

## *Full Length Research Paper*

# **Economic analysis of the shea sector in Cote d'Ivoire.**

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**In order to appreciate the financial and economic performance of the different functions of the shea sector in Côte d'Ivoire, a survey was conducted among 206 collectors, 8 traders and 3 processors from the Korhogo town and the sub-prefecture of Ouangolodougou. The data were analyzed using Monke and Pearson's (1989) Policy Analysis Matrix (PAM). Results show that the shea sector is economically and financially profitable. However, collectors are implicitly taxed and do not benefit from any incentive to collect. On the other hand, traders and processors benefit from a subsidy and an incentive to carry out their activity.**

**Keywords:** shea butter, performance, Ouangolodougou, Korhogo, PAM

## **INTRODUCTION**

In Cote d'Ivoire, agriculture has remained since independence, the basis of the economy. It represents the largest part of export earnings. In addition, it distributes 40 to 70 per cent of export earnings and accounts for only 25 per cent of GDP.

If the coffee-cocoa pair has been at the basis of the economic boom in this country, it should be noticed that other cash crops such as shea also contribute to give the Cote d'Ivoire leadership position in the country, UEMOA space savings. In fact, with an estimated shea almond production potential of 150 000 tons per year, Cote d'Ivoire produces approximately 40 000 tones of shea butter annually. Cote d'Ivoire ranks fifth in the world and ranks in Africa, behind Nigeria, Mali, Burkina and Togo (MINADER, 2015).

Considered as the third export product in the north, after cotton and cashew, shea is exploited by more than 54 000 women in Cote d'Ivoire (MINADER, 2015). According to that same source, it constitutes a substantial source of income and contributes to a certain extent to the reduction of poverty in the production zones.

However, this sector encounters many difficulties related to organization and marketing. Moreover, despite the importance of shea in the Ivorian economy, this sector

is confronted with the virtual absence of studies and reliable data on its performance (GIZ/RONGEAD, 2015).

Then, the overall objective of this study is to evaluate the performance and determine the factors that improve the competitiveness of the shea sector in Cote d'Ivoire.

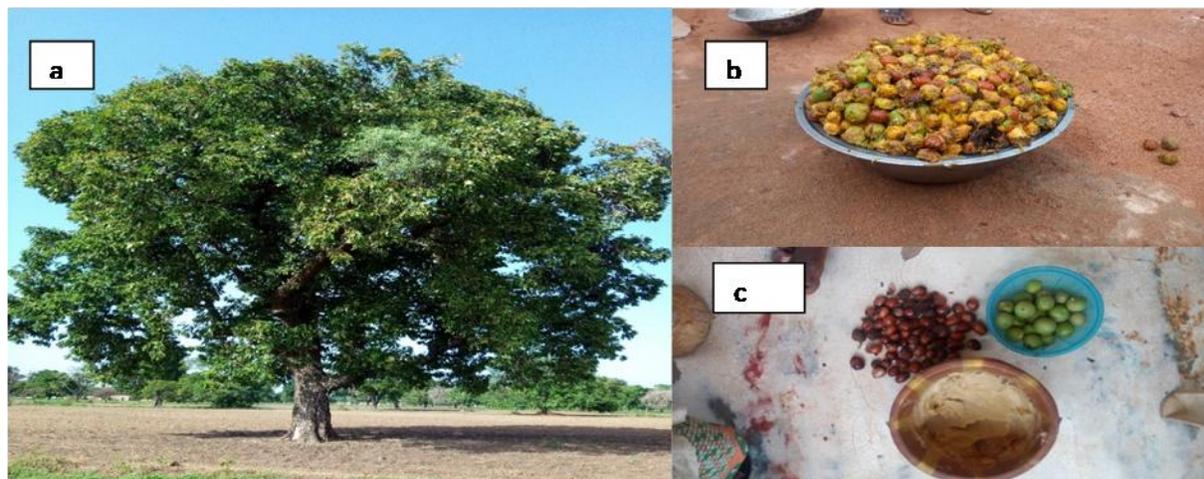
Specifically, it will be a question of:

- (1) determining the financial and economic profitability of the various functions ;
- (2) checking whether Ivorian agricultural policy encourages the collection, marketing and processing of shea ;
- (3) measuring the effect of policy changes on this profitability ;
- (4) and proposing measures to improve competitiveness in a more sustainable and structural way in the shea sector.

## **MATERIAL**

### **Human material**

The human material constitutes actors of the shea sector. There are mainly collectors, traders and processors



**Figure 1 :** (a) Tree, (b) fruit, (c) nuts and shea butter

from Korhogo department and the sub-prefecture of Ouangolodougou.

### Technical material

The equipments used for the collection, marketing and processing activities are essentially: the basin, the bag, the wood, the weighbridge, the peson, the bowl, the roaster and the pot.

The data were mainly collected from the questionnaire and a maintenance guide. The data collected after processing were processed using Excel and Word software.

### Biological material

In this study, there are two (2) types of biological materials namely shea almond and shea butter. Shea (*Vitellaria paradoxa* C.F Gaertn) is a multiple purpose tree of the sapotaceous family, this deciduous tree with a spherical crown can reach 15 m in height, exceptionally up to 25 m at 90 cm – 1m in diameter at the level of the trunk. The tree is typical of the dry forests and savannah of the soudanian climate zone. It prefers clay and argilosilicous soils and areas characterized by rainfall of 600 to 1500 mm (Tekleehaimanot, 2004). According to the same sources, the adult tree produces annually 15 to 20 kg of fruit that can give 3 to 4 kg of ground almonds dried shea and from which 1 to 1.5 kg of shea butter can be extracted.

There are two subspecies of shea tree: the subspecies *nilotica* presents in Central Africa and East Africa, mainly in Soudan and Uganda and the subspecies *paradoxa* which is distinguished by its strong hair and flowers and the subspecies *paradoxa*, as for it, presents in

West Africa and Central Africa, from Senegal to the Central African Republic (Vermilye, 2004).

The fruit of shea, also called shea, is a large fleshy berry that is ovoid in shape and dark green to brown in color between 4 to 8 cm long. The shape and size of the fruit are variables according to the varieties of shea. It matures in 2 or 3 months, contains one or two hard almonds (comparable to a avocado seed, donate nucleus), a whitish hue surrounded by a thin hull of a pulp (55%). Each almond contains a fat for about half of its weight (CNRA, 2008). The fruit of the shea consists of pulp and walnut.

The shea pulp 4 to 8 mm thick, with a sweet and very fragrant taste, is comestible but has a taste that is evenly pleasant according to the trees. It is very nourishing, rich in various sugars, mineral salts, and especially in vitamin C (Sanou and Lamien, 2011).

The shea nut is covered with a very thin shell, brown and shiny, which breaks very easily. This set is enveloped by the pulp. In the nut, we find the almond and each fruit can contain up to two nuts. Drying the nut from 2.5 to 3.5 cm causes it to lose approximately 40% of its fresh weight. It weighs only 6 g with residual moisture of 7%.

The figure 1 shows the tree, fruit, nuts and shea butter.

## METHODOLOGY

### Study area

The study took place in two distinct areas: the municipality of Korhogo and the sub-prefecture of Ouangolodougou. This choice was made taking into

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account their potential for shea kernel production (more than half of the Ivorian production comes from its localities) and also their representativeness in the marketing and processing of shea.

### Data collection

The survey took place from May to December 2017 in nine villages of ouangolodougou (namely Torla, Sokourani, Benifesso, Torlanimouso, Bourounougou, Nioronigué, Gbinsokoura, Diaratiévogo and Pléou) and in the municipality of Korhogo.

### Sampling

A census was conducted on the side of the actors in the two localities. The parent population of this study consists mainly of collectors, traders and shea processors. The sample was constructed from random selection sampling techniques.

It is made up of two hundred and seventeen (217) actors in the sector (Table 1).

**Table 1** : Distribution of respondents by actors

Actors	ni (number of actors listed)	ni/N	n.ni/N	Xi (number of actors surveyed)
Collectors	2060	0.95	206.00	206
Traders	80	0.04	8.00	8
Processors	30	0.01	3.00	3
<b>Total</b>	<b>2170</b>	<b>1</b>	<b>217</b>	<b>217</b>

This number was obtained on the basis of one-tenth of the total number of actors identified. For all the members of the actors of the shea sector, the samples are chosen by excess with reference to the result obtained from the formula below:

$$Xi = \frac{n.ni}{N}$$

where:

$Xi$  = number of actor to be investigated

$n$  = size of sample

$ni$  = number of actors

$N$  = total number of actors

$\frac{n.ni}{N}$  = relative frequency

### DATA ANALYSIS METHODS

#### Descriptive statistics

Descriptive statistics were used to study the sociological profile of actors in the shea sector.

#### Policy Analysis Matrix (PAM)

The Policy Analysis Matrix used in this study, was developed by Monke and Pearson (1989) to assess the

impact of Portugal's entry into European Economic Community on its agriculture (Table 2 and 3).

It makes it possible to evaluate the impact of agricultural policies on value chains, while estimating the effects of discommitment or State interventions on the value chains. It also makes it possible to better quantify the effect of the sectorial interventions of the public authorities and to take into account the equity dimension. PAM is composed of two types of budgets: a budget evaluated at market prices or financial price and the other at opportunity prices or economic price.

The budget is built for each production system and for each actor in the sector. Prior to budget design, all inputs are classified as either tradable or non-tradable.

The financial price is the market price, the price at which each actor (collector, trader and processor) sold his product.

The economic price is the FOB price at which almonds are exported. It was calculated from the price at the collector by adding to the collector the various costs of the competition from the field to the wholesaler and from the wholesaler to the exporter (taxes of waters and forests, the sacks, the weighbridge, the scale and the transport...).

Tradable factors or marketable factor include goods or products that can be theoretically imported or exported. They are valued at international market prices. They also correspond to all intermediate consumption that can be valued at international prices. The tradable factors in the case of our study are: the basin, the shea butter, the bags, the scales, the peson, the roaster, the cooking pot.

**Table 2:** Policy Analysis Matrix (PAM)

Indicators	Revenue	Input cost		Profit
		Tradable factors	Non-tradable factors	
Private prices	A	B	C	$D=A-B-C$
Social prices	E	F	G	$H=E-F-G$
Net transfers	$I=A-E$	$J=B-F$	$K=C-G$	$L=I-J-K$

**Source:** Monke and Pearson, 1989

**Table 3:** Competitiveness and economic efficiency indicators of the Policy Analysis Matrix (PAM)

1-	Private profit	$D=A-B-C$
2-	Private Cost Ratio	$PCR=C/(A-B)$
3-	Social profit	$H=E-F-G$
4-	Domestic Resource Cost Ratio	$DRC=G/(E-F)$
5-	Social Cost Ratio	$SCR=(F+G)/E$
6-	Transfer	$L=I-J-K$
7-	Nominal Protection Coefficient	$NPC=A/E$
8-	Effective Protection Coefficient	$EPC=(A-B)/(E-F)$
9-	Profitability Coefficient	$PC=D/H$
10-	Subsidy Ratio to Producers	$SRP=L/E$
11-	Equivalent Subsidy to producers	$ESP=L/A$

Non-tradable factors are valued according to their marginal value of production if they are factors of production and evaluated according to the criterion of willingness to pay of the consumers if they are final goods and services. Non-tradable factors in the case of our study include le transport, capital, firewood, water, labor, bowl and small equipment.

At the collection level, the opportunity cost of the various operations (pickup, pulping, and decoupling) was calculated from the cost of the wage labor.

For processors, the opportunity cost of the various operations (crushing, roasting, grinding, churning, washing, cooking, filtering) was estimated from the cost of the wage labor.

## RESULTS

### Sociological profile of actors in the shea sector

#### Kind of actors

The activity of collecting shea almonds is largely dominated by women (96%). The marketing of shea almonds is essentially done by men (100%). Lastly, the processing of shea almonds and the marketing of shea butter in the commune of korhogo mainly employs women (100%).

#### Age range

Almond collection actors are mostly young people

between the ages of 20 and 39 years (52%). On the other hand, those of marketing (75% and processing (63%) are essentially adults whose age ranges from 40 to 60 years.

#### Level of education of the actors

The study reveals that about 95% of the actors in the collection of shea nuts are illiterate. However, 50% traders have at least primary level and 13% secondary level. Finally, it can also be noted that 56% of the shea nut processors are illiterate.

#### Number of dependents of actors

The actors in the shea sector are generally members of large families (6 to 10 people in charges).

#### Main activity of the actors

Actors in processing and marketing essentially practise this activity although some are interested in other sectors such as handicrafts and agriculture. However, collectors generally have agriculture as their main activity.

#### Marital status of the actors

Most of the shea nuts collectors, traders and processors are married according to custom (92%).

## Economic and financial study of almond shea collection

### Evolution of the shea market price in 2017

In 2017, the price per field of the kilogram of the shea almond varied during the year. In the period from May to July, the month of full production and collection, the average price per kilogram reaches the level of 80 F CFA. From August to November, the price oscillates between 91 to 114 F CFA per kilogram. From December, the price evolves to reach the record level of 136 F CFA per kilogram.

### Operating account of shea almond collection

According to Table 4, the collectors support a load of 6 200 F CFA per bag of 100 kg (6 2000 F CFA per ton). These expenses are notably related to labor, transport and the purchase of firewood for shelling. However, the collection generates respectively a Gross Margin and Net Margin of 2 891 F CFA per bag of 100 kg (28 910 F CFA per ton) and 1 116 F CFA per bag of 100 kg (11160 F CFA per ton).

**Table 4:** Operating account of shea almond collectors

Wording	Unity	Values
1. Product (shea almond)	kg/bag	100
2. Selling price	FCFA/kg	91
3. Gross production (3=1x2)	FCFA/bag	9 091
4. Transport	FCFA/bag	1 200
5. Workforce	FCFA/bag	4 000
6. Firewood	FCFA/bag	1 000
7. Average cost price (7=4+5+6)	FCFA/bag	6 200
8. Gross margin (8=3-7)	FCFA/bag	2 891
9. Amortization	FCFA/bag	1 775
10. Net margin (10=8-9)	FCFA/bag	1 116

### Policy Analysis matrix of shea almond collection

Financial profit (D) and economic profit (H) are greater than 0 (Table 5). The collection of shea almond is therefore a profitable activity for the collectors of Ouangolodougou sub-prefectures. New operators can therefore enter the shea sector.

**Table 5:** Policy Analysis Matrix (PAM) of shea sector at the collection level

FCFA/Bag of 100kg	Revenue	Inputs cost		Profit
		Tradable factors	Non-tradable factors	
Private profit	A 9 091	B 187	C 6 257	D 2 648
Social profit	E 10 000	F 153	G 6 006	H 3 841
Net transfers	I -909	J 34	K 250	L - 1 193

In addition, the collection of shea is beneficial to the community and therefore to the sub-prefecture of Ouangolodougou. The absence of public intervention is profitable for the sector.

However, the net negative transfer (L) indicates that collectors are implicitly taxed.

**Table 6:** PAM indicators of shea almond collection

Indicators	Formulas	Values
Domestic Resource Cost Ratio	[DRC= G / (E - F)]	0.61
Private Cost Ratio	[PCR= C / (A - B)]	0.70
Social Cost Ratio	[SCR = (F + G) / E]	0.62
Effective Protection Coefficient	[EPC= (A - B) / (E - F)]	0.90
Nominal Protection Coefficient	[NPC=A / E]	0.91
Profitability Coefficient	[PC=D / H]	0.69
Subsidy Ratio to Producers	[SRP=L / E]	-0.12
Equivalent Subsidy to producers	[ESP=L / A]	-0.13

**Table 7:** Operating account of shea almonds

Wording	Unity	Amount
1. Average selling price	FCFA/ton	184 267
2. Average purchase price	FCFA/ton	100 000
3. Average cost of labor	FCFA/ton	13 000
4. Average cost of transportation	FCFA/ton	25 000
5. Other expenses (water and forest, etc.)	FCFA/ton	3 409
6. Average cost price (6=2+3+4+5)	FCFA/ton	141 409
7. Gross margin (7=1-6)	FCFA/ton	42 858
8. Amortization	FCFA/ton	5 500
9. Net margin(9=7-8)	FCFA/ton	37 358

### Indicators of the Policy Analysis Matrix of shea almond collection

According to Table 6, the Private Cost Ratio (PCR), the Social Cost Ratio (SCR), the Effective Protection Coefficient (EPC), the Nominal Protection Coefficient (NPC) and the Profitability Coefficient (PC) are less than 1. Then, it is shea support domestic costs while remaining profitable. The expenses of the collectors are lower than the receipts when the State does not intervene. Therefore, the collection activity is socially profitable. However, collectors are implicitly taxed and not protected. They would earn a better income if they sold the almonds at the economic price (international price). These collectors are disadvantaged on the local market because they are not protected by the current agricultural policy. In addition, the Subsidy Ratio to Producers (SRP) being less than 0 indicates that the collectors are taxed on their incomes (12%). However, with a Domestic Resource Cost Ratio (DRC) of less than 1, the Ouangolodougou sub-prefecture has a comparative advantage in shea collection. Shea collection expenses are lower than the current gain. Encourage the domestication of this plant would be beneficial to the entire locality and country.

### Economic and financial study of the marketing of shea almond

#### Operating account of the marketing

Wholesalers in the city of Korhogo achieve a net margin of 37 358 F CFA / ton (Table 7). This level of profit is often high because of the very large quantity of stocks (on average 978. 6 tons for wholesalers). This activity is therefore profitable.

#### PAM of shea almond marketing

The financial profit (D) and economic profit (H) are respectively greater than 0 (Table 8). The marketing of shea is thus a profitable activity for the traders of the municipality of Korhogo. New operators can therefore enter the shea sector in Cote d'Ivoire. Moreover, this activity is beneficial to the community and therefore to the municipality of korhogo. The absence of public intervention is profitable for the sector. Moreover, the net transfer (L) is greater than 0. This means that traders are then favored and benefit from implicit subsidy.

**Table 8:** PAM of the shea sector at the level of marketing

FCFA/TON	Revenue	Inputs cost		Profit
		Tradables factors	Non-tradable factors	
<b>Private profit</b>	A 184 267	B 100 265	C 41 409	D 42 593
<b>Social profit</b>	E 155 858	F 100 217	G 37 659	H 17 982
<b>Net transfers</b>	I 28 409	J 48	K 3 750	L 24 611

**Table 9:** PAM indicators at the level of marketing

Indicators	Formulas	Values
Domestic Resource Cost Ratio	[DRC= G / (E – F)]	0.68
Private Cost Ratio	[PCR= C / (A – B)]	0.49
Social Cost Ratio	[SCR = (F + G) / E]	0.88
Effective Protection Coefficient	[EPC= (A – B) / (E – F)]	1.51
Nominal Protection Coefficient	[NPC=A / E]	1.18
Profitability Coefficient	[PC=D / H]	2.37
Subsidy Ratio to Producers	[SRP=L / E]	0.16
Equivalent Subsidy to producers	[ESP=L / A]	0.13

### PAM indicators at the level of shea marketing

The Domestic Resource Cost (DRC), the Private Cost Ratio (PCR) and the the Social Cost Ratio (SCR) are respectively greater less than 1. The municipality of Korhogo therefore has a comparative advantage in the marketing of shea. The expenses related to the marketing of shea almonds are lower than the gain in currency. Then, encouraging the marketing of this product would be beneficial to the country. In addition, shea traders can support domestic costs while remaining profitable. Expenses are lower than incomes when the State does not intervene. Therefore, the marketing activity is socially profitable.

Moreover, the Effective Protection Coefficient (EPC) and Nominal Protection Coefficient (NPC) are greater than 1. Traders are subsidized at the rate of 16% on their income. They then benefit from an incentive to continue their marketing activity of shea almond. Furthermore, the Profitability Coefficient (PC) being greater than 1 indicates that economic operators of the shea sector are protected by the current agricultural policies (table 9).

### Economic and financial study of the processing of shea

#### Operating account of the processing

For a ton of shea almond purchased, the processors in Korhogo commune achieve a Net Margin of 4 889 F CFA per ton of processed shea almond (Table 10).

### PAM of the shea almond processing

The financial profit (D) is greater than 0 (Table 11). Shea processing is therefore a profitable activity for the processors in Korhogo commune. New operators can therefore enter the shea sector in Cote d'Ivoire.

In addition, with an economic profit (H) greater than 0, shea processing is beneficial to the community and therefore to the municipality of Korhogo. The absence of public intervention is profitable for the sector, also, the transfer (L) greater than 0 indicates the processors of shea butter are favored and benefit from an implicit subsidy.

### PAM indicators of shea processing

The table 12 shows a Domestic Resource Cost Ratio (DRC) less than 1. The korhogo commune has a comparative advantage in the shea processing. The expenses linked to the shea almond processing lower than gain devise. Therefore, encouraging the processing of this product would be of good use for the country.

**Table 10:** Operating account of shea almond processing

Wordings	Unit	Amount
1. Average selling price of butter	FCFA/ton	320 000
2. Average purchase price of almond	FCFA/ton	200 000
3. Mouture	FCFA/ton	10 667
4. Water	FCFA/ton	1 111
5. Firewood	FCFA/ton	8 000
6. Workforce	FCFA/ton	30 000
7. Average cost of transportation	FCFA/ton	10 000
8. Average cost price (8=2+3+4+5+6+7)	FCFA/ton	259 778
9. Gross margin (9=1-8)	FCFA/ton	60 222
10. Amortization	FCFA/ton	11 333
11. Net margin (11=9-10)	FCFA/ton	48 889

**Table 11:** PAM of shea almond processing

FCFA/TON	Revenue	Inputs cost		Profit
		Tradable factors	Non-tradable factors	
Private profit	A 320 000	B 200 136	C 59 844	D 60 020
Social profit	E 310 000	F 200 111	G 56 185	H 53 703
Net transfers	I 10 000	J 25	K 3 659	L 6 317

**Table 12:** PAM indicators of the shea sector at the processing level

Indicators	Formulas	Values
Domestic Resource Cost Ratio	[DRC= G / (E - F)]	0.51
Private Cost Ratio	[PCR= C / (A - B)]	0.50
Social Cost Ratio	[SCR = (F + G) / E]	0.83
Effective Protection Coefficient	[EPC= (A - B) / (E - F)]	1.09
Nominal Protection Coefficient	[NPC=A / E]	1.03
Profitability Coefficient	[PC=D / H]	1.12
Subsidy Ratio to Producers	[SRP=L / E]	0.02
Equivalent Subsidy to producers	[ESP=L / A]	0.02

Moreover, the Private Cost Ratio (PCR) and Social Cost Ratio (SCR) are less than 1. The processors of shea can support domestic costs while remaining profitable. The expenses of processors are less to the receipts when the State does not intervene. Therefore, the processing activity is socially profitable. Also, the Effective Protection Coefficient, the Nominal Protection Coefficient and the Profitability Coefficient are respectively greater than 1. The processors are subsidized. These actors benefit from a

protection of shea price and therefore an incentive to continue their shea almond processing activity. Processors are thus protected by the current agricultural policy and subsidized to the rate of 12% on their income.

#### Income, cost and profit structure analysis per actor

The reading of the Table 13 shows that processors

**Table 13:** Structure of income, cost and profit

	Structure (FCFA/ton)			Proportion (%)		
	Income	Cost	Profit	Income	Cost	Profit
Collectors	90 909	64 430	26 479	15.3	13.8	20.5
Processors	320 000	259 980	60 020	53.8	55.8	46.5
Traders	184 267	141 674	42 593	31.0	30.4	33.0
Sector	595 176	466 084	129 092	100	100	100

invest the most (55.8%) and receive the largest profit (46.5). The traders, meanwhile, with an investment rate of 30.4%, receive a profit of 33%. Finally, the collectors invest the least and receive the lowest 20.5%.

## DISCUSSION

Shea almonds collectors of the sub-prefectures of Ouangolodougou are mostly women (96%). This is linked to the type of culture. Shea is a picking product that requires a lot of efforts and time to obtain nuts until the production of butter. Men believe that the income from shea is low unlike other cash crops such cashew, cotton....

Also, women have more time to collect shea nuts. These results are similar to those of Ouedrago (2002).

Almost all of the shea almond traders in Korhogo commune are men. They are sometimes prefinanced by exporters or processing units. This assertion is supported by Alira (2004).

The shea processing activity in Korhogo commune is done by women. This high rate is explained by the fact that the manufacture of shea butter is an activity traditionally reserved for African women. That assertion is supported by Sawadogo (1990).

Approximately, 52% of the collectors have an age between 20 and 39. The collection is therefore dominated by people of a less advanced age. This related to the arduousness of this activity. This activity requires long distances to travel and physical effort for the collection, pulping and shelling of shea nuts. Older collectors are less willing to travel long distances. They are most often dedicated to the production of butter. This assertion is supported by Damiba (1986).

The marketing of the product is therefore dominated people of advanced age (75% of the actors have an age between 40 and 60). In fact, this activity requires know-how and several years of expertises. These results are similar to those obtained by Diallo (2002).

At the processing level, one notices that 63% of actors have an age between 40 and 60. This can be explained by the fact that, the shea processing activity is traditionally reserved to women of an advanced age which

have traditionally secrets of the manufacturing of shea butter. In addition to that, they have the family workforce (children, grandchildren, daughters-in-law). This assertion is supported by Zida and yameogo (2002).

Most collectors are illiterate (95%). In this region, the schooling rate is very low. This is related to the religion practiced by the collectors. Most of the actors of this function are the Moslem religion. According to this practice, the woman does not the right to be educated because she has to take care of the family. These results rejoin those of Sokpon and Yapi (2006) who found that shea collectors are characterized by a low level of education.

Half of the traders have a primary level. However, there are 38% actors in this link who have no level of education compared to the secondary level 13%. In fact, marketing in general requires the intellectual level necessary for the conclusions of sale contracts. This result is similar to that of Zall (2008). For him, wholesalers have a level of commitment upstream of the sector with other actors.

56% of processors generally women have no education level and are not illiterate. On the other hand, 44% others have a primary level. In fact, in Senoufo culture, women do not have the right to go to school. She has an obligation to take care of her family. This assertion is supported by Morènikè (2008). According to this author, the shea butter processors are characterized by a low level of education.

Most of the actors of shea sector (collectors, traders, and processors) have a familial effective of between 6 to 10 people. This is explained by the fact that activities of collection, marketing and of processing of shea almond use mostly the family workforce. And then, the important number of household's members makes it easy different activities. This assertion is supported by Helmfrid (1998).

The main activity of collectors is agriculture (74%). However, 19% of collectors trade against 7% of the crafts. The collection of almonds is considered by the collectors to be a secondary activity. In fact, in addition to the activity of gathering nuts for monetary purposes, collectors practice other crops in rural areas in order to feed themselves. It is difficult for a collector to collect a large volume of shea to

ensure his livelihood. The income that we derive from it is the price of the effort of the collector. This income is considered as a profit for current expenditure: clothing purchases, schooling of children, health expenses etc. This same observation was also made by Zacharie et al (2011).

At the level of marketing, 63% wholesalers are primarily committed in trading, even though 38% of them carry out other income generating activities such as transport and real estate etc. These results are near to those obtained by Sawadogo (1990). They argue that some wholesalers operate outside the marketing of agricultural products to guard against risks.

On the other hand, the actors of the processing exert exclusively this activity. In fact, the production of shea butter is a very painful activity that requires long working hours. Thus, processors have less time to perform other income-generating activities. These results corroborate with those of Skopon and al (2006).

The collection, marketing and processing of shea almond are essentially done by married people. In fact, in rural areas, early marriage is imposed on all people according to custom and religion. These results are similar to those of Len and Golane (1987) and Zalle (2008).

In terms of financial and economic performance, the PAM analysis gives convincing results. In fact, the collection function generates a positive financial and economic profit. Then, the shea almond collection is financially and economically profitable. However, even though having a comparative advantage, collectors are implicitly taxed and are not protected. They would earn a better income if they sold almonds at economic price (international price). These collectors are not favored on the local market because they are not protected by the current agricultural policy. These results are similar to those obtained by Ouédraogo (2011) in his study on socio-economic analysis of the marketing of forest products: the case of shea in the Ziro region in Burkina Faso.

Moreover, the shea almond marketing is a financially and economically profitable activity with a financial profit of 42 593 F CFA / ton and an economic profit of 17 982 F CFA / ton. Traders are subsidized to the rate of 16% on their income. They therefore benefit from a protection and an incentive to continue their activity of marketing of shea almond. That result is similar to that of Karen (2016) in his study of power relations and social and environmental changes related to the globalization of the shea almonds: the case of western Burkina Faso. This author has come to the conclusion that the marketing of the shea almond is profitable for traders.

The shea almond processing is also financially and economically profitable with a financial profit of 60 020 F CFA / ton of almond and an economic profit of 53 703 F CFA / ton. The actors of this function of the sector benefit from a protection of the price of shea and therefore from an incentive to continue their processing activity of shea

almond. These results are similar to those obtained by Ouédraogo (2002).

However, in the shea sector, processors are those who invest the most (55.8%) and receive in return the greatest profit (46.5%). As for traders, with a rate of investment of 30.4%, they receive a profit of 33%. The same observation was made by Ouédraogo (2002). According to her, the processor of shea butter has a higher profit margin.

## CONCLUSION

This study aims at assessing the economic and financial performance of the shea sector. On the basis of the results, it appears that the collection and processing of shea are largely dominated by illiterate women. Educated men usually intervene at the marketing level of shea almond. Most collectors have a less advanced age while traders and processors have an advanced age. Also, a large proportion of actors of the shea sector are married. The size of households is significantly high is an asset for the actors of the collection, marketing and processing of shea almond because the family workforce is the main workforce.

In terms of profitability, each of the three functions namely the collection, marketing and processing makes an important financial and economic profit. However, the sector of processing is the most competitive followed by that of marketing. This is seen by a greater economic profitability (53 703 F CFA / ton) and a lower domestic resource costs (0.51).

Furthermore, the collection is not protected while the marketing and processing receive an implicit low subsidy of the State.

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