

Opportunism and persistence in milk production in the Brazilian Amazonia

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Family farming, milk production, milk collection, sustainability, Amazonia

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Summary

In Amazonia milk production is considered as an opportunity to improve the viability of small farms because of the double function of milk and calf production, which is promoted by the high forage potential resulting from the hot and humid climate. However, dairy production does not depend on fodder only, the challenge is more complex. This paper describes how the local milk supply chain and the context restrict the productivity and innovation process in the dairy sector. It also outlines short-term development possibilities. We implemented a new method that combined three complementary approaches in order to understand better the complexity of dairy production in Amazonia. These approaches were based on i) a farm typology carried out during two different periods to build farm trajectories, ii) a retrospective analysis to describe changes and persistence in the involved factors, and iii) a supply chain analysis based on secondary data and information collected from key informants. The obtained results completed the significant knowledge gathered by researchers over the past ten years. The typology revealed the frequent and sudden changes in farm strategies, with two main trends: opportunism and persistence in relation to management practices, especially animal reproduction, feeding, and dairy product marketing. The latter highly depends on the capacity of local dairy factories to build a trusting relationship with the farmers. However, this partnership is difficult to set up because of transportation constraints, insufficient access to the market, and national production norms. This context explains the frequent creation / closing out of dairy factories. This is why many farmers center their production on calves and consider milk as a by-product. Others, however, keep up producing milk and calves for cultural reasons, looking out for alternatives to milk marketing. Three scenarios have been developed: i) intensification, ii) increase in the local demand, and iii) demanding environmental policies.

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■ INTRODUCTION

Agricultural changes have been very dynamic in Amazonia for the past fifty years, especially along the 'arc of deforestation' where pioneers of several populations have been building new agricultural basins, using slash-and-burn practices to destroy natural

rainforest and plant their crops and pastures (Maia et al., 2011). This region is regarded as a frontier, characterized by agricultural colonization launched since the middle of the 1960s by the Brazilian federal government (Hurtienne, 1999), which also decided that cattle ranching would become the main activity of colons' families with around 80–90% of deforested areas planted in pastures. A low level of infrastructures, especially for energy, transportation and communication or services, is a characteristic of the Amazonian frontier (Mertens et al., 2002; Margulis, 2003). This situation strengthened the place of livestock because most of the producers considered extensive cattle ranching as an efficient solution to survive under such precarious contexts (Da Veiga et al., 2004; Vaz et al., 2012). But this also led to serious consequences regarding both the environment (deforestation of the rain forest, soil degradation, low use of agroecological potential) and the social issue with low income generation, land concentration and conflicts (Pacheco and Pocard-Chapuis, 2012).

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Since 2005, strict national policies have blocked cattle ranching expansion with the objective of stopping deforestation and use of fire which are the two main consequences of these extensive production systems (Maia et al., 2011). Nowadays, farmers need to adopt new strategies and practices in order to increase, or at least maintain, their forage production despite smaller available areas, and therefore to increase their income (Vaz et al., 2012). Small farmers are especially vulnerable within this challenge and milk commercialization could be an adapted solution for the intensification of their production. Small dairy production systems could generate increased income thanks to great forage production, even in fire-free and deforestation-free conditions (Poccard-Chapuis et al., 2003b). This possibility has become a priority for some public policies to ensure the stability of family farms on the Amazon frontier (Vaz et al., 2012). However, in this isolated region, innovations in the farm systems are linked to commercialization conditions (Da Veiga et al., 2004). The purpose of this paper was to present and debate recent evolutions in dairy farms in the Brazilian Amazonia, their capacities to stabilize an intensification trajectory, and the difficulties in relation to the dairy sector at local scale.

■ MATERIALS AND METHODS

Study area

The research was carried out in Brasil Novo County located in the area known as the Transamazon, in reference to Federal Highway 230 (the Transamazon Highway) built in the 1970s, during the military government, at the beginning of the National Program for Agrarian Reform and Amazonia Colonization (PIN). More than two hundred thousand families settled along the Transamazon Highway in a few years, with little assistance or public services (Léna and Da Silveira, 1993). As everywhere else along the colonization roads, Brasil Novo County received migrants from various regions of Brazil, some of them settling through government colonization programs, others rather spontaneously. Families had to adapt knowledge and practices to the Amazonian agroecosystem conditions. They used slash-and-burn agriculture to grow annual crops such as corn, rice and cassava, and perennial crops such as coffee, cocoa and black pepper. Their main constraints were plant diseases, conservation and commercialization (Sablayrolles and Simões, 2003). They also developed extensive cattle ranching, which are less sensitive to these constraints, for calf and milk production and for savings (Da Veiga and Tourrand, 2000; Tourrand et al., 2013).

Each 45–50 kilometers along the Transamazon Highway, PIN planned a small urban center in order to support the rural activities of the pioneers settled in the surroundings. Brasil Novo Town (3° 18' 17" S, 53° 32' 8" W) was at first one of these small colonization villages created during the highway construction. The village grew and the county was established in 1991, covering 6400 km². In the 2010 census, Brasil Novo counted 17,960 inhabitants, with 6912 and 11,048 in urban and rural areas, respectively (IBGE, 2010).

Brasil Novo County's economy is based on extensive cattle beef and dairy production, perennial crops (e.g. cocoa, pepper and fruit), annual crops (e.g. beans, rice, maize and cassava), trade, small cottage industry and sawmills. The county has a poor road network, with a total of 13 secondary roads where farms are located. Because of weather conditions and the lack of maintenance, the road network is damaged, causing isolation of the families and hindering the flow of agricultural production. The county is not able to support the population needs for health services and schools in the rural areas. Recently, because of the 'Light for All' federal program, farms installed along twelve of the secondary roads have had access to electricity.

Before colonization, Brasil Novo County had been entirely covered by natural rainforest. The implementation of agricultural activities, especially the expansion of cattle ranching, led to deforestation. In 2008, according to INPE database, Brasil Novo was among the 36 most deforested counties in Brazilian Amazonia (IBGE, 2010).

Methodological procedures

The research focused on two main objectives: i) to understand better the dairy production system at farm level, using the systemic approach and establishing relations between the farms and various local levels, and ii) to describe the medium-term evolution and diversity of the livestock systems. Five specific methods have been combined, articulating different spatial and temporal scales and all based on a systemic approach, combining quantitative and qualitative data collected from farmers or local stakeholders. Details on this approach are described in de Carvalho (2010).

Structural and functional farm typologies

A survey addressing structural issues was implemented in 2001 in order to describe the main characteristics of the 103 farms of the study, including their constraints regarding dairy production and marketing. A statistical analysis with R software derived from Ferreira (2001) was developed to build a typology designed to identify the structural diversity of the dairy systems. The principal component analysis revealed four types of farms. This structural typology is detailed in de Carvalho (2010).

In 2009, another survey was conducted in 70 farms. As only 52 of the farms of the first study were still accessible, 18 other farms were added to the sample. The collected data focused on practices rather than on the farm structure since the objective was to understand how the dairy systems were run. Statistical analyses were carried out to build a typology based on experts' knowledge and random logic. Local experts with knowledge of the study area and dairy systems defined the different types, as described by Perrot (1991), and Perrot and Landais (1993). The software Genetype was used to calculate the degree of similarity of each farm with every predefined type (Perrot and Leroy, 1995).

Specific interviews with producers who stopped milk production

From 2001 to 2009, many farmers gave up milk sale. Between December 2008 and February 2009, 40 families were interviewed using a specific questionnaire developed to understand the reasons behind this decision. According to the method described by Ferreira (2001), the analysis focused on descriptive statistics, the production system and the herd, but no typology was done.

Retrospective analysis

In 2009, ten farmers were selected for a retrospective analysis among the seventy producers involved in the 2009 typology survey. The selection criteria were the time spent in the dairy business, the distance between the farm and consumers' centers, the marketed products, and the use of direct sale to consumers or not. The objective was to collect qualitative information on agricultural and nonagricultural activities, land, beef and dairy herds, pasture and animal feeding, milk production, dairy products, and commercialization to understand the role of milk production in the family history during the last decade. The method used was that proposed by Moulin et al. (2005).

Key informant interviews

Interviews were also carried out in 2009 with local stakeholders selected according to i) their knowledge of the area where they had been living for a long time, and ii) their direct or indirect

professional connection with the dairy sector (e.g. transportation, transformation, distribution to consumers, credit, animal health, local policy makers). The data collection method was adapted from Da Veiga et al. (2004). The objective of these interviews was to describe and understand the evolution of the public policy at local scale in Brasil Novo County and the Transamazon area, and its impacts on the dairy sector, marketing, supply chains and their evolution. The method was adapted from Pocard-Chapuis et al. (2003a), which was implemented in the same region. In the following section only the main results of the presented study have been reported.

■ RESULTS

Dairy supply chain

The dairy supply chain in Brasil Novo consisted of three different circuits in 2009. They were all relatively short, with local production, local consumption and few intermediate operations. In many cases, a same person assumed more than one function in the chain (Table I).

Circuit 1: mini dairy factories

These mini dairy factories (n = 3) collected, processed and distributed fresh milk, cheese, yogurt and butter. All three were informal in terms of labor relations and technical standards of production (far from health standards), working without any registered license. Their daily milk processing capacity was low: one of them was able to receive 9000 liters per day and the two others 500 and 800 liters, respectively. Only the biggest dairy had a large radius for milk collection, with six collecting circuits up to 50 and even 90 kilometers from the town of Brasil Novo. The other plants were based in the rural area and had a shorter radius, collecting only along two secondary roads. Distance was a serious constraint because of poor traffic conditions, as well as the farmers' small scale production, most of them producing daily 20 liters only. Another problem was the poor milk quality, with high and irregular degrees of acidity and biological contamination, because of bad hygienic conditions in the farms and lack of refrigeration during farm storage and transport to the dairy factory (from two to five hours).

The dairy factory sector in Brasil Novo County has a short history, characterized by successive and quick sequences of opening and shutting down. The reasons are diverse, ranging from mismanagement, corruption, lack of respect of health legislation or

of business authorization. For these reasons, farmers did not trust local dairy factories whose owners did not invest to improve production, productivity and profitability of their dairy activity. As a result, the dairy system was based on extensive practices, low production, and low milk quality.

Circuit 2: direct milk sale to urban consumers

Farmers who used this circuit were mainly installed near the town, no more than 15 kilometers away, in relation to the available transport means (bicycle, horse or motorcycle). Direct sale had two main advantages: higher selling price (at least twice that of the first circuit) and a more stable market. Usually, each farmer had regular and occasional buyers, with a slight risk of not selling. Consumers accepted non-pasteurized milk. The delivery was done daily by the farmer's family, directly to customers' homes or bakeries.

Circuit 3: direct cheese sale to urban consumers

Some farmers produced homemade cheese. They might choose this option because their farm location was too far from town or the milk collection routes of the dairy factories. Moreover, some producers preferred to have their own cheese circuit, deeming it more secure than dairy factories and easier than direct milk sale. The cheese could be sold only once a week or once a month, directly to consumers, or to brokers, grocery stores, bakeries, etc. Cheese long-life ensured that all production was sold. A major constraint for the farmers was to produce regular quantities of cheese. In some cases, they could not maintain this regular production and ended up losing customers. Another key challenge was to find the time and labor to make the cheese since this task is time consuming. Cheese processing know-how was also important to keep regular customers.

Functional farm typology

The first typology carried out in 2001 did not explore relationships between milk production and farm structure. The 2009 retrospective analysis showed that farm strategies were sometimes very unstable, with periodic changes along the milk intensification scale. Some farms could thus have periods of high milk production, investment and adaption of management practices to optimize their milk production, and then periods of low production, shifting to a calf production oriented system where milk was a secondary product. These changes strongly depended on milk commercialization possibilities (see above) and other external factors such as credit policies or market prices for plant products.

The 2009 typology allowed quantifying these changes in terms of farm number, highlighted the existence of two farm types according to the degree of intensification and evaluated their degree of similarity. The first one was the 'Persistent' type where farms maintained a relatively intensive milk production regardless of external factors that might be unfavorable, such as commercialization or transportation. The other was the 'Opportunistic' type where farms adopted the opposite strategy, dropping intensive milk production when conditions became unfavorable. The extreme tendency of this opportunism was a third type, 'No milk production', where farmers gave up dairy production. The 'Milk intensive' farm type, an evolution of the Persistent one, should emerge in the near future, with better practices in terms of productivity and quality.

In 2009, 18 farms were of the Persistent type (more than 60% of similarity) whereas 52 farms were categorized as Opportunistic. As the studied sample focused on milk producers, the No-milk-production type did not appear. However, we know that, by 2009, 50% of the farms included in the 2001 structural typology survey dropped dairy production or abandoned farming all together.

Table I

Main characteristics of the dairy circuits in Brasil Novo County in Amazonia in 2009

Milk chain	Num. of farms	Milk price at the farm	Estimated total eq. milk	Final product
Dairy mini industries	51	0.33 BRL/L	10,500 L/day	Various dairy products
Milk direct selling	5	0.80 BRL/L	1,000 L/day	Raw milk
Cheese direct selling	14	0.60 BRL/L	1,000 L/day	Artisanal cheese

Eq.: equivalent; BRL: Brazil real

Farms could move from one type to another. In fact, each farm had several similarity coefficients with the core of each type, but many of them had similarities with the three types. This represented a kind of transition between the types (Figure 1).

Persistent type

The main characteristic of the Persistent-type farms was to sell lastingly milk or homemade cheese. They had the most technically efficient dairy production systems and were located either near or far from the town. The geographic and cultural origin of the owners was clear: 78% of the households were from the southern and southeastern regions of Brazil where milk and cheese production is a tradition. This showed the importance of dairy production skills and knowledge in maintaining a persistent strategy of milk production. In this type family members were the main labor force, and 28% of the farms also had one or two permanent employees. The average farm size was 234 hectares, with a high standard deviation (SD: 144). This fact supported the statement made by some key informants that the farm size was not a decisive factor in defining farm types in this region. The cultivation of cocoa was present in 50% of the farms from this group, which allowed a relatively high investment capacity because of the high cocoa revenue in the region, even if this crop entails strong investments and labor costs.

The average number of dairy cows was 59 (SD: 22) and, at the time of the interviews, the average number of milking cows was 35 (SD: 18). The average milking period was seven months. In some cases, the calf stayed longer with its dam, until the age of 8–10 months. This was a strategy used by many farmers to have a heavier calf and thus a better price. The revenue from calf sales was as a result of another important income, even in this Persistent type.

The average daily milk production was 171 liters, i.e. around five liters per milking cow. Eleven percent of the farmers provided feed supplementation using mainly sugar cane and elephant grass (*Penisetum purpureum*). This percentage was significant for the region where feed supplementation was usually based only on minerals.

Opportunistic type

Farmers of this type sold milk only when the market was favorable in terms of price, transportation and collection at the farm. Otherwise, milk production was for home consumption only. The dairy

system was less efficient than the Persistent type. The priority was to sell calves for ranches. The level of investment in dairy production and related labor was lower because this activity could be stopped at any time.

This type was not present near Brasil Novo Town (less than 15 kilometers) but was found instead 20–90 kilometers away. The geographic and cultural origin of the farmers was mainly from the northeast region (52%) where milk production is not a tradition. Only 13% of the farms used permanent labor for milk production and 77% used temporary labor for pasture cleaning, as it was also the case in the Persistent type. The average number of dairy cows in this group was 30 (SD: 19) and the average number of milking cows was 16 (SD: 10). The milking period was six months, a clear strategy to favor calf growth. Only 29% of the families weaned immediately after milking cessation. The average daily milk production was 49 liters with around three liters per milking cow. Eight per cent of the farms practiced feed supplementation.

No-milk-production type

This group was characterized by the temporary suspension of any dairy production. The forty interviewed farmers of this group had been producing milk in 2001 but had stopped doing so by 2009. The reasons were related to family problems, lack of payment for the dairy products that had been distributed, excessive labor for milk production, and lack of infrastructure, mainly roads and electric energy.

Retrospective interviews

If a functional typology can characterize and quantify farm changes along the milk intensification gradient, it is necessary to understand better the transition conditions and processes, and the factors that set a farm in one type or another. Based on the retrospective analysis, a diachronic vision of some typical farms was built. It highlighted successive coherent stages and transition periods. To illustrate these results, the evolution of two farms are detailed, one of each type, representing these factors and conditions in Brasil Novo County.

Opportunistic type: Case of MM's farm

The global trajectory of this farm has been characterized by the rapid consolidation of the production system thanks to external

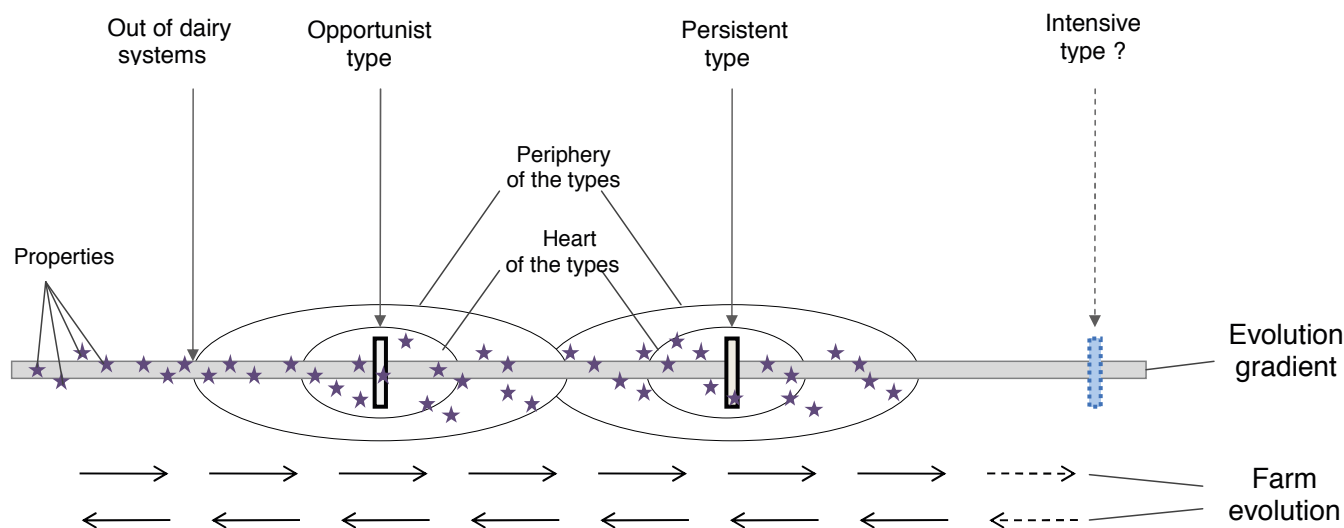


Figure 1: Farm evolution between the types along the gradient of intensification in Brazil Novo County in Amazonia.

revenues from the region of origin. Since the family had settled in the Transamazon, milk production has been mainly for home consumption and sometimes for sale, but milk has never been a priority in the farm strategy, nor a main source of income. However, this family has been afflicted by successive serious health problems.

The trajectory presented two main coherent periods. The first 15 years constituted the settlement phase – installation and consolidation – during which the family invested in an urban activity (meat selling). The farm activity was mainly calf breeding, with a low milk production dedicated to home consumption and sometimes sold to neighbors or friends. During the second period, which extends into the present, the family has mainly been living from breeding and crop production, while investing in cocoa in order to enhance soil fertility.

The main factor of change was the death and illness of family members. A large part of the herd was sold because of financial needs. The family gave up the urban activity and decided to invest in a new rural model based on cocoa crop and to stop milk production because of labor requirements. Later on, as a result of a credit program for purchasing dairy cows, the farm chose to maintain milk production and generated an added value by making traditional cheese. This second period has been sustained until today.

Persistent type: Case of JC's farm

This farm is a success story: the family moved from being poor migrants without capital or livestock and created a small rural business. Milk trade played a central role in this evolution.

Three successive coherent periods have been defined: settlement, breeding, dairy production and processing. During the settlement phase, the farmer worked as a cowboy in large ranches, investing his savings in acquiring a milking herd. He used the milk to produce cheese which was sold in the city. After ten years, the system was quite consolidated. But when the father died, the family had to sell immediately a significant part of the herd which marked the beginning of a transition phase. The milk trade decreased but did not disappear. Seven years later, JC bought a Holland bull and started improving his herd. He began by selling the milk production to a dairy factory then bought cheese-making equipment. At the same time, he opened a shop in town to sell his own cheese and he is now planning to buy milk from neighboring farmers. Today, he has adopted artificial insemination, and production has been quickly increasing.

■ DISCUSSION

The study confirmed that the structural characteristics of the dairy farms were not decisive to explain their dynamics. Factors such as land and pasture surface area, cow number and family labor were surprisingly not informative. This inconsistency is explained by strong family factors which impacted during the settlement and consolidation phases and led to significant changes in the technical projects. On the other hand, market access and its strong instability was a determinant factor. For these reasons, permanent projects prioritizing milk production were few. Milk producers either accepted that constraint or considered milk as a secondary option. In that case, they aimed at more steady beef, cocoa or other plant productions, along with urban activities. These choices were as unpredictable as the key factors cited above.

The transition between persistent and opportunistic milk systems was progressive. It was visible in some managerial practices such as the time between milking cessation and calf weaning or the

daily quantity of commercialized milk throughout the year. On the other hand, differentiation in genetic management is not clear since both farm types could work with dual capacity cows. Moreover, genetic innovations were not easily implemented in these isolated regions. Milk production of the farms was thus strongly limited by local and external factors.

Other studies showed that coordination between local actors is the major challenge at regional scale (Rocha and Couto, 2002; Pocard-Chapuis et al., 2003b; Da Veiga et al., 2004). But in this particular case, there was no regulation between components of the production network and public policies. Moreover, national dairy laws are not adapted to the Amazonian frontier context where it is for example not possible to reach sanitary standards. Similarly, credit policies, which were designed for more developed regions, have negative results such as farmers' excessive debts. For their part, environmental requirements to stop deforestation affect the local feeding systems but no alternative solution has been proposed. Conflicts or contradictions also exist between credit and environmental local policies. On the other hand, no regulation or public information system allows price control or ensures payment of products sold to consumers or dairy factories. In this context, three scenarios for future evolutions have been elaborated.

The first scenario suggests the evolution of farmers and dairy systems along the production gradient toward intensification. Over a period of ten years, it has been observed that farmers adapted their dairy projects according to the dairy market at local scale and to the opportunities. This impacted the intensification level of milk production. A stronger intensification is thus limited by temporary factors, such as social instability during the first period after installation of the migrants, but also by external factors at local scale. In a global process of frontier stabilization, both factors can have a positive evolution. In this case, farmers' projects can be more stable and institutional coordination can be more effective, which can facilitate the emergence of a new intensive dairy system inasmuch as transition along the intensification gradient is linked to few adaptations in managerial practices. Only a holistic process targeting farmers, supply chain, public policies and regional development can thus achieve a strong evolution in the dairy pool of Brasil Novo, which entails coordination and collective decisions. Milk production needs to become a priority for all actors, not only for small farmers.

A second scenario promotes the development of the local demand for dairy products which would result from the installation of the Belo Monte hydroelectric structure in Altamira (45 kilometers from the study area). With this enterprise (ELETORNORTE) and its 15,000 workers over five years the region will change. It is expected to accelerate frontier stabilization, promote investment, and consolidate local milk industries. Sanitary legislation should be adopted through local negotiations in the dairy sector since one of the objectives of ELETORNORTE is to promote sustainable development. The consolidation of a dairy sector should become a priority. Some farmers would like to invest in milk production with the help of new specialized credit lines. Furthermore, good salaries and professional training programs in Belo Monte would attract young people.

The last scenario anticipates stronger environmental policies. Brasil Novo is one of 36 counties which are in a critical state of deforestation. For this reason, the Arco Verde (Green Arc) federal program supports a strict policy for deforestation repression in the region. In the near future, a new phase would apply special regulation of credit, land price and tenure, as well as agribusiness investments in order to avoid new deforestation trends and to enforce environmental protection. Local farmers should however,

with incentives, promote livestock intensification on their farms. But small farmers would be vulnerable if they could not see good perspectives for their activities. Simultaneously, new migrants would be attracted in Brasil Novo by business options. They would come from Central Brazil with skills, knowledge and investment capacities to develop intensive systems of food production with no deforestation practices, but these systems would depend on high levels of chemicals and motorization. In this context, the price of land might increase and small farmers would be prompted to sell their properties to go to urban peripheries resulting in an increase in social inequalities and urban problems.

■ CONCLUSION

Diversity among dairy farmers in Brasil Novo County is complex and depends partially on factors related to the farm structure and the family trajectory. But the main difference in the objectives and strategies of the farmers, especially regarding intensification, appears to be in relation to some key factors, mainly the efficiency of the dairy system at local scale. There is an evolution gradient, on which each farm has a specific and temporary position. This notion of gradient is well adapted to explain the influence that social, economic and environmental policies have on the dairy sector. The farms constantly change their positions along the gradient in reaction to changes in their contexts. Market access is the stronger factor for instability and is a result of local interaction between sanitary, credit policies and transport conditions. The consolidation of dairy industries thus appears to be the highest priority for expansion of the dairy basin and local development.

Milk production could be a way to intensify livestock production and contribute to the reduction in native forests deforestation. Furthermore, it is possible to adopt new practices related to the genetic improvement of the dairy herd as well as new sustainable pasture management that enhances the agronomic potential of the region. A food system should simultaneously promote the potential of tropical grasses and legumes, and associate them with a good mineral supplement. This requires specific policies in market access, a better local coordination and credits for livestock, farm monitoring, capacity building and trainings.

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Résumé

De Carvalho S.A., Pocard-Chapuis R., Tourrand J.-F. Opportunisme et persistance dans la production de lait en Amazonie brésilienne

En Amazonie, la production laitière est considérée comme une opportunité pour améliorer la viabilité des petites fermes du fait de la double fonction (production de lait et de veaux) de cette activité qui est favorisée par le fort potentiel fourrager dû au climat chaud et humide. Mais la production laitière ne dépend pas que du fourrage, la question est plus complexe. Cet article décrit ainsi comment la filière laitière locale et le contexte limitent la productivité et l'innovation dans ce secteur. Il esquisse également les possibilités d'évolution à court terme. La méthode mise en œuvre a combiné trois approches complémentaires afin de mieux comprendre la complexité de la production laitière en Amazonie. Ces approches se sont basées sur a) une typologie des fermes, réalisée à deux périodes différentes, afin d'identifier leurs trajectoires, b) une analyse rétrospective décrivant les changements et les invariants des facteurs concernés, et c) une analyse de la filière reposant sur des données secondaires et des informations recueillies auprès d'informateurs-clés. Les résultats obtenus ont complété l'expertise développée depuis une dizaine d'années par l'équipe de chercheurs concernée. La typologie a révélé les fréquentes et soudaines modifications de la stratégie des fermes suivant deux tendances principales, opportunisme et persévérance, en lien avec les pratiques d'élevage, notamment la reproduction, l'alimentation et la commercialisation des produits laitiers. Cette dernière dépend fortement de la capacité des laiteries locales à établir une relation de confiance avec les éleveurs. Ce partenariat est délicat à mettre en place à cause du contexte local, en particulier du fait des difficultés de transport, de l'accès insuffisant au marché, des normes nationales de production. Ce contexte explique les fréquentes créations et disparitions de laiteries. C'est pourquoi de nombreux éleveurs se concentrent sur la production de veaux et considèrent le lait comme un sous-produit. D'autres, en revanche, souvent pour des raisons culturelles, continuent à produire du lait et des veaux, recherchant des alternatives à la commercialisation du lait. Trois scénarios ont été envisagés : a) intensification, b) augmentation de la demande locale, et c) politiques environnementales exigeantes.

Mots-clés : agriculture familiale, production laitière, collecte du lait, durabilité, Amazonie

Resumen

De Carvalho S.A., Pocard-Chapuis R., Tourrand J.-F. Oportunismo y persistencia en la producción de leche en la Amazonía brasileña

En la Amazonía la producción de leche se considera como una oportunidad para mejorar la viabilidad de las pequeñas explotaciones, debido a la doble función de producción de leche y de terneros, promovida por un alto potencial forrajero resultante del clima cálido y húmedo. Sin embargo, la producción de leche no depende solamente de forraje, el desafío es más complejo. Este estudio describe cómo la cadena local de suministro de leche y su contexto limitan la productividad y el proceso de innovación en el sector lácteo. Se presentan también las posibilidades de desarrollo a corto plazo. Implementamos un nuevo método que combina tres enfoques complementarios, con el fin de comprender mejor la complejidad de la producción lechera en la Amazonía. Estos enfoques se basan en i) una tipología agrícola llevada a cabo durante dos períodos diferentes, para construir las trayectorias de las fincas, ii) un análisis retrospectivo para describir los cambios y la persistencia de los factores que intervienen, y iii) un análisis de la cadena de suministro basadas en datos secundarios e información obtenida de los informantes clave. Los resultados obtenidos completaron el importante conocimiento recogido por los investigadores en los últimos diez años. La tipología reveló los cambios frecuentes y repentinos en las estrategias agrícolas, con dos tendencias principales: el oportunismo y la persistencia en relación con las prácticas de gestión, especialmente la reproducción animal, la alimentación, y la comercialización de productos lácteos. Este último depende, en gran medida, de la capacidad de las fábricas de productos lácteos locales para construir una relación de confianza con los agricultores. Sin embargo, esta asociación es difícil de establecer debido a las limitaciones de transporte, acceso insuficiente al mercado, y las normas nacionales de producción. Este contexto explica la frecuente creación / cierre de fábricas de productos lácteos. Por esto muchos agricultores centran su producción en los terneros y consideran la leche como un subproducto. Otros, sin embargo, mantienen la producción de leche y terneros, por razones culturales, buscando alternativas a la comercialización de la leche. Tres escenarios se han desarrollado: i) la intensificación, ii) aumento de la demanda local, y iii) exigir políticas ambientales.

Palabras clave: agricultura familiar, producción lechera, recogida de leche, sostenibilidad, Amazonia

