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Honey Sector Economic Analysis in the Area of Nahouri in Burkina Faso

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Abstract: Burkina Faso has many classified forests that are home to a diversity of species which provide non-timber forest products (NTFP), including honey. This paper aims at demonstrating the economic efficiency of the honey sector in the province of Nahouri in Burkina Faso. The methodological approaches used in the study are the library research and socio-economic surveys of 53 beekeepers from six villages impacted by the creation of the corridor, namely Bourou, Kollo, Ouallème, Saro, Tiakané and Yaro. The SWOT analysis showed that beekeeping is a profitable activity and constitutes a good opportunity for income diversification. However, the beekeeping activity is limited by the archaic technique used. As for the economic analysis following the matrix of the exploitation account, it showed that the "average beekeeper" realizes an exploitation result of 73,250 FCFA per annum, since his operational expenses amount to 34,750 FCFA, while his exploitation products amount to 108 000 FCFA per annum. The analysis of the prices and margins of marketing of the honey of Nahouri shows that the big beekeepers record a coefficient multiplier more powerful than the small and average beekeepers, because of their weak capacity to finance the operational expenses which represent 33% of the products. For a social and economic promotion of the sector, it would be imperative to consider community support actions to beekeepers through the introduction of modern techniques.

Keywords: Beekeeping, Economic Analysis, Honey, Nahouri, Burkina Faso

1. Introduction

Burkina Faso is a country located between 5° and 2° West longitude and 9° and 15° North latitude [1]. Approximately 80% of its populations draws their income from the agricultural sector, which contributes between 35% and 40% of the gross domestic product [2]. A large part of this population is confronted with poverty, the rate of which is higher in rural areas than in urban areas. Indeed, the incidence of poverty in 2018 was 47.50% in rural areas compared to 13.70% in urban areas. This makes rural households face food insecurity risks and health and education problems, leading them to diversify their sources of income and livelihood through the exploitation of Non-Timber Forest Products (NTFP) [3]. Among these NTFPs, there are more than one hundred honey species [4]. These melliferous species constitute a significant asset in the fight against poverty in the villages bordering the Pô-Nazinga-Sissili ecological complex (PONASI). In addition to its main function of conserving animal and plant species, the PONASI ecological complex generates NTFPs including honey.

According to local actors, beekeeping is one of the effective alternatives for countering the desire to recolonize Corridor 1 for agriculture, livestock, etc. In the villages bordering Corridor 1, the practice of traditional beekeeping is ancient. The beekeepers are grouped in associations with an annual production varying between 35 and 190 liters of honey per association with a yield varying between 6 and 12 liters per hive. Whereas if the

structures are well modernized, it is possible to collect up to 50 liters per hive [5]. This low yield observed can be related to a bad combination of the factors of production, from where the sense of this work which is a contribution to the improvement of the economic efficiency of the honey sector. Indeed, to correct the inefficiency of the techniques of the production of honey, the main question of research which seems necessary to us is the following one: how to increase the production of honey in the villages bordering the corridor n°1 of the ecological complex PONASI without that the beekeepers do not support additional expenses of production? To answer this question, the study proposes to: i.) determine the level of economic efficiency of the beekeepers; ii.) To identify the main constraints to the production of honey and iii.) To propose more effective mechanisms of production.

2. Material and Methods

The methodological approach is based on the commodity chain approach. The study concerns beekeepers from six (6) villages (Tiakané, Yaro, Bourou, Saro, Ouallème and Kollo). These villages are home to approximately 15,000 people grouped into 530 households. The socio-economic surveys concerned a 10% sample, or 53 beekeepers. The measurement of economic efficiency is based on the production-exploitation account matrix (Table 1).

Table 1. *Matrix of the production-farming account (Source: [6].*

Expenses or Intermediate consumption (IC)	Income or Sales revenue
IC = All goods and services consumed Sales	SR= All goods and services sold
AV = Added Value or Result of the exploitation	
AV= SR-IC	

3. Conceptual Framework

For a better understanding of the study, two concepts attract our attention and deserve to be elucidated. These are the notion of commodity chain. The concept of commodity chain is polysemous. Indeed, Garrouste G. (1984) believes that it has several meanings as the number of researchers who are interested in the question [7]. Thus, Labonne M. (1985) defines the commodity chain as "the set of agents or groups of agents involved in an agri-food product (or group of products), from its production to its consumption, and by the relationships they maintain between them [8]". Fabre P. (1994) adds that he understands by production chain, "all the economic agents (or fraction of agents) that contribute directly to the production, then to the transformation and to the routing to the market of the same agricultural product [9]". As for Fontan C. (2006), "the commodity chain can be analyzed as a system[10]". Indeed, according to her, the commodity chain is defined as "a succession of operations that allow for the production of a good, but it is also necessary to consider all of the necessary techniques and technologies, the relationships of complementarity, the path between these stages, the economic results, all of the actors as well as their strategies and the relationships (of complementarity, dependence, hierarchy...) that exist between them ". From these different definitions, we consider in this study that a commodity chain is a succession of operations and agents that, starting upstream from one (or more) raw materials, ends downstream, after several stages of transformation/ valorization, in one (or more) finished product at the consumer level.

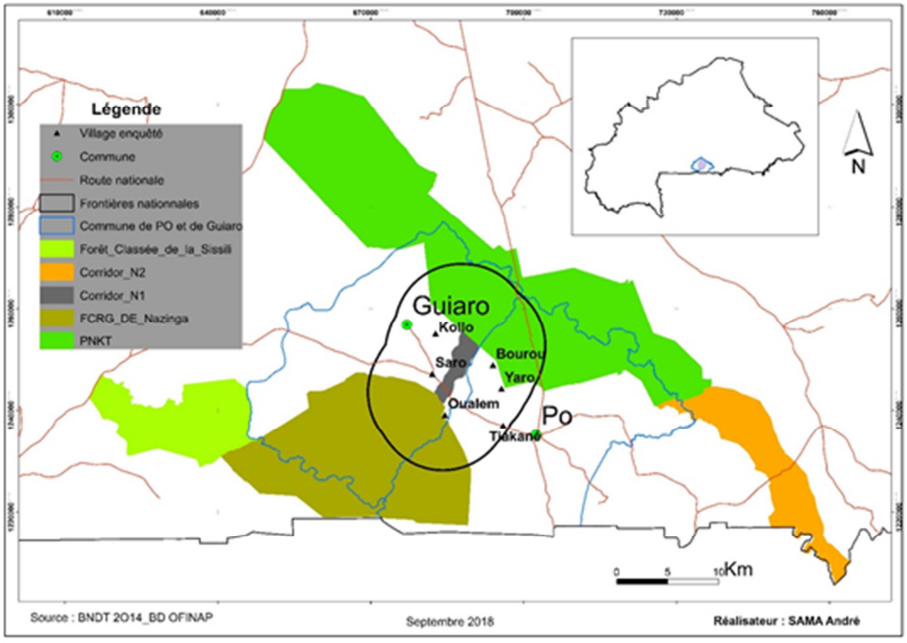

Figure 1. *Location of the study area.*

4. Results

4.1. Study Area Presentation

The PONASI ecological complex was created by decree No. 2001-041/MEE/CAB of October 22, 2001, on the modification, allocation and operation of wildlife conservation units in Burkina Faso. It straddles two administrative regions (Figure 1), namely the South-Central Region (Po Region) and the West-Central Region (Guiaro Region), with an area of more than 300,000 ha [11].

4.2. Organizational and Economic Analysis of the Honey Sector

Table 2. Operating account of the average beekeeper.

ITEMS	AMOUNTS
Total Products	108,000
Total expenses	34,750
Operating result	73,250

Source: Personal elaboration, based on field data.

The analysis is based on the establishment of an exploitation account (Table 2). To do this, we chose to present the case of an "average beekeeper". We understand by "average beekeeper", a beekeeper having the averages of the various quantitative variables which we used for our econometric regressions in chapter 4 located a little further. This beekeeper has thus, an annual production of 36 liters of liquid honey (the representative average), possesses 5 modern hives of Kenyan type (since it is this type of hives which is more met in the zone) and devotes 3400 FCFA (approximately 3,390 FCFA) for the purchase of the light material (bucket and torch). He is 43 years old with 9 years of experience in beekeeping and 3 years of training in beekeeping, spends 1500 FCFA (approximately 1,463 FCFA) for the telephone credit and is located 1.33 km from a road in good condition for the eventual sale of his production.

From this chart, it appears that the "average beekeeper" achieves an operating income of 73,250 FCFA, since his operating expenses amount to 34,750 FCFA while his operating income amounts to 108,000 FCFA. The expenses suppose that the beekeepers buy all their beekeeping materials, from the hives to the torch; otherwise this operating result would be equal to the total amount of the sales of honey deducted from the cost of the light material since the heavy material is granted to the producers in the form of gift. The beekeepers maintain that these margins of exploitation allow them to educate their children, to clothe their wives, to look after the possible sick of their families, to reinforce agriculture and breeding; in spite of the fact that the beekeeping constitutes the last professional activity for all these beekeepers.

4.3. Honey Sector Strengths-Weaknesses-Opportunities-Threats (SWOT) Analysis

The SWOT analysis (Table 3) is part of a global diagnosis of the honey sector in the villages bordering the corridor n°1. This analysis is carried out at two levels: at the internal level of the commodity chain to identify the strengths and weaknesses of the commodity chain and at the external level to detect the opportunities and threats to the existence of the commodity chain.

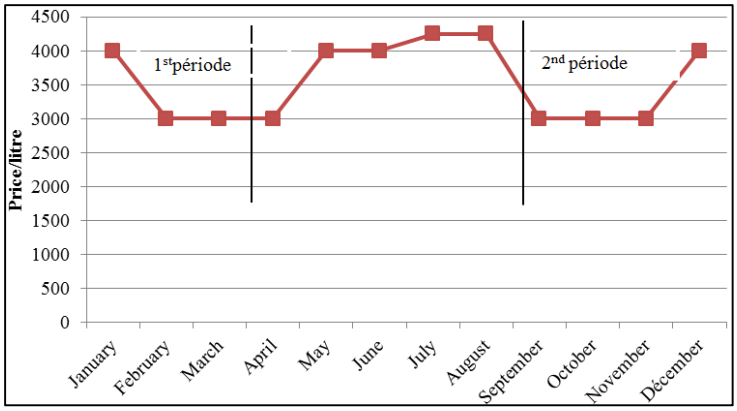

Figure 2. Structure and evolution of the price of honey.

Table 3. Results of the SWOT matrix.

The strengths	The weaknesses
1) Honey consumption in strong growth 2) Birth of local initiatives	1) The inadequacy of certain hives to the needs of the beekeepers 2) The insufficiency of materials of production, extraction and conditioning of honey 3) The lack of professionalism of the beekeepers
The opportunities	The Threats
1) The existence of melliferous species 2) The presence of the local species of bees Apis Mellifera Adansonii and Melipona beecheii 3) The existence of an institutional framework and partners for beekeeping	1) The effects of demographic growth 2) The zone's cotton tradition and new cotton-growing practices 3) Frequent bad weather

Source: Own elaboration, based on field data, 2021

4.4. Structuring and Evolution of Honey Prices

The analysis of the effects of the producer's price and the market or consumer's price completes the socio-economic approach by measuring the indirect effects of the production and commercialization of honey. To better understand this variation, it seems necessary to us to analyze the rhythm of variation of the prices (Figure 2).

The figure 3 highlights two (2) periods of variation in honey prices:

1) For the periods from February to April and from September to November where the prices are constant and correspond to the period of harvest;
2) For the intercensal period that is to say from May to August, the price of honey increases of approximately of 30% and correspond to the period of scarcity, where the beekeepers are occupied by the agricultural campaigns.

4.5. Price Analysis and Marketing Margin

The price variation affects the level of economic profitability of the farm (Chart 4).

A multiplier (Income/Loads) greater than 2 is an indicator of good performance [12]. The difference between the different levels of returns can be explained by the difference in operational expenses. Not all producers have working capital for optimal financing of expenses (purchase of hives, labor, inputs). Thus, the large beekeepers have a more efficient multiplier.

Table 4. *Distribution of annual margins by beekeeper category.*

Economic parameters	Small beekeeper	Average beekeeper	Big beekeeper
Selling price per Litre (a)	3,000	3,000	3,000
Gross income (b)=(a) x (nbre L)	73,250	108,000	171,000
Operating expenses (c)	34,750	54,750	66,500
Gross margin (d) = (b) - (c)	41,500	73,250	104,500
Multiplier coefficient (e) = (b) / (c)	1.94	1.97	2.57

4.6. Marketing Circuit

The marketing of agricultural products can be defined as the performance of all commercial activities involved in the movement of goods and the provision of services from the initial point of agricultural production to the final stage where the products reach the hands of the consumer [13]. According to Malam Boukar A. - K. (2016), it is the "movement that a product follows from its zone of production to its zone of consumption [14]". The diagram of the marketing of the honey of Nahouri is illustrated in figure 3 below.

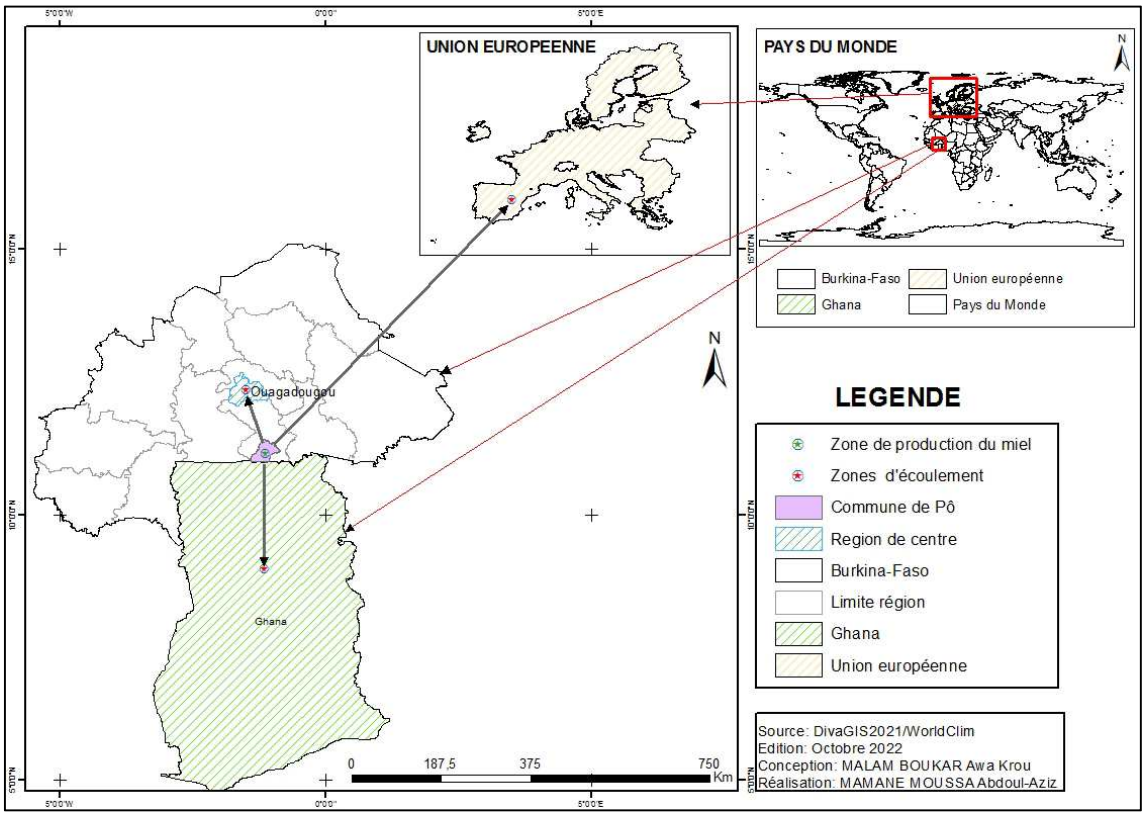

Figure 3. *Map of the marketing circuit for honey from Nahouri.*

4.7. Destination and Structure of Expenditures

The incomes drawn from the production of the honey of Nahouri are essentially intended for the sale. This proportion represents 99.27% against 0.73% for the self-consumption (Figure 4).

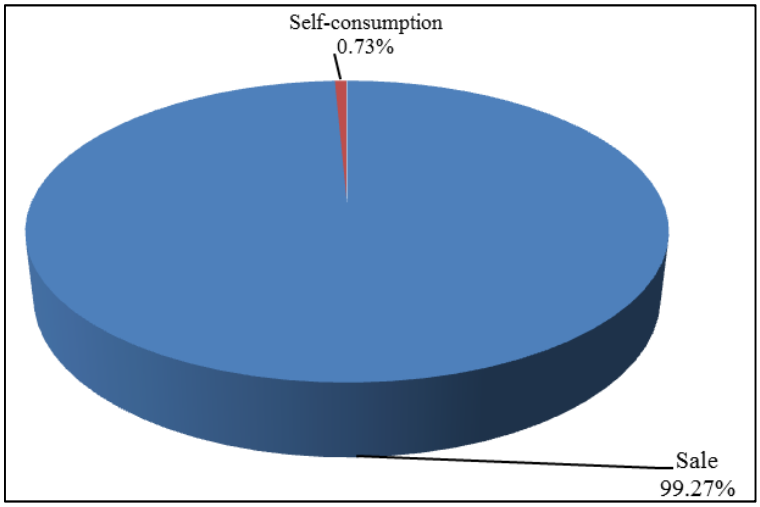

Figure 4. *Breakdown of expenditure structure.*

5. Discussion

The honey chain in the villages bordering corridor 1 is a short chain, dominated by beekeepers. This is similar to the results obtained by Vestalys H. and Andrianarivelo A. (2008) [15]. The accounting analysis showed that on average, each beekeeper made a turnover of 108,000 FCFA during the last beekeeping season. And when one supposes that each beekeeper bought his beekeeping materials, he would have realized 73,250 FCFA as operating result. It also revealed, through the SWOT analysis, that there are possibilities and potentialities to develop a real beekeeping sector (and not only honey) if the weaknesses of the sector are solved and especially if one manages to mitigate the constraints and threats. This is in line with the conclusions formulated by Porporato A. and al. (2009) [16] who, in their work on the analysis of the beekeeping sector in Niger, have shown that beekeeping is a profitable activity and constitutes a good opportunity for income diversification in rural areas, with potential for increasing production. They added that beekeeping activity is limited by the techniques used, the lack of professional training for beekeepers and the presence of bee parasites, including the small hive beetle Aethina tumida. But in view of the conclusions of the study of Nombré I. (2003) [17], which we evoked in general introduction, it is more relevant that we continue our research on the questions of effectiveness of the beekeepers in order to propose recommendations which will make it possible to amplify the positive results of the die analysis. To this end, the following chapter provides the theoretical and empirical basis for the efficiency analysis.

The analysis of the strengths-weaknesses-opportunities-threats (SWOT) of the honey sector shows that the sector has real assets in spite of its traditional character. It is among other strengths, the birth of local initiatives which are translated by sessions of sensitization and training of the young beekeepers, the interest more and more growing of the honey near the consumers can privilege the demand and opens thus new hopes to increase the offer.

Let us note finally that if the average score of technical efficiency of the beekeepers is of 0.5517, these beekeepers still have a potential to allow them to increase the quantity of the production of honey. To do this, the modernization of the sector would be of an irreversible asset.

6. Conclusion

In the light of these results, it seems appropriate to affirm that the apiculture sector is quite profitable for the beekeepers of the villages bordering the corridor n°1 of the PONASI complex. Indeed, the establishment of the account of exploitation of an "average beekeeper" gives an exploitation result of 73,250 FCFA. However, one notes a strong decline of the traditional beekeeping and a rise in power towards the modern beekeeping. In addition, the analysis of the results of estimation of the technical efficiency scores shows that approximately 55% of the beekeepers of the villages bordering the corridor n°1 have a technical efficiency score lower than 0,6. It should be noted that the average technical efficiency score of the beekeepers is 0.5517. This means that it is still possible to increase the quantity of honey production by 44.83%.

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