

Meeting the challenges of change: Cattle farms in Vina (Cameroon) between opting for security, diversification or intensification

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Abstract

The livestock farming systems of Vina have been faced with many changes in recent years. Understanding these dynamics requires a better knowledge both of what is behind them and of the strategies the farmers use as an answer to them. A multidisciplinary approach was used consisting in the analysis of how farms operate and in the study of the market channels. Results show that the current transformations are due to the joint effect of resource inadequacy and to the development of market channels for the milk and meat sectors in the periurban area of Ngaoundere. These transformations which give rise to new opportunities destabilize the functioning of traditional farming systems. Cattle farmers' answers are diversified and vary from favoring security, diversification or intensification. These various options which match the different steps of a move from extensive to intensive farming need to be accompanied and raise questions about the emergence of new counseling services for farmers and about the sustainability of livestock activities in Vina.

Key words : Cattle breeding, transformations, multidisciplinary approach, strategies, Cameroon

Introduction

The Vina territorial and administrative division is one of most important cattle breeding zones of Cameroon. It is considered as the cradle of the Ngaoundere breed of Gudali, one of the outstanding African butcher breeds. Beyond its Sudano-Guinean climate, favorable to cattle breeding activities, this region has long been coveted by different groups of breeders (Mbororo vs Fulbe) because of the abundance and good quality of its pastures (Boutrais, 1999).

The 70's and 80's were a period of deep crisis because of the invasion of pasture land by tsetse fly and the occurrence of a cattle plague epidemic which decimated part of the livestock. Today, heavy mortality and epidemics are rare thanks to vaccination campaigns carried out each year. New opportunities are emerging: milk production and intensive cattle-fattening activities are expanding because of an ever-rising market demand. But the exploitation of these new opportunities is compromised by declining and highly damaged pastoral resources.

These transformations have consequences on livestock breeding systems which Landais (1987) defines as "a set of elements in dynamic interaction organized by man to make the most of resources through the use of domestic animals". As pilot and organizer of the system, the breeder of Vina is at a crossroads. His points of reference are shattered. Presently, the technical and managerial support that he could need to negotiate this period of turmoil cannot be brought because of the lack of reliable knowledge on the current dynamics and on the functioning of farms. This concern has led to the carrying out of the present study. Its objective is to identify the determining factors behind the current evolutions and to emphasize strategies developed by farmers as an answer to these change.

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Theoretical and methodological framework

A comprehensive analysis focused on the stakeholders' strategies and practices

The model used is inspired from the one designed by Caron and Hubert (2000). It focuses on farmers' objectives and projects through the analysis of strategies that farmers work out. Strategies are defined as a coherent set of operational objectives worked out by farmers in order to meet challenges they are facing. These challenges could be aimed at the maintenance, the improvement or the change of their way of life. Thus three types of strategies could be distinguished (Chauveau, 1997).

- Defensive strategies, these are aimed at the defense and the maintenance of the way of life and standard of living. The innovations they give rise to are of low cost; they are aimed at finding a certain security and a control of risks.
- Offensive strategies: these are indicative of the orientation of the farm toward accumulation and increase of income. They are very risky and require a lot of investment.
- Combined strategies: these associate the two previous categories. They express a state of transition and uncertainty.

The study of farmers' strategies can give insights into their objectives. But to better understand these projects and their motivations, it is necessary to analyze concrete actions carried out by farmers. In order to organize the study of breeding practices, Landais (1987) suggests the following classification: i) aggregation practices, operations through which herds and lots are built up; ii) conduct practices, which group together all the operations carried out on animals in order to look after them and put them in suitable conditions to achieve growth, reproduction and production performance; iii) exploitation practices through which the farmer "takes" some production (e.g. milk, wool); iv) improvement practices and v) renewal practices, which concern the culling or acquisition of young animals.

Data collection and analysis

The methodology used associates the study of the functioning of farm units and an analysis of the milk and meat sectors. The approach uses analysis and synthesis at the same time, because it is more the understanding of the motivations behind farmers' strategy than their inventory which was targeted.

Data were collected from 32 farmers using a questionnaire of which the main headings were: the trajectory of the farm unit; its means of production; farmers' activities; farmers' objectives and strategies, and different breeding practices.

Because of the lack of a reliable database, the method of random sampling was used. Thirty-two cattle breeders were interviewed. These farmers belonged to three types of livestock farming systems: i) pastoralists (10); mixed-farms (14) and iii) semi-intensive farms (8). Moreover, 20 complementary interviews were carried out with other stakeholders of the sector (cattle dealers, veterinarians) and other resource persons (researchers, NGOs, extension services).

Data analysis was inspired by the method of speech analysis. First, stakeholders' speech was reformulated and submitted back to them. The first replay permitted us to validate the initial speech interpretation and possibly to go further with some questions which were not tackled during the first meeting. Secondly, this reformulated statement was confronted with other data sources (bibliography, personal observations and statements of other stakeholders). Finally, a general report of the results was made during a meeting to which all the persons interviewed and other stakeholders interested by the

research topic were invited. Discussions and remarks raised during this meeting enabled us to refine and give the results a final form.

Analysis of the market aims at understanding the organization and the functioning of the milk and meat sectors. This analysis consisted of the study of different flows, the location of markets, the cover of the demand, the regulation of supply and the type of relations between the different stakeholders of the sector.

Results

Access to market and resource unsuitability: factors determining cattle breeding dynamics in Vina

Data analysis shows that farmers' practices and strategies evolve under both the effect of resource availability and accessibility to markets and services (Figure 1). This result is similar to that of Landais (1986) who underlined the fact that African farming systems change as a result of the modification of the natural environment and socio-economic context. The population of Vina has doubled within twelve years, moving from 122,000 in 1987 to almost 240,000 people in 1999 (Tsapi, 1999).

The increase in human population and its numerous consequences (urbanization, increase in the number of stakeholders and diversification of their activities) encroach on pasture lands which are now used by different stakeholders. For example the size of farmlands in Ngaoundere region increased by about 1,500 ha each year. At the same time livestock keeps on increasing. From 240,000 in 1987, livestock has increased to 600,000 cows in 2003 (DDEPIA-Vina, 2003). This situation gives rise to higher animal density (1.2 to 1.6 Ubt¹ /ha while the recommended norm by extension services is 0.4 Ubt) which in turn leads to the shortage and the damage of pasture resources (forage, water).

However, the high density of cattle in a given area is not always the sign of a decrease in pasture land. It could be an "opportunistic concentration" because of a poor spatial arrangement of infrastructures (water points) or to proximity of markets. This case is found in the urban area of Ngaoundere where there is a multiplication of milk production and cattle-fattening units.

When resources decrease, cattle farmers face a dilemma: migrate/move to a zone where natural resources are still abundant or choose to settle down. In that case they thus engage a modification of their practice and strategies in order to supply their cattle with a good feeding. The choice of settling down will be all the easier when the accessibility to market and services, a sign of opportunities, is good. This is the case of former pastoralists who have settled in the proximity of the town of Ngaoundere.

In some respects, the emergence of markets and services could be interpreted as an answer to a real demand because of the development of breeding activities. Thus, in Mbé (one of the three administrative subdivisions of Vina) where animal husbandry is less developed, there is no cattle market nor veterinary pharmacy. But, in the sector of Ngaoundere, an important zone of animal husbandry (almost 400,000 cattle) there are about ten veterinary pharmacies and twelve cattle markets. In fact, the town of Ngaoundere plays an important role in the development of livestock activities in Vina.

¹ Ubt = Tropical cattle unit, an animal with an average weight of 250kg.

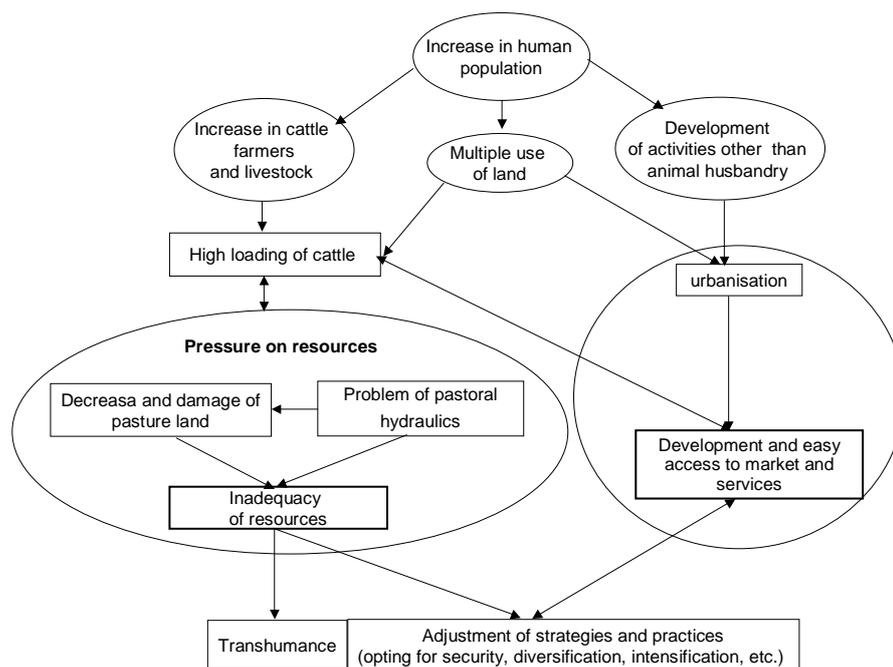


Figure 1: Forces behind the evolution of farmers' practices and strategies

Ngaoundere, the epicenter of the mutation of farming systems and driving force behind the cattle sector

The population of the town of Ngaoundere is about 120,000 inhabitants (that is 50% of the overall population of Vina). This population represents 45% of the urban population of the Adamawa province. Thus, Ngaoundere is an important market for meat and even more for milk products. Furthermore, because of its strategic position as the end point of the Transcamerounais rail line², this city is a point for the collection, transit and loading of cattle for the consumer markets of the main cities of the south of Cameroon (Yaounde, Douala) and neighboring countries (Equatorial Guinea, Congo and Gabon in particular). These various reasons could explain the emergence of milk and intensive cattle-fattening activities around this town.

New opportunities

Milk production

The development of milk production is linked to the setting up in 1992 of the “dairy project” in the suburbs of Ngaoundere. Despite its privatization in 1996 and its closing in 2002, this project has played an important role in the popularization of the consumption of fresh milk products by city-dwellers. Before this project, only shepherds and a few Mbororo women were interested in milk production, using it for family consumption and if possible for sale.

Today, about 4,000 liters of milk are processed and marketed daily in Ngaoundere by a dozen “milk bars”. For comparison, this quantity is about 10 times what Sogelait³, at the time the main operator, was treating on the eve of its closing (Tsapi, 2002). Moreover, there are 50 milk producers’ groups all grouped together under Fekossam, a dairy organization. This a sign of the interest that cattle farmers

² It is the railway line that links the southern and the northern parts of Cameroon. Railway is the main means of transporting goods and passengers between these two parts of the country.

³ Société de gestion de la laiterie. In 1996, this company took over the “dairy project” with aim of revitalizing it.

have for this activity. For those cattle farmers, milk production has three main advantages: “income, milk for family consumption, and not being not obliged to sell one’s animal in order to earn money”. Thus for some farmers it is a means of diversifying activities. For others, it is an economic activity that generates income as much as meat production.

However, the further development of milk production has encountered some difficulties because of an insufficient technical mastery observed on some farms. Also, the dairy sector is not yet well organized. Except for the locality of Idool which is more distant (70 km), nearly all milk production units are located within a radius of 50km around the urban center. Ngaoundere is the main market because of a lack of transport means. During the rainy season, the production is abundant (more than 4,000 l daily), prices are at their lowest level (100 to 150 Fcfa⁴ as compared with 200 to 350 Fcfa in the dry season) while the processing and marketing units are unable to deal with it all. This situation would worsen with the current extension of milk conservation by the lactoperoxidase (LPS) method. A better technical management would allow farmers to postpone production until the dry season. During this period the supply (1,500 to 2,000 l daily) is insufficient. Thus milk processors and buyers buy reconstituted milk to make up for the shortage.

Intensive cattle fattening

Because of the position of Ngaoundere as the final point of the Transcamerounais rail line, there is a large number of intensive cattle-fattening units around this town. Each year about 30,000 cattle are transported by train to markets which are located outside Vina. Beside rail, transport by truck and on foot is also practiced but is of lesser importance (5000 cattle / year). Setting up near Ngaoundere allows farmers who practice fattening to minimize loss of weight caused by the walk from the farm to the loading platform.

The development of cattle-fattening is linked to the loss of weight experienced by cattle during the dry season (November – April). During this period, the supply of cattle is very low because of the departure of many farmers in transhumance. Cattle-fattening activities appear as a regulator of flows both on the local and external market. Cattle are bought at the moment of departure to transhumance when prices are relatively low (140,000 – 200,000 Fcfa). The maintenance and the increase of body weight of these cattle enable farmers to gain a substantial profit (30,000 – 60,000 Fcfa /animal), when the supply is insufficient.

Generally, fattened cattle are steers or young bulls. They are reared in small herds (20 to 35 cattle) for 30 to 45 days. Thus, some farmers have the possibility to rear two or three bands per year.

In some respect, fattening could be considered as a will to improve productivity, and particularly carcass yield, given the current context marked by the increase in demand while resources are lacking. Progressively, farmers are conscious that at mid-term the challenge would be to “rear only three cattle instead of five” while keeping the same or even raising the level of income if possible.

On the other hand, fattening activities require capital. A good technical follow up is also necessary. If not, capital invested would not be profitable.

In a context where rural loans are lacking, the majority of farmers who practise cattle-fattening are found among the wealthiest farmers (cattle dealers, ranchers). Some people rely on this fact to affirm that fattening is a means of diversification for the wealthiest while poor farmers are more interested in milk production. However, this statement is questionable given the high level of investment found on the farm of some milk producers. Moreover, farmers who practise both activities are common.

⁴ 1 euro = 656 Fcfa

In fact, fattening as well as milk production cannot yet be considered as a complete production system. They are still made up of a few additional and more or less specialized cattle herds beside traditional herds. The creation of these units brings farmers to review their farming practices.

Transformations of farmers' practices and strategies

The main modifications concern the improvement of the feeding and health of animals, husbandry techniques and the starting of a process aimed at improving the genetic potential of animals. These adjustments can be considered as the beginning of intensification. They lead to changes in the structure of the farm.

Improvement of feeding and health follow-up of livestock

Forage plants are cultivated in order to complement the feeding of livestock, particularly in the dry season when pastures are sparse and lose nutritive value.

Almost 60% of farmers producing milk and those practicing fattening activities own forage fields of which the average size is about 1 ha. However, the extension of these forage fields is slowed down by the land tenure systems which render access to property very difficult. Moreover, seeds of the most sought after forage species (*Brachiaria ruziziensis* and *Stylosanthes guianensis*) are less available on local markets and not all farmers have a good mastery of production techniques (seedlings, follow up, harvesting). Thus there is a general use of agro-industrial by-products such as maize and wheat bran. But above all, cotton cake is the most used by farmers. The supply of cotton cake is provided by Sodecoton (Société de développement de coton du Cameroun), a company located 270 km to the north of Ngaoundere. More and more, the quantity supplied falls short of the demand. For instance, for an order for 1,200 tons that Ugiceta⁵ placed during the 2002/2003 campaign, it received only 60 tons. This situation emphasizes a problem which threatens the further development of cattle fattening and milk production activities.

The creation of water points for livestock is also part of the investment underway in farms which are intensifying their production techniques. Apart from some ranches which have permanent water points, more than 90% of farmers water their animals in rivers or pools. With the increase in livestock and the insufficiency of water infrastructures, the death rate during the dry season is rising, reaching the threshold of 5 to 8% of livestock.

Finally, the existence of a dozen veterinary pharmacies in Ngaoundere expresses the importance that farmers attach to the health of their livestock. Each year, the ministry of livestock and animal husbandry carries out a vaccination campaign on cattle against pneumonia and pasteurellosis. Farmers take care themselves of other diseases whose effects could lower the performance of the herd. Skin diseases (dermatophilosis, ticks, scabies) and intestinal parasites are the most common. However, farmers still do not have treatment against foot-and-mouth disease. This disease which is endemic in Vina with a prevalence rate of 84.3 % (Bronsvort *et al.*, 2002), will be in the mid-term one of the main constraints to the development of milk production.

It is important to notice that apart from food complements (wheat and cakes) and veterinary drugs, small equipment necessary for different animal husbandry activities (syringes, castration pliers, scales for weighing) is not very available on the local market. Thus farmers have to import these materials as they do for the animals and semen of exotic breeds to improve the genetic potential of their Gudali breed livestock.

⁵ Union des Gic du comité d'éradication des tsé-tsé en Adamaoua. It is dairy organization which groups together more than 2,000 farmers.

Gene flows and “hybridization” of the African Charolais

Traditionally, farmers used to rear livestock of the Gudali breed. The butcher performances of Gudali (400 to 500 kg of body weight at adulthood, average carcass yield of 55%) are among the best in Africa (Boutrais, 1999). Thus it is called the African Charolais. For local farmers, mostly of the Foulbe ethnic group, the Gudali breed has always been considered as a mark of their identity. But, more and more, these farmers are showing an increasing will to improve the genetic potential of their animals. This objective is concretized through an all-out crossbreeding of Gudali with exotic breeds considered more efficient.

In this trend, three cases can be distinguished among milk producers :

- The farmer crossbreeds his Gudali cow with a Holstein bull belonging to another farmer or to the dairy station located in the suburbs of Ngaoundere.
- Some wealthy farmers buy a bull, very often a crossbreed, with a potential varying from less than 25% to up to 50 % of Holstein blood. This bull is introduced into the dairy livestock.
- The wealthiest farmers (ranchers and some sedentary semi-intensive farms) progressively make up a dairy herd composed mostly of animals of exotic breed (Holstein or hybrid). This is done through the purchase of animals themselves or by artificial insemination.

The same phenomenon is observed in the meat sector apart from the difference that here, the exotic breeds used are Charolais or Brahman. To justify their choice, some farmers argue that “*a four-year old Gudali is the equivalent of a two-year old Charolais.*”

In an environment where animal breeds have a high identity value, these gene flows could be considered a sign of the current context that the economic function of cattle is predominating progressively over their socio-cultural value (Boutrais, 1994). The last stronghold of Gudali breeds is constituted of pastoralistes, and in general, of small farmers who do not have enough financial means to cover food needs and health care of crossbreeds. The “cradle of Gudali” is becoming more than ever a utopia. Many risks are rising because no herd-books are kept, and fewer farmers have a farm notebook that could help them to manage and follow up the breeding of their cattle. More often, what is commonly considered as a purebred Charolais, Brahman or Holstein is in reality a crossbred.

Gudali is not a dairy breed (Table 1), thus the desire of milk producers to improve the genetic potential of their cattle seems justified. On the other hand, the use of crossbreeding by meat producers is questionable. In fact, it has been shown that if they are reared in the same conditions, Gudali and Charolais or Brahman crossbreeds will have almost the same yields. Thus it appears more judicious for those farmers to emphasize their strategies on the improvement of breeding conditions, and the designing of selection processes of Gudali breeds. This suggestion rejoins the statement of Lhoste *et al.*, (1993) according to which the genetic potential of local breeds has rarely been the “limiting factor” of livestock farming systems’ yields in tropical regions.

Table 1: Milk production of Gudali, Holstein and crossbred Gudali x Holstein at the «Station zootechnique de Wakwa»

Breed	Length of lactation (days)	Production (liters)
Holstein	238	3,431
Goudali x Holstein	256	1,524
Gudali	168	499

Source: Maliki (2001).

Multiplication and monospecificity of herds

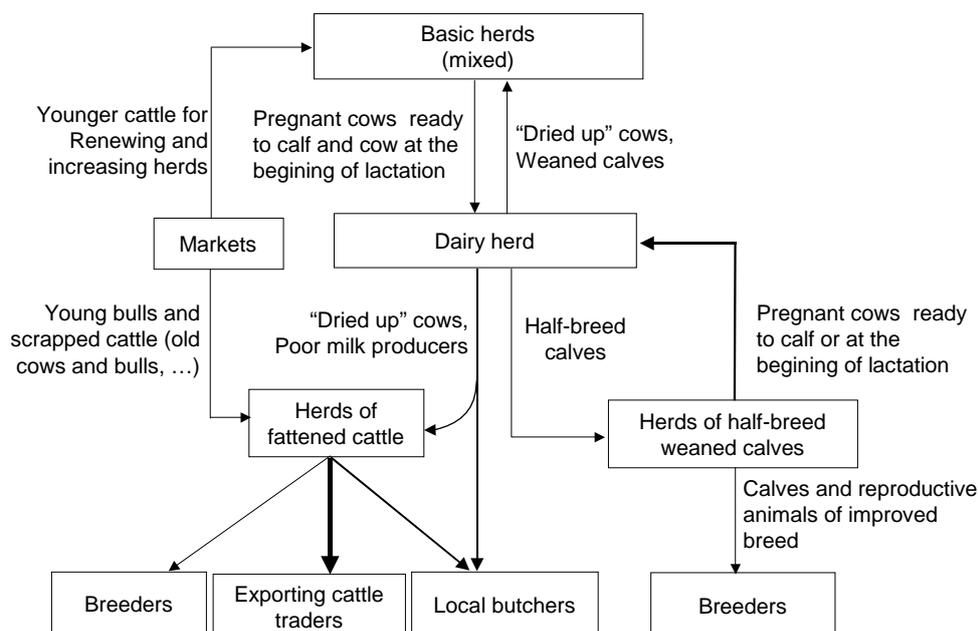
Traditionally in Vina herd sizes vary from 40 to 70 cattle (IRZ and GTZ, 1989). Herds are mixed, that is to say cattle of different ages and categories (bulls, cows, heifers, calves etc). They expand at the rate of birth and acquisition of new cattle.

The carrying out of milk production or fattening activities leads to changes in aggregation and conduct practices. There is a trend towards the multiplication and the monospecificity of herds. This change is more common to dairy farmers. While keeping their traditional “bush herd” (BH), which is generally situated in the rural area, they start up the constitution of a ‘dairy herd’ (DH) in the periurban zone of Ngaoundere. This second herd is made up of pregnant cows and/or cows just beginning lactation that come from the BH. Once these cows have finished their lactation, they and their weaned calves are brought back to the “bush herd”, and the cycle starts (Figure 2).

In some cases, the flows between BH and DH, express a process of selection. Only cows giving high yield (milk production, space between two births, obedience, etc.) will return to the herd. Others would be sold to local butchers or to “exporting cattle traders” who supply markets outside of Vina. In some cases, the same farmer in addition to his dairy herd, possess a fattening unit where cattle are scrapped animals, coming from his own farm, or as in 70% of cases, are bought to the market. Paradoxically, some farmers, but few, buy back fattened cattle and use them to increase their livestock, or as reproductive animals.

Calves born from “improved crossbreeding” Gudali x exotic breeds (Holstein) will form a separate herd, conducted by one shepherd. This is contrary to the common practice where the cow and its calf are brought to pastures together. This herd of half-breed calves which are generally reared in the periurban zone will later on form the basis of the dairy herd. The owner of this cattle supplies other milk producers in reproductive animals of “improved breeds”.

For the moment, there is little knowledge on the efficiency of this selection process and its technical and economic impact on farms. Furthermore, the necessity to take adequate measures to avoid deviations caused by the current wave of “improvement crossbreeding”, expresses the fact that farmers need support to help them meet challenges of transformations. Thus, it is important that extension services and research design tools and methods can be permitted to size up and accompany the current transformations.



Legend: The thickness of the arrow expresses the importance of the flow

Figure 2: Flows of cattle between different categories of herds and selection processes of dairy cows

Discussion

Faced with transformations, cattle breeders of Vina between opting for security, diversification or intensification

Figure 3 gives an insight into strategies designed by farmers to meet the challenges brought by the transformations of their environment. These strategies appear very diversified and depend on the position of each farmer with respect to accessibility to resources and the economic position of the farm (Chauveau, 1997).

The functioning of an extensive livestock farming system is based on a great availability of resources. That is why the farmers practice seasonal transhumance. But when the possibility to move is reduced, we see another form of security strategy consisting first in the maintenance of the productive capital, then in the diversification of activities and income. Diversification can be achieved through the creation of agricultural plots and/or the development of non farm activities such as trade. In any case, livestock remains the main activity. Growing crops helps to diminish expenditure for food and thus to sell as few cattle as possible and to strengthen savings in the form of live animals. More than 70 % of breeders have small plots (less than 1 ha on average) of food crops (maize, cassava, sorghum).

It could also happen that diversification concerns only livestock activities. This is the case for breeders who become butchers, or cattle traders or who while keeping their traditional livestock herd start up milk production or a cattle-fattening unit.

Generally, the strategy of diversification goes hand in hand with the dynamics of settlement. According to Steinfeld *et al.* (1999), mixed-farming systems (crops – livestock) will intensify their practices to keep up with the rate of resource damage or market accessibility and price levels. Later, specialisation in

crops or livestock will appear according to the profitability of each activity and the farmer’s strategy. But in Vina, the current trends marked by a revival of interest of breeders for farming let us think that at the mid term, specialisation of farmers will be done within livestock activities (milk production, fattening, cattle trading). Progressively, the integration of livestock to farming is moving from a “technicist myth” (Landais and Lhoste, 1990) to a field reality, fruit of an endogenous farming system dynamic.

Forming contracts is a result of the specialisation of stakeholders. Already, there are two examples of contracts which are more or less formalised: i) agreements linking milk producers to milk processors and “milk bars” situated in the urban zone; ii) some “exporting” cattle traders who have signed agreements both with their suppliers (farmers practising cattle-fattening) and with their customers (butchers situated outside Vina). Here, mainly intensive farmers (ranches), high input users are found.

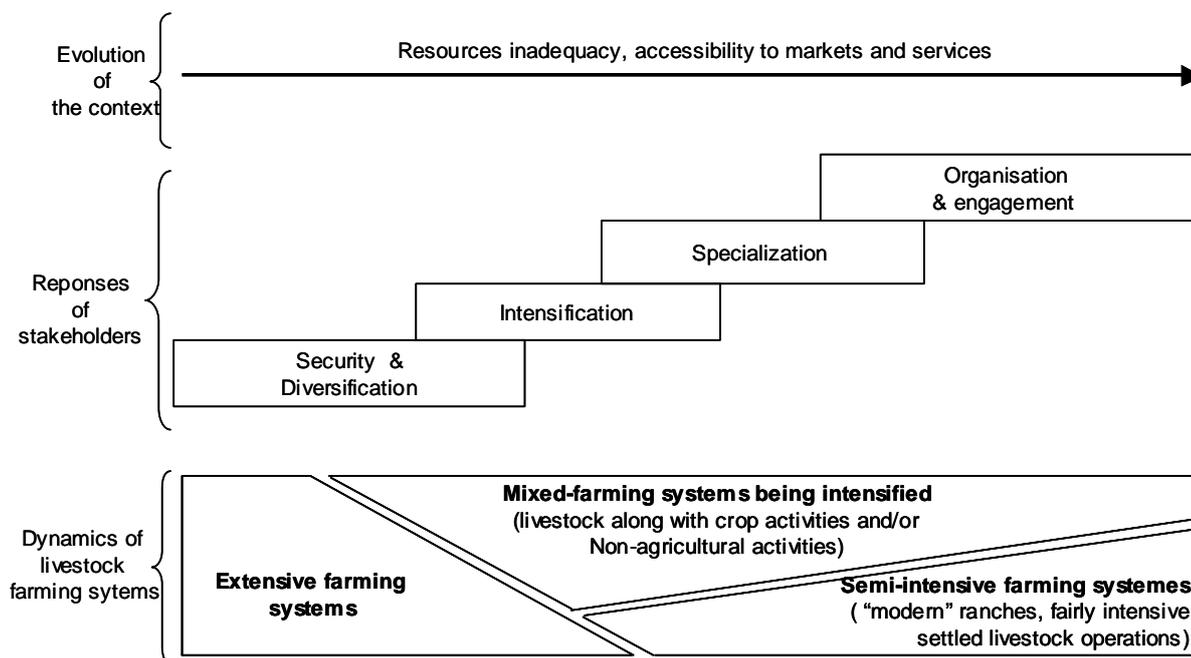


Figure 3: Dynamics taking place, responses of actors and impacts on the production systems

This result shows that in the current context, the diversity of farming systems can be highlighted by lining up farms on a scale where the two extremities are made up of two factors : availability of resources and accessibility to markets and services. All along the scale, intermediate cases can be distinguished. They are separated by a continuum. At mid-term, one can imagine that the current trend towards settlements will end in a transformation of extensive farming systems to mixed or semi-intensive systems.

The coexistence of different farming systems (extensive, mixed and semi-intensive) could express a static situation, but also stages of evolution linked to one and the same dynamic. It is necessary to continue the present study in greater depth looking at how this dynamic works, the levers and thresholds which allow producers to go from one form of farming to another.

Combined strategies, characteristics of uncertainty

Table 2 gives a general idea of practices and strategies that farmers have designed to meet the challenge of the current transformations.

Pastoral systems have defensive strategies. The main goal is the maintenance of production capital and thus the survival of the farm. Choices are made with the objective of minimizing risk and overcoming challenges brought by the inadequacy of resources. Extensive farmers prefer the Gudali breed because they feel that animals of this breed are less demanding with respect to feed and health care. This is a sign illustrating defensive strategy.

The crossbreeding of Gudali practiced in mixed-farming experiencing intensification is a sign of the combined strategies that help farmers to keep livestock as the main activity while seeking other opportunities raised by a better access to markets.

The canvassing of new opportunities is done through the development of agricultural and non-farming activities. In those cases, livestock can serve at the same time as: i) a launch pad for new activities inasmuch as income earned from the sale of cattle is reinvested in another activity; ii) the force that helps the farmer to absorb impacts, to restart a trade which has collapsed. This could explain why the sale of cattle is occasional in extensive and mixed-farming systems.

Livestock can also be a means of accumulation. This is the case both for farmers who are interested in cattle-rearing and cattle farmers, cattle traders or butchers who increase their herds from income earned through extra-livestock activities. Lastly, the diversity of the role of livestock (productive capital, savings, factor of social prestige, source of different products, etc.) appears as a lever that farmer use to adjust their strategies according to their objectives. Moreover, in a context where animal breeds have at the same time a biological, socio-cultural and economic function, the rate of selection or crossbreeding of Gudali can be considered as a key to reading and understanding farmers' strategies.

Table 2: Objectives, practices and strategies of different livestock farming systems facing changes

Extensive farming system (Pastoral system)	Mixed farming system being intensified (livestock along with crop activities and/or non agricultural activities)	Semi-intensive farming system ("modern" ranches, fairly settled livestock operations)
Objectives		
Survival of livestock during difficult periods Increase livestock	Improve the productivity of livestock Reduce household expenditure Diversify activities and income Build up savings through livestock	Improve the profitability of the farm Improve the productivity of livestock Increase the productive capital
Strategies		
Use of community pasture land Control risks A strong preference for local breed (Gudali) considered as less demanding in food and health care	Improve the diet and health of cattle Carry out crossbreeding with exotic breeds Start up milk production and/or fattening units Carry out agricultural and extra-farming activities	Improve rearing techniques and genetic material Constitution and use of fodder stock Acquire new infrastructures Take risks Partnership with other stakeholders Increase the renewal rate of herd Keeping of farm notebook
Practices		
Mainly family workforce (wf) Transhumance of the entire livestock during the dry season (ds) Little food complementation Poor health care follow up	Family and wage workforce Use of community pasture land Transhumance of part of livestock during ds Feed complementation Fodder plot, milk production during the rainy season (rs), intensive fattening in ds Trade of cattle in some cases	Mainly wage wf Import of exotic breeds and "improvement" crossbreeds, mono specificity of herds, complementation of feed, fodder land, Intensive fattening in ds, growing interest for milk production, good follow up of animal health care Partnerships and agreements with input suppliers, cattle traders, etc.
Occasional sales of cattle	Occasional and/or planned sales of cattle	Planned sales of cattle

Key: wf : workforce ; ds : dry season ; rs : rainy season

Semi-intensive farming systems have a clear economic trend. In addition to the accumulation of the capital, their main objective is to improve the technical and economical profitability of the farm. Thus they practice selection and crossbreeding of Gudali with exotic breeds, intensify their rearing practices and have a better follow up of animal health. Heavy investments are carried out (setting up of forage plots, building of water points, vehicles, etc.). Here also, productions are diversified. In addition to cattle trading, some farmers also practice intensive fattening. Sales of cattle are made during the period of November to February when the supply is low on the market. Generally, these sales are planned in order to have a higher profit. However, interest of semi-intensive farmers for milk production is still low though it is increasing. All these futures indicate an offensive strategy, with more risky innovations and an economic trend leading to considerable impact on the production system (Chauveau, 1997).

However, the different strategies are not so clear-cut nor are they mutually exclusive. It is common to encounter them on the same farm, that is the case of combined strategy. Thus, a farmer can have a maintenance strategy for livestock while for crop activities, he has chosen to increase the yield in order to move from self-consumption to sale. Moreover, in almost all types of farming systems, farmers are diversifying their activities. This trend emphasises a context of uncertainty. Stakeholders canvass different opportunities by a "trial and error" method. Strategies are designed progressively without a real plan. Thus it appears that strategies which are coherent and designed in advance are found among those farmers who have a good mastery of their production system and of their environment.

Conclusion

The transformations of livestock farming systems of Vina in recent years are due to the joint effect of resource inadequacy and to the emergence of milk and meat market channels in the periurban area of Ngaoundere. The current changes bring new opportunities, but they also disrupt the functioning of traditional systems. Moreover they accentuate the dependence of farmers on foreign markets both for the sale of productions and for the acquisition of inputs.

To meet new challenges, the breeder in his role of pilot and organizer of the system adjusts the functioning and the structure of his farm. The issue is not only to redefine objectives, but it is also above all to find ways and means necessary for their achievement. Farmers' answers are diversified and vary from favoring security, diversification or intensification. The high use of combined strategies in the implementation of these different answers expresses a transitional situation marked by uncertainty, thus emphasizing the needs of stakeholders for new counseling services. To accompany these changes, research should move from diagnosis to prospective in order to anticipate the rapid transformations of farmers environment.

In the mid-term, the success of this transitional period demands that the government and different stakeholders involved in the cattle sector work out together a regional strategy likely to contradict Malthusian forecasts (Boserup, 1965; 1994) and, also to permit farmers to have a better mastery of their farm within a context of heavy internal and outside pressures.

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