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Challenges of restricting natural pastures on the mobility of transhumant cattle in the Uvira territory, South Kivu province in Democratic Republic of Congo

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ABSTRACT

Description of the subject. In the Uvira region, natural pastures are decreasing due to the illegal occupation of land by armed groups and the fragmentation of land for agricultural use and housing construction. This restriction leads to a decrease in the natural food resources for cattle.
Objective. This study identifies and analyzes the major challenges of reducing grazing areas on which the mobility of transhumant cattle depends in the territory of Uvira, South Kivu province, in the DRC.
Methods. A participatory approach through 18 individual interviews and 6 focus group discussions was conducted in the Uvira territory with 66 survey units involved in the cattle transhumance sector. The data were analyzed and presented in tables and figures as results.
Results. The factors restricting natural pastures are related to land management, social, and security. These factors lead to a decrease in forage, low milk production, and low income from economic activities linked to cattle transhumance.
Conclusion. Fragmenting, seizing land, and building on pasture areas destroys the mobility of transhumant cattle and its associated economies. Therefore, the development of artificial pastures (grassed night paddocks, permanent forage blocks) and the practice of conservation and valorization of agricultural and industrial products (silage, barn construction, and feed storage) will allow for smoother cattle transhumance in the Uvira area.

Keywords: Challengers of restricting, natural pastures, mobility of transhumant cattle, Uvira/DRC

RESUME

Défis de la restriction des pâturages naturels sur la mobilité des bovins transhumants dans le territoire d'Uvira, province du Sud Kivu, en République Démocratique du Congo
Description du sujet. En territoire d'Uvira, les pâturages naturels diminuent suite à l'occupation illégale des terres par des groupes armés et au morcellement des terres pour l'exploitation agricole et des constructions des habitats. Cette restriction entraine une diminution de ressources naturelles alimentaires des bovins.
Objectif. Cette étude relève et analyse les défis majeurs de la réduction des aires pâturables que dépend la mobilité des bovins transhumants dans le territoire d'Uvira, province du Sud Kivu, en RDCongo.
Méthodes. La démarche participative à travers 18 entretiens individuels et 6 focus groupes discussions a été réalisée dans le territoire d'Uvira auprès de 66 unités de sondage impliquées dans la filière de la transhumance bovine. Les données ont été analysées et présentés dans les tableaux et figures comme résultats.
Résultats. Les facteurs de la restriction de pâturages naturels sont d'ordre de gestion foncière, sociale et sécuritaire. Ces derniers font qu'il y ait diminution des fourrages, de faible production laitière et de faible revenu des activités économiques liées à la transhumance bovine.

Conclusion. Morceler, s'accaparer des terres et construire sur les aires des pâturages, c'est détruire la mobilité de l'élevage bovin transhumant et ses économies. Afin, l'aménagement des pâturages artificiels (parc de nuit enherbé, bloc fourrager permanent) et la pratique de conservation et de valorisation des produits agricoles et industriels (ensilage, construction de grange et stockage d'aliment,) permettront une transhumance bovine apaisée dans le territoire d'Uvira.

Mots-clés : Défis de la restriction, pâturages naturels, mobilité des bovins transhumants, Uvira/RDCongo

1. INTRODUCTION

The natural pastures in the Uvira territory are vast and rich in natural resources that meet the nutritional needs of cattle. These resources should be exploited and managed rationally to cover the dietary needs of transhumant cattle. Failing this, one can easily find oneself in a situation of declining cattle numbers and a shortage of dairy and meat products. The inhabitants of this area, instead of emigrating, will be permanently exposed to nutritional diseases. From 2020 to 2025, a period marked by insecurity and rural exodus, natural pastures have only been diminishing due to the occupation of several grazeable hills by foreign and local armed groups, population growth resulting from rural exodus, and the appropriation and fragmentation of pastures.

According to Schmink *et al.* (1992), land invasions have existed since the beginning of colonization and remain relevant today. However, the reasons for land invasions can be multiple; they change over time and are not systematically linked to land degradation or the gradual process of land concentration. The restriction of pastures poses problems of considerable magnitude, especially in areas with high household concentrations in Uvira (Sange, Bwegera, Katogota, Kiliba, Kavinvira, Luvungi, Luberizi, Runingu Kalundu, Kitundu, Kasenga, Kavinvira, and Kamanyola), where a natural population growth rate of 3.85% is recorded (Report of the Ruzizi health zone, mid and high plateaus 2024-2025), which would double the population in roughly 20 years.

With 411 inhabitants per km², 90 % of the population of the Uvira territory lives primarily from agriculture and livestock farming. In 2021, the income per capita was estimated at less than one dollar per day, and the agricultural land per inhabitant was 25.00 ares (Report of the Central Health Zone Office/Ruzizi, 2021). This population suffered from a lack of employment before the practice of cattle transhumance. Indeed, the flow of transhumant cattle herds has increased the number of cattle, but pastures never increase and are affected by bushfires, the devastation of shrub species, the disappearance of fodder species preferred by cattle, and irregular seasonal rainfall. Moreover, cattle transhumance is of the traditional extensive type: Cattle feed only on forage collected from various natural pastures. Currently, cattle production (milk and meat) could necessarily decrease if cattle no longer meet their nutritional needs on grazing lands. That being said, what would be the factors contributing to the reduction of natural pastures in the Uvira territory?

What previous studies have been conducted in this area? And what is the contribution of this research? The hypothesis is based on the assumption that the factors limiting natural pastures are related to land management, social issues, and security in the Uvira territory. Its goal is to identify and analyze the main challenges related to the reduction of grazing areas on which the mobility of transhumant livestock depends in the Uvira territory, South Kivu province, DRC.

The aim of this study is to promote the rational management of natural pastures to ensure the safe mobility of transhumant cattle herds in the Uvira area.

2. MATERIAL AND METHODS

2.1. Study site

The territory of Uvira is located in the east of the DRC, in the South Kivu province, bordering Rwanda and Burundi. It has an area of 3,146 km² and a population of 1,165,092 in 2022. This area has a very rich hydrography with many rivers, clay-sandy soil rich in natural resources (fodder, water, magnesium salt), terrain consisting of plains, lush valleys, and mountains with shade-loving plants, and a humid tropical climate.

2.2. Material

During the survey, the semi-structured interview guide tool was used for data collection. During the visit, natural pastures and cattle of local breeds (Ndama and Ankole) and improved breeds (Sahiwal, Brown Swiss, Jersey, and Holstein) were visited and observed at the breeding sites.

2.3. Methods

The collection of field data required a participatory diagnostic. A situational analysis of the pastures was conducted, along with observation visits to the pastures and transhumant cattle herds. During the interviews, both open and closed questions were administered to 66 survey units composed of transhumant herders, sedentary herders, herd leaders, local authorities, officers from the territorial fisheries and livestock inspection, and farmers. 48 people participated in the 6 focus groups of 8 participants conducted in 6 villages: 2 focus group discussions were organized in the Ruzizi plain, 2 others in the mid-plateaus, and finally 2 last focus groups were organized in the high plateaus. The data collected were supplemented by those gathered through individual interviews of 18 survey units. After data processing, the analysis focused on the results presented through tables and figures.

3. RESULTS AND DISCUSSION

The results below concern the factors restricting natural pastures and their impacts on transhumance and cattle production.

3.1. Factors Restricting Natural Pastures in Uvira

Several factors underlie the ongoing restriction of pastures in the Uvira territory. Figure 1 below presents the factors restricting natural pastures in the livestock farming sites of Uvira.

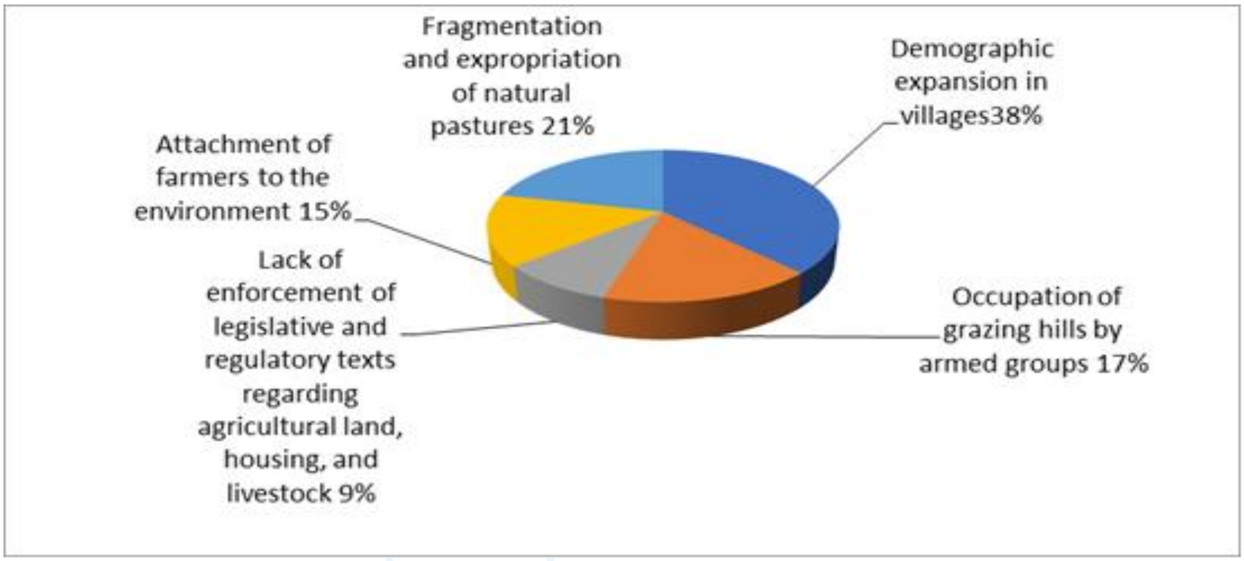

Figure 1. Factors restricting natural pastures in the Uvira area

Several factors are behind the continual restriction of natural pastures in livestock farming areas in Uvira. Often, fleeing violence in the middle and high plateaus of Uvira and food insecurity are the reasons why many families move to safer villages. These difficult living conditions of the population contribute to demographic growth in Uvira (38 %), resulting in the emergence of new villages on areas suitable for cattle grazing and the destruction of fodder. Everywhere else in the country, population pressure has reduced forests and natural pastures, forcing the population to adopt agroforestry to cope with fodder shortages, especially during the dry season (Mihigo., 2001). Currently, the rate of population growth in the Uvira territory is comparable to a water lily that doubles its initial space every 24 hours. The arithmetic density of this population per km² in 2021 was 411 inhabitants. In 2025, it increased to 431 inhabitants with a population growth rate of 3.85 %, corresponding to an increase of 5 to 6 people per km² (Report of the Central Health Zone Office / Ruzizi, Ibid). This sufficiently high density in this environment presents a major challenge for the grazing areas of Uvira's livestock sites. This aligns with what Georges (1965) stated: "All developing countries have a natural growth rate exceeding 2 %. They are thus all in the category of rapidly growing countries."

However, the residents of the villages of Uvira are more attached to their agricultural activity areas (15 %). Mostly inhabited by agro-pastoralists, they remain closely tied to their farming and livestock activities, as well as cattle and milk trade; they can never believe that there are pastures and farmland elsewhere. In this twentieth century, some herders still maintain taboo, forbidden, cursed, or sacred lands. In the past, these lands included cemeteries, sites for sacrifices, as well as places where related instruments were kept, and areas where a person or their cow had died without an identified cause. They are often afraid of moving their herds and settling in a new village until they have assessed the customs and habits of the inhabitants of the new village, the environmental climate, the variety of grasses, cattle diseases, and the availability of natural food resources (forage, magnesium salt, and water). This attachment to their environment encourages the sedentarization of certain cattle herds and the sanctification of local lands. Currently, in some families, despite education, it is still forbidden for a son of the family to leave the lands inherited from his ancestors under penalty of curse and loss of identity; for it is believed that the ancestors had conquered the land with the aim of developing cattle farming, ensuring food for their descendants, and governing the land. Throughout the ages, this sanctification of the land has profoundly influenced the peasant and forced him to remain in place. Furthermore, natural pasture lands are continuously fragmented, expropriated, and divided (21%) among agricultural operators and families. Consequently, a family member who receives a fragmented plot builds a hut on it, settles there, practices agriculture, calls upon other nearby or related families, and thus transhumant herders' settlements emerge. who no longer return to their villages or countries of origin.

This successive fragmentation eventually leads to the smallness of the forage hectares for cattle herds. Currently, the corridors and routes for cattle transhumance in Uvira correspond to the existing road network. This is a challenge related to the implementation of the legislative and regulatory land texts of the South Kivu province. These texts must be enforced while respecting the boundaries of residential land, agricultural land, pasture, and mineral deposits. Now, at the time of departure and return, transhumant herders gather information through their social connections (friends, ethnic members) established by predecessors at the sites. These social connections provide information regarding accessible pastures, the agricultural calendar along the routes, and above all, the presence of armed groups. However, nutrition plays an important role in cattle production, growth, and health. Due to a shortage of forage, herd mobility and cattle production (milk and meat) decrease in the home villages of transhumant pastoralists. Yet, cattle transhumance constitutes a source of economic activities for farming households in Uvira. Due to insecurity, several grazing areas (hills, valleys, and the Mitumba range) are occupied by armed groups (17 %), leading to a reduction in pastures. Consequently, the exploited pastures are at risk of rapid overexploitation. In Africa, the stocking rate is evaluated in "Tropical Livestock Units" (TLU), with one unit corresponding to an animal weighing 250 kg (Labonne *et al.*, 2002). Carrying capacity is therefore the number of Livestock Units that the pasture can support per hectare. However, the carrying capacities of pastures are not the same depending on whether the pasture is already degraded or not: for Guinean pastures, Douffissa *et al.* (1995) recommend carrying capacities of 0.6 LU/ha to 1.5 LU/ha depending on whether the pastures are degraded or not. H.D. Klein *et al.* (2014) recommended 1.2 LU/ha to 1.6 LU/ha under the same conditions. Below are some images of the negative impacts of cattle transhumance on the biophysical environment affecting grazing areas.

3.2. Consequences of Pasture Land Problems

Natural pastures are and remain important natural resources; their mismanagement leads to instability among agro-pastoralists, the destruction of green economies, and poverty among the populations, while green finance does not invest in the restoration of grazing areas in the DR Congo. Figure 2 below presents various consequences related to pasture land in different livestock sites in Uvira.

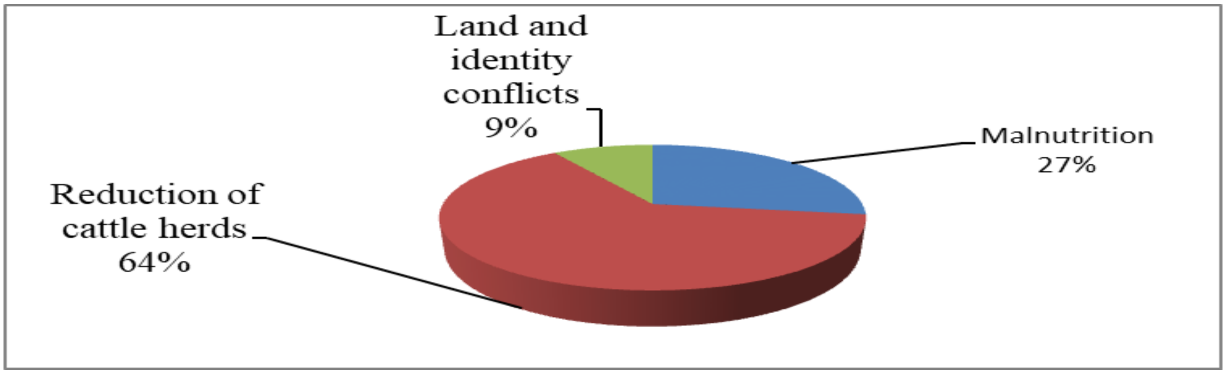

Figure 2. Consequences Related to Poor Management of Pasture Lands

The results in Figure 2 indicate that the consequences of poor management of natural pasture lands are social, economic, and health-related. Indeed, the insufficiency of pasture lands in relation to the dietary needs of cattle leads to emaciation and/or cachexia in cattle, weight loss, cattle deaths, and a reduction in transhumant cattle herds (64 %). Meanwhile, the food factor has a greater influence on the dynamics of cattle transhumance in the Uvira region. It should be noted that the impact of an increase in cattle on the way pastures are used becomes evident when the cattle population reaches a level where there is no longer enough pasture to allow efficient feeding of the herds. According to some estimates, Caldwell (1973) states that this situation is very likely to occur when the population density reaches 57-84 inhabitants per km². Considering that the current density in the Uvira territory is 411 inhabitants/km², which is five times that of Caldwell's estimate, it is quite clear that fallow land is almost nonexistent there.

Currently, transhumant herders occupy the natural pasture lands, rarely following the boundaries of areas reserved for agriculture. However, in traditional settings, almost the entire mountainside remained untouched for the free roaming of domestic animals. It should also be noted that the hills and slopes of the Mitumba range, which were claimed to be reserved as natural cattle pastures, are already developed by farmers, with house constructions and plantations of *Eucalyptus*, *Grevillea*, *Markhamia lutea*, *Cypress*, *Acacia* species, *Leucaena leucocephala*, *Podocarpus* species, etc., used for firewood, sale, or construction materials.

According to Wilde (1960), the phenomenon of land valuation was expressed in these terms: 'The buying and selling of land, a practice that is not at all universal in tropical Africa, can reflect, among the inhabitants, the feeling that the land is capable of being improved.' It is now evident that certain people, namely businessmen from the cities of Bukavu, Uvira (in South Kivu), Bugarama, Kamembe (in Rwanda), Bujumbura, Cibitoki, and Rugombo (in Burundi), acquire significant land concessions even at exorbitant prices. Indeed, agricultural pressure on the land leads to the occupation of pastures intended to grow grass for the feed of transhumant cattle herds. This occurs primarily in Kawizi, Kiliba, Katogota, Luvungi, Luberizi, Ndunda, Kimuka, Bwegera, Runingu, Sange, and Kamanyola. This behavior is a direct consequence of the importance placed on land to secure a better future. Finally, some herders, noticing the insufficiency of forage in the remaining space, engage in the trade of cattle, milk, or relocate their herds to other villages.

The territory of Uvira has grazing areas whose forage composition is mainly dominated by grasses consisting of *Pennisetum clandestinum* (Kikuyu grass), *Pennisetum purpureum* (elephant grass, napier grass), *Panicum maximum*, *Bracharia ruziziensis*, *Tripsacum laxum* (Guatemala grass), *Setaria nandi*. Legumes are found in various species (*Stylosanthes guianensis*, *Arachis pintoi*, *Trifolium* sp (clover), *Medicago sativa* (alfalfa), and *Vigna anguiculata* (cowpea forage). More areas are covered with wild leguminous shrubs that are drought-resistant and serve as fodder for cattle, notably *Cajanus cajan*, *Desmodium uncinatum*, *Calliandra calothyrsus*, *Leucaena leucocephala*, *Albizia lebbeck* and *Sesbania grandiflora*. In any case, destroying pastures rich in these palatable species reduces biomass in grazing areas, leading to a decrease in cattle production and its corollaries, including higher market prices for milk and meat. Under current conditions, preserving these species is nevertheless imperative for any sustainable development (Soulama, 2010).

These products provide animal-based proteins to the population; their current deficiency leads to endemic malnutrition among certain members of agricultural households (27 %) in the middle and high plateaus of Uvira. However, land grabbing by transhumant herders does not promote a climate of coexistence in the area. Often, there are identity and land conflicts (9 %) between transhumant herders and local communities due to the illegal appropriation of pasture lands. Herders of different ethnicities often do not get along when there is a shortage of fodder. Herders belonging to the ethnic group that controls the pasture lands in a chiefdom develop stereotypes and feel that others are suffocating them on their own pastures, which triggers violence in the area. At the beginning of agricultural activities, problems are related to cattle straying into crop fields and disputes over land management.

The ongoing land-related dispute explains the shortage of land relative to the population's needs. The land issue is also at the root of identifying each person within an ethnic group. Land is inherited within one's ethnic group of origin. Each person knows precisely which ethnic group they belong to in order to justify their right to pasture land. From this ethnic approach, it is thus possible to identify the pasture lands of each ethnic group within a chiefdom in the Uvira territory.

3.3. Its Impact on Cattle Production

In February 2025, the Uvira territory had 154,846 head of cattle; with the resurgence of armed groups in the mid and high plateaus, many cattle were killed, stolen, and slaughtered in the pastures, and others were relocated to escape these attacks and access fodder and agro-industrial products (bagasse, molasses, corn waste, rice bran, vegetable crop tops, etc.) in the Ruzizi plain. Table 1 below presents the consolidated status of the cattle herds in the Uvira territory.

Table 1. Consolidated numbers of cattle heads in the herds of the Uvira territory

Year/livestock	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**Total**	**%**
Ruzizi Plain	10400	12820	10300	14790	16470	28145	92925	60
Medium trays	945	2117	1566	5454	5525	7503	23110	15
High plateaus	5204	6014	6203	6917	7130	7343	38811	25
Total	16549	20951	18069	27161	29125	42991	154846	100

Source: Territorial Inspection Report on Fisheries and Livestock, 2024

The herd was estimated at 154,846 cattle spread across 3,100 herds; 85 % of which are managed through transhumance and 23,554 cattle, or 25 %, are kept in sedentary farms. The Ruzizi Plain hosts a high percentage of transhumant herds (60 %), which explains the availability of milk in the villages of this area. The highlands represent the second site with 25 %, followed by the midlands in third place with 15 % of the transhumant cattle. Indeed, every 3 to 4 months, a herd of about 2,500 to 4,000 cattle from neighboring countries crosses the Ruzizi River to transhumance in the breeding areas of Uvira.

Based on the cattle herd size, the flow of cattle transhumance from 2023 to 2025 contributed to the increase in cattle herds, which in turn led to an increase in milk and meat production in various markets across the Uvira territory. Indeed, the decline in cattle herds is often caused by insecurity, lack of access to certain pastures, closure of transhumance corridors and tracks, and fragmentation of pasture lands to the detriment of family farming. Often, transhumants from neighboring countries (Rwanda and Burundi) move their herds to the southeast of the territory, where the cattle graze along the banks of the Ruzizi River and near ponds (Nyangara, Ruziya, and Kindava). Table 2 below shows the number of cattle heads that have decreased in the herds following the reduction in pasture areas.

Table 2. Number of cattle heads decreased in herds following the reduction of grazing areas from 2020 to 2025.

Year/livestock	2020	2021	2022	2023	2024	2025	Total	%
Ruzizi Plain	455	430	780	540	320	280	2805	60
Medium trays	180	103	86	133	147	138	787	17
High plateaus	130	205	188	148	200	213	1084	23
Total	765	738	1054	821	667	631	4676	100

Source: Territorial Inspection of Fishing and Farming 2025

Table 2 presents the number of cattle that actually died due to a lack of fodder or were stolen and killed in the pastures. During fodder searches, cattle do not graze in areas occupied by armed groups due to the risk of being stolen or killed. The recorded number of deaths and thefts was 4,676 heads, which corresponds to an average of 14.62 % of heads that were dead, stolen, or killed. The mortality rate during the study period was highly variable, ranging between 4 to 5%. The highest number of thefts occurred during the first five years, and the best outcome was recorded in the year 2025.

The average rate during this period varied around 2 % in 2025. These cattle losses have consequences for the economy of farmers and agricultural households. Table 3 below shows the amount of milk produced per day related to access to and availability of pastures in the Uvira farming sites.

Table 3. Quantity of milk in liters/day of transhumant cattle

Milk production of the different crossbreeds	Lactation duration (days)	Period of availability and access to forage		Period of no access to fodder	
		Quantity of milk in liters/day	Quantity of milk in liters/year	Quantity of milk in liters/day	Quantity of milk in liters/day
Ndama	310	1 à 1,5 l/jr	310 à 465 l/an	1 l/jr	310 à 465 l/an
Ankolé	308	1 à 2 l/jr	308 à 616 l/an	1,5 l/jr	462 l/an
Swiss noise	242	8 l/jr	1936 l/an	4 l/jr	968 l/an
Sahiwal	235	9 l/jr	2115 l/an	5 l/jr	1175 l/an
Jersey	278	6 l/jr	1668 l/an	4l/jr	1112l/an
Frisian	300	8 l/jr	2400 l/an	5 l/jr	1500 l/an

Transhumant cattle herds are dominated by 80 % improved cows (Sahiwal, Brown Swiss, Jersey, and Holstein) known for their high genetic potential for milk production. Farmers are satisfied with daily and annual milk yields, but these quantities would increase if farmers took into account the nutritional requirements of dairy cows. It is essential to understand that productivity per cow can vary considerably, even if the total number of cows differs (Haddj *et al.*, 2016).

The insufficiency of natural food resources affects milk production in cattle herds. Cattle do not meet their nutritional needs when grazing on small areas of 3 to 4 hectares; this leads to a reduction in the amount of milk produced at milking.

Instead of the Sahiwal producing 9 liters of milk per day (2115 l/year), it produces 5 liters (1175 l/year); the Brown Swiss gives 4 liters per day (968 l/year) instead of 8 liters per day (1936 l/year); the Frisian gives 5 liters per day (1500 l/year) instead of 8 liters per day (2400 l/year); the Jersey gives 4 liters per day (1112 l/year) instead of 6 liters per day (1668 l/year); and N'dama and Ankole cows give 1 to 2 liters of milk per day or none. This loss of milk during periods of feed shortage or lack of access to fodder affects the economy of farmers, the agricultural households whose survival depends on milk sales, and the nutritional status of consumers.

4. CONCLUSION

In Uvira, the restriction of natural pastures poses a challenge to the mobility of transhumant cattle herds, cattle production, and the socio-economy of farming households. Parceling out, dispossessing, seizing natural pasture lands, and building on grazing areas is destroying the economies that ensure the stability and well-being of agro-pastoralists. One cannot destroy the food base of transhumant and sedentary cattle farming.

With a view to peaceful transhumance, the State authority must enforce the limits of natural pastures, promote relevant pasture management strategies; and the herders must develop artificial pastures (grassed night enclosures, permanent forage blocks) and carry out the conservation and enhancement of agro-food and industrial products (silage, construction of barns and feed storage) to ensure adequate feeding of cattle during periods of insufficient natural food resources.

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