

ASSESSMENT OF THE IMPACT OF THE SECURITY CRISIS ON THE PRODUCTION CAPACITY OF MILK PROCESSING UNITS IN THE MUNICIPALITY OF BANFORA, BURKINA FASO

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ABSTRACT

The objective of this study was to assess the impact of the security crisis on the activities of milk processing units in the municipality of Banfora in Burkina Faso. Individual interviews were conducted with six promoters of milk processing units in the municipality. The results of these interviews revealed that 66.67% of processing units are run by adult men over the age of 40. The average number of years of experience of the promoters is 11.33±6.71 years. With an actual collection capacity averaging 550±372.83 liters of milk per day, the units currently receive an average volume of 81.67±18.35 liters of milk per day for processing. Between 2019 and 2023, the amount of milk collected annually by the Milk Processing Units (MPUs) declined significantly, from 320,019 to 209,623 liters, with an average of 351,360±99,297.40 liters of milk. The main processed products are mainly yogurt, fresh pasteurized milk, butter, cheese, cream, *gagal*, and *dégué*, which are sold both within the region and outside it. The security crisis led to a mass exodus of herders and their herds, resulting in a considerable decrease in the amount of milk available on the market, a drop in turnover for these dairies, and the closure of the region's three milk collection centers. In terms of adaptation strategies, all processing units (100%) are using imported milk powder, while 50% of them have developed partnership initiatives to sell their products. Units should ensure their production; they should also promote themselves and fodder cultivation to intensify milk productivity.

Keywords: Security crisis, Impacts, Transformation, Milk, Banfora.

INTRODUCTION

Burkina Faso is primarily an agropastoral country. This sector employs more than 86% of the working population and contributes on average more than 20% to GDP (IAP, 2021). It is also an important source of livelihood for the rural population. The potential of the sub-sector is enormous given the size and diversity of the livestock population. According to INSD estimates (2021), in 2020 the country had 16,587,000 goats, 11,078,000 sheep, 10,237,000 cattle, 2,642,000 pigs, 1,280,000 donkeys,

42,000 horses, 221,000 camels, and more than 50 million poultry (chickens and guinea fowl). Specifically, more than 65% of the cattle population is made up of zebu, which represents real potential in terms of milk production. Despite the large number of dairy cattle, the national supply of milk and dairy products remains below the population's needs due to the low productivity of local breeds, low public investment in the sector, and a lack of professionalism among stakeholders (Sanon, 2003). Of an estimated annual national production of 306,815 tons, 80% is consumed by farmers themselves, while 20% is destined

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for sale (Vias, 2018). The low availability of milk (20 to 30 liters per capita per year) leads industry players to import the equivalent of 70,000,000 liters of powdered milk each year, mainly to supply urban areas (GIZ, 2018). In addition to the difficulties facing the dairy sector, there has been a double security and health crisis, with the first terrorist attacks in 2015 and the first cases of COVID-19 in Burkina Faso in 2020. The overall objective of this study is to present an overview of the situation of milk processing units (MPUs) in Banfora in light of the security crisis.

MATERIAL AND METHODS

Study area

The Cascades region is one of the regions with agro-climatic conditions favorable to agro-pastoral activities. Due to its phytogeographical position, this region benefits from good rainfall, which promotes the development of abundant and diverse vegetation cover and a large livestock population. The province of Comoé, together with that of Houet, constitutes the dairy basin of the “great west” of the country (Figure 1). Indeed, dairy production and processing activities are well developed there thanks to centuries-old

local know-how and the presence of processing units. However, the advent of the dual crisis of insecurity in 2016 and health in 2020 in Comoé has had a significant impact on milk production and processing capacities. Insecurity has led to the departure of some agro-pastoralists from Banfora with their herds to neighboring countries. Other localities surrounding Banfora, which were home to large dairy herds, became inaccessible due to the establishment of armed terrorist groups. In addition, restrictive measures on the movement of people with the advent of COVID-19 contributed to the isolation of populations and a considerable reduction in milk processing activities.

Materials

The materials used consisted mainly of a questionnaire administered to dairy processors. The information collected related to the socio-professional characteristics of the actors, the infrastructure and equipment encountered, the processing capacities of the various dairy products, and the strategies adopted by the units to adapt to the security crisis.

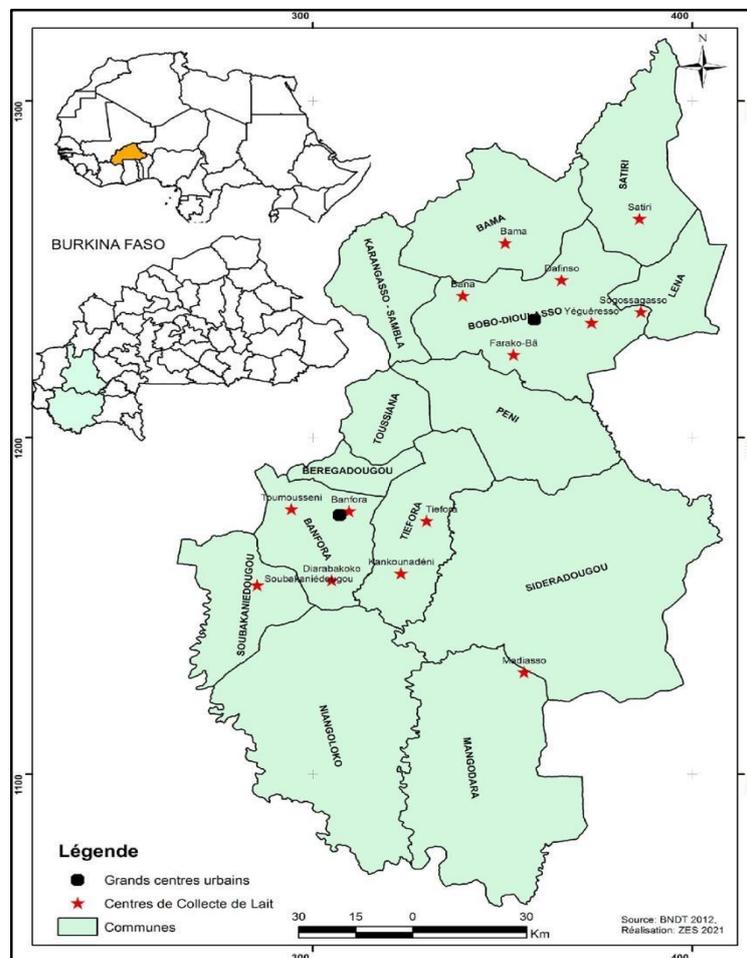


Figure 1. Dairy basin in western Burkina Faso (Source: Sodrè *et al* (2022)).

Methods

This study was conducted in the municipality of Banfora. It consisted of an exploratory survey in the form of semi-structured interviews with dairy product processors in the study area and in situ observations, with the aim of characterizing the UTLs.

Data analysis

Excel spreadsheet version 2022 was used for data entry, descriptive analyses, and graph construction. Rstudio (version 2025.05.1) were used to draw graphics and statistic analysis.

RESULTS AND DISCUSSION

The municipality of Banfora has six (06) milk processing units (MPUs), of which 33.33% are managed by women. Milk processors are over 40 years of age. They are all experienced, with an average of 11.33±6.71 years of experience. They are all organized into cooperatives and

are members of the Banfora departmental union of milk processors' cooperatives (COTRALAIT abbreviated in French), which has a board of directors. Their main activity is milk processing (100%). The milk processing units surveyed have the infrastructure, various equipment, and workforce needed to carry out their activities. The equipment mainly consists of: collection equipment (bottles, 20-liter cans, etc.); -processing equipment (sieves, pots, plastic barrels, pasteurizers, etc.); -storage equipment (refrigerators, freezers); -marketing equipment (mopeds, tricycles, cars, etc.).

From 2019 to 2021, the quantity of milk received from several UTLs, such as Pouvoir Yaourt and DANKAN Yaourt, remained constant. From 2022 onwards, there was a marked decline in the quantity of milk received for certain UTLs, such as Pouvoir Yaourt and Yaourt Foulani. The UTL Aïcha Lait seems to have maintained higher production levels compared to the others, especially in 2019 and 2020. Some UTLs, such as LaBanKo, showed relatively high figures, especially in 2019 and 2020, while others stagnated or declined.

Table 1. Characteristics of the UTLs surveyed.

Name of the UTL	Number of years of experience	F	p-value
Pouvoir Yaourt	6	0,67	0,41
Yaourt Foulani	5		
Dankan Yaourt	9		
Aïcha Lait	23		
Labamko	15		
Kassam Comoé	10		
	Office	3	-
Pouvoir Yaourt	1	3	
Yaourt Foulani	1		
Dankan Yaourt	1		
Aïcha Lait	1		
Labamko	1		
Kassam Comoé	0		
	Density meter	3	
Pouvoir Yaourt	1	0	-
Yaourt Foulani	0		
Dankan Yaourt	1		
Aïcha Lait	1		
Labamko	1		
Kassam Comoé	0		
	Pasteurizer	0	-
Pouvoir Yaourt	0	0,67	0,41
Yaourt Foulani	0		
Dankan Yaourt	1		
Aïcha Lait	1		
Labamko	1		
Kassam Comoé	0		
	Crime skimmer	0,67	0,41

Pouvoir Yaourt	0
Yaourt Foulani	0
Dankan Yaourt	0
Aïcha Lait	1
Labamko	1
Kassam Comoé	0

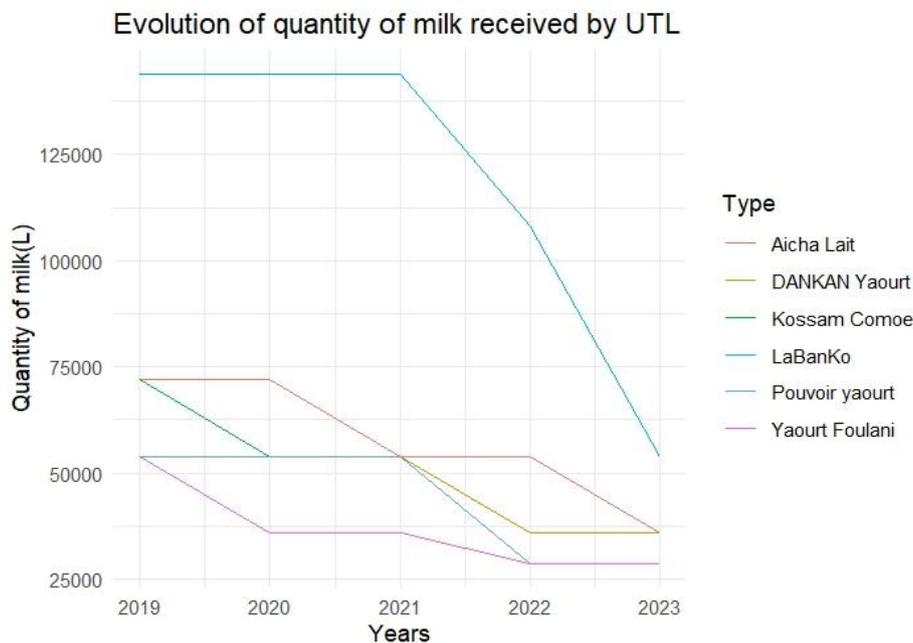


Figure 2. Change in the quantity of milk received per UTL from 2019 to 2023.

The UTLs interviewed process milk into various products on a daily basis. The average quantity of fresh pasteurized milk is 13.33 ± 5.16 (Table II); that of butter is 5 ± 5.48 . The UTLs in Banfora process locally produced milk. It appears that this milk is supplied to the UTLs by individual collectors (100%). However, 50% of UTLs are supplied with milk by surrounding livestock farms. Furthermore, the study reveals that all UTLs sell their various products within the city of Banfora. However, 66.67% of these UTLs have customers outside the Cascades region and only 33.33% have a market outside the national territory. The results of this study reveal some of the impacts of the security crisis on the operation of UTLs. All UTLs (100%) are facing difficulties in sourcing milk, their raw material, which is reducing the quantity of processed dairy products and leading to a considerable drop in their turnover. This security crisis has also led to a number of difficulties within these UTLs (100%), particularly in terms of the supply and/or use of various processing equipment and in terms of personnel management.

With the advent of the security crisis, our study revealed the deployment of strategies put in place by UTLs to ensure the continuity of their activities. In this regard, 100% of UTLs had to reduce their staff numbers in view of the significant drop in the amount of work. In addition, all

UTLs (100%) use imported powdered milk to manufacture certain dairy products such as yogurt, *gapal*, and *déguê*. Furthermore, only 50% of these UTLs have developed strategies to diversify their customer base to ensure the purchase of their products. In terms of prospects for improvement, 83.33% of the promoters of these UTLs hope to set up their own dairy cow units using high-performance breeds. All UTLs hope to acquire solar refrigeration and freezing equipment for better preservation of dairy products. In order to promote the consumption of local milk and develop their marketing, 66.67% of UTLs are working to have their products included in school canteens. The study revealed that the activities carried out in the UTLs are mainly led by adult males. This result differs from that found by TROQUER (1993), who estimated that milk processing activities in mini-dairies were carried out entirely by Fulani women. The predominance of relatively older men could be explained by their social responsibilities, which lead them to diversify their sources of income in order to meet the needs of their families. However, although women are underrepresented in the management of these UTLs, it should be noted that they constitute the largest segment of the workforce employed there. The average number of years these UTLs have been in existence is more than ten (10), indicating the existence

of endogenous expertise in dairy processing activities. They have developed mainly in the country's major cities such as Ouagadougou, Bobo-Dioulasso, Banfora, Fada N'Gourma, etc. Thus, the cities of Bobo-Dioulasso and Banfora have seen a proliferation of UTLs over the last thirty years (Corniaux *et al.*, 2014). These are mainly small artisanal and semi-artisanal units that process between 40 and 2,000 liters of milk per day (GRET, 2019). All UTL promoters are primarily involved in dairy processing. However, according to the MRA, 2010, in its national program for the development of the dairy sector in BURKINA, 40% of UTL owners are agro-pastoralists. Milk is a product that is highly sensitive to microbial germs, and its processing requires skilled handlers, patience, and strict hygiene measures applicable to personnel, various materials, and equipment.

Milk processing requires a minimum amount of space (storage, packaging, and preservation rooms) and equipment (bottles, sieves, pots, pasteurizers, refrigerators, freezers, coolers, rolling stock, etc.). However, some milk processing units do not have equipment such as pasteurizers and cream separators due to their limited financial capacity to import them. According to the 2010 MRA report, units processing local milk have difficulty acquiring the equipment they need to carry out their activities. Nevertheless, these UTLs pasteurize the milk they collect in a water bath, which explains the availability of gas bottles. In addition, the difficulty some UTLs have in acquiring motor vehicles (vans) to transport milk and its derivatives leads them to use mopeds or tricycles for this purpose. Furthermore, the study revealed the existence of temporary labor in some UTLs. This presence is due to peak production periods when these UTLs collect large quantities of milk on a daily basis, thus increasing the workload in processing activities. This study reveals a clear decline in the quantity of milk collected by the UTLs in Banfora. This result is similar to that of VIAS FRANCK, 2018. According to this author, over the period 2014-2016, the growth rate of national milk production remained negative (-2%). This finding could be explained by several factors. In fact, grazing areas and pastoral zones are occupied by gold mining sites, fields, and cashew orchards, leading to a decrease in natural fodder resources and, as a corollary, a decline in milk production. The persistence of extensive dairy farming systems, the resurgence of certain epizootic diseases, and the high cost of zootechnical and veterinary inputs are all factors contributing to a sharp decline in available milk in the Banfora UTLs.

Furthermore, one of the main causes of the decline in milk collected in the UTLs is believed to be the insecurity in the Cascades region. This situation has led to the mass departure of some farmers with their herds, which are estimated to number 884,000 head of cattle in 2021. In fact, the regional directorate in charge of animal resources in the Cascades issued 34 international transhumance certificates in 2018, compared to 168 in 2022. In terms of the number of animals in transhumance, 2,634 head of cattle were registered in 2018, compared to 34,959 in 2022. In addition

to these official figures, there are also figures for illegal border crossings by certain transhumant herders, which increases the number of animals that have left, particularly cattle. During the period from 2018 to 2022, this transhumance was characterized by the non-return of herders who, for security reasons, settled permanently in Côte d'Ivoire, Ghana, and Guinea Conakry. The decline in milk collected by UTLs also leads to a decline in the availability of other dairy products on the market (yogurt, butter, cream, gapal, dèguè, etc.). Furthermore, yogurt is the main product derived from the processing of raw milk collected, while butter and especially cream are produced in smaller quantities. This result is in line with that of Sowou, 2014, which estimates that 80% of production is yogurt and curdled milk, compared to 20% for fresh pasteurized milk. These results could be explained by the existence of several manuals and guides on good practices for processing milk into yogurt, which promotes and facilitates the implementation of this technique. The significant weight of yogurt and curdled milk in the product portfolio of these mini-dairies can be explained by the added value they bring and the interest that consumers show in them (AGECO 2006). Added to this are market needs, which indicate a preference for yogurt consumption among customers. However, obtaining cream requires a good command of technology and specific equipment such as a cream separator, which 50% of the UTLs surveyed do not have.

The Banfora UTLs process locally produced milk. It appears that all UTLs are supplied with milk by individual collectors. These results are similar to those of Aragrande (1997) and Goossens (1998), who pointed out that the supply of milk and dairy products to cities in Saharan Africa is generally ensured by three (03) channels, including individual collectors. Some UTLs have also opted to work with local milk by establishing productive alliances with farmers, collectors, traders (distributors), and other actors in the sector (Duteurtre, 2004). This situation can be explained by the disappearance of the three milk collection centers (CCL) from the sector's value chain. The security crisis, marked by a sharp drop in milk production, led to the closure of these CCLs, which were struggling to collect enough milk to supply the UTLs. In addition, the management committees (COGES) of these CCLs were formerly made up mainly of certain communities which, for reasons related to the onset of insecurity, have been stigmatized. This fracture in the social fabric has led to the withdrawal of these communities. Furthermore, given the difficulties in sourcing raw materials due to insecurity, processing units are no longer supplying sufficient quantities of milk products. In order to ensure minimum operations, some UTLs have reduced their workforce, and in order to satisfy customer demand for dairy products, UTLs are resorting to imported powdered milk. According to FAOSTAT, 2017, imports of milk and dairy products increased steadily between 2010 and 2016, reaching a cumulative total of 500,539 tons of dairy products worth more than US\$146,206,000 million. This is due to the fact that local production is poorly collected and processed (80% of production is consumed locally and another part is

marketed through short supply chains) on the one hand, and on the other hand because imports seem to have been used as the primary lever by the state to date to meet the population's needs for dairy products (Corniaux and Duteurtre, 2014). As a result, imports are increasing in proportion to consumption and currently account for around 30% of the milk and dairy products consumed in Burkina Faso (FAOSTAT, 2019; Corniaux *et al.*, 2007; Corniaux, 2015). Imported milk generally comes from European Union countries such as France, the Netherlands, Belgium, Luxembourg, and the United Kingdom.

This study, conducted in the municipality of Banfora, revealed that the majority of processing units are run by adult men who employ a predominantly female workforce. Given their long history, these processing units have staff with expertise in the field of dairy product processing. The main products produced by these units include yogurt, fresh pasteurized milk, butter, cream, gapal, and dêguê. However, the production of certain dairy products such as cream requires specific equipment such as cream separators, which not all of the UTLs surveyed have. Nevertheless, since 2020, UTLs have seen a drastic drop in the quantities of milk collected, which has led to a decrease in the products derived from the processing of raw materials. One of the main causes of this decline in milk availability is insecurity, which has led to a mass exodus of some dairy farmers. Faced with this situation, processors have developed resilience strategies to ensure the continuity of their services. These strategies include staff reductions, importing reconstituted milk powder, and seeking partnerships to introduce dairy products into school canteens. Revitalizing and capitalizing on research and development efforts in the dairy sector requires an inclusive and participatory policy involving the various stakeholders.

CONCLUSION

In light of this, we recommend: (i) State structures and all development partners to: - Train producers in good practices for fodder production and conservation with a view to ensuring food security for dairy cows; - Establish a market mechanism to promote the consumption of dairy products in school canteens, public and private services, health facilities, and prisons and correctional facilities. - Create an inclusive consultation framework for the swift return of livestock farmers and their herds in order to rebuild the national livestock population and promote the revival of dairy production; -Establish a support fund for people affected by the security crisis to help them set up income-generating activities; (ii) Actors in the dairy value chain should: -Practice high-yield fodder crops to compensate for food deficits in natural pastures; - Collaborate with veterinary agents to ensure the quality of milk production; -Work to rebuild the social fabric in order to ensure peace and stability throughout the country.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest

ETHICS APPROVAL

Not applicable

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AI TOOL DECLARATION

The authors declares that no AI and related tools are used to write the scientific content of this manuscript.

DATA AVAILABILITY

Data will be available on request

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