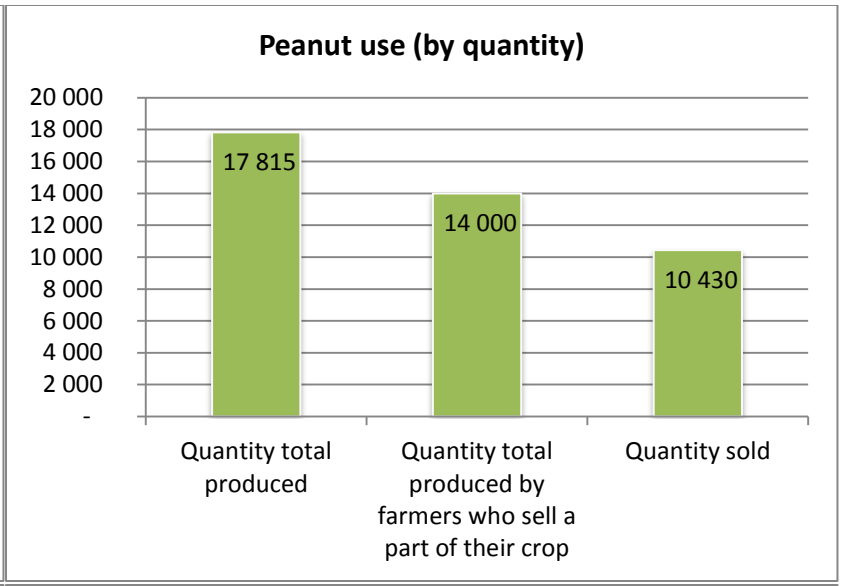



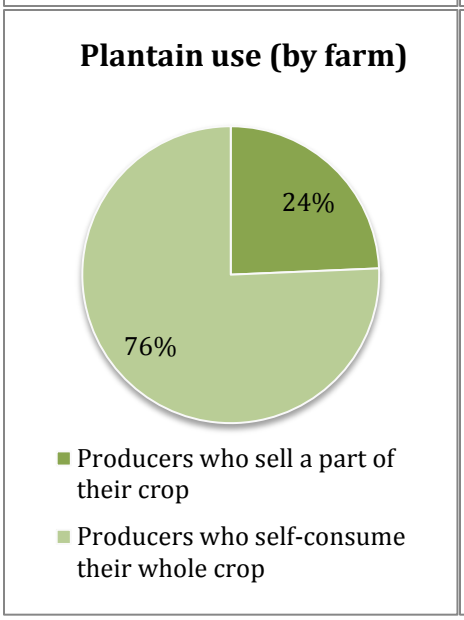



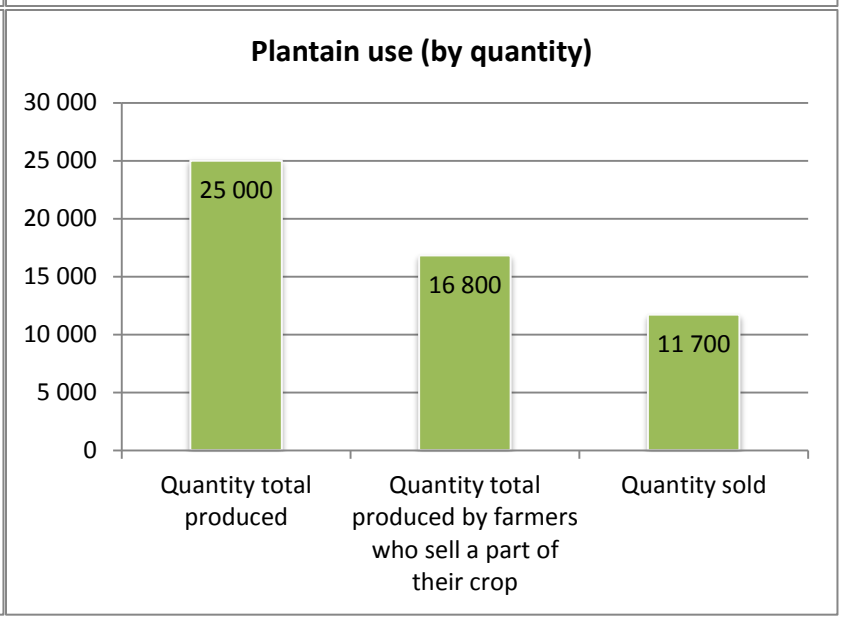

Maize use(by farm)
38%
62%
Producers who sell a part of their crop
Producers who self-consume their whole crop

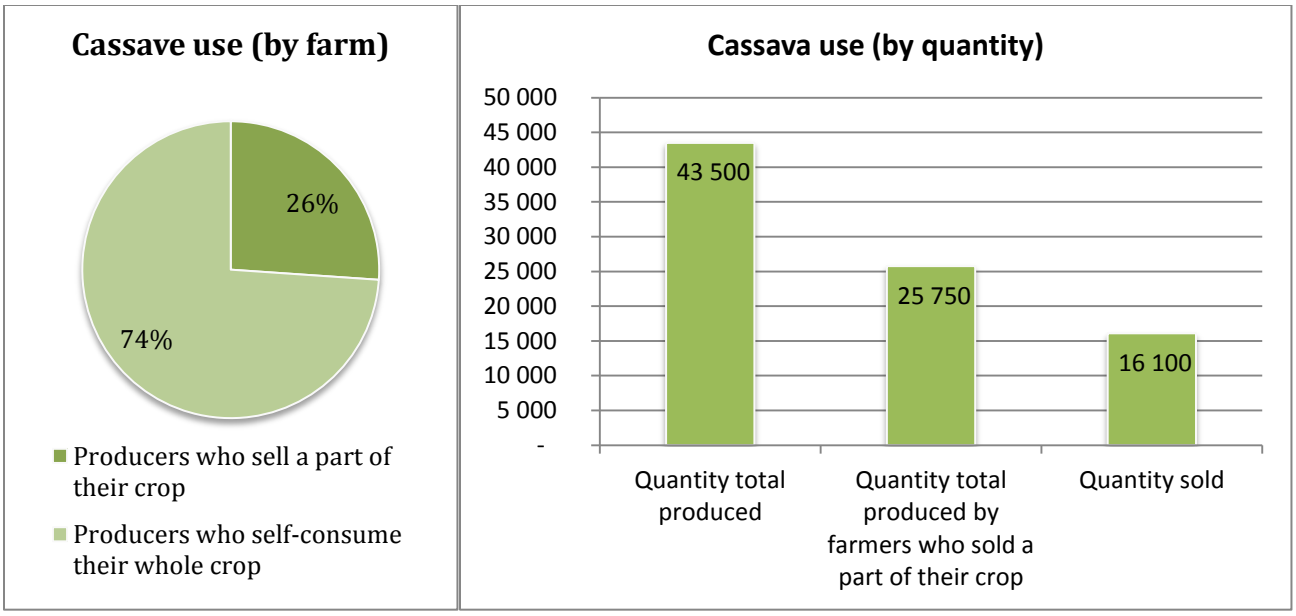

Maize use (by quantity)
40 000
35 000
30 000
25 000
20 000
15 000
10 000
5 000
0
kg
37 130
28 100
23 740
Quantity total produced
Quantity total produced by farmers who sell a part of their crop
Quantity sold


Peanut use (by farm)
29%
71%
Producers who sell a part of their crop
Producers who self-consume their whole crop


Peanut use (by quantity)
20 000
18 000
16 000
14 000
12 000
10 000
8 000
6 000
4 000
2 000
-
17 815
14 000
10 430
Quantity total produced
Quantity total produced by farmers who sell a part of their crop
Quantity sold


Plantain use (by farm)
24%
76%
Producers who sell a part of their crop
Producers who self-consume their whole crop


Plantain use (by quantity)
30 000
25 000
20 000
15 000
10 000
5 000
0
25 000
16 800
11 700
Quantity total produced
Quantity total produced by farmers who sell a part of their crop
Quantity sold

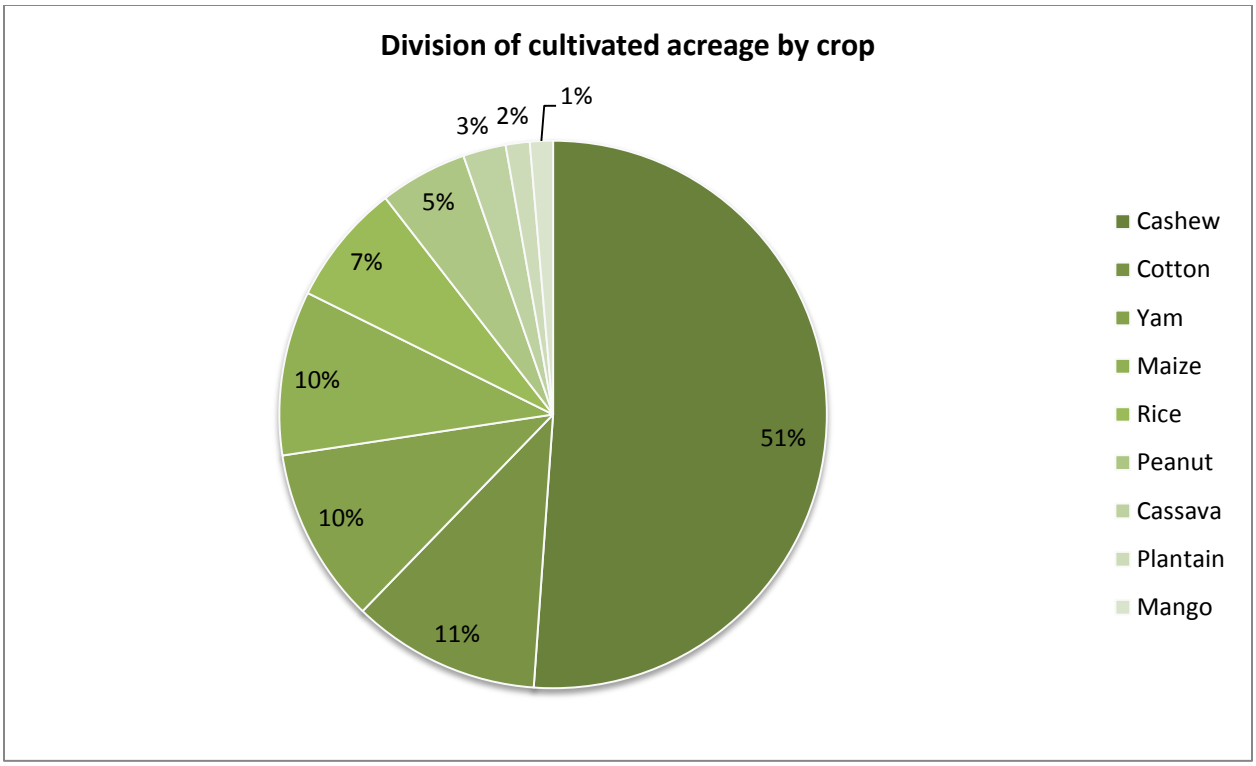


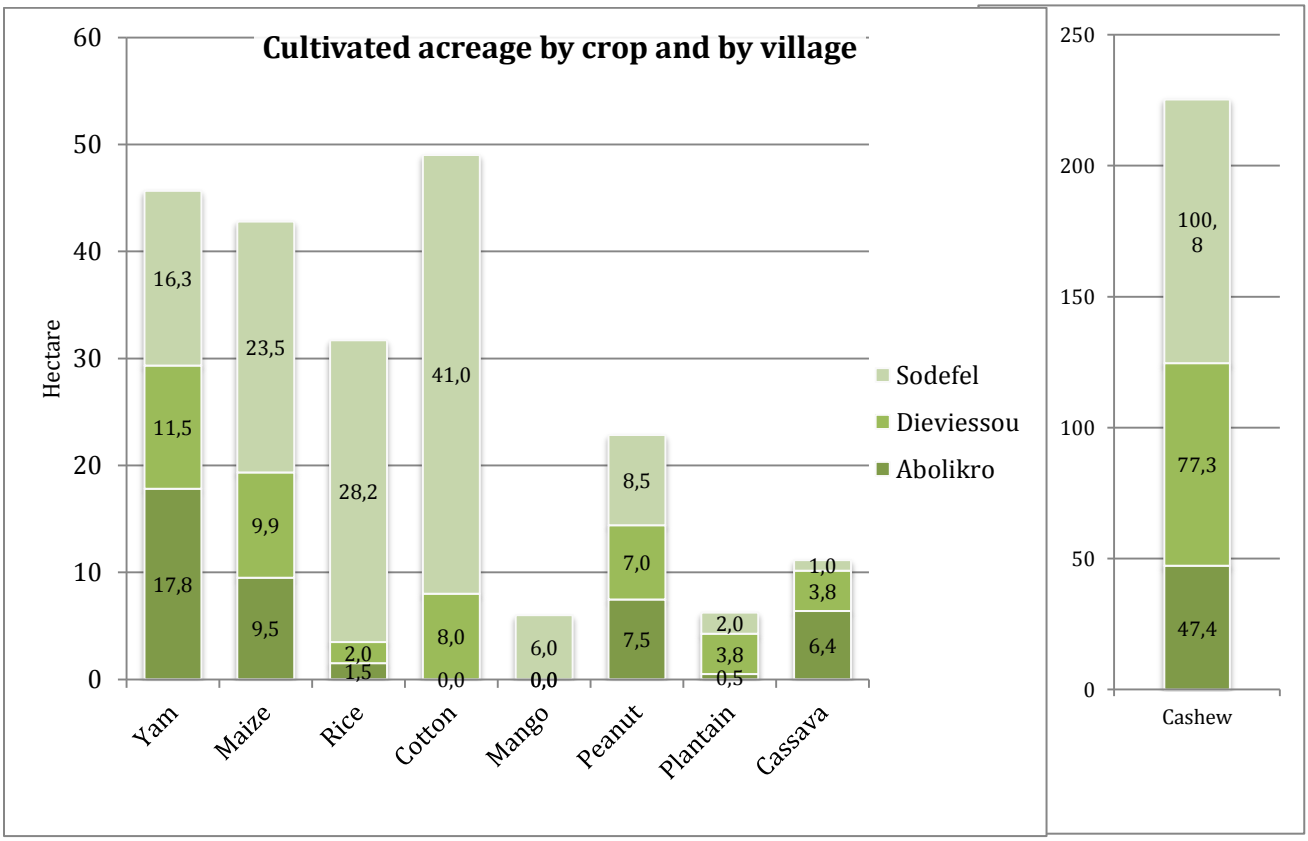

Some producers also grow cocoyam but there is not enough data to estimate the volume of production. This crop seems to be only for personal consumption. The main cash crops are cashew nuts, horticultural crops (tomatoes, peppers, zucchini and cabbage, amongst others), cotton and palm oil. Rainfall in the village area is insufficient to obtain good yields for cacao plantations, so some households have cacao fields outside the village.

**Crops and acreage**

In the farming system of the region, cashew nuts represent the greatest cultivated area. It is a particularly extensive crop which is planted at the end of the crop rotation cycle on nutriently impoverished lands. Given the absence of varieties and cashew nut nurseries, grains are planted among the rows of an annual crop. The three or four first years, producers continue to grow annual crops (penauts, maize, cassava, yam) between the cashew nut saplings, which saves time by combining both land clearing and maintenance activities.

This practice reduces the area of available fallow lands, but does not seem to have had a marked impact on soil quality. This is because of the large area of available fallow land and the relatively recent development of the cashew nut crop in the region, relative to the cultural cycles.

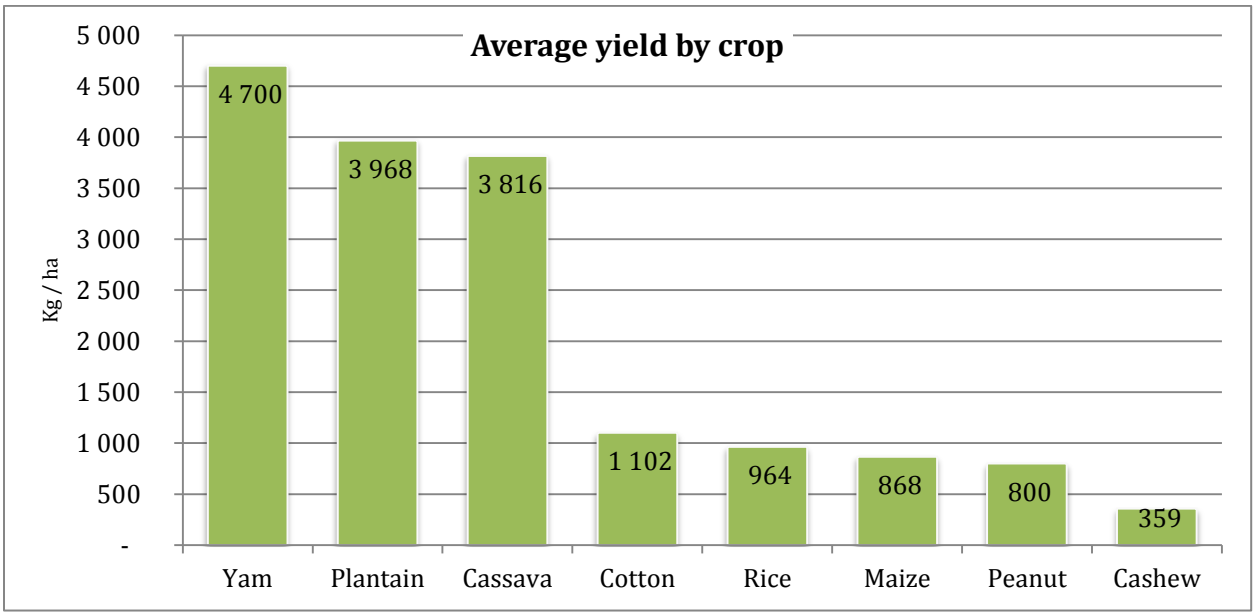

Division of cultivated acreage by crop
51%
11%
10%
10%
7%
5%
3%
2%
1%
Cashew
Cotton
Yam
Maize
Rice
Peanut
Cassava
Plantain
Mango


Cultivated acreage by crop and by village
Hectare
60
50
40
30
20
10
0
Yam
Maize
Rice
Cotton
Mango
Peanut
Plantain
Cassava
16,3
11,5
17,8
23,5
9,9
9,5
28,2
2,0
1,5
41,0
8,0
0,0
6,0
0,0
8,5
7,0
7,5
2,0
3,8
0,5
1,0
3,8
6,4
Sodefel
Dieviessou
Abolikro
250
200
150
100
50
0
100,8
77,3
47,4
Cashew

**Average yields**

The following graph shows the average yield of each culture on the basis of information provided by the producers. For each product, we see that the average yield is much lower than the theoretical yield seen in agronomic literature, which is often double what was found in the field.

Clearly, the cashew nut crop is potentially the most land extensive crop with yields per hectare lower than all the other cultivated crops. Tubers and plantain bananas have high yields per hectare which could increase food security in this region, unlike in other Sahelian regions such as Burkina Faso, Mali, Sénégal or Niger where only cereals grow and where the yields are insufficient to feed households.



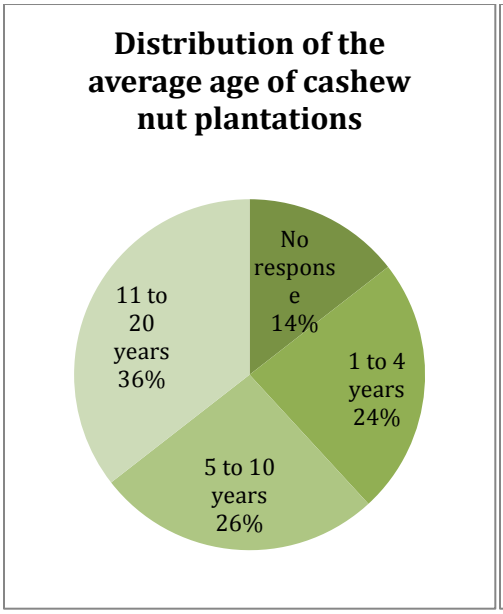

For the cashew nut, only productive plots, meaning plots 5 years or more, were taken into account.

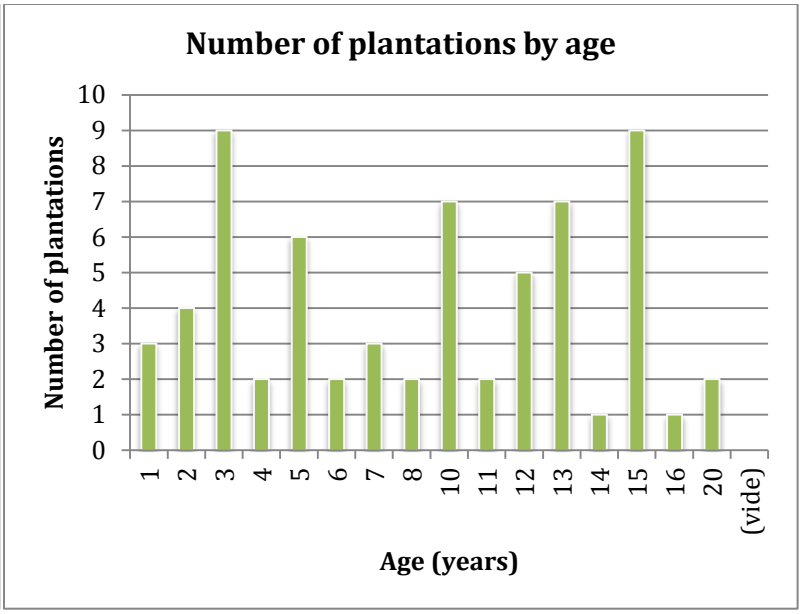
**Age of cashew nut plantations**

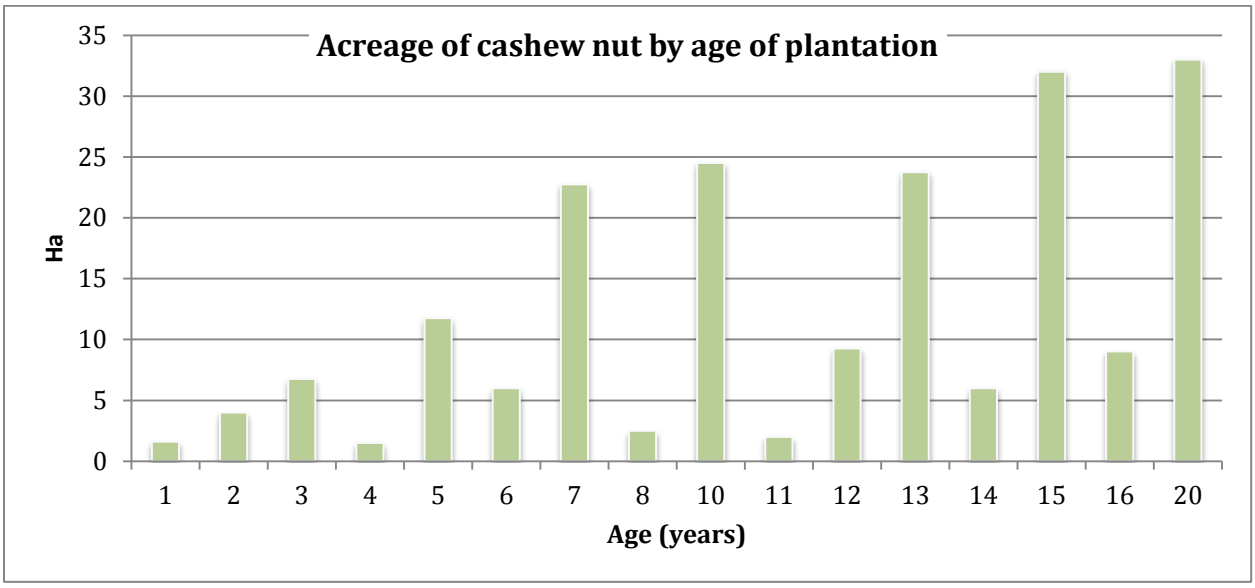
The analysis of the age of cashew nut plantations showed two peaks within the plantations :

- one between 1997 and 2002, which concerns the majority of the plantations that still produce today. This time frame corresponds to a period where the price of cashew nuts on the international market, along with the exchange rate FCFA to USD, kept the price of the kilogram very high (between 300 and 500 FCFA/kg) on the local market
- The other peak was from 2008 to today, wihtin plots that are not yet, or are just beginning, to be productive. This peak corresponds to a general increase in the price of cashew nuts on the international market (besides the year 2009). While this peak affects a great number of plots, this second peak is more limited in terms of affected area. As shall be discussed later in the report, the reduction in the cultivated areas corresponds to a new mindset of the producers that have participated in this second wave of planting : these producers are generally poorer and have smaller plots and less workforce. They

plant cashew nuts more to diversify their cropping system then to benefit from money that this cash crop could generate.

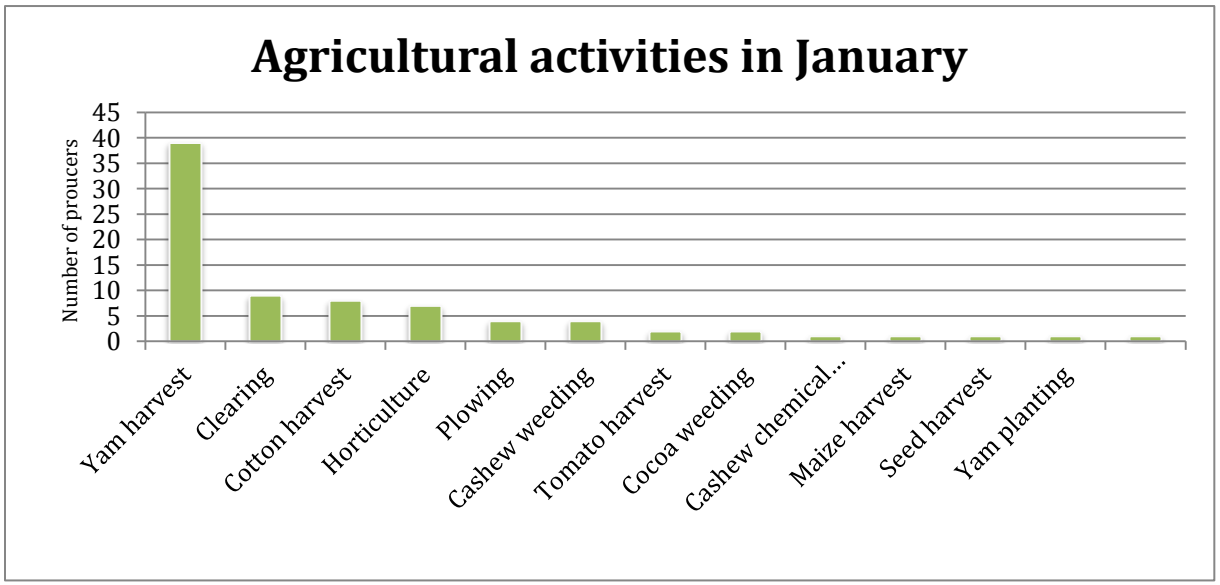


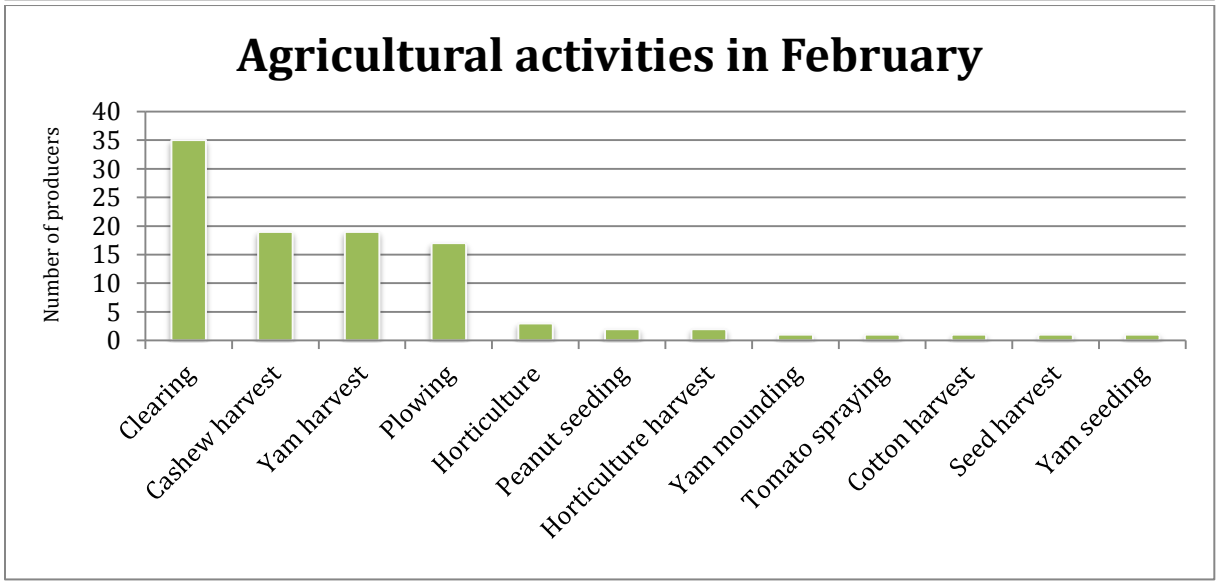



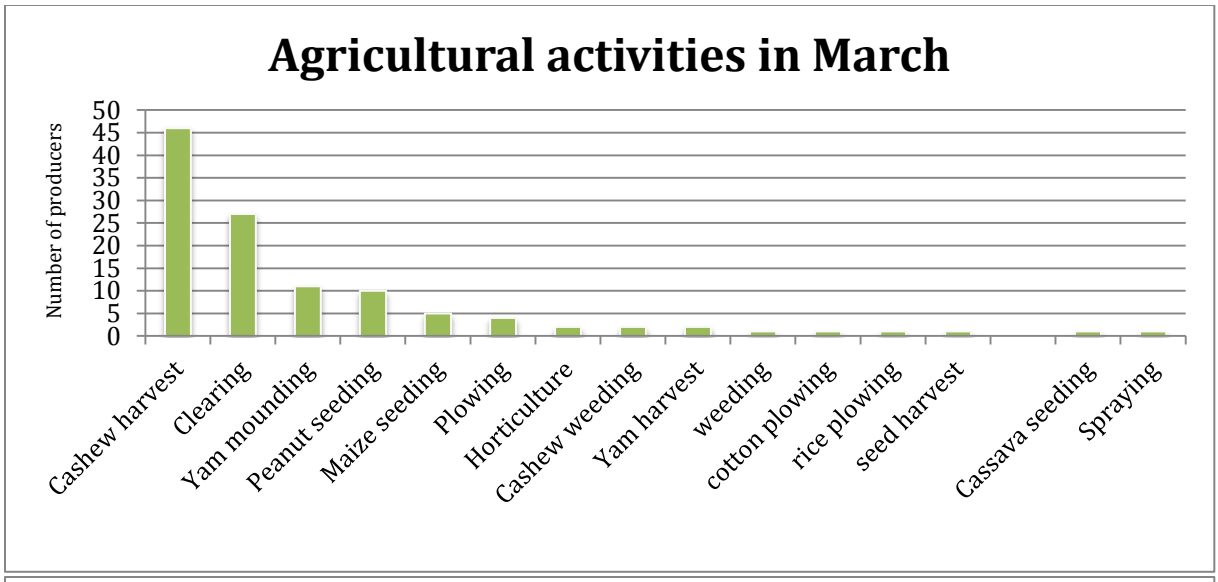



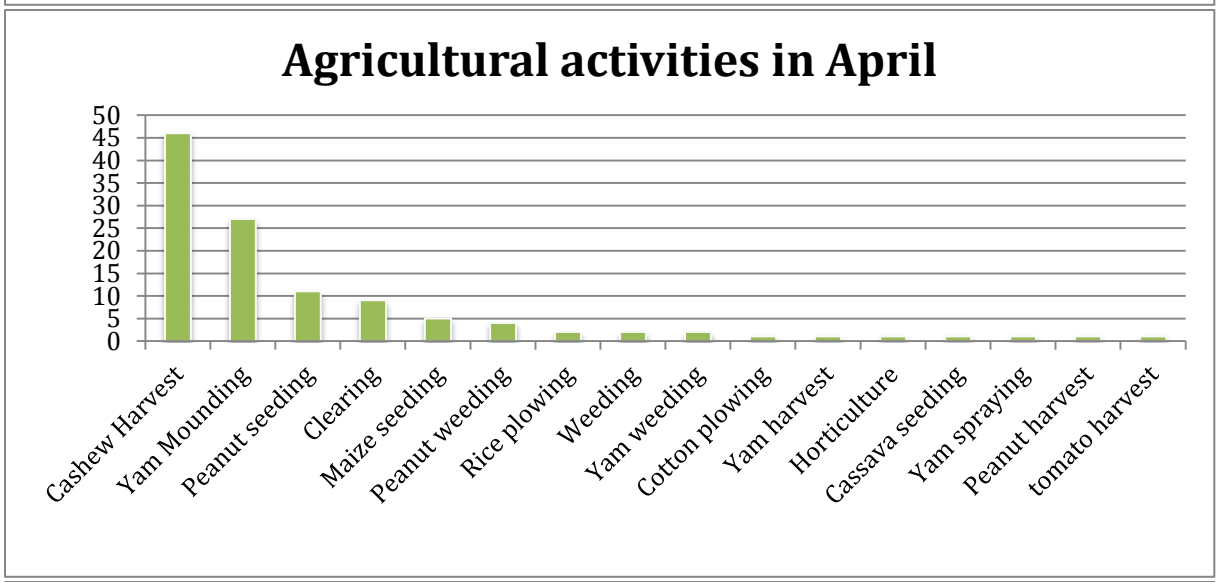
**Work organisation**

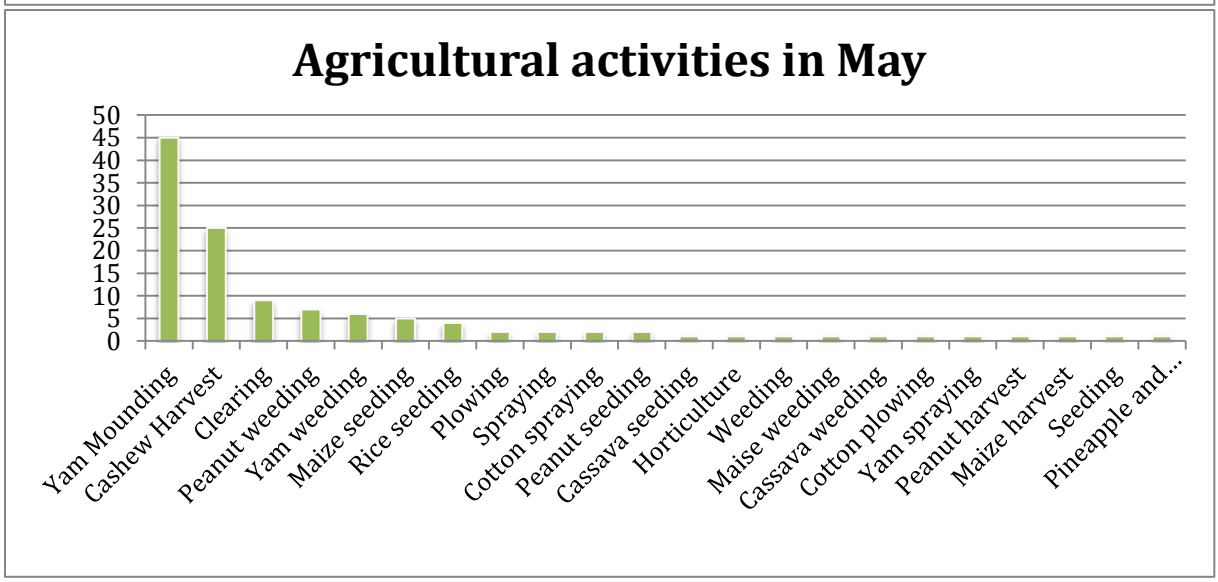
A calendar of activities was made with the producers which allowed us to understand what activities take up the majority of their time throughout the year.

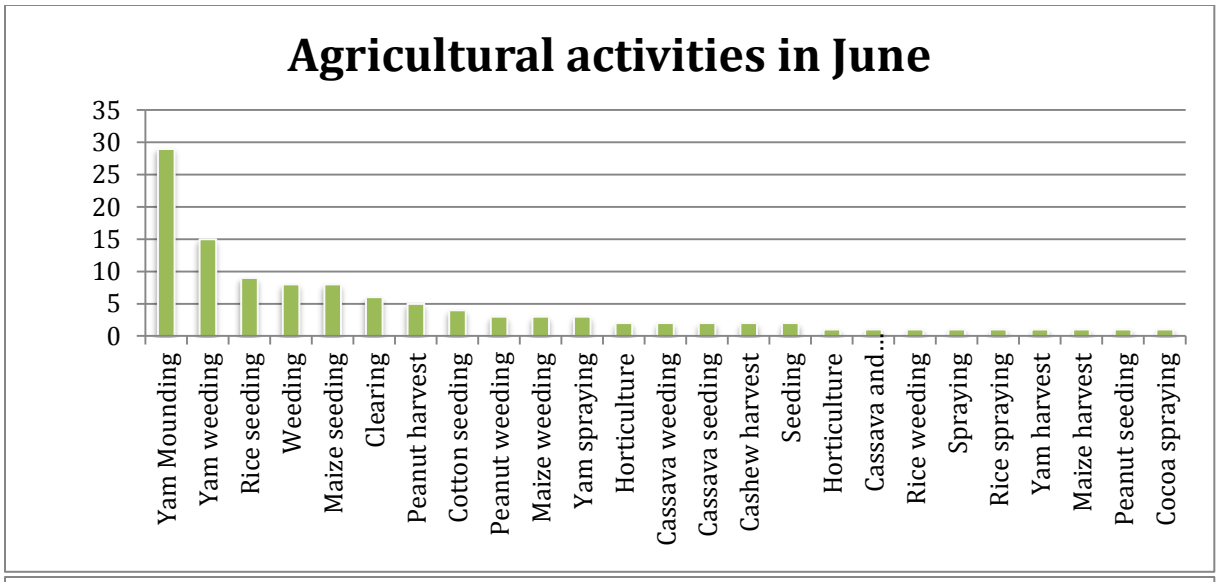


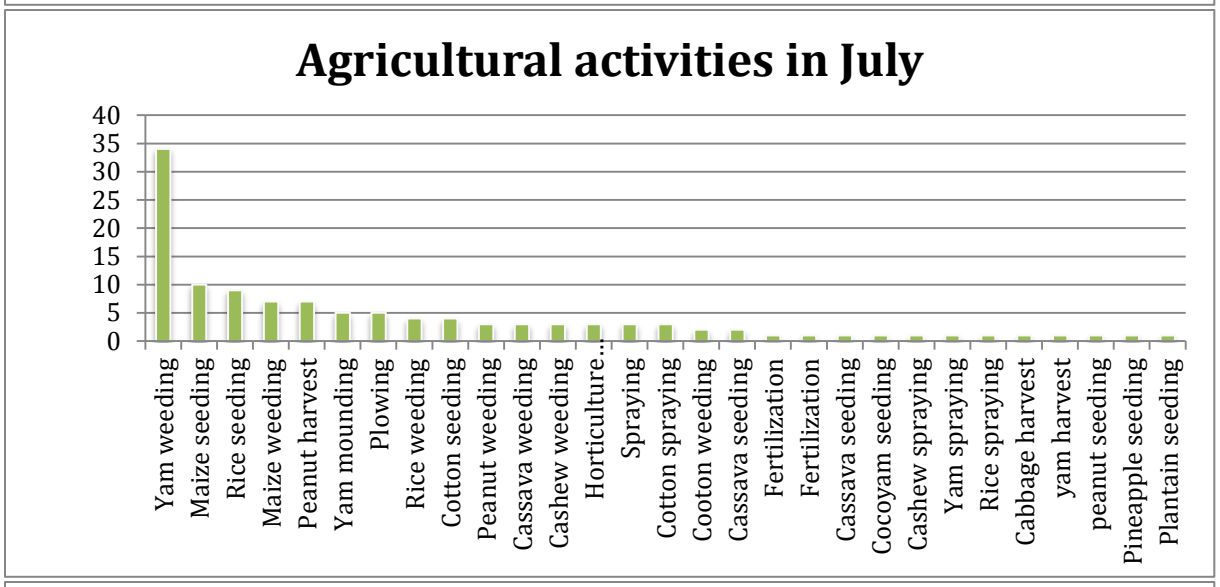



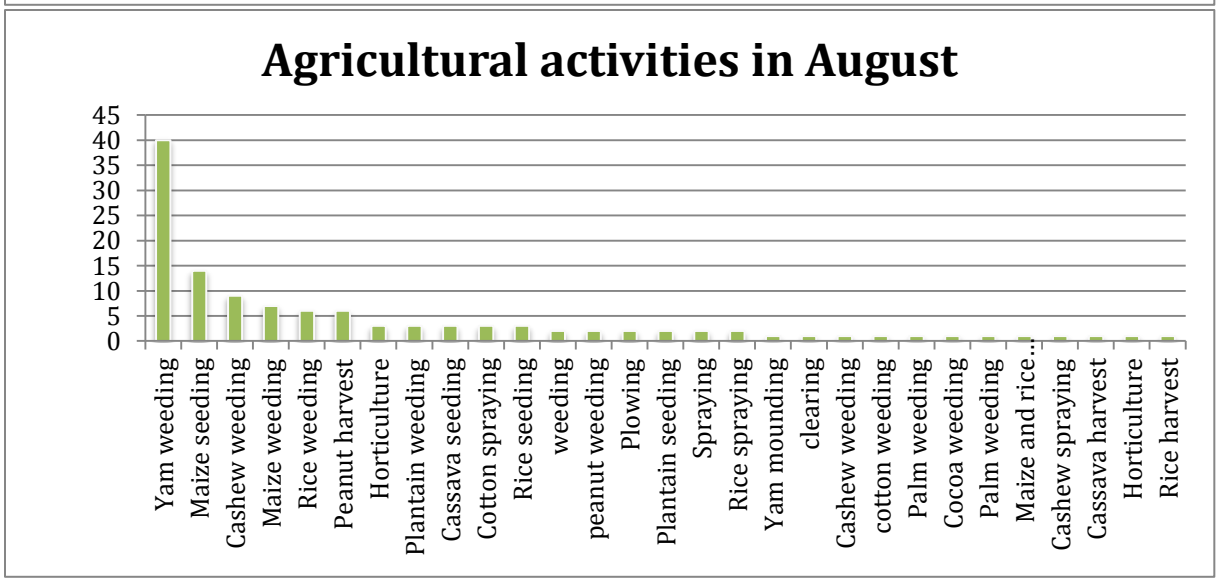

Agricultural activities in March
Number of producers
50
45
40
35
30
25
20
15
10
5
0
Cashew harvest
Clearing
Yam mounding
Peanut seeding
Maize seeding
Plowing
Horticulture
Cashew weeding
Yam harvest
weeding
cotton plowing
rice plowing
seed harvest
Cassava seeding
Spraying

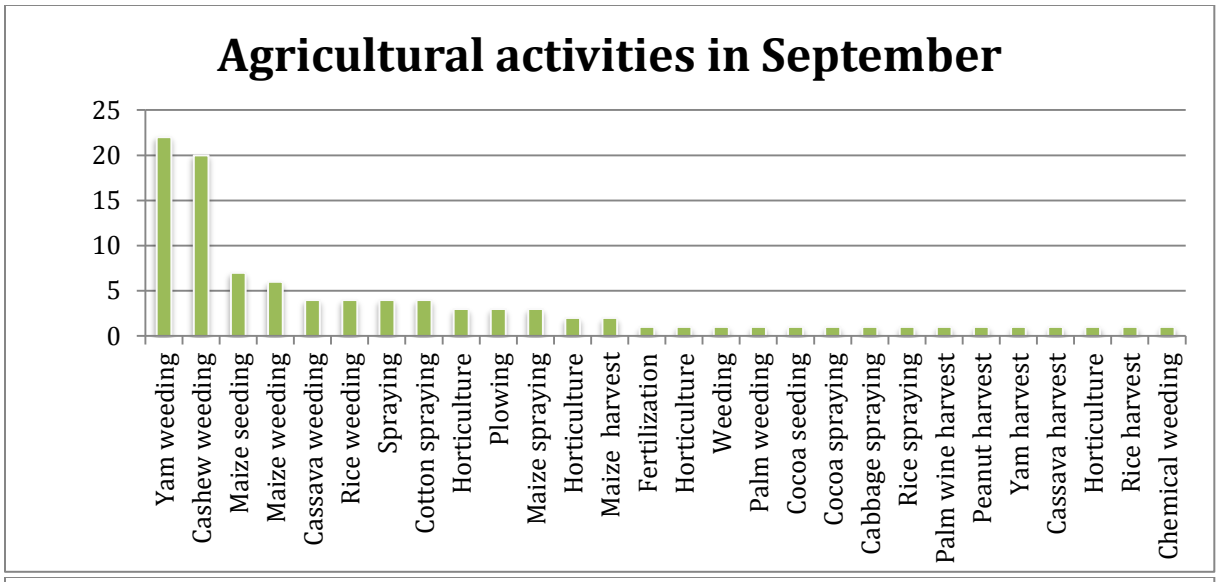

Agricultural activities in April
50
45
40
35
30
25
20
15
10
5
0
Cashew Harvest
Yam Mounding
Peanut seeding
Clearing
Maize seeding
Peanut weeding
Rice plowing
Weeding
Yam weeding
Cotton plowing
Yam harvest
Horticulture
Cassava seeding
Yam spraying
Peanut harvest
tomato harvest

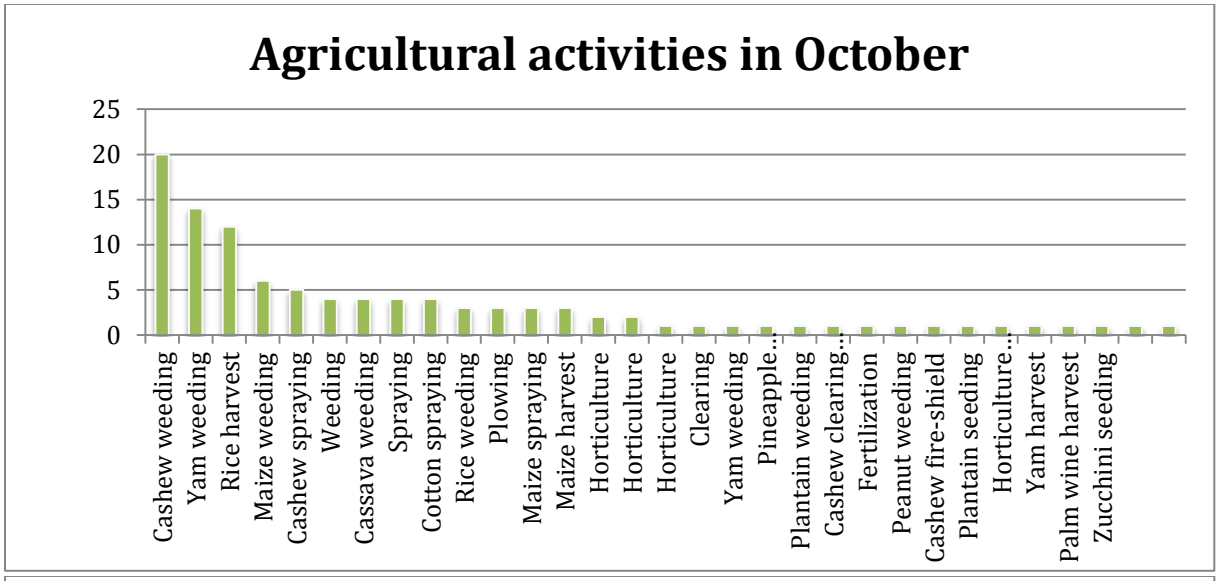

Agricultural activities in May
50
45
40
35
30
25
20
15
10
5
0
Yam Mounding
Cashew Harvest
Clearing
Peanut weeding
Yam weeding
Maize seeding
Rice seeding
Plowing
Spraying
Cotton spraying
Peanut seeding
Cassava seeding
Horticulture
Weeding
Maise weeding
Cassava weeding
Cotton plowing
Yam spraying
Peanut harvest
Maize harvest
Seeding
Pineapple and...

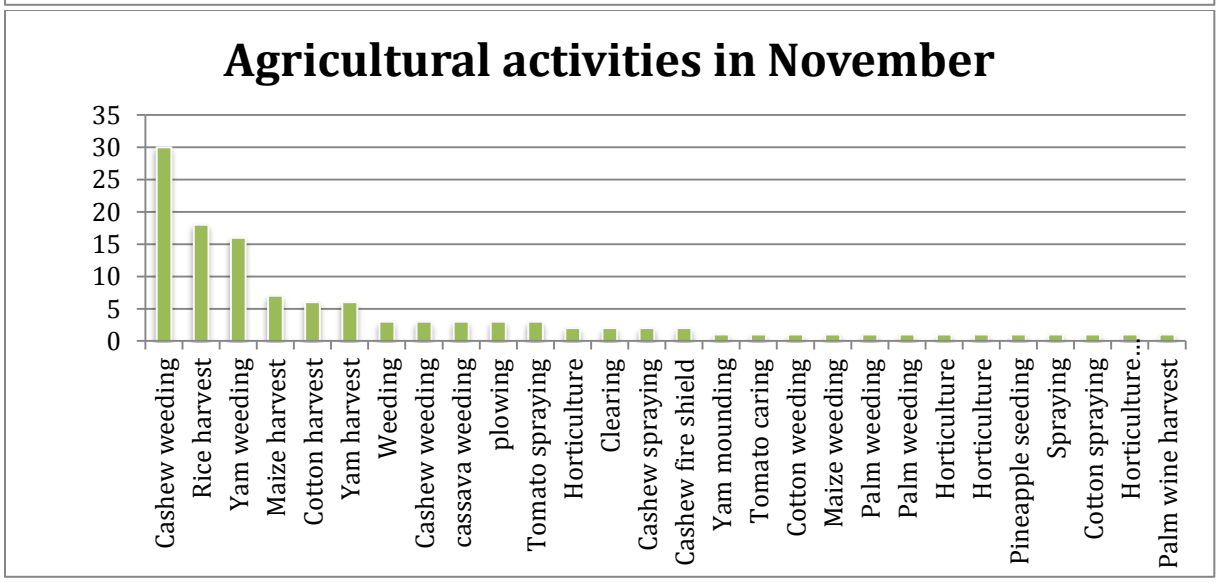

Agricultural activities in June
35
30
25
20
15
10
5
0
Yam Mounding
Yam weeding
Rice seeding
Weeding
Maize seeding
Clearing
Peanut harvest
Cotton seeding
Peanut weeding
Maize weeding
Yam spraying
Horticulture
Cassava weeding
Cassava seeding
Cashew harvest
Seeding
Horticulture
Cassava and...
Rice weeding
Spraying
Rice spraying
Yam harvest
Maize harvest
Peanut seeding
Cocoa spraying

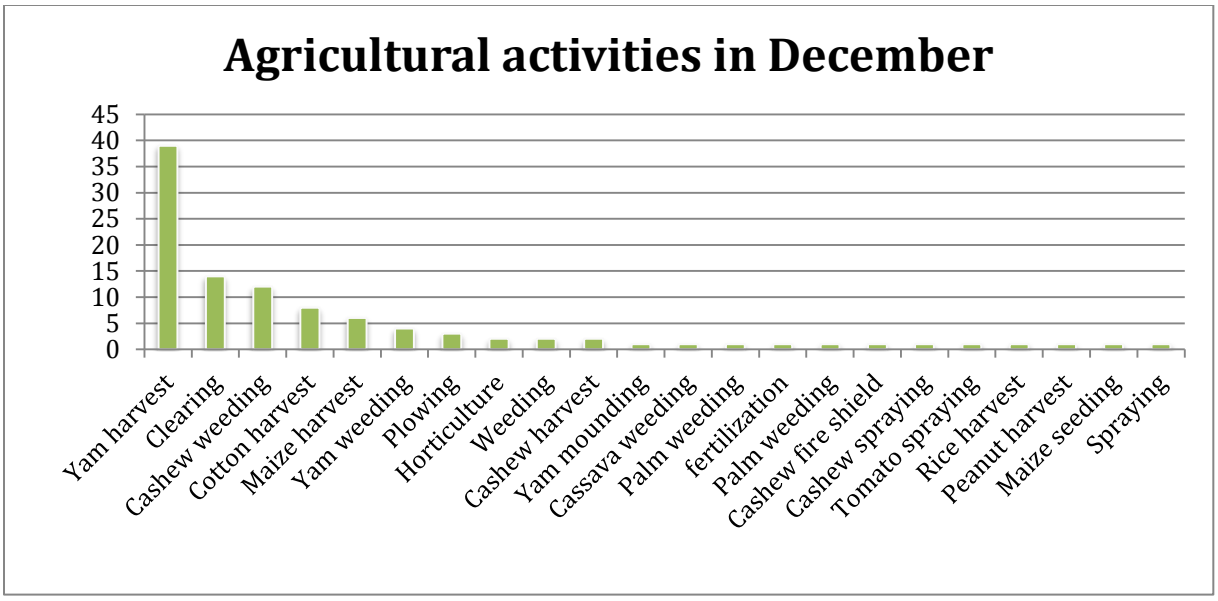

Agricultural activities in July
40
35
30
25
20
15
10
5
0
Yam weeding
Maize seeding
Rice seeding
Maize weeding
Peanut harvest
Yam mounding
Plowing
Rice weeding
Cotton seeding
Peanut weeding
Cassava weeding
Cashew weeding
Horticulture...
Spraying
Cotton spraying
Cooton weeding
Cassava seeding
Fertilization
Fertilization
Cassava seeding
Cocoyam seeding
Cashew spraying
Yam spraying
Rice spraying
Cabbage harvest
yam harvest
peanut seeding
Pineapple seeding
Plantain seeding


Agricultural activities in August
45
40
35
30
25
20
15
10
5
0
Yam weeding
Maize seeding
Cashew weeding
Maize weeding
Rice weeding
Peanut harvest
Horticulture
Plantain weeding
Cassava seeding
Cotton spraying
Rice seeding
weeding
peanut weeding
Plowing
Plantain seeding
Spraying
Rice spraying
Yam mounding
clearing
Cashew weeding
cotton weeding
Palm weeding
Cocoa weeding
Palm weeding
Maize and rice...
Cashew spraying
Cassava harvest
Horticulture
Rice harvest


Agricultural activities in September
25
20
15
10
5
0
Yam weeding
Cashew weeding
Maize seeding
Maize weeding
Cassava weeding
Rice weeding
Spraying
Cotton spraying
Horticulture
Plowing
Maize spraying
Horticulture
Maize harvest
Fertilization
Horticulture
Weeding
Palm weeding
Cocoa seeding
Cocoa spraying
Cabbage spraying
Rice spraying
Palm wine harvest
Peanut harvest
Yam harvest
Cassava harvest
Horticulture
Rice harvest
Chemical weeding


Agricultural activities in October
25
20
15
10
5
0
Cashew weeding
Yam weeding
Rice harvest
Maize weeding
Cashew spraying
Weeding
Cassava weeding
Spraying
Cotton spraying
Rice weeding
Plowing
Maize spraying
Maize harvest
Horticulture
Horticulture
Horticulture
Clearing
Yam weeding
Pineapple...
Plantain weeding
Cashew clearing...
Fertilization
Peanut weeding
Cashew fire-shield
Plantain seeding
Horticulture...
Yam harvest
Palm wine harvest
Zucchini seeding


Agricultural activities in November
35
30
25
20
15
10
5
0
Cashew weeding
Rice harvest
Yam weeding
Maize harvest
Cotton harvest
Yam harvest
Weeding
Cashew weeding
cassava weeding
plowing
Tomato spraying
Horticulture
Clearing
Cashew spraying
Cashew fire shield
Yam mounding
Tomato caring
Cotton weeding
Maize weeding
Palm weeding
Palm weeding
Horticulture
Horticulture
Pineapple seeding
Spraying
Cotton spraying
Horticulture...
Palm wine harvest




Here is a calendar that sums up the biggest agricultural activities by crop

| | January | February | March | April | May | June | July | August | Septembe r | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Weather** | Dry weather | Dry weather | Dry weather | Light rains | Light rains | Light rains | Heavy rains | Heavy rains | Heavy rains | Last rains | Dry weather | Dry weather |
| **Annual crops** | End of harvests | Land clearing | Land clearing | Beginning of planting | Planting | Planting | Planting | Weeding | Weeding | Weeding | Beginning of harvest | Harvest |
| **Cashew nut** | End of weeding | Beginning of harvest | Harvest | Harvest | End of harvest | | | Weeding | Weeding | Weeding | Weeding | Weeding |
| **Horti-culture** | Planting or harvesting | Planting or harvesting | Planting or harvesting | Planting or harvesting | Planting or harvesting | Planting or harvesting | Planting or harvesting | Planting or harvesting | Planting or harvesting | Planting or harvesting | Planting or harvesting | Planting or harvesting |

In the following calendar, we study the work done by « strong » men and by workers with less physical strength (women, preadolescents, older people).

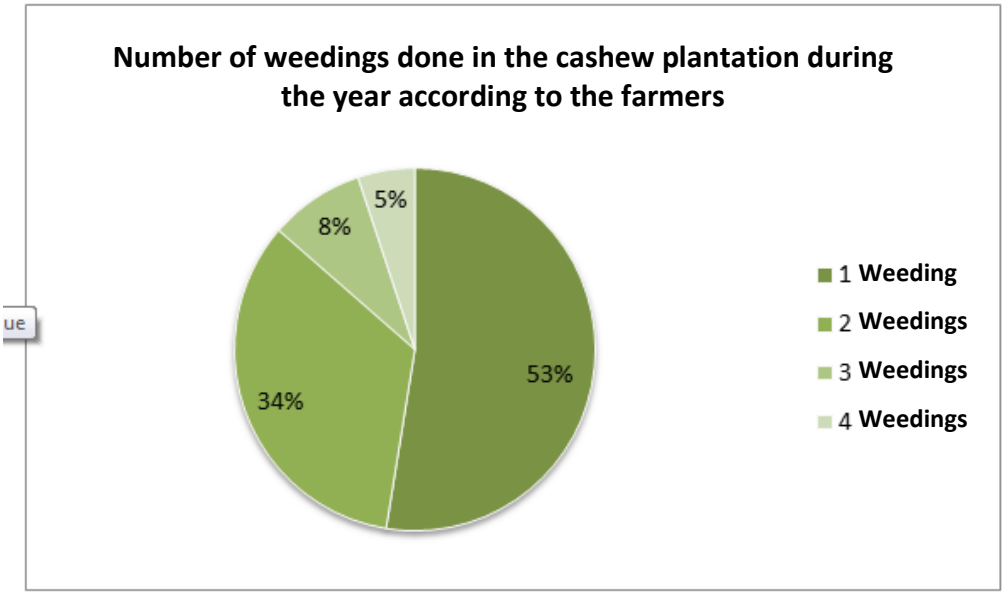
| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Weather** | Dry weather | Dry weather | Dry weather | Light rains | Light rains | Light rains | Heavy rains | Heavy rains | Heavy rains | Last rains | Dry weather | Dry weather |
| **Young men and men** | Harvest and land clearing | Land clearing | Land clearing | Land clearing and yam | Yam mounding | Yam, mounding | Sowing | Sowing | Weeding | Weeding | Weeding and harvest | Harvest, weeding |
| **Women, children, elderly** | Harvest annual crops | Harvest cashew nut | Harvest cashew nut | Harvest cashew nut | Harvest cashew nut | Sowing | Sowing | Weeding | Weeding | Weeding | Harvest annual crops | Harvest annual crops |

One of the advantages of the cashew nut crop is that it does not require much work during the preparation of fields for the annual crops. This period is critical because it is at this time that the available work force in the household conditions the area that can be cultivated.

However, the months during which maintenance of the cashew tree occurs conflicts with other agricultural activities. Maintenance of the cashew nut trees coincides with maintenance or harvesting of other crops. This conflict partially explains why few cashew nut plantations are well maintained (see graph).

This constraint also encourages producers to grow trees close together to limit weed infestations in order to reduce maintenance time.

These poor agricultural practices negatively impact the yields of cashew nut plots but will be difficult to change in a system as extensive as the majority of the zones of cashew nut production in the Ivory Coast.



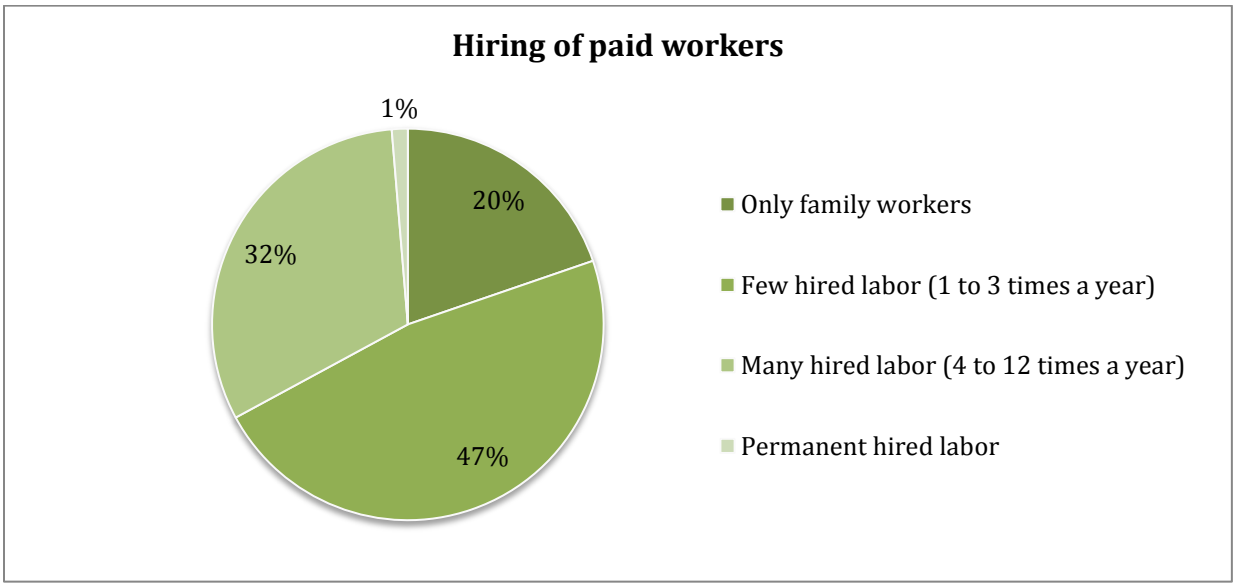

Let us note that horticulture practiced in shallow areas is an interesting activity because it can be undertaken year round and fills in lulls in the agricultural calendar.

However, horticulture presents two contradictory points: on the one hand, it requires an initial investment in seeds, fertilizers and pesticides of more than 300 000 FCFA/ha[2] (582 USD) which is much more than for any other crop. On the other hand, horticultural products need rapid access to a market because of limited shelf life of horticultural products.

[2] It means more than 30 000 FCFA (58 USD) on 0,1 ha which is the acreage most commonly cultivated (around 20 000 FCFA (39 USD) for fertilizers, 6000 FCFA (11,6 USD) for phytosanitary treatments, 4000 FCFA (7,7 USD) for seeds).

**Agricultural Labor**

The majority of manpower is family-based but many producers hire daily workers (groups of young people or workers who are not from the same village) every once in a while if they are behind schedule or need to compensate some absence (due to illness for example). Only one third of the producers hire manpower regularly, as is visible in the following graph.

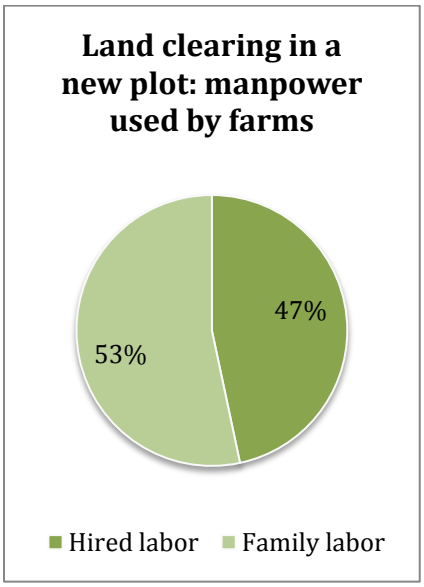


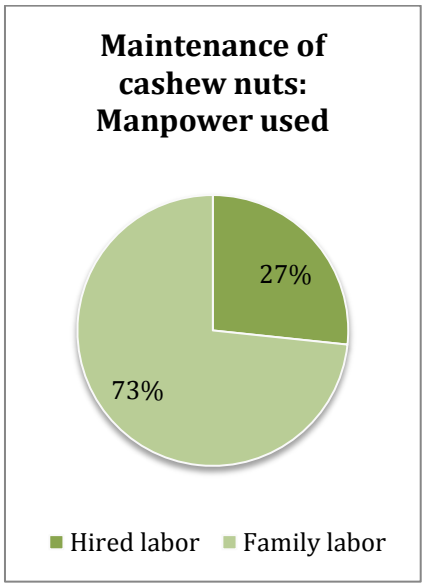

The cost of a worker varies between 500 and 1500 FCFA/day (0,97 to 2,91 USD) depending on the physical effort required and the availability of workers. The daily wage tends to be 1000FCFA/day. The following table shows the average time necessary to do the main agricultural activities and the cost of paying a worker.

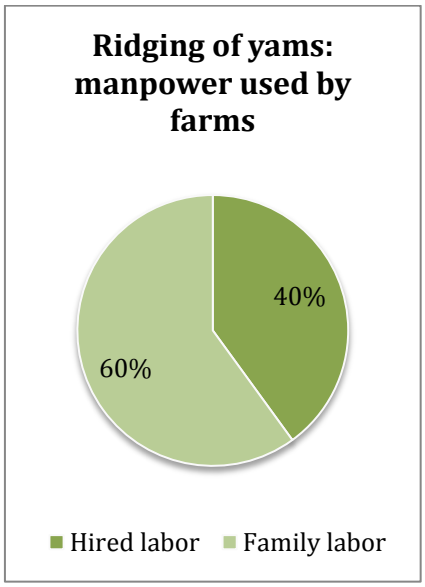
| Activity | Man-days/ha/month | Nbr of months | Cost per man-day | Cost of activity if paid |
|---|---|---|---|---|
| **Clearing new land** (cultivation of fallow land) | 30 | 1 | 1000 - 1500 | 30 000 - 45 000 |
| **Mounding and sowing of yam** | 30 | 1 | 1000 - 1500 | 30 000 – 45 000 |
| **Plowing** | 20 | 1 | 1000 - 1500 | 20 000 – 30 000 |
| **Sowing maize, rice, peanut** | 10 | 1 | 1000 | 10 000 |
| **Weeding** | 20 | 3 | 1000 - 1500 | 60 000 |
| **Harvest yam - cassava - peanut** | 15 | 1 | 1000 | 15 000 |
| **Harvest maize, rice** | 10 | 1 | 1000 | 10 000 |
| **Weeding young cashew plantations** | 15 | 3 | 1000 | 45 000 |
| **Weeding cashew plantation > 6 years** | 4 | 3 | 1000 | 12 000 |
| **Harvest of cashew nuts** | 8 | 3 | 500 - 1000 | 12 000 – 24 000 |

In comparison with the other crops, cashew nuts are not very demanding in either manpower or production costs.

Besides cotton, for which all farms hire workers, the three activities which require the most extra labor are land clearing, maintenance of cashew nut plantations during the harvesting season of the other crops (Nov-Dec-Jan) and the ridging and sowing of yams.



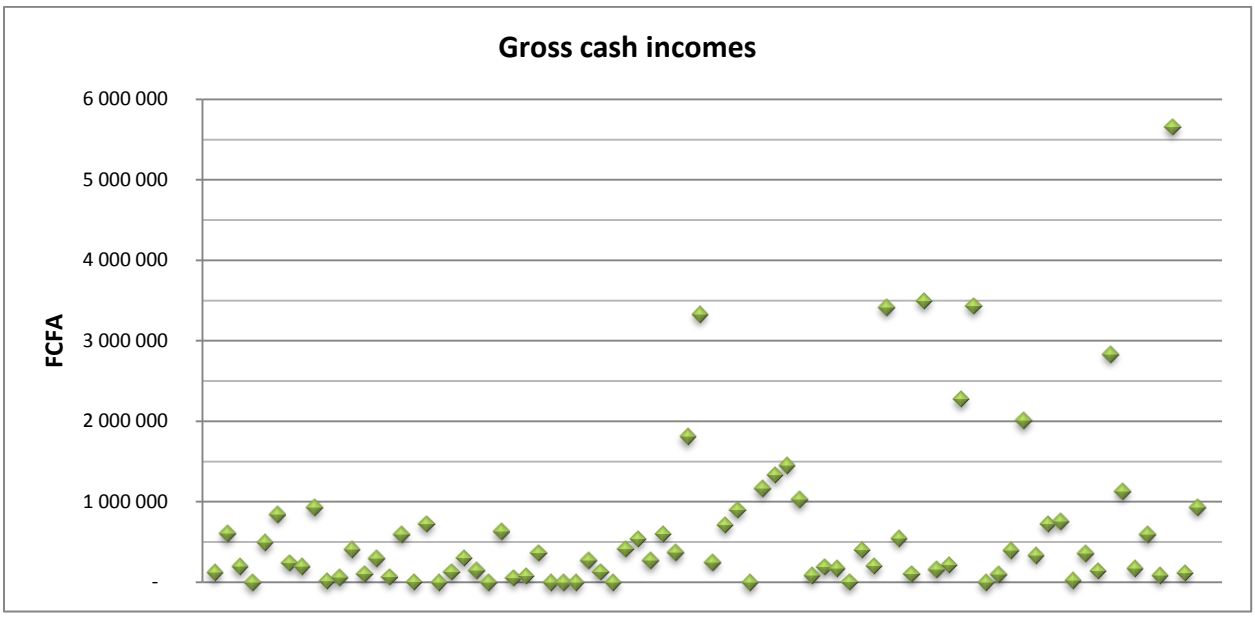




Some producers are also organized in work groups of 5 to 10 people, generally for the preparation of plots. The group works from plot to plot for each member and the household whose plot is being worked pays lunch for all the workers there that day. This organization allows for a greater motivation to work and increases the size of areas that are prepped at the beginning of the rainy season (June-July).
Weeding and harvesting are generally family business with the exception of some producers who cultivate very large areas or who cannot work in their fields due to age or sickness.

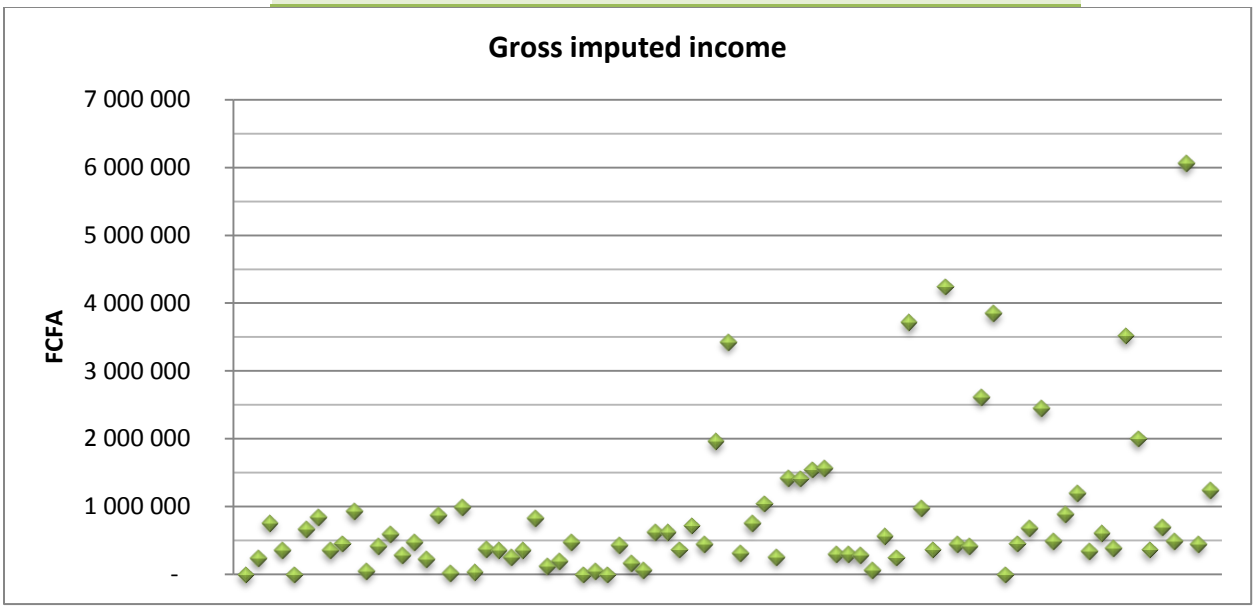
**Farm income**

In this chapter, we differentiate between three different types of income: gross cash income from the commercialization of surplus food crops or cash crops, gross imputed income which takes into account the estimated value of products consumed by the family and net cash income which are the benefits of the farm. The median gross cash income is 323 563 FCFA (628 USD), while the gross imputed income is 481 250 FCFA (935 USD) per farm. The median net cash income is 271 250 FCFA (526 USD).
As is visible in the following table, the distribution of the revenues is relatively unequal between farms. The 25% most productive farms earn more than 6 times what the 25% poorest make.

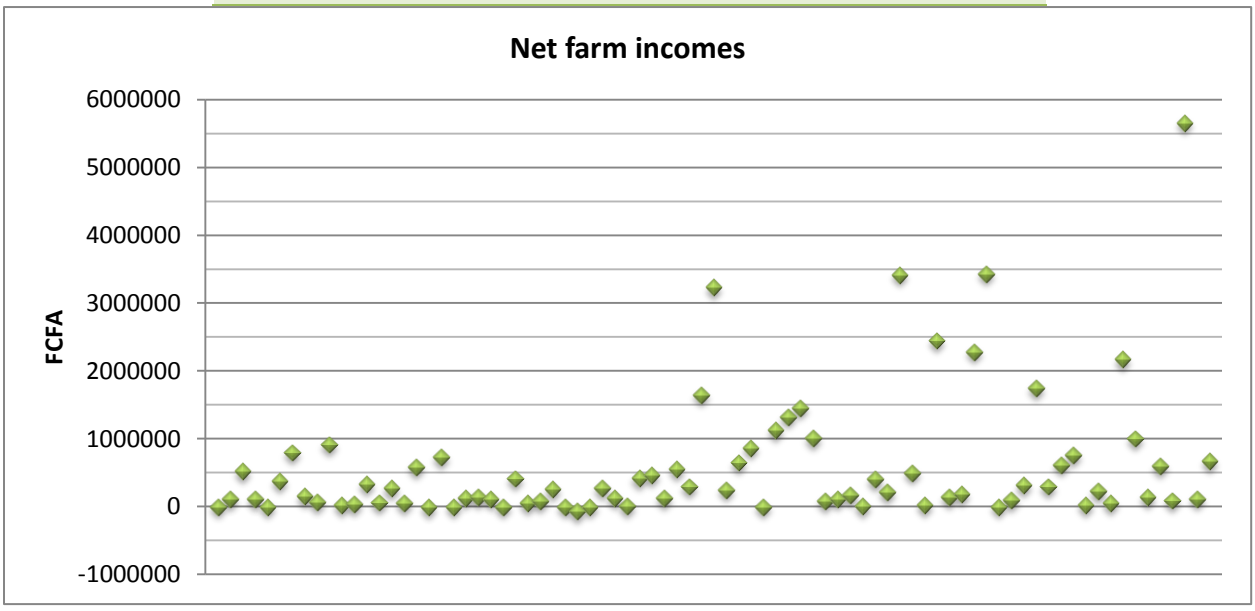
| Quartiles gross cash income | FCFA | USD |
|---|---|---|
| Min | 0 | 0 |
| Q1 (25% of farms) | 124 531 | 241 |
| Q2 (25% of farms) | 323 563 | 628 |
| Q3 (25% of farms) | 737 125 | 1431 |
| Max (25% of farms) | 5 658 750 | 10 987 |



| Quartiles gross imputed income | FCFA | USD |
|---|---|---|
| **Min** | 28 750 | 55,8 |
| **Q1 (25% of farms)** | 341 381 | 663 |
| **Q2 (25% of farms)** | 481 250 | 934 |
| **Q3 (25% of farms)** | 945 875 | 1 837 |
| **Max (25% of farms)** | 6 062 500 | 11 772 |




| Quartiles net farm income | FCFA | USD |
|---|---|---|
| **Min** | -11250 | - 21,8 |
| **Q1 (25% of farms)** | 108 969 | 212 |
| **Q2 (25% of farms)** | 273 125 | 530 |
| **Q3 (25% of farms)** | 714 125 | 1 396 |
| **Max (25% of farms)** | 5 658 750 | 10 988 |



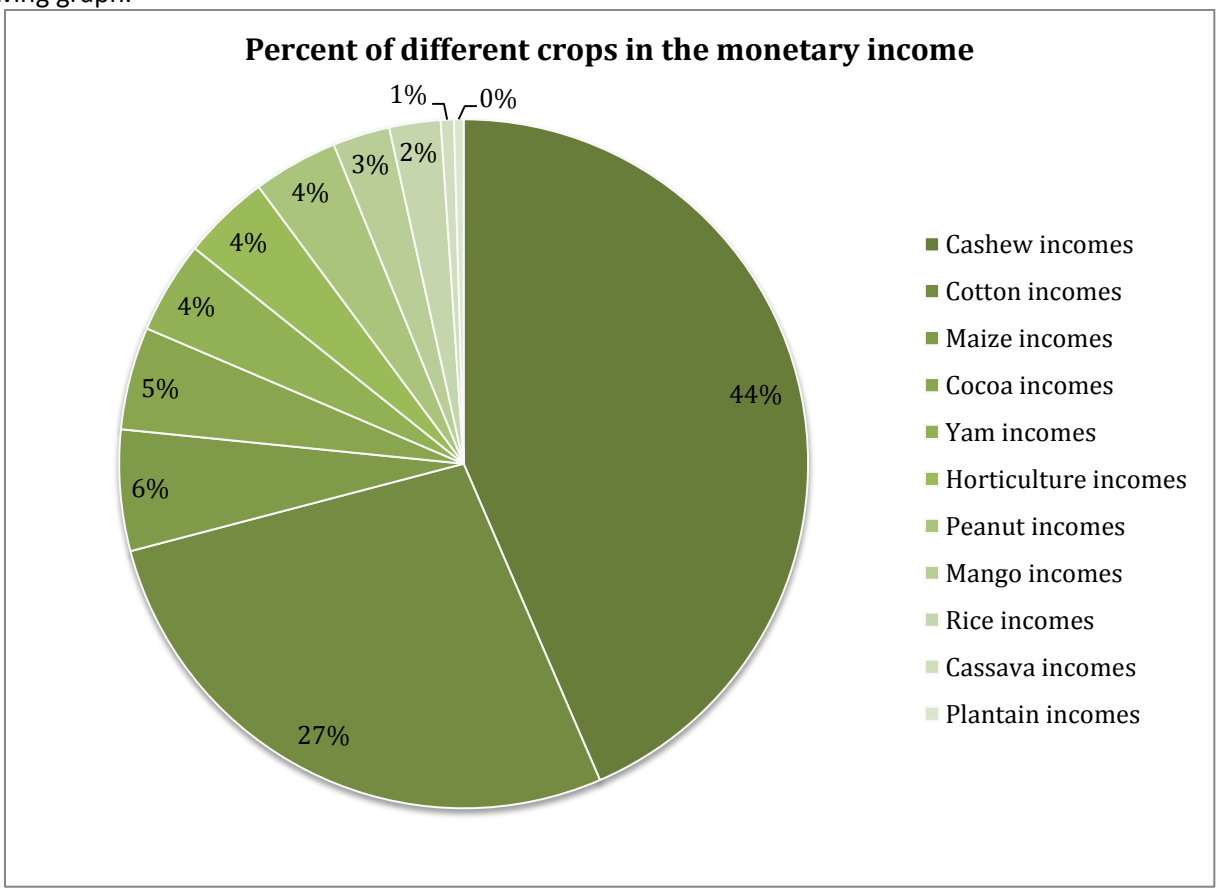
Only two farms had a negative financial balance sheet: that of the old man, widowed, who lived with his grandson and received financial support from his children, and that of the divorced woman whose cashew nut production burned down. However, 25% of the farms have a financial balance that is less then 108 000 FCFA/year (209 USD).

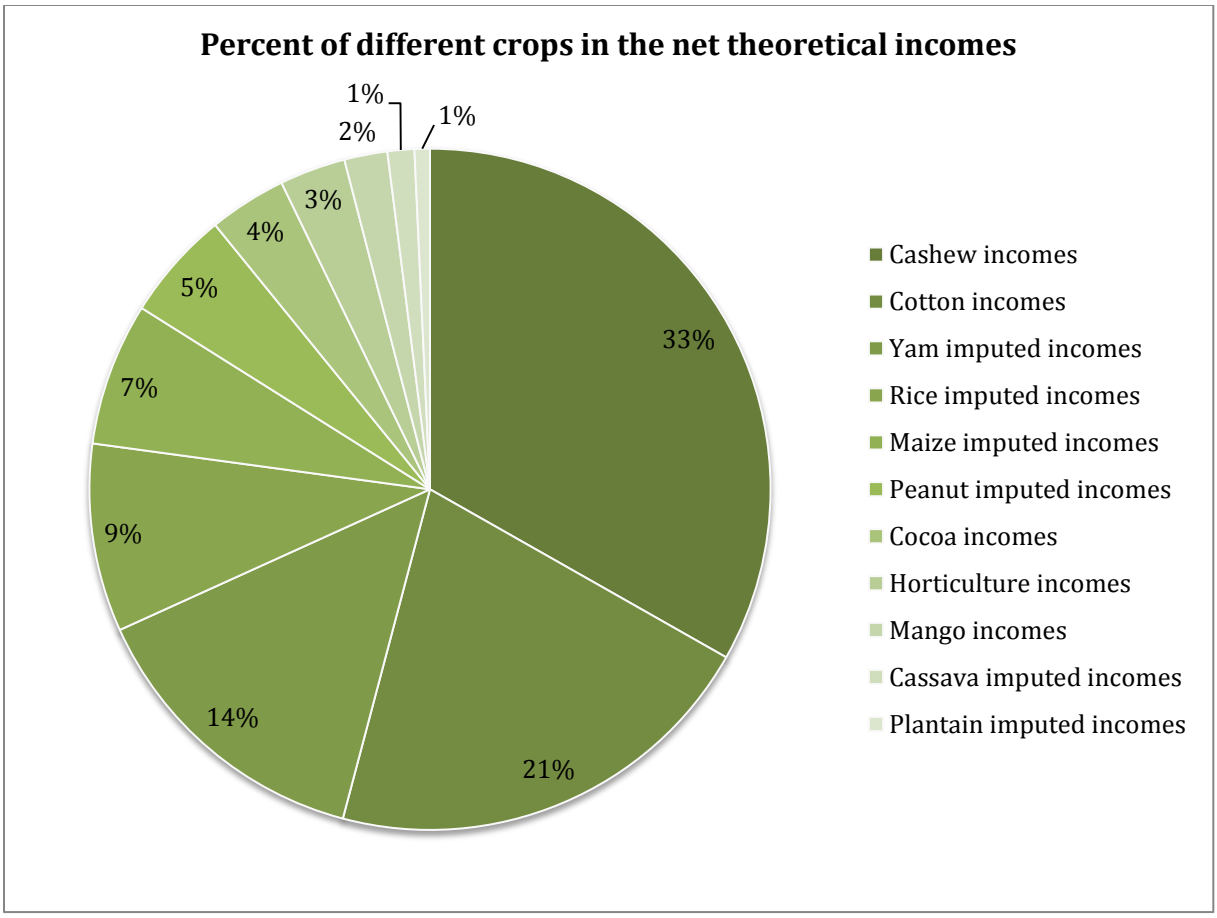
**Share of cashew nuts in the farm incomes**

For 25% of households, cashew nuts represent 73% of the monetary incomes. However, for the half of the producers whose plots have not yet started producing, cashew nuts represent less then 24% of the monetary income of the farms.

| Quartiles : part de l'anacarde dans les revenus monétaires | |
|---|---|
| Min | 0% |
| Q1 (25% des exploitations) | 0% |
| Q2 (25% des exploitations) | 24% |
| Q3 (25% des exploitations) | 73% |
| Q4 (25% des exploitations) | 100% |

However, cashew nuts do represent almost 45% of the total monetary incomes of all farms, as is visible in the following graph.

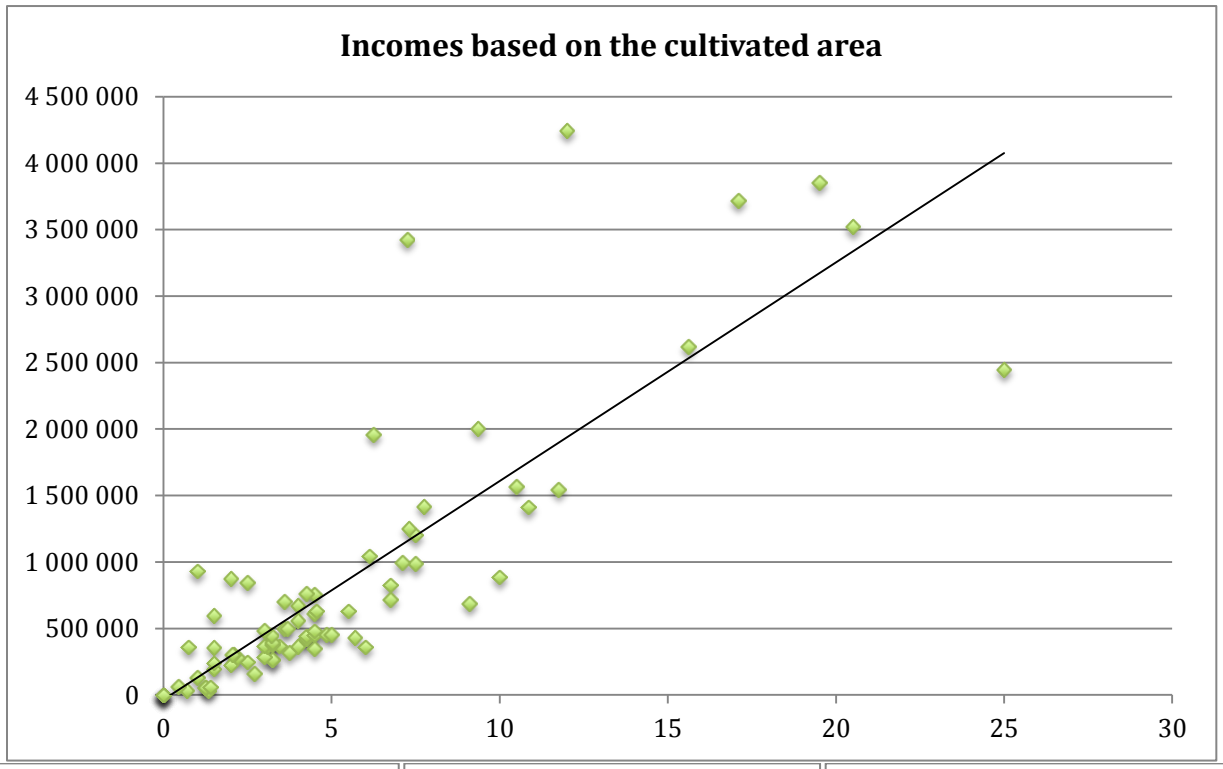


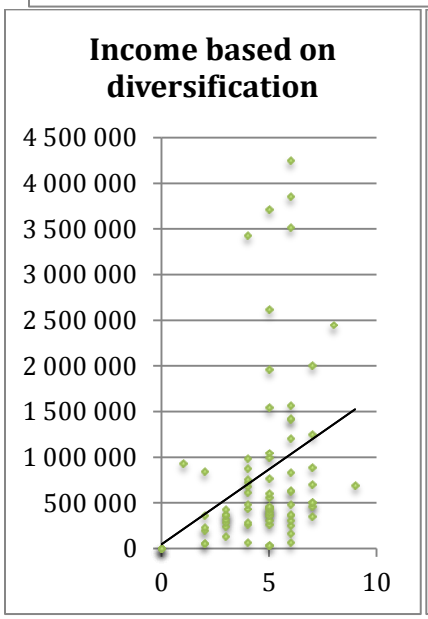


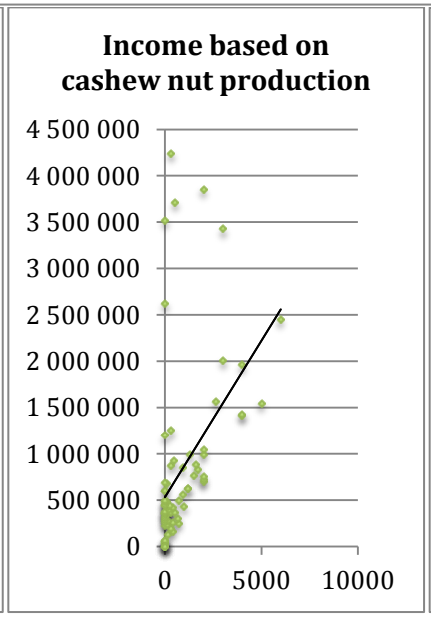

Cashew nuts strongly contribute to the creation of added value in the areas where this study took place, as is the case in production zones all over the Ivory Coast. However, these revenues seem concentrated in the hands of only part of the population today.

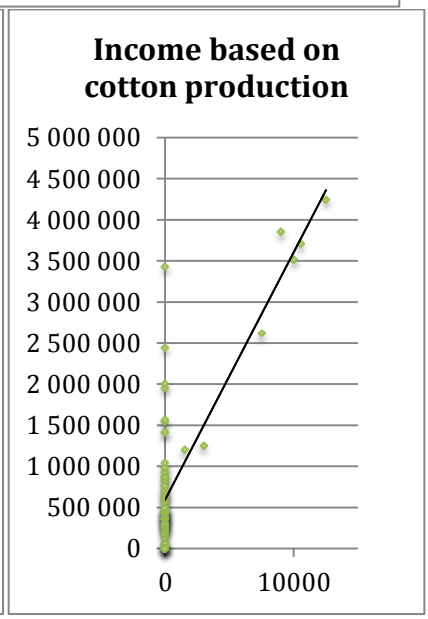
**Incomes: factors of differentiation:**

As is visible in the following graph, the gross imputed income depends primarily on the cultivated area. Cashew nut production, diversification of crops and the production of cotton also correlate with increases in revenue.

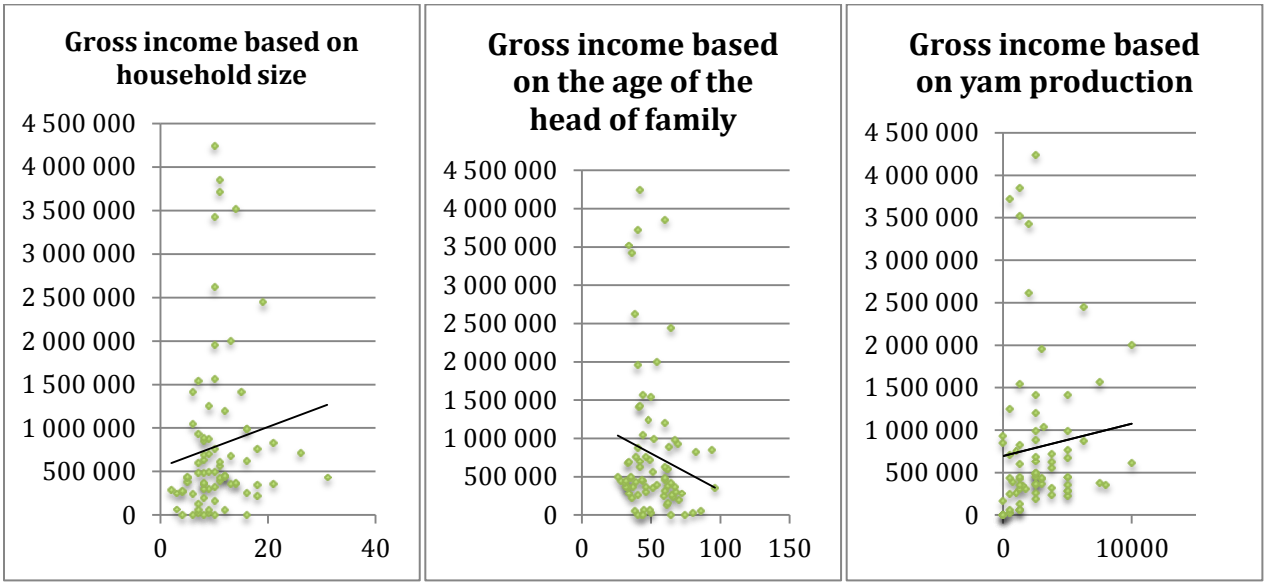


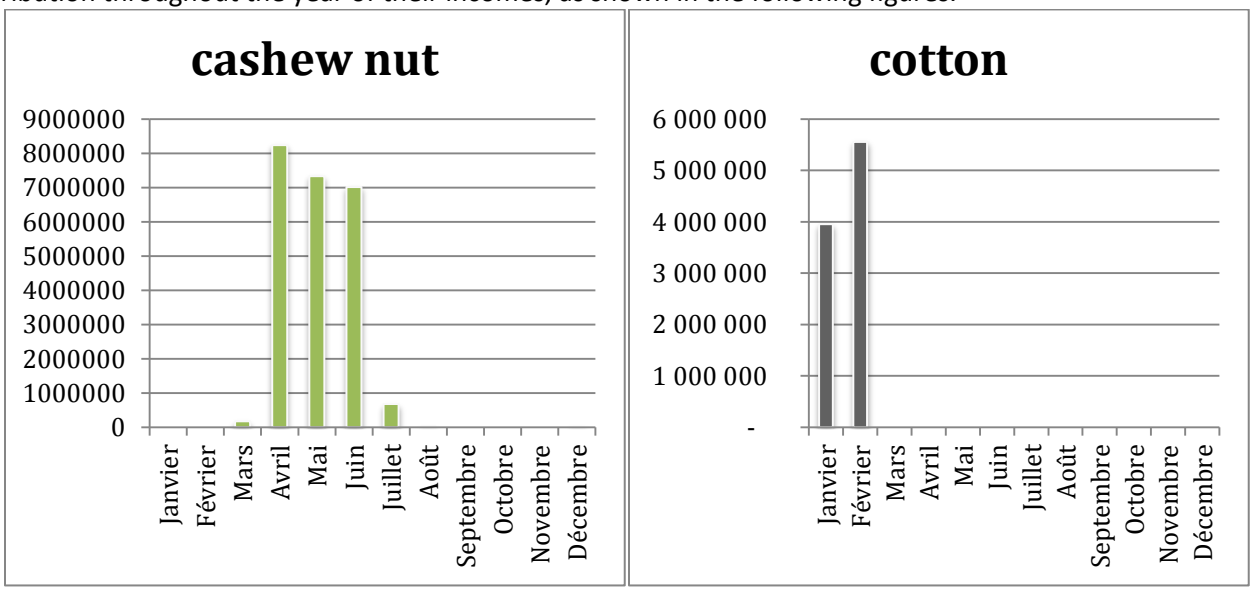
The gross imputed income does not correlate in any obvious manner with the age of the head of the family, the size of the household or the production of yams.

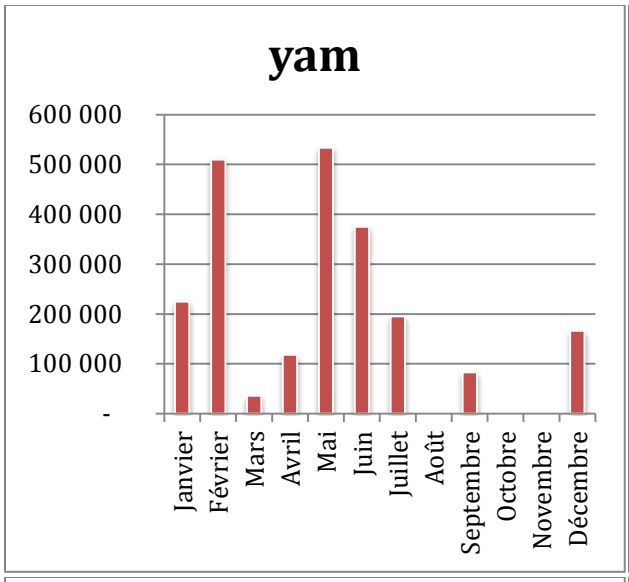



It is thus interesting to note that cashew nuts, much like cotton, are a crop that has strong potential to reduce poverty and help farms that have a financial margin that is strong enough that they can think of undertaking agricultural entrepreneurship. The growing of cashew nuts, because of low initial investments costs, a relatively simple technical itinerary and low production costs make it a crop that is easier for producers to access than cotton, for example, even if per hectare, cotton producers might gain higher profits.

**Allocation of monetary income throughout the year**

From the agricultural calendars that were drawn up with the producers, we were able to estimate the distribution throughout the year of their incomes, as shown in the following figures.

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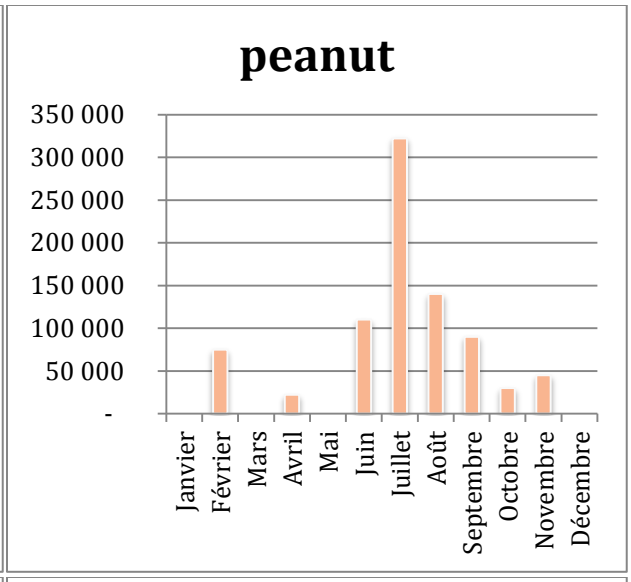
peanut
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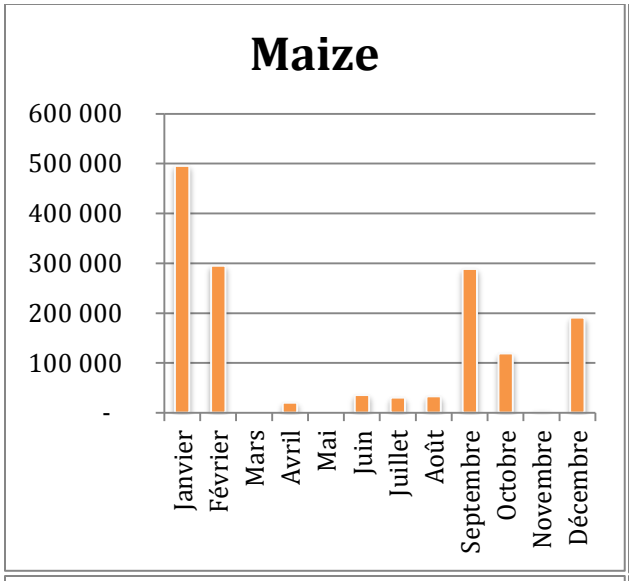
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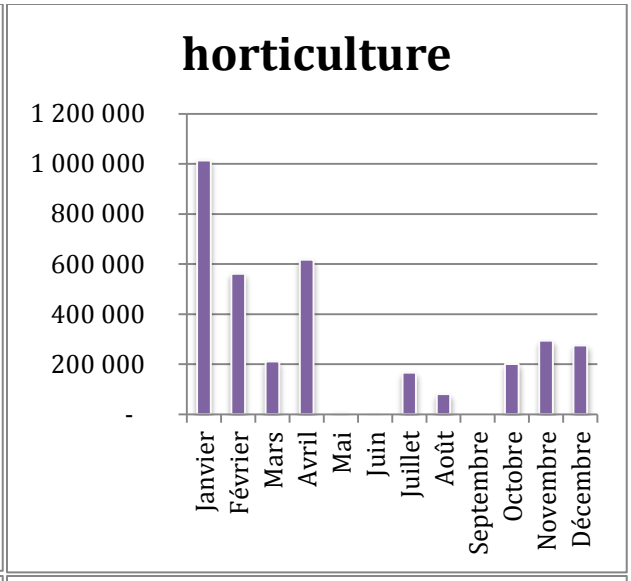
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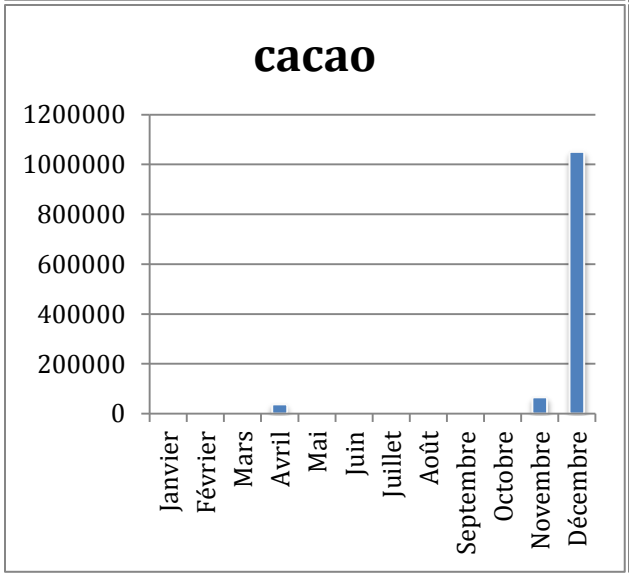
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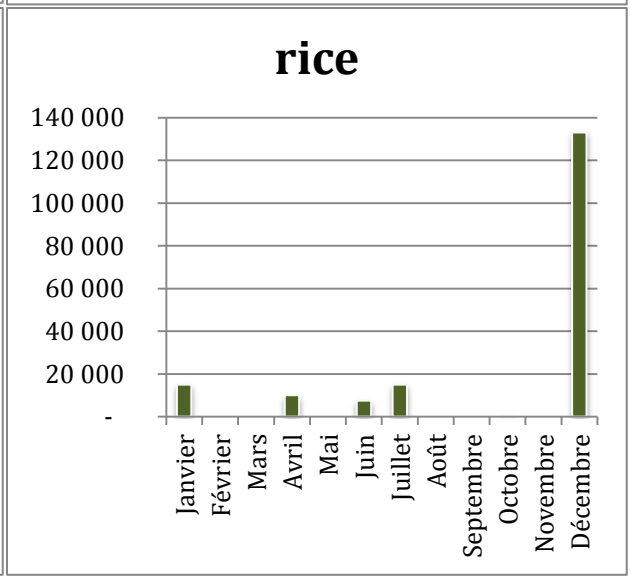
rice
140 000
120 000
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60 000
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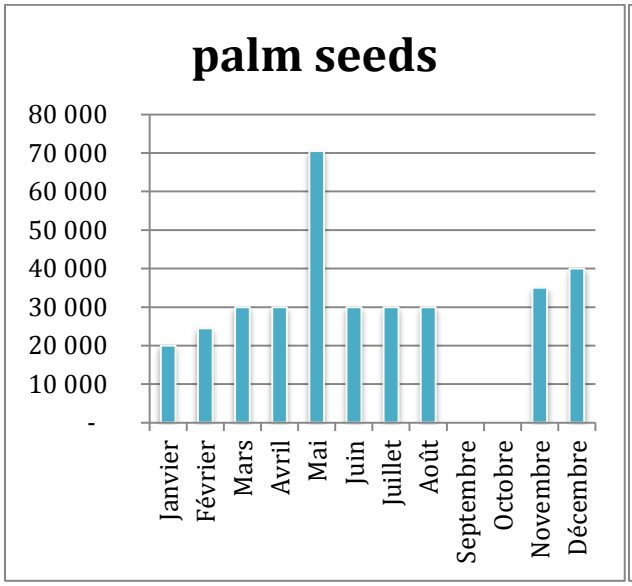
palm seeds
80 000
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60 000
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40 000
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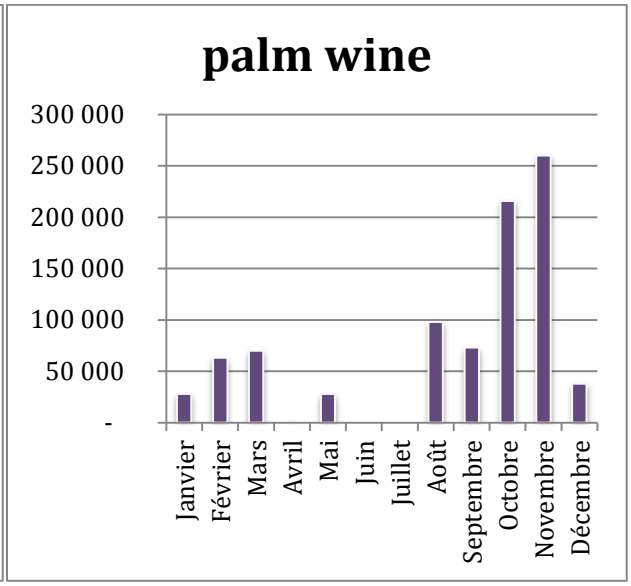
palm wine
300 000
250 000
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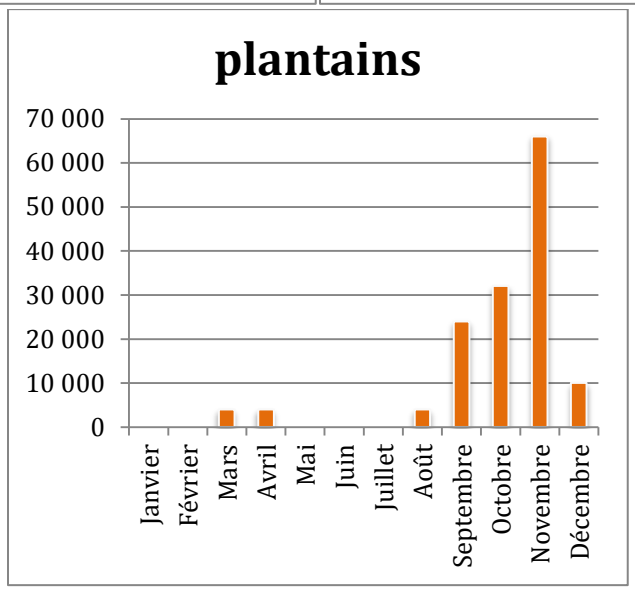
plantains
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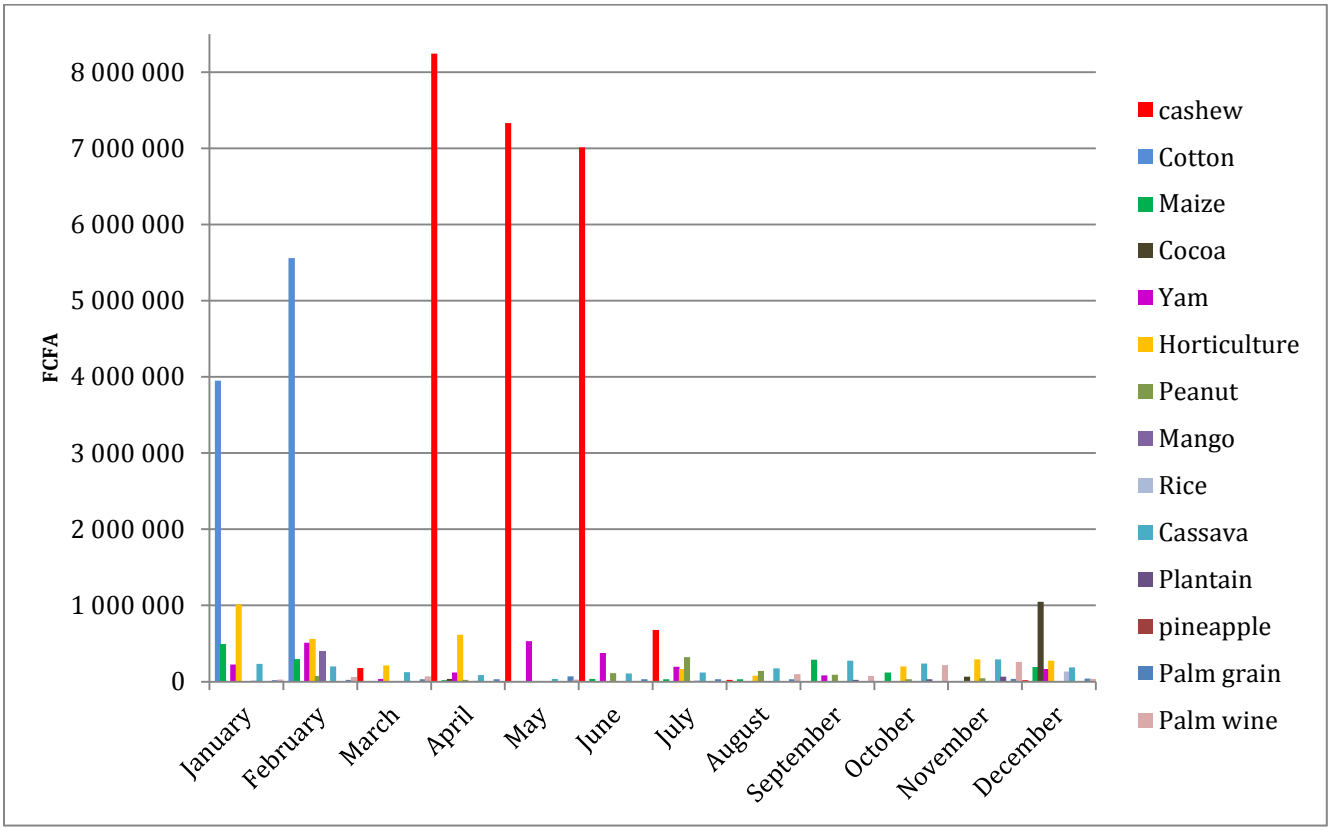
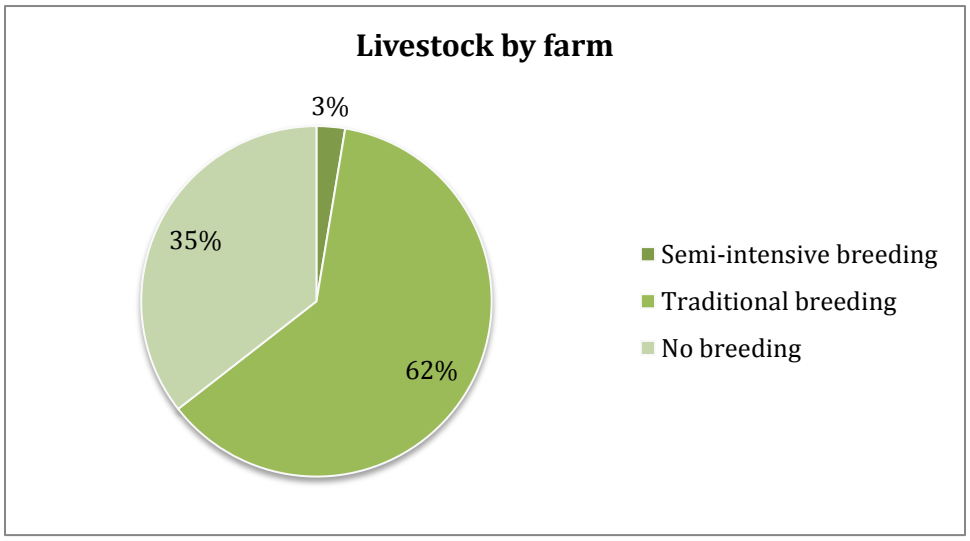
The following graph shows the distribution of farm incomes by crop over the course of the year




One of the economic purposes of cashew nuts is to provide monetary income several months after the main crops have been harvested, at a time period when fields are prepared. Cashew nuts could thus prove to be an interesting cash crop to provide capital for investing in annual crops (purchase of seed and fertilizers, paying of labor). We shall later see that this is not the reason producers plant cashew trees.

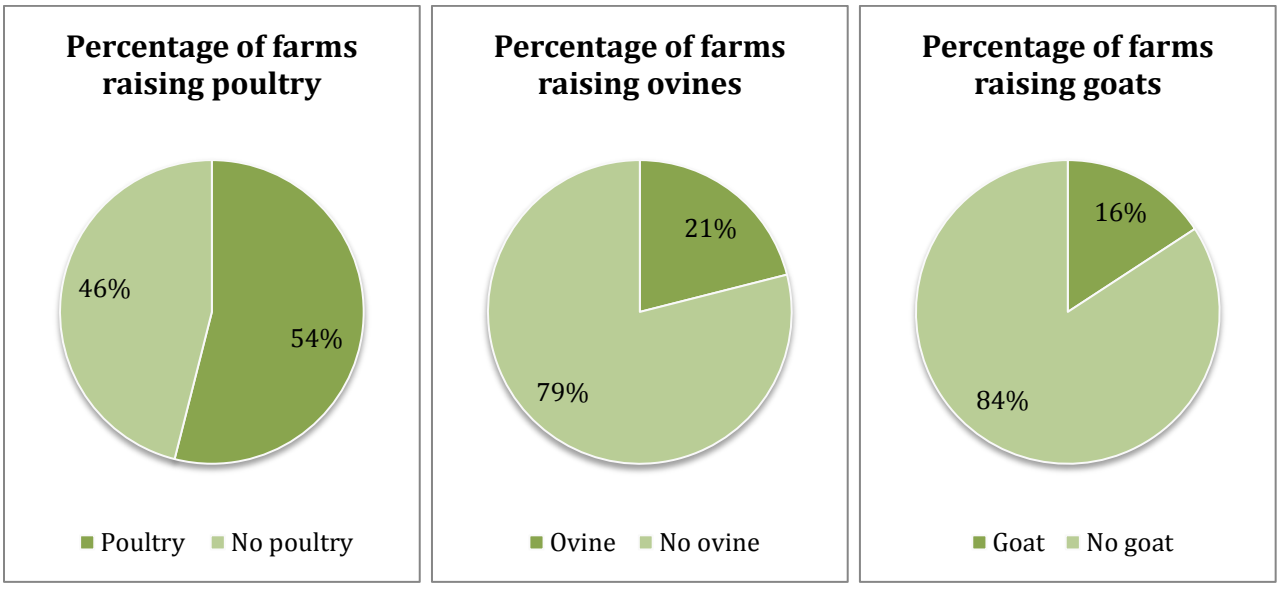
**Livestock**

Slightly less than two thirds of the households practice traditional breeding and only two producers buy cattle feed for semi-intensive breeding.




Poultry is the most commonly raised livestock. Less than one farm out of four has « small animals » while only five have cattle.

| | Number of farms | Average number of animals per farm | Maximum number of animals per farm |
|---|---|---|---|
| **Poultry** | 41 | 10 | 40 |
| **Sheep** | 16 | 3 | 20 |
| **Goats** | 12 | 3 | 15 |
| **Cattle** | 5 | 4 | 60 |
| **Pigs** | 1 | 1 | 1 |

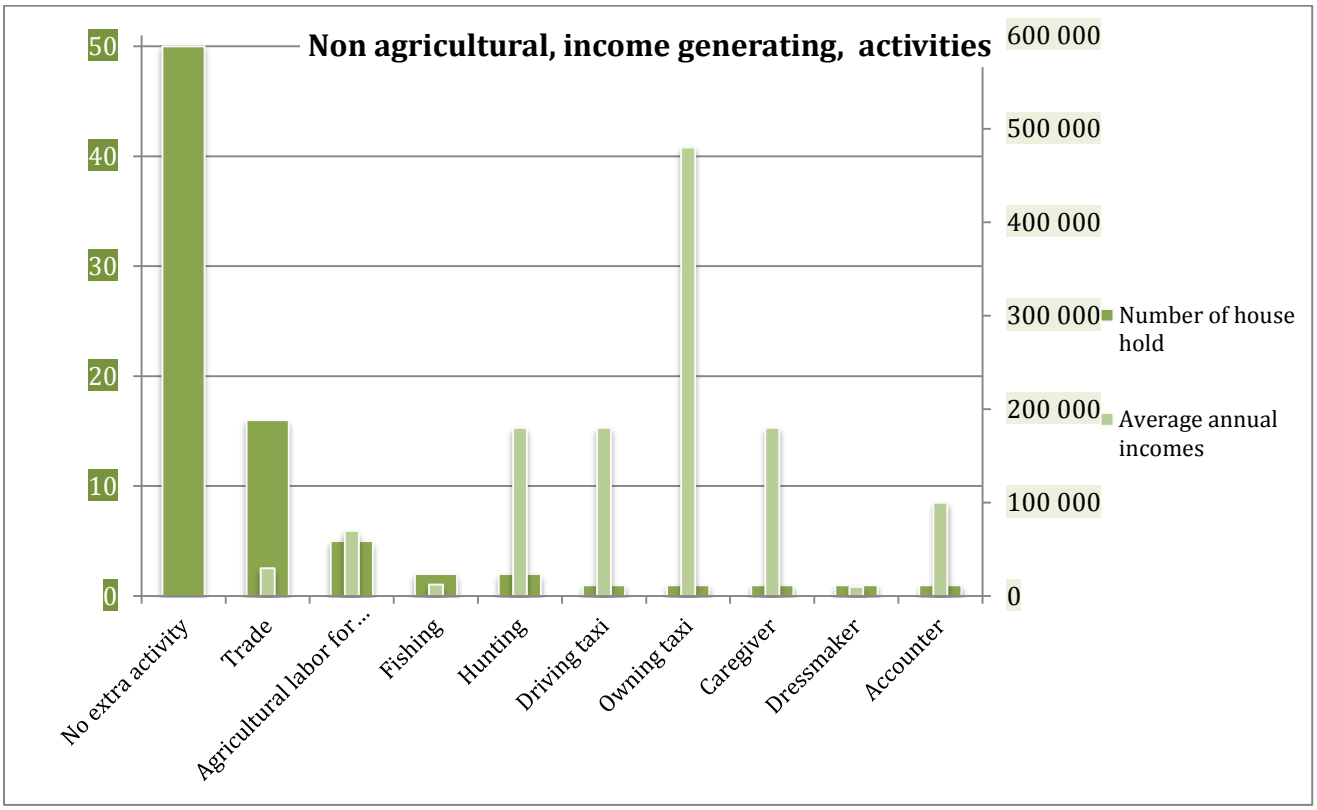


Only 21 households reaped benefits from livestock during the year, with a median profit of 17 125 FCFA. Twelve households lost money because of livestock, either because they had to invest in veterinary products to treat animals or because they bought more animals than they sold. For many producers, livestock is a way of saving but also making money. Young animals are bought during a period of strong financial times and can than be sold, if needed, for a greater price. Sheep are the best example of an investment saving because they feed themselves and their value can be multiplied by 5 once they are big enough.

| Unitary value | minimum | Average | maximum |
|---|---|---|---|
| **Poultry** | 1 625 | 2 500 | 5 000 |
| **Sheep** | 10 000 | 30 000 | 55 000 |
| **Goats** | 7 000 | 10 000 | 16 000 |

**Other income generating activities**

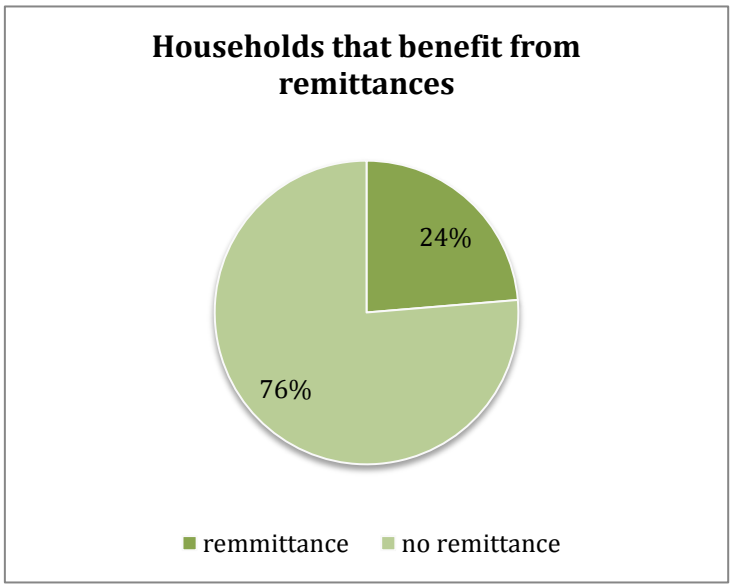
Slightly more than one third of the households engage in another activity besides farming. These activities are generally linked with trade or working as a laborer on other farms, but other activities are also practiced, as is visible in the following graph. Usually, these activities do not involve the heads of family but another member of the household.



**Financial support from outside the household: Remittances**

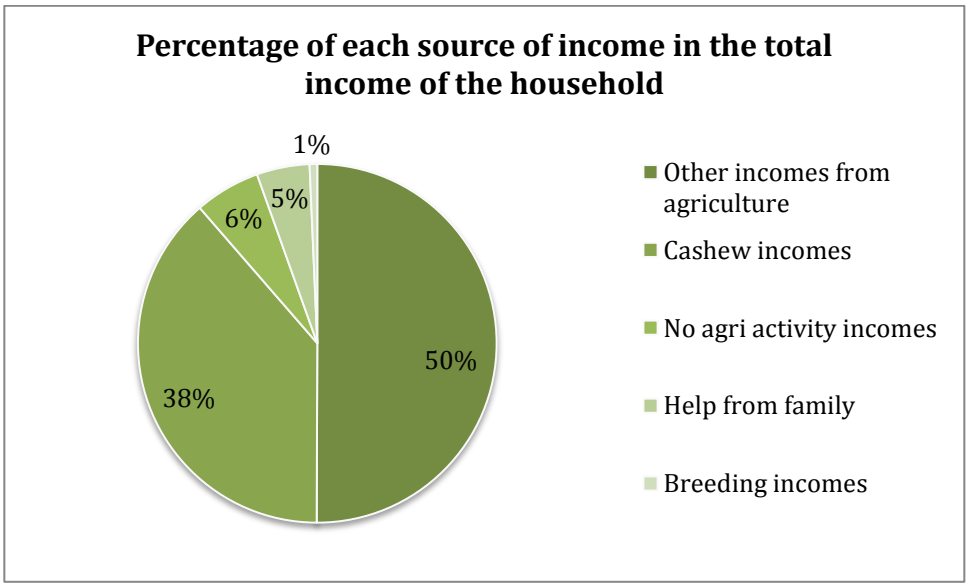
18 producers benefit from exterior assistance. Most often, this aid comes from children who work in cities or in cacao plantations in the South of the Ivory Coast. However, these workers do sometimes receive money from their brothers or sisters.

The amounts sent home vary between 20 000 and 360 000 FCFA per year. The median is 60 000 FCFA. The total sum of these remittances is of 1 404 000 FCFA.




**Percent of agriculture and cashew nuts in the total monetary revenues of households**

To sum up, we have observed that cashew nuts represent more than one third of the overall wealth of these farms. Agriculture represents over 88% of the incomes, it is thus a central element in the fight against poverty in this region.



**Tentative typology of cashew nut producing farms**

On the basis of this study of the incomes and the organization the farms, we have distinguished three main farming systems.

Large farms with an entrepreneurial dynamic

This typology encompasses about one fourth of the farms. The areas vary between 15 and 30 ha. The heads of such farms are active men between the ages of 35 and 55 and have not necessarily gone to school. The household is big enough to provide lots of familial labor but is not necessarily so big that it brings excessive costs. In general, there are between 10 and 15 family members. Children generally attend school but also work in the fields during the weekends and family vacations. The family generally has two buildings of which at least one is built of cement.

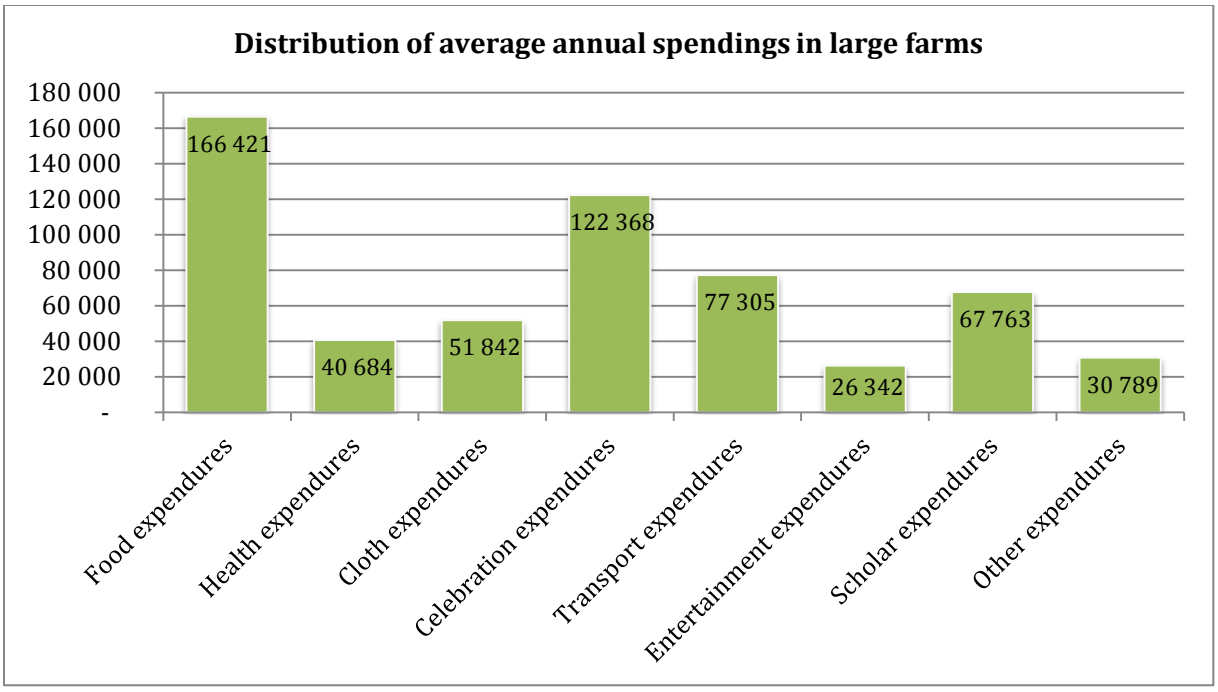
The household has more than one bike and a motorcycle with which to go to the city. There is not necessarily a television but there is a radio and a cell phone.

The household does not always use animal or mechanized traction but often work with paid laborers to help with most agricultural activities. Fertilizers for some cultures (cotton, maize and horticulture), pesticides and sometimes herbicides, are used.

The farm is relatively diverse with between 5 and 6 crops planted. The cashew nut plantation is generally between 10 and 15 years old and represents about one third of the total farmed area. One third is used for 2 food crops, yam and rice, while two crops are planted as cash crops (though part of the harvest is eaten), such as maize and peanuts, or cotton, mango and/or horticulture. The last third is left fallow.

The household has poultry and sheep or goats and some members of the household usually have some small side commerce for additional revenue. The average revenue of the household is between 1 000 000 and 2 500 000 FCFA per year, which represents between 100 000 and 300 000 FCFA/year per person.

The households spend about 600 000 FCFA per year, distributed as is shown in the following graph. These farms have a net annual profit varying between 400 000 FCFA and more than 1 000 000 FCFA.




Balanced Middle-sized farms

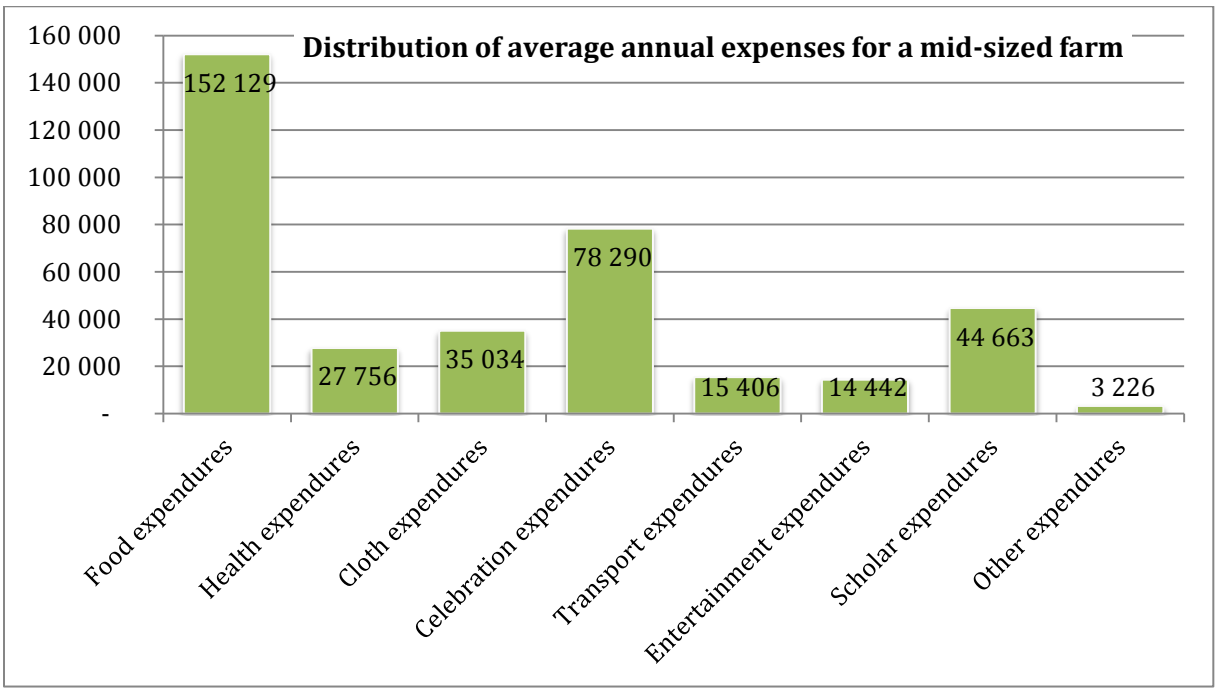
They represent about half of the farms. In these farms, the cultivated area varies between 5,5 and 8 ha, including fallow land. The age of the head of family is extremely variable. For the most part, children of age do not necessarily attend school. The number of children attending school depends on the financial records of the past year. Indeed, these farms do not have much profit relative to the needs of the household. Expenses (including school-related expenses) are thus highly variable depending on the income of the previous year. The size of the household varies strongly and the area of the farmed land is proportional to the available manpower.

These farms only rarely hire external help and thus, when their profit allows them to do so. This explains the percentage of fallow lands, which is higher then in bigger farms: without enough manpower, less fields are cultivated. The vast majority of these households have a bike but few have a motorcycle. They usually live in one single building.

These farms are less diverse in their crop choices than than the bigger ones. They grow between 4 and 5 crops. About one third of the cultivated area, between 1,5 and 3 ha, is planted with cashew nuts. However, half of these farms have a cashew nut plantation where the trees have not yet started producing so cashew nuts are not an important part of the farming system. There is a correlation between their income levels and the age of the cashew nut plantations. 0,5 to 1 ha are grown with yam, which is one of the staple foods. Most sell a surplus of their yam production, amounting to 25% to 30% of the total yam production. About half a hectare of two or three different products, mainly peanuts, yams and maize, are cultivated but some grow rice and plantain bananas as well. With the exception of cashew nuts, the only other cash crop in this typology are horticulture and palm oil, cultivated on small areas. Two thirds of these farms have poultry or goats but few get much financial benefits from livestock.

The income of these households varies between 250 000 and 500 000 FCFA per year, which represents an average income between 30 000 et 45 000 FCFA per year. There is little financial profit in these farms and they are thus highly sensitive to price variations of the cashew nuts, which is the principal source of revenue.

The income covers their expenses that are between 250 000 and 400 000 FCFA/year. However, those that have an exceptional expense, such as a great sickness, must borrow money or ask for exterior help to help overcome the expense.

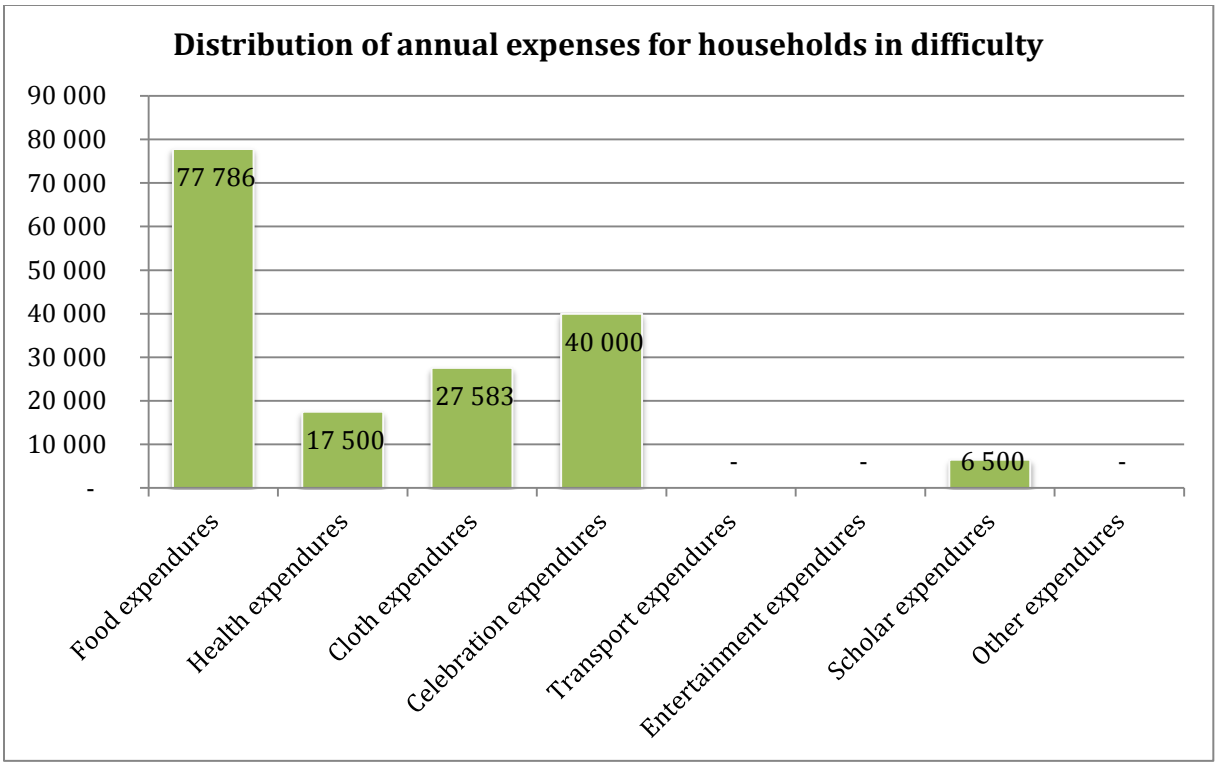



Farms in financial difficulties

This type includes a great diversity of farms that often suffer from some structural imbalance. Women are often the heads of the family, and they receive only between 1 and 2 ha of land by the person in charge of distributing land. Otherwise, the heads of family are old producers, who have difficulties working their land or young producers who have only little familial manpower and capital.

The common traits are lack of diversification of the cropping system, with production concentrated on yam for self-consumption. There are also young cashew nut plantations on small areas. Monetary revenues are based on the sale of surplus yam and one or two other crops such as peanuts, maize, rice, plantains or cassava.
The net income varies between – 73 000 and 185 000 FCFA. Total net revenues vary between 60750 and 250 000 FCFA thanks in part to exterior support.

Expenses are limited as much as possible, except for those linked to festivities, which are surprisingly high.



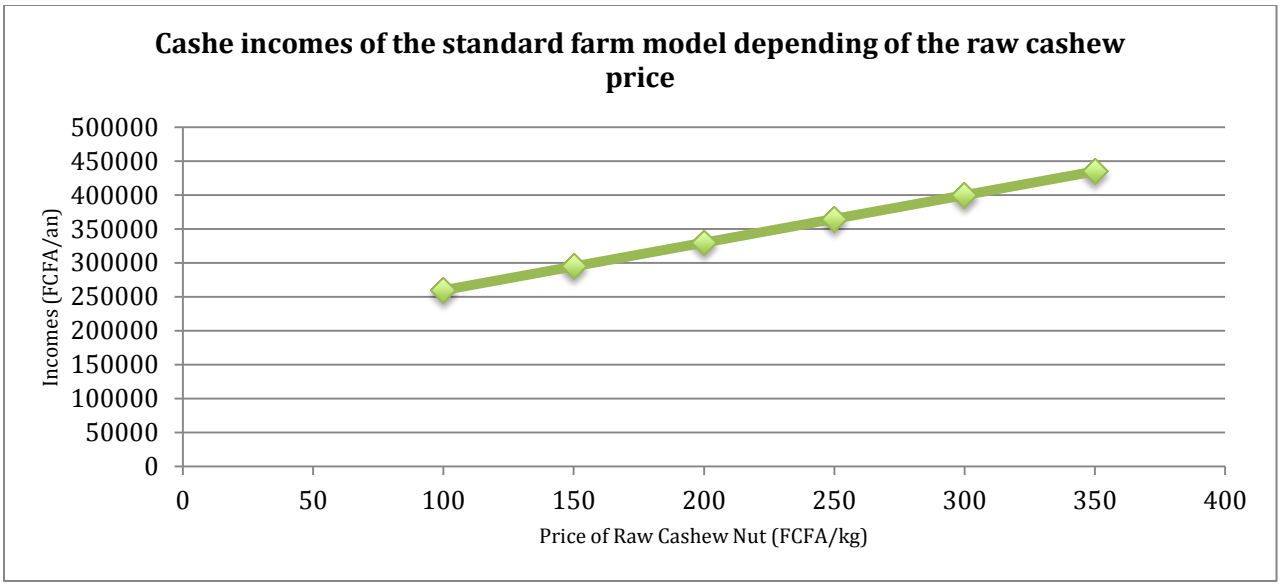

**Standard farm model**

From the data, we have tried to characterize a mid-sized cashew nut producer's household in Bouaké. This characterization is available in the annex and shows that with a price of 286 FCFA/kg, as with a price of 150 FCFA/kg, cashew nuts are the most advantageous activity in terms of work time. It is also the activity that gives the greatest part of monetized income. However, it is also the crop that is the least profitable per hectare. It is thus a crop that is advantageous in large farms where land is available. Manpower is the limiting factor.

| 275 FCFA/kg | Profitability of working time | Profitability of land |
|---|---|---|
| Yam | 886,4 FCFA/H-J | 195000 FCFA/ha |
| Maize | 1232,1 FCFA/H-J | 115000 FCFA/ha |
| Cashew | 6083,3 FCFA/H-J | 91250 FCFA/ha |
| Cassava | 882,4 FCFA/H-J | 150000 FCFA/ha |
| Peanut | 1541,7 FCFA/H-J | 185000 FCFA/ha |

| 150 FCFA/kg | Profitability of working time | Profitability of land |
|---|---|---|
| Yam | 886,4 FCFA/H-J | 195000 FCFA/ha |
| Maize | 1232,1 FCFA/H-J | 115000 FCFA/ha |
| Cashew | 3166,7 FCFA/H-J | 47500 FCFA/ha |
| Cassava | 882,4 FCFA/H-J | 150000 FCFA/ha |
| Peanut | 1541,7 FCFA/H-J | 185000 FCFA/ha |

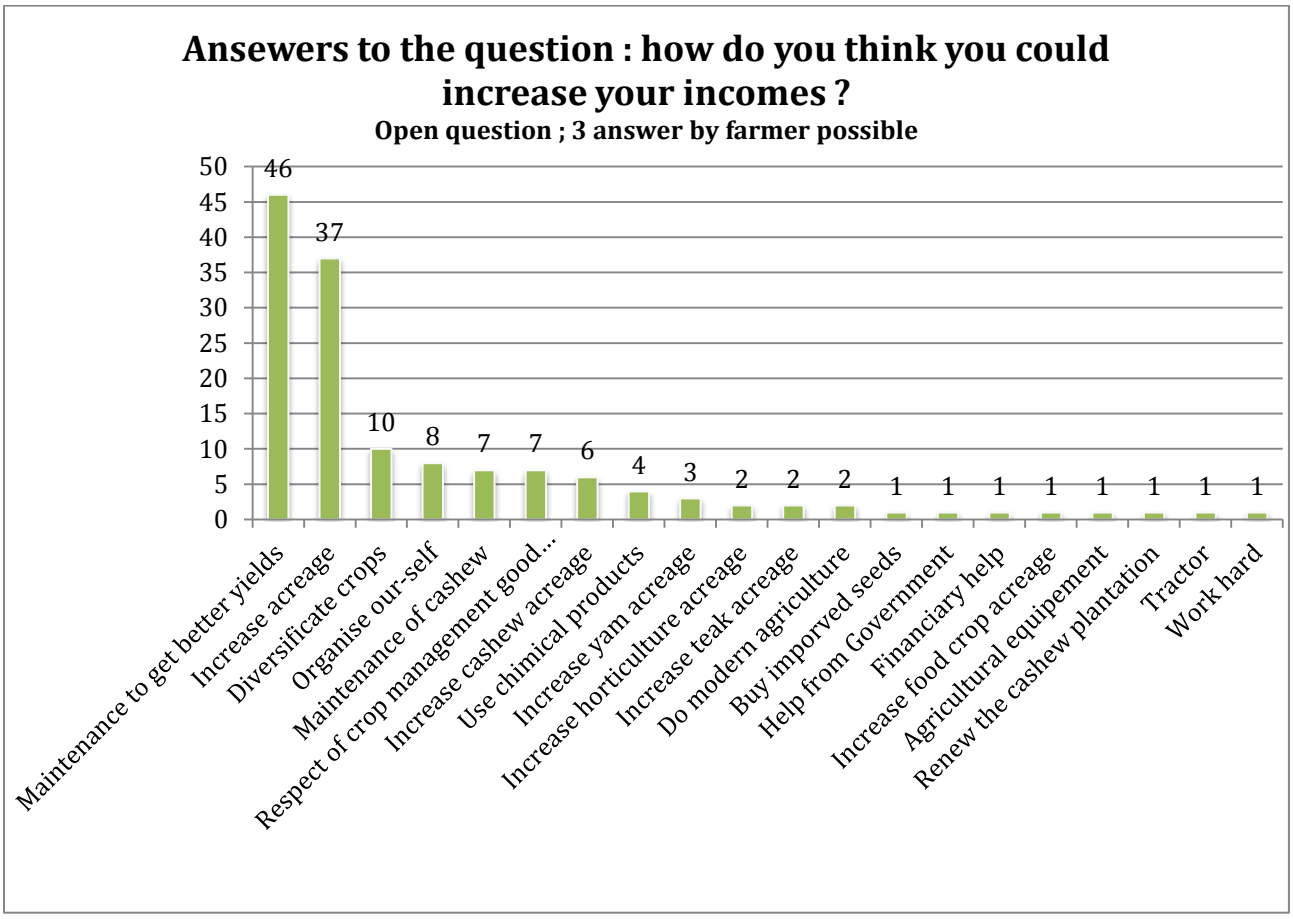
In light of the diversity of this farm type, the variations of the price of the cashew nut have an important impact but do not necessarily put it in danger.

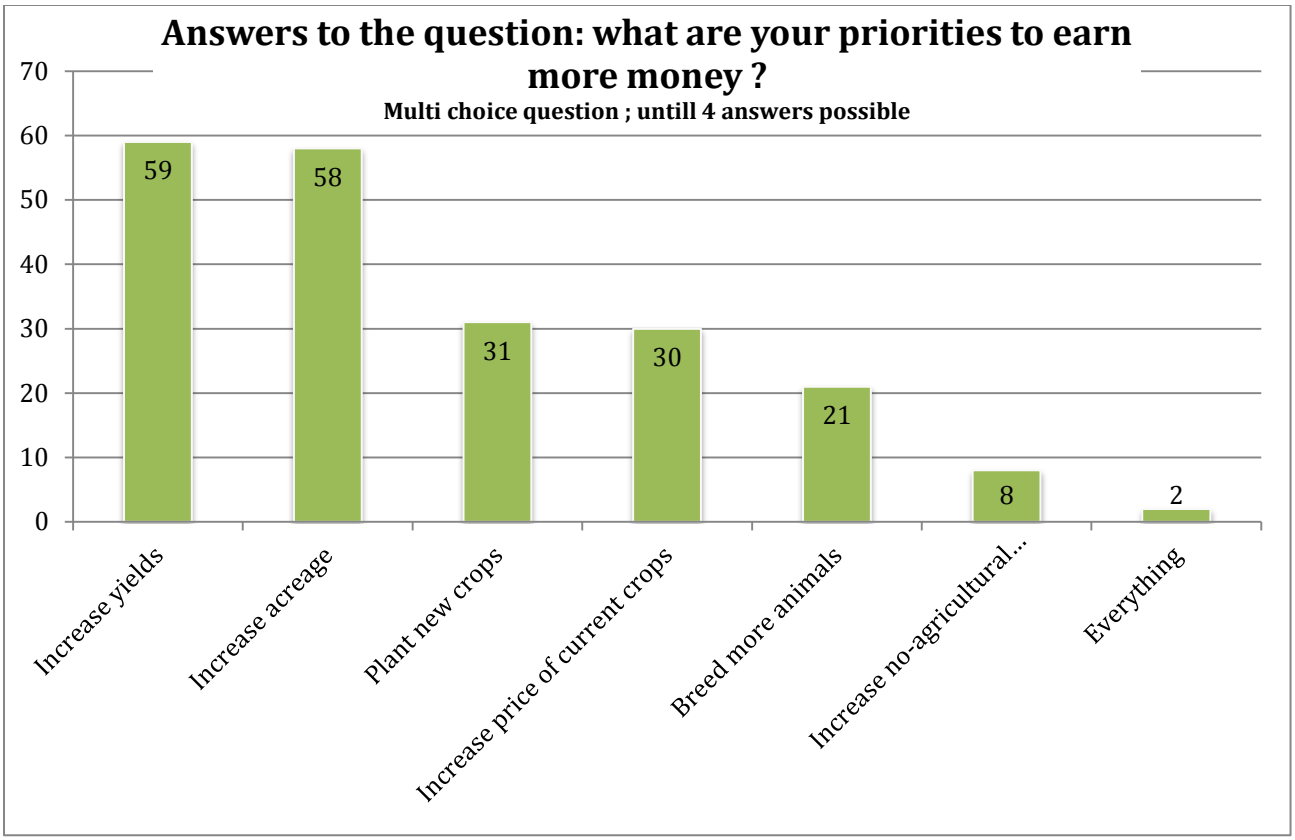

Cashe incomes of the standard farm model depending of the raw cashew price
Incomes (FCFA/an)
500000
450000
400000
350000
300000
250000
200000
150000
100000
50000
0
0
50
100
150
200
250
300
350
400
Price of Raw Cashew Nut (FCFA/kg)

**Household priorities to improve their incomes**

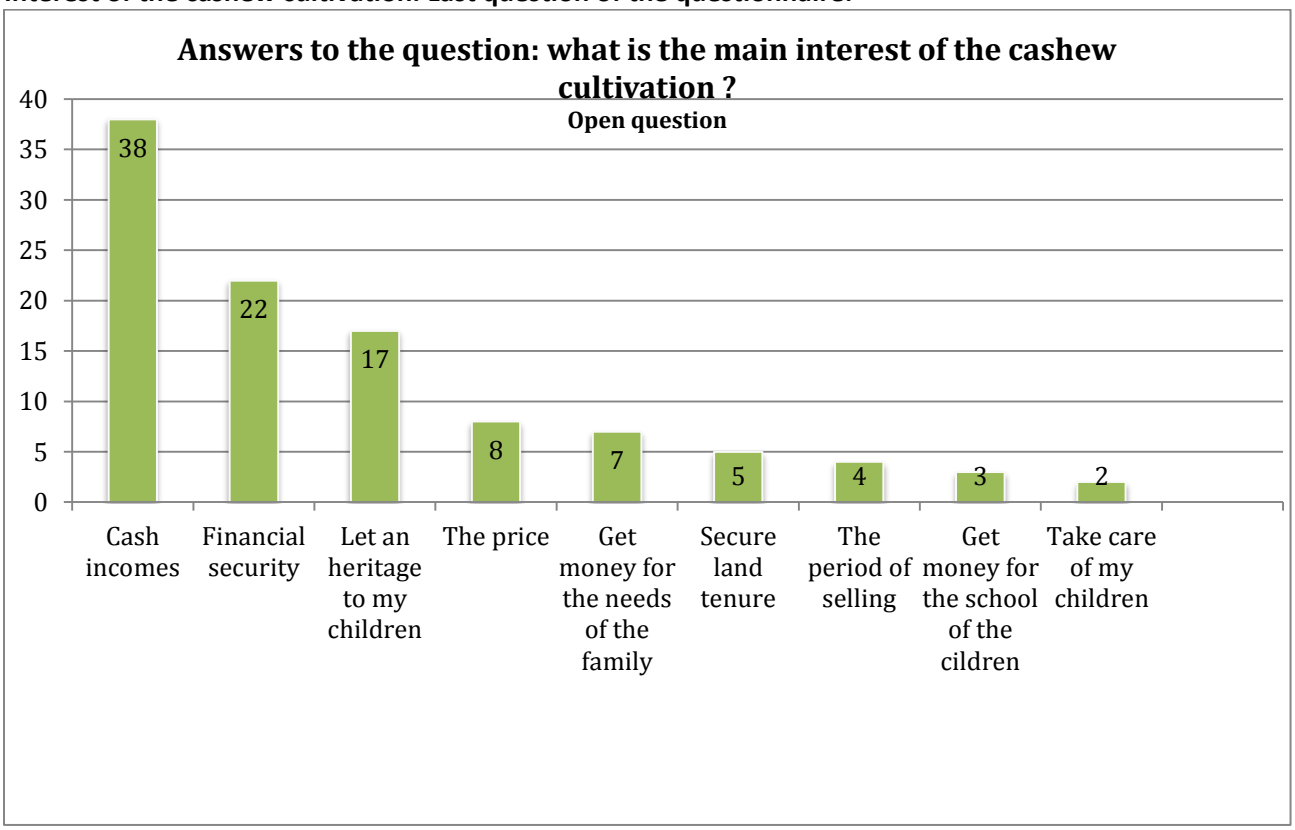
At the end of the interview, it was asked to the head of family how he thought he could imrpove his incomes. First we asked it trhough a open question, next with a multiple choice question.

Here are the answers gotten :






**Interest of the cashew cultivation. Last question of the questionnaire:**



## Conclusion :

The results from the surveys, that were conducted in 3 villages of the soudano-guinean region of the Ivory Coast, in the region of Bouaké, do not attempt to be representative of the cashew nut production system in the entirety of the Ivory Coast. The quality of the collected data is related to the time constraints and interviewed populations.

However, this study did make a general illustration of local farmer dynamics that can be extended to general organization of farms in rural areas. Through this study, certain tendencies over the past 10 years within agrarian systems have been identified. It has also been possible to document the place of cashew nuts within family farming systems in the 3 villages. In addition, the surveyed villages represent two main socio-cultural groups of Northern Ivory Coast : 2 Baoulé villages and 1 Malinké village.

**A crop that has become central to the farming systems in the research areas**

The agro-ecological zone of this study is an area of soudano-guinean savannas, with pockets of forests characterized by emerging trees. The agricultural setting paints the portrait of a landscape transitioning from subsistence living with annual crops and fallow periods, towards a market-based economy where cashew nuts are one of the major economic drivers. The surveyed villages are mainly composed of family farms with little diversification (2 crops and 75% of gross income), poor (a majority are under the poverty line) and extensive (no inputs, little use of animal traction unless it is for cotton). The dominating system is made of yam-peanuts. This is an association between an essentially self-consumed food crop planted on cleared land (1/3 of the lands are fallow) and a perennial crop (peanuts) whose production cycle is greater then 15 years; which constitutes a strong change in crop and land rotations in the area. The cultivation of cashew nuts is closely related to the recent links between EAF and markets that are ready to push for plantation. This ensures a relatively low risk initial investment, because the beginning of the cashew nut plantations is done in associated cultures. The link to dynamic markets and strong infrastructures has strongly influenced the development of valuing local productions: horticulture has begun which use the shallows near roads.

Cashew nuts are a fundamental part of the increasing artificiality of farm landscapes in the area, by changing both the fundamental nature and societal organization in the surveyed villages. Over than 50% of the land is occupied by cashew nuts in the 3 villages: its place has become central to the farming systems in less than 10 years.

**A crop with a clear positive economic role**

The positive economic role of cashew nuts is visible in more than one way: the gross values becoming a part of local economy, increased income peaks at different times of the year, valuing of local work and the creation of savings.

Incomes from cashew nuts represent more than 44% of net incomes and 33% of theoretical incomes (by deducing self-consumption). The increase of the incomes of the family farms in the zone is strongly correlated

with the increase in cultivated areas: regardless of the size of the farms, cashew nut plantations have been created within the past 5 years to help secure a stable income.

The marketing period of cashew nuts responds to a crucial financially tight time of year: cash in June and July, when the crops are being sown, comes at a time when extra food is consumed due to the difficult work.

The valuing of the work, relative to other agricultural activities, is 3 to 6 times greater, according to estimates in this study.

Lastly, the creation of a legacy for children is a way of securing village savings.

**A role that must be nuanced depending on the type of farm**

The survey allowed us to refine our understanding of the role of cashew nuts in family farms and to characterize each of these different farms :

- for the « large farms with an entrepreneurial dynamic », the cultivation of cashew nuts is the economic motor of the farm. These family farms work with more than 15ha, are moderately diverse in their cropping systems and have a profit that varies between 400 000 FCFA and 1 000 000 FCFA. Cashew nut trees occupy a minimum of 1/3 of the area and provides a majority of the income.

- for the « mid-sized farms », between 5 and 8ha, the cultivation of cashew nuts takes up 1/3 of the area and provides the bulk of the monetary income. Food crops are essential to ensure food security for the household. These households manage to balance their financial needs. However, these households are particularly sensitive to shocks (sickness, climate) and to the price fluctuations of cashew nuts.

- for the « farms in financial difficulty », which encompasses a great diversity of structural imbalances, the cultivation of cashew nuts is not a part of the income scheme. These farms tend to be « yam-centered » and their primary source of income comes from the selling of surplus. They are also supported by exterior sources. The recent planting of cashew nut trees shows a willingness to secure income in the future though.

**A role that can be threatened by future constraints**

This highly positive role of cashew nuts on farms raises the question of the sustainability of agrarian systems, in particular for the maintenance of the fertility of the soils with fallow years and the capacity of local populations to adopt new methods when planting orchards. Agricultural land is still available in these zones, and there is only a low population density. But the collective management of lands and plots are strong issues to encourage the sustainable development of territories.

Access to land, and thus to an income, is also a factor that increases inequalities within communities, especially in this area where cashew nut trees are the only important source of monetary income.

**For a greater sustainability and fairness of production, the following actions can be undertaken, as a part of the global partnership for development**

We propose two types of actions :

Concrete proposals to ensure and improve the management of the cashew nut incomes :

- Put in place a system of refunds after the commercialization campaign, which would thus create cash inflow in September, which would facilitate the education of children

- For the most disadvantaged, facilitate access to collective infrastructures for quality production and commercialization: storage facilities and drying areas

- Secure the diversification of farms by increasing access to inputs for the food crops – yam, rice, maize (seeds and fertilizers)

- Prevent the shortening of fallow periods by promoting techniques that improve soil fertilization (crop techniques, composting of waste, associating agriculture and animal husbandry, agroforestry).

- Support the productivity of orchards by supporting research and the distribution of material (in partnership with other development operators and the national research facilities)

Propositions for a better understanding of culture and its impact on men, territories and the environment

- extend the study to other agro-ecological zones

- improve the understanding of the mechanisms of land management and potential social conflicts that could arise in order to pre-emptively put in place methods for consultation and sustainable land management.

- improve knowledge about the environmental impacts of the cashew nut sector, in particular the effects on deforestation and/or reforestation, its potential for carbon uptake and its role in the evolution of biodiversity. For this, we shall inform the sponsor of RONGEAD's ongoing work and analysis of satellite images and the carbon impact of the cashew nut value chain.

Annexes:

**Annexe : micro-eonomic modelisation of a standard cashew farm in Bouaké région**

| Production | | | yields | | Production | | Average value | | Theoric income | | Quantity self-consumed | | Quantity sold | | Cash incomes | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Yam | 0,5 | ha | 5 000 | kg/ha | 2 500 | kg/an | 45 | FCFA/kg | 112 500 | FCFA | 1 500 | kg | 1 000 | kg | 45 000 | FCFA |
| Maize | 0,75 | ha | 1 000 | kg/ha | 750 | kg/an | 125 | FCFA/kg | 93 750 | FCFA | 200 | kg | 550 | kg | 68 750 | FCFA |
| Cashew nut | 2 | ha | 350 | kg/ha | 700 | kg/an | 275 | FCFA/kg | 192 500 | FCFA | | | 700 | kg | 192 500 | FCFA |
| Cassava | 0,25 | ha | 5 000 | kg/ha | 1 250 | kg/an | 30 | FCFA/kg | 37 500 | FCFA | 50 | kg | 1 200 | kg | 36 000 | FCFA |
| Peanut | 0,5 | ha | 1 000 | kg/ha | 500 | kg/an | 200 | FCFA/kg | 100 000 | FCFA | 100 | kg | 400 | kg | 80 000 | FCFA |

| Costs | Clearing | | | | | | Plowing/seeding | | | | | | Weeding | | | | | | harvest | | | | | | Seeds | Amortization of weeding during years without production | Total costs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M-D | | cost Man-Day | | Cost total | | M-D | | cost Man-Day | | Cost total | | M-D | | cost Man-Day | | Cost total | | M-D | | cost Man-Day | | Cost total | | | | | |
| Yam | 15 | | 0 | FCFA | 0 | FCFA | 15 | | 1000 | FCFA | 15000 | FCFA | 60 | | 0 | FCFA | 0 | FCFA | 20 | | 0 | FCFA | 0 | | | | 15 000 | FCFA |
| Maize | 22,5 | | 0 | FCFA | 0 | FCFA | 5 | | 0 | FCFA | 0 | FCFA | 35 | | 0 | FCFA | 0 | FCFA | 7,5 | | 0 | FCFA | 0 | | 7500 | | 7 500 | FCFA |
| Cashew nut | 0 | | | | 0 | FCFA | 0 | | 0 | FCFA | 0 | FCFA | 10 | | 1000 | FCFA | 10000 | FCFA | 20 | | 0 | FCFA | 0 | | | 10000 | 10 000 | FCFA |
| Cassava | 7,5 | | 0 | FCFA | 0 | FCFA | 7,5 | | 0 | FCFA | 0 | FCFA | 17,5 | | 0 | FCFA | 0 | FCFA | 10 | | 0 | FCFA | 0 | | | | 0 | FCFA |
| Peanut | 7,5 | | 1000 | FCFA | 7500 | FCFA | 12,5 | | 0 | FCFA | 0 | FCFA | 30 | | 0 | FCFA | 0 | FCFA | 10 | | 0 | FCFA | 0 | | | | 7 500 | FCFA |

| Annual balance | Profitability of crops | Total work (in man-day) | Cash balance by crop | |
|---|---|---|---|---|
| Yam | 97 500 | 110 | 30 000 | FCFA |
| Maize | 86 250 | 70 | 61 250 | FCFA |
| Cashew nut | 182 500 | 30 | 182 500 | FCFA |
| Cassava | 37 500 | 42,5 | 36 000 | FCFA |
| Peanut | 92 500 | 60 | 72 500 | FCFA |
| Bilan de l'exploitation avec MO familiale | | | 382 250 | |

M-D : Man-Day, unity generally used to measure the amount of work in a farm.

Primary school in Abolikro:

Interview in Abolikro (Interviewer Clarice KOUADIO):

House semi-moderne (mud plastered):

Interview in Dieviessou (interviewer Djakaridja OUATTARA):

Interview in Dieviessou (interviewer Clarisse KOUADIO):

A woman head of family:

Yam mounds in Abolikro:

Cashew plantation 15 years old in Abolikro: