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Honey production and marketing circuit in
Southern Chad: case of the Maro sub-prefecture
in the South

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Abstract: Southern Chad in general and the Maro sub-prefecture in particular are honey-producing areas. The production, processing, transportation, and marketing of honey are essential income-generating activities in Chad in general and Maro in particular.

The question posed by this article is: how can honey production and marketing contribute to the socioeconomic development of the populations of the Maro sub-prefecture? The objective of this article is to identify the impacts of honey production and marketing in the Maro sub-prefecture.

Data were collected through a survey and direct field observations using interview guides and data collection forms.

The analysis of this data shows that the financial income generated by the various stakeholders allows them to meet their needs.

Furthermore, the weak organization of the actors, the weak support or lack of commitment of the State and its development partners to the different activities of the actors constitute major difficulties in this sector.

Résumé : Le Sud du Tchad en général et la sous-préfecture de Maro en particulier est une zone production du miel. La production, la transformation, le transport et la commercialisation du miel sont des activités génératrices de revenus indispensables au Tchad en général et à Maro en particulier. La question qui se pose à travers cet article est de savoir : en quoi la production et la commercialisation du miel peuvent-elles contribuer au développement socio-économique des populations de la sous-préfecture de Maro ? L'objectif assigné à cet article consiste à identifier les impacts de production et de commercialisation du miel dans la sous-préfecture de Maro.

Les données ont été collectées au moyen d'une enquête et des observations directes sur le terrain à travers les guides d'entretien et les fiches de collecte.

Il ressort de l'analyse de ces données que les revenus financiers que procurent les différents acteurs, leurs permettent de subvenir à leurs besoins. Par ailleurs, la faible organisation des acteurs, le faible appui ou manque d'engagement de l'Etat et ses partenaires au développement aux différentes activités des acteurs constituent des difficultés majeures dans cette filière.

Keywords: Production, Marketing, circuit, socioeconomic, Maro

Mots clés : Production, Commercialisation, circuit, socioéconomique, Maro

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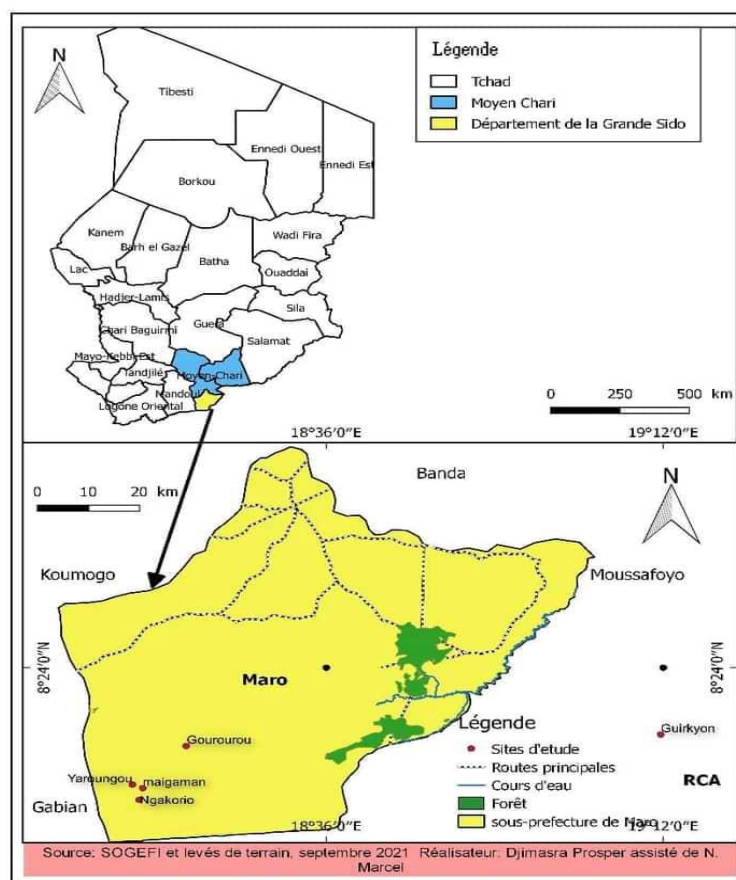
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Introduction

Honey is the natural sweet substance produced by *Apis melliferous* bees from nectar and honeydew, which they forage, transform, store and leave to ripen in the combs of the hive (EU, 2014) cited by Dedo Fabrice KOUASSI et al, 2018. It constitutes a product of great interest to humans who have exploited it for more than 4,500 years for food, therapeutic and economic needs (FAO, 2019).

In Chad, many people are involved in honey harvesting, production, and trade. Like other sub-prefectures, the Maro sub-prefecture (Figure 1) boasts several potentialities, including natural and human resources, as well as socio-economic factors (field devastation by animals and climatic hazards).

These situations have harmful effects on agricultural productivity, hence the option for some people to invest in the beekeeping sector as a second activity after agriculture.



Source : SIGEFI, September 2021 // **Figure 1. Map of the location of the study area**

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The sub-prefecture of Maro is located between latitude 8°28'33'' North and longitude 18°46'10'' East. It is bordered to the north by the sub-prefecture of Danamadjé and the sub-prefecture of Moussafoyo, to the south by the sub-prefecture of Sido, to the east by the Chari River and to the west by the sub-prefecture of Djekedjeke.

1. Methodology

Regarding the sampling, we interviewed 50 beekeepers. We also interviewed three leaders of NGOs that support stakeholders in the beekeeping sector in the Maro sub-prefecture. For the methods, we used the observation method through field visits, then documentary research through the country's various libraries and finally field surveys.

2. Results

2.1. Natural factors of honey production

In the sub-prefecture of Maro, natural factors play a very important role in the production of honey, hence certain requirements must be met in its production. Speaking of the requirements for honey production, a number of important elements appear, notably the climatic and pedological conditions favorable to the development of honey plants from which the sub-prefecture of Maro benefits.

The Sudano-Guinean region, in which the Maro sub-prefecture is located, has a favorable environment for honey production. These environmental factors are crucial in the conduct of beekeeping activities, and this is what determines the abundance, diversity, and availability of resources necessary for the development of beekeeping.

2.1.1. Sudanese-Guinean climate favorable to honey production

The climate has a significant impact on the activity of bee colonies. Prolonged bad weather can be detrimental to the activity of foragers. However, to prevent hives from being abandoned and to facilitate the work of the bees, it is strongly recommended to avoid extreme environments. Therefore, choosing the location of the beekeeping operation is essential.

The space for the location of an apiary should not be too hot, too humid or too exposed.

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Located in the Sudano-Guinean zone, the sub-prefecture of Maro has a tropical climate. Annual rainfall varies between 800 mm and 1300 mm and lasts from April to November, or 7 to 8 months. The dry season lasts from November to April, or 5 to 6 months. The peak rainfall occurs between July and August. The dry season is characterized by intense heat between March and April (see Table 1).

Table 1: 2016-2021 rainfall data for Maro

Years	Rainfall amount/mm	Number of rainy days	Rainy period	Maximum rainy month	Honey production/L
2016	1024.2	53	May-October	July	13500
2017	1045.9	56	April-November	August	13500
2018	1018.8	63	March-October	August	13500
2019	1208.2	66	April-October	October	18900
2020	1163.5	68	April-November	July	13500
2021	1257.4	84	March-November	July	18900

Source : ANADER Maro 2022

It emerges from the analysis of this table that the year 2021 is the wettest in terms of number of days (84 days of rain) with a cumulative total of 1257.4 mm in the sub-prefecture of Maro. In 2018, it did not rain enough in terms of days, i.e. 63 days, Maro recorded 1018.8 mm unlike the year 2021. The peak precipitation is in July and August.

2.1.2. Soil conditions favorable to the growth of honey plants

The soil is both the growing medium and the nutrient reserve of plants. It must therefore have physical and chemical characteristics suitable for trees. The formation of the soil and its evolution is the reflection of various factors including the climatic conditions prevailing in the place of formation. The soils of southern Chad are formed under a semi-humid tropical climate,

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are generally light. They are developed on the alluvial, tertiary parts of the terminal continent composed mainly of sandstone and clay and whose raised parts hill and plateaus are exposed (Djimasra P., 2018).

There are three types of soil in the sub-prefecture of Maro. These are: clay soil, sandy soil and laterite (Coulibaly S. 2014). We can list some conditions favorable to the development of bee colonies.

2.2. Honey production actors

Stakeholders are elements that act in the geographical space. These include individuals, groups, businesses, local authorities, and the State. They are also a person who actively participates in a business, who plays an effective role in a case or event. These stakeholders act on the space that they help to change.

Honey production is very poorly organized by beekeepers in the Maro sub-prefecture because there is practically no formal organization of beekeepers. This situation leads beekeepers to be able to develop their own strategies to deal with this lack of organization. Surveys conducted among 75 beekeepers reveal that 86.67% of beekeepers do not belong to a honey producers' organization. This inadequacy or lack of organization has negative consequences on the production and sale of honey because beekeepers face enormous problems in setting prices due to a lack of price information.

In the various sites surveyed, it should be noted that the direct actors are made up of individuals, family farmers and groups (see table 2).

Table 2: Producer type

Type of producer	Number	Percentage
Individual	52	69,33 %
Family	18	24 %

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Group	05	6,67 %
Total	75	100%

Source : Field survey 2024

This table shows the number and percentage of different types of honey producers in the sub-prefecture. It is clear from this table that individual producers largely dominate with 69.33% followed by family producers with a rate of 24%. The group rate represents only 6.67%. The very low rate of beekeeper groups is explained by the lack, the insufficient support of the State and its development partners and the lack of dynamism of the producers themselves in the sub-prefecture of Maro.

When it comes to individual producers, men are the most involved in this activity. The survey results showed that producers aged 25 to 45 years old largely dominate this category. These producers have hives that vary in number from 5 to 15. A large quantity of their honey is intended for sale and a small quantity is consumed on their own, in most cases it is used for processing into a local drink (douman).

2.2.1. Beekeeping practices in Maro

Today, two types of beekeeping techniques and practices are distinguished: traditional beekeeping and modern beekeeping. Traditional beekeeping was born from the wild collection of honey; it is ancestral knowledge that is passed down within the family. Unlike modern techniques, traditional beekeeping does not concern itself with the breeding of bees since during the harvest all the honey reserves are taken. Bees are considered wild because there is no breeding and maintenance of colonies. Hives are simple, often placed in the natural environment and can be made from various materials. In addition, a strong beekeeping tradition exists in many African countryside and this activity plays an important role in the rural economy (Maria Mislen. R de Sous, 2016).

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Modern beekeeping involves the domestication of bees through breeding since the introduction of the super hive. Humans were able to separate honey reserves from feeding the colony and the brood, creating additional reserves of honey ideal for human consumption. Today, various modern beekeeping techniques are practiced. To have multiple colonies, modern beekeepers practice different types of swarming, as well as queen reproduction. The development of equipment and the use of appropriate materials from the ancestral method allow for higher yields and optimal honey quality.

However, beekeeping is an activity that combines ancestral and modern methods.

2.2.2. Traditional beekeeping

It uses traditional hives, the shapes and layout of which vary from one country to another. The combs are attached by the bees to the inner wall of the hive. The entrance consists of a small hole of variable position. The materials used for the manufacture of traditional hives include tree trunks, tree trunk pulp, straw, rope, plastic and wood (see plate 1). In addition, the low density of hives has allowed it to be given the status of extensive beekeeping.

While the bee's habitat has seen a marked improvement, the same cannot be said for the work of the workers and the harvesting method. Indeed, the workers' mission is to build the wax combs and provide the colony with food and build up reserves. The traditional beekeeper uses burning straw for harvesting. To improve his harvest, man has developed hives with fixed or mobile frames, thus giving rise to modern beekeeping preceded by semi-modern beekeeping.



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Source : Field survey, 2024AF

Plate 1: Traditional hive

This board shows us a boy making the traditional beehive which will then be hung in the branches of the tree.

2.3. Semi-modern beekeeping

Semi-modern beekeeping differs from traditional beekeeping by the use of fixed or mobile frame hives. Assembled in the form of a box, these hives are fixed on different types of support (tree and wooden support). The materials used are: the board, the rope, the sheet metal and the point for assembly (see plate 2). The beekeeper can control the colony without harming its organization and capture the swarms in order to populate his hives. He has improved the harvesting techniques which can be done during the day thanks to the use of a protection kit.

The techniques and materials used are a reflection of the yield and quality of the honey because production depends largely on the technique and materials used in production.



Source : Field survey, 2024

Plate 2: Semi-modern hive

This plate shows the construction of the semi-modern hive.

2.3.1. Processing and marketing of honey in the sub-prefecture of Maro

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During the honey harvest period, a large quantity of honey is used in the processing of a local drink which is very popular with the population and another quantity (pure honey) is intended for sale on site and in other towns in Chad, notably Sarh, Koumra, Doba, Moundou and Ndjamena.

2.3.2. Transforming honey into a local drink

The transformation of honey into a local drink (douman, chies dans ton coin, tanga oussé) (see plate 3) is an activity practiced by women as well as by men. The consumption of these honey-based drinks provides many economic benefits.



Source : Field survey, 2024

Plate 3: Tools for making local drinks

The board shows the tools for making a local drink called "chies dans ton coin" (shits in your corner) made from honey. The board shows two half-barrels connected by two pipes and a 1.5-liter plastic recovery bottle to collect the alcohol, dead wood used for the fire and a bag filled with sand to support the half-barrel. In the background, we see a woman processor sitting to ensure control. And finally, there are six plastic recovery bottles containing the ready-to-drink drink.

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The processing of agricultural products in general, and honey in particular, is in its infancy. This processing is carried out using rudimentary equipment. These tools consist of buckets, basins, half-barrels, pipes, large cups, and plastic recycling containers for storage.

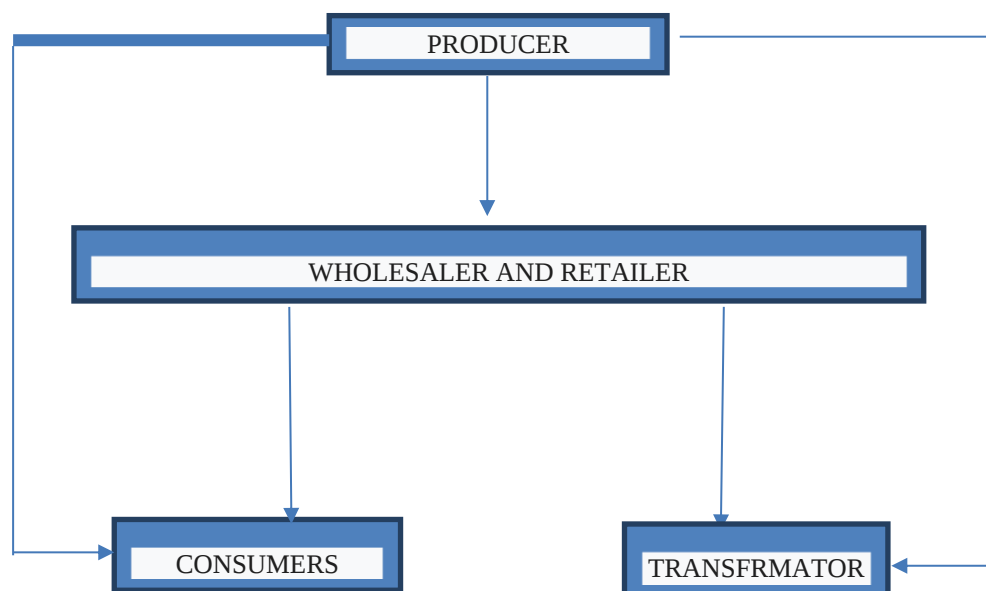
2.3.3. Marketing circuit and places of sale of honey

Honey is sold wholesale and retail in the Maro sub-prefecture. A larger quantity of honey is consumed locally. Pure honey is sold for 1,000 to 2,000 francs, and honey mixed with water is sold for 800 to 1,500 francs. This price varies depending on the availability and quality of the honey on the market.

During the honey harvest period, traders and processors residing in Maro travel from village to village in search of honey and purchase it from local traders and producers. Another form of sales exists: some producers sell their honey directly to processors and households.

2.4. Commercial circuit

The channel involves direct sales between producers and traders without any intermediary, or sometimes processors and consumers buy from the wholesaler or retailer at their point of sale (Figure 2). Some processors and consumers buy directly from producers.



Source : Field survey, february 2024

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Figure 2 : Honey marketing circuit

This figure presents the honey trade circuit in the Maro sub-prefecture. It is clear from this figure that wholesalers and retailers purchase honey directly from the producer. Processors and consumers have several options for purchasing honey, particularly from the producer, either from wholesalers or from retailers. At this level, there is no longer an intermediary in the consumption chain.

2.4.1. Places of sale of honey

The honey trade is an income-generating activity for many people in the Maro sub-prefecture. This activity allows households to meet their family's needs and solve other problems. There are many places where honey is sold in the Maro sub-prefecture. Honey is sold in the village, from the producer, to the neighborhood, and from the merchant.

The producer's concession is a very safe point of sale for the merchant coming from Maro Danamadji and Sarh. (See photo 1). The results of the survey show that 85% of producers sell their honey at home. The advantage of selling honey at home is that they are spared all the bad tongues that will inform the water and forest agents and also avoid the transport costs.



Source : Field survey, 2024

Photo 1: Honey sold by the producer

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This photo illustrates the sale of honey at the producer's in the village of Ngakorio. The photo shows the beekeeper's wife measuring the honey into a 1.5-liter plastic bottle to give to the trader.

2.4.2. Honey trade flows in the sub-prefecture of Maro

Flows are the movements of goods and valuables that occur within a given time interval. These goods have a point of departure and a point of arrival. Here, the goods in question are honey produced in the sub-prefecture of Maro, which is transported to other locations. It is these movements that will be the subject of our analysis.

These flows reveal two types of honey flows in the sub-prefecture of Maro: large flows and medium flows. The large flows are between Maro, Doba, Moundou and N'Djamena, and the medium flows are between Maro, Danamadji, Sarh and Koumra.

2.4.3. Type of object used for packaging and mode of transport

The honey packaging system in the Maro sub-prefecture remains very derisory. There is no specialized infrastructure for packaging honey in the Maro sub-prefecture. However, the extracted honey is stored in 25-liter recycling containers (see photo 2) or in buckets. It is then removed from storage and sold wholesale in recycling containers of various sizes, and retail in recycled plastic packaging.



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Source : Field survey, 2022

Photo 2 : Honey packaging method in the sub-prefecture of Maro

This photo shows an image that illustrates the honey packaging method in the Maro sub-prefecture. The photo shows four 25-liter cans and one 20-liter can fill with honey.

3. Discussion

The issue examined in this article is organized around the impact of honey production and marketing on the socio-economic life of the populations of the Maro sub-prefecture. Beekeeping is a profitable activity and allows actors or populations to provide for their needs to some extent. The commercial circuit, it should be noted, concerns direct sales between producers and traders without intermediaries. According to surveys, individual producers largely dominate with 69.33% followed by family producers with a rate of 24%. Speaking of the gender of the actors; men are the main actors in beekeeping. Finally, the age group of producers for the most part is between 25 and 45 years.

These results confirm those of (Abdon Awono, Diomedee, 2008, p. 44) who emphasize the beekeeping sector which is an economic opportunity for the populations of the sub-prefecture of Maro. Thus, the work of (Alexandre ROSSANT, 2011, p. 98) on the properties

honey. These two authors analyzed the socio-economic impact of the beekeeping sector on the populations on the one hand and the properties of the honey on the other hand. However, these authors worked in West Africa and not in the South of Chad (sub-prefecture of Maro). Then, some authors like (G. Hamidou Mahamat LAWALI and KAOUDJI Younes, 2021, p. 77) worked on the market study and strategies on the beekeeping sector.

Conclusion

This article presented the honey production and marketing chain, along with their strategies at different levels in the Maro sub-prefecture. Analysis of the collected data shows that natural and human factors play a significant role in the honey production chain. Analysis of the stakeholders' strategies also shows that honey production is carried out using traditional and

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semi-modern equipment. Regarding the structure of producers, 43 producers operate alone, representing 57.34%, 22% operate as a family, representing 29.33%, and 10 people are part of the beekeepers' group, representing 13.33%.

Regarding material support and supervision, 65.34% of producers reported having received no equipment or training from the government, and 34.66% reported having received awareness training from the livestock service and the forestry inspectorate in collaboration with the Maro sub-prefecture. 13.33% of producers reported having received material support and training from FLM, and 86.67% reported having received awareness training.

It should be noted that honey production is broken down by production zone based on characteristics including the total number of hives, the total number of liters of honey produced per year, and the total number of producers.

The honey trade is a source of income. This analysis shows that despite its poor organisation and informal nature, it remains a promising sector for the future. The honey produced in the sub-prefecture of Maro is intended for local consumption on the one hand and for other towns in Chad on the other.

However, honey production has socio-economic implications in the sub-prefecture of Maro.

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