

RESEARCH PAPER

Improving rural livestock farmers' competitiveness through the livelihoods approach¹

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ABSTRACT

Goal: This research intends to improve the quality of life of rural livestock farmers through livelihood approaches analyzing each of the five capitals to strengthen the sustainable value chain.

Design / Methodology / Approach: The research was guided by the theoretical framework of the livelihoods approach. A survey was conducted among the population under analysis to describe each of the phases of the five capitals. Finally, some recommendations for value chain articulation were proposed.

Results: The research development involved the use of Value Links framework to characterize current livelihoods of livestock population in Campo Verde - Ucayali. This served as basis for the improvement proposal to strengthen livestock value chain in the zone under analysis.

Limitations of the investigation: The characterization is specific since each zone presents particularities in the livelihood capitals.

Practical implications: Diagnose and design an improving proposal for the value chain of the livestock sector in Pucallpa that governmental entities and private companies can apply with a social and economic approach.

Originality / Value: A study of vulnerable rural populations in Peru that seeks to strengthen the value chain of their main economic activities.

Keywords: Livelihoods in Livestock Farming; Rural Sector Growth; Improvement of Rural Livestock Farmers' Quality of Life.

1 INTRODUCTION

When we investigate the main activities of Peruvian settlers throughout their history, we find livestock as an ancestral activity; this is evidenced by the domestication of native animals such as the llama, alpaca, and guinea pig. Later, with the arrival of Spanish colony, other species were introduced, such as bovines and porcines, which successfully adapted to climatic conditions; and whose consumption is mainly oriented to direct consumption as beef (Comisión de Promoción del Perú para la Exportación y el Turismo, 2017). Livestock sector is extremely important because it represents nearly 40% of the Gross Value of Agricultural

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Production (Ministerio de Agricultura y Riego, 2017a) and is one of the main income-generating activities of the country's rural population.

In Peru, at least 880 thousand producers are dedicated to farming various breeds of cattle, which are subdivided into milk production and beef cattle (Ministerio de Agricultura y Riego, 2019). In 2019, cattle production in live weight was more than 192 thousand tons, achieving a yield of 142.16 kg/unit on average (Red de Comunicación Regional, 2019), which is directly related to the breed of the animal. 63.9% of the national cattle population is Creole, with the predominant breeds are Brown Swiss with 17.6%; Holstein, 10.3% (mainly for milk production); Cebu, 3.4% and the remaining percentage of various other breeds. From the total number of cattle, 73% are in the highlands, 12% in the coast and 15% in the jungle (Ministerio de Agricultura y Riego, 2017b).

Peruvian jungle livestock is characterized by the raising of crossbred cattle with different degrees between Creole, Zebu and European and its feeding is based on the forage grazing (Ministerio de Desarrollo Agrario y Riego, 2015); a local, low cost and abundant food resource (Echevarría, 2020), this system is called extensive. Extensive or semi-intensive livestock production accounts for 80% and is concentrated in the highlands and jungle.

Cattle raising in the department of Ucayali represents 15.78% of the Gross Production Value of the Livestock Sub-sector. Its exploitation is based on the sale of meat, milk, dairy products, and leather (Ministerio de Agricultura y Riego, 2017a).

Livestock production is extremely important for the economic development of rural populations. In recent years, the performance indicators in Peruvian jungle have been improving; however, these production indexes are still not competitive.

Therefore, this research focuses on the articulation of livestock value chain in the district of Campo Verde - Ucayali by value chain tools and value chain livelihood approaches. As defined by Michael Porter (1985), a value chain is the set of activities that should be developed to obtain a product or service, giving value to both, the consumer and producer (García Saltos et al., 2016). Therefore, the objective is to improve livestock farmers' work and their quality of life by optimizing and strengthening the production chain in which they develop their cattle-raising activities.

2 METHODOLOGY

There was a review of scientific literature and case studies focused on value chain and livelihood analysis. Then, the research sample was determined with an induced analysis of 15 livestock farmers from Campo Verde - Ucayali. As a next step, the livelihood analysis was carried out by means of a survey proposed by the Value Links methodology to the members of the cattle-raising community under study. With the result, each phase of the five capitals was characterized. Finally, the proposal to strengthen the livestock value chain in the area was developed.

To conduct the surveys, we based ourselves on the questions proposed by the Value Links methodology (Springer-Heinze, 2018) which focuses on 14 criteria.

1. Market demand prospects: demand and pricing analysis.
2. Opportunities for employment creation: characterization and population employment trends.
3. Comparative advantage of production; level of competitiveness (in comparison with competing producers): Production costs, technical capacity, and innovation.
4. Impact of the value chain functions on the environment: Future production potential, and environmental impact.
5. Impact of the environment on value chain functions; low vulnerability of the value chain to degraded environment and climate change: Vulnerability of the value chain and external effects.
6. Green opportunities: Reduce greenhouse gas emissions.
7. Prospects for inclusion of disadvantaged groups (poor, women, youth, refugees, minorities, handicapped, ...): Vulnerable groups and characterization of their assets.
8. Working conditions: Risk to workers' health and safety, physical and mental well-being.

9. Impact of the value chain on surrounding communities: Eventual conflict between value chain actors.
10. Reason(s) and need for public investment: Government and private investment restrictions.
11. Evidence of private sector, government and or donors having plans for investment in the value chain: Support programs for key players in the value chain.
12. Sector (promotion) policies and regulations are in place & effective: Policies that promote environmental, economic, and social opportunities.
13. Chain actors/government/donors/support organizations' readiness to change, to collaborate and to align interventions: Value chain articulation.
14. Feasibility of the intervention: Technical and strategic feasibility of value chain articulation.

After conducting the survey to the 15 farmers, the labor force was characterized, obtaining that 10 of them have a labor force of less than 3 workers; 3 of them between 4 and 5; and 2 of them, more than 6. This serves as a basis for identifying the level of effectiveness of breeding, levels of beef production and quantity of derived products, which are detailed in the chapter on the current situation.

Having characterized the 5 capitals in the livelihoods study, the strategies to be adopted by government entities, companies, individuals, communities, and markets are determined to articulate the small livestock value chain and obtain sustainable growth for the area's livestock farmers, which allows improvement in their quality of life and lays a basis for economic growth for the population.

3 THEORETICAL LITERATURE FRAMEWORK

Agriculture and livestock are basic components of supply chains, and it is necessary to strengthen corporate culture as a driver for sustainable development of the development cluster that allows for the articulation of economic globalization. The article proposed by Luis Maldonado shows that approximately 3.3 million poor people live in the city because of migration from rural areas to the capital seeking better working and living conditions. Therefore, he analyzes urban agriculture as one strategy for households to cope with urban poverty, examining institutional and political factors that restrict the strategy, focusing on a livelihood approach (Maldonado, 2009). A livelihood includes capabilities, material and social assets and activities (see Figure 1); and a sustainable livelihood is the one that can cope and survive in adverse conditions without affecting natural resources (Chambers and Conway, 1991).

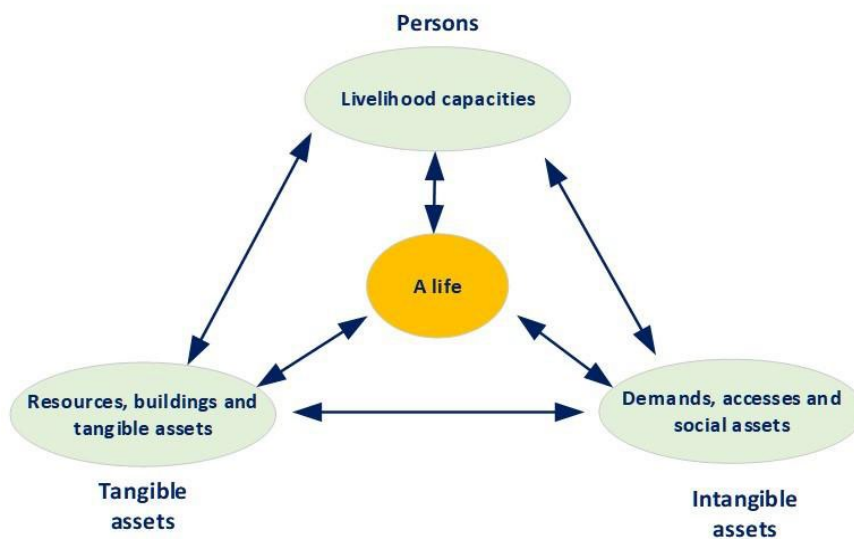


Fig. 1. Livelihood components and flows (Chambers and Conway, 1991)

4 CURRENT SITUATION

Livestock farming is developed in the 3 Peruvian regions: Coast, Highlands, and Jungle; various climates and systems in each region characterize the type of species and breeding in each one. Its importance is since it represents approximately 40% of the Gross Value of Agricultural Production and involves various sectors, including the most vulnerable (Ministerio de Agricultura y Riego, 2017a).

Livestock raising in Peruvian jungle is called extensive, mainly focused on crossbred raising and feeding based on forage grazing (Ministerio de Desarrollo Agrario y Riego, 2015); characterized by low productivity and poor relationship with environmental care because of the low-quality single crop used, which degrades easily (Messer and Townsley, 2003). After breeding, exploitation is based on selling meat, milk, milk derivatives and leather (Ministerio de Agricultura y Riego, 2017a; Lockie and Carpenter, 2010), which makes up to 16.6% of the Gross Production Value of the Livestock Sub-sector in Ucayali region (Ministerio de Desarrollo Agrario y Riego, 2020). Most livestock producers are divided into two types according to type of animals raised:

- Fattening cattle: The farmer buys young bulls (Figure 2a) that he cares for and feeds until they reach a weight of approximately 500 kg, then sells them to local markets made up of stockpilers who purchase cattle to transfer them to Lima and local slaughterhouses.
- Breeding cattle: The farmer's animals are mostly cows and one or two bulls called stallions whose main purpose is reproduction for sale of weaned animals. In addition, some producers use the milk production for direct selling and artisanal processing of milk derivatives that they offer in nearby areas or their community.

In addition to cattle, most farmers raise other species such as guinea pigs (Figure 2b), domestic chickens (Figure 2c), rams, or sheep on a small scale for consumption by family members and sale to neighbors or within the area to obtain an additional income source quickly.

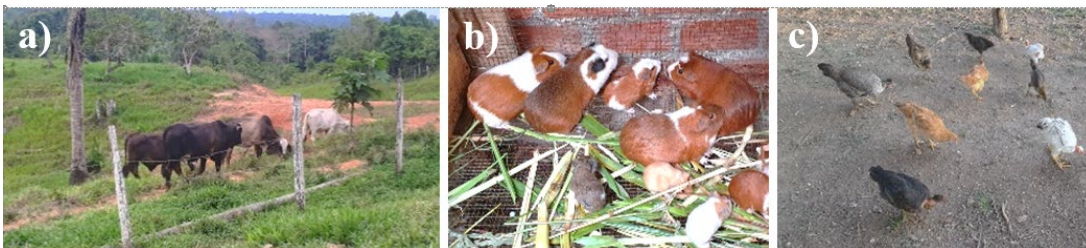


Fig. 2. (a) Cattle breeding. (b) Guinea pig breeding. (c) Chicken breeding.

Human capital

More than 800,000 Peruvian farmers are participating in cattle raising; 31% of them live in poverty and 13% in extreme poverty. One of the most critical factors for the growth and development of livestock farming is the lack of training programs for species management, pastures, processing, and commercialization of products (Ministerio de Agricultura y Riego, 2017a).

In Ucayali, families dedicated to cattle raising are mostly composed by the mother, who cares for household; the father, who dedicates to animal care with the support of his sons when they reach an age that allows them to help their father and children.

In 2017, population in poverty in the region was between 12.1% and 14.6%, in addition, access to water by public network was 67.5%, below national average. In terms of health, the region is affected by chronic malnutrition and anemia, impacting 59.1% of children between 6 and 35 months of age. Finally, about education access, 84.4% of them were attending to schools close to their place of residence (Fondo de las Naciones Unidas para la Infancia, 2017).

Natural capital

Livestock feeding is based on the use of cultivated and natural pastures, conserved forages, balanced feed, commercial concentrates, and mineral salts depending on the

availability in each region. By 2017, approximately 18 million hectares were registered with natural pastures (Ministerio de Agricultura y Riego, 2017a).

Based on the IV National Agricultural Census, 5 strata of livestock activity were defined according to agricultural surface area:

- U.A. with surface area less than 0.5 ha (Micro-producers).
- U.A. with an area of 0.5 to 4.9 ha (Small producers)
- U.A. with an area between 5.0 and 49.9 ha (Medium producers)
- U.A. with surface area from 50 to more ha (Large producers)
- U.A. with no land, livestock species (Micro and small producers)

Most of the livestock producers in the area work and use available forage according to their parents' experience, which often leads to overutilization of the area because of the number of animals (Food and Agriculture Organization of the United Nations, 1999) (Figure 3).



Fig. 3. Livestock breeding in Campo Verde - Ucayali

Social capital

In 2017, only 22.9% of producers were registered in some association; within micro and small producers, 24.9% and 22.7% respectively. In landless producers, percentage is reduced to 5.8%.

However, these percentages vary according to their species. The Table 1 shows distribution of livestock producer associations according to identified strata:

Table 1. Distribution of livestock producer associations in Peru (Ministerio de Agricultura y Riego, 2017b)

Size of agricultural units	Producers belonging to an association at national level	Livestock producer association (%)
National	517,667	1.1
U.A. with less than 0.5 ha	126,455	0.5
U.A. from 0.5 a 4.9 ha	283,665	0.8
U.A. from 5.0 a 49.9 ha	96,550	1.7
U.A. from 50 to more ha	8,232	6.8
U.A. with no land	2,765	11.2

Financial capital

In 2017, 8.2% of livestock farmers applied for agricultural credit and obtained it through Municipal Savings and Credit Banks, EDPYMES and Rural Savings (Ministerio de Agricultura y Riego, 2017b). AGROBANCO, a state-owned entity focused on financial inclusion that grants loans to agriculture and livestock, only served 10.5% of farmers who applied at nationwide.

According to MINAGRI, in 2020, only 9% of farmers in Ucayali had credit access (Ministerio de Desarrollo Agrario y Riego, 2020) that would allow them purchase tools for better management of pasture used to feed their animals, as well as access to medicines, balanced feed and others that would improve their animals' performance of their species.

Physical capital

Farmers have tools such as spray backpacks, cultivators, and chainsaws for maintaining and caring for the pasture used to feed their animals. In addition, they have corrals that facilitate vaccination control, feeding with balanced diet and management for selecting species for sale when expected weights are reached.

To access livestock raising areas, producers use roads administered by townhalls. In Ucayali, livestock farmers face problems with access roads because they are damaged by heavy rains, complicating sales of livestock during the winter months from October to March (Figure 4).



Fig. 4. Access roads - Campo Verde

5 LIVELIHOODS' IMPROVEMENT RECOMMENDATION

Human capital

Through training in livestock management, it should be possible for families to have access to basic services and education to ensure their members' life quality. On the other hand, it is important to inform about anemia and malnutrition so that, supported by the governments institutions and health systems, they could have access to nutritional supplements and recommendations to ensure their families' healthy growth.

Natural capital

Most livestock producers use pasture for feeding their animals; however, this technique is not sustainable because of wastage. In 2020, only 9% of the pasture used was managed using conservation techniques; note that only 38% of the agricultural land in Ucayali is registered (Ministerio de Agricultura y Riego, 2020). It is essential to ensure the source of supply (pasture) for animal feeding as it is the cheapest and easiest to access. For this, regional governments, in collaboration with MINAGRI, should implement techniques such as silvopastoral systems, combining fruit or forest trees and pasture to better conserve the soil and achieve higher yields and long-lasting pastures, achieving greater nutritional value for animals and better care of them due to the shade generated by trees (Food and Agriculture Organization of the United Nations, 1999)].

Social capital

There are various entities related to livestock producers, including livestock associations, SENASA, MINAGRI and provincial governments. They are responsible for the regulation of livestock activity and support by providing access to vaccination, training, and funding information and others.

Thus, it is essential that each of these entities reach out to livestock producers and develop a joint training plan that integrates each stage of breeding, starting with proper pasture management for maximum optimization through sectorization, pest control, vaccination to prevent diseases, recommendations for species improvement and basic services that enable farmers and their families to improve their life quality and the use of their animals and related products.

Financial capital

It is critical to provide more information on credit requirements to achieve a higher percentage of producers who qualify for credit. It is also necessary to reinforce training programs promoted by the Ministry of Agriculture through AGROBANCO to promote financial access and proper use of resources to improve pastures and animal management systems.

Physical capital

One of the key stages of the livestock activity is the sale of animals; for this, it is necessary to have an adequate road that allows access to the trucks that will pick the animals up without complications or accidents. Otherwise, producers will be forced to transport their animals on foot, exposing them to complications such as their loss, which could result in serious losses for the farmer.

Another key point for livestock management is the availability of corrals and materials for sectorization to achieve adequate management of species, requiring essential supplies such as wood, wire, nails, and others.

In addition, basic services such as water and electricity are important to improve families' life quality. For this, solar panels are a good option in areas where there is no electrical wiring; in the case of water, if there is no sewerage and public systems, the option would be teaching how to disinfect available water (subsoil and rivers) to prevent diseases.

6 CONCLUSIONS

In Peru, agriculture and livestock contribute 5.9% of GDP², making it necessary to strengthen it to achieve greater business competitiveness and an improvement in the country's economic circulation. Most of small and medium livestock farmers use ancestral and traditional breeding and production methods. These systems generate relatively low and very varied yields. In this context, it is necessary to elaborate development strategies in rural communities. Aligned to this objective, the research proposes the articulation of the rural livestock value chain. In which it is intended to generate value in each of the different productive links, with sustainable bases for the community, being necessary to use applications of Sustainable Livelihoods approach.

According to the SDG³, both rural agriculture and animal breeding in rural communities will allow sustainable growth in the economic, social, and environmental dimensions. Therefore, livelihood approaches were used as a strategic pillar to strengthen value chains of livestock farming in the community of Campo Verde. As detailed in the research, it is an a priori and a posteriori approach, serving as a diagnostic and improvement tool.

The investigation seeks to solve the problems of poverty, human wellbeing, and equity in this community through on-site employability, reducing environmental risks and improving life quality. Without the articulation of the value chain through livelihoods approach, the poor levels of health and education indicators in the area, 12%-14% and 84.4%, respectively, will persist.

² GDP: Gross domestic product

³ SDG: Sustainable Development Goals

REFERENCES

- Chambers, R. and Conway, G. (1991), *Sustainable rural Livelihoods: Practical Concepts for the 21st Century*, Institute of Development Studies, Brighton.
- Comisión de Promoción del Perú para la Exportación y el Turismo – PROMPERU (2017), “Ganadería en el Perú: El importante desarrollo ganadero en el Perú”, available at: <https://peru.info/es-pe/inversiones/noticias/5/23/el-importante-desarrollo-ganadero-en-el-peru> (accessed 28 February 2022).
- Echevarría, M. (2020), *Cincuenta Años de Investigación en Alimentación del Ganado con Pastos en la Amazonía Peruana*. Universidad Nacional Agraria La Molina, Lima. Available at: <http://www.fondoeditorialunalm.com/wp-content/uploads/2020/12/CINCUENTA-ANOS-DE-INVESTIGACION-EN-ALIMENTACION-DEL-GANADO-CON-PASTOS-EN-LA-AMAZONIA-PERUANA.pdf> (accessed 28 February 2022).
- Fondo de las Naciones Unidas para la Infancia – UNICEF (2017), *La situación de las niñas, niños y adolescentes en Ucayali*, UNICEF, Lima.
- Food and Agriculture Organization of the United Nations – FAO (1999), *Educación Ambiental para El Trópico de Cochabamba*, UNDCP, Cochabamba.
- García Saltos, M.B., Juca Maldonado, F. and Juca Maldonado, O.M. (2016), “Estudio de los eslabones de la cadena de valor del banano en la provincia de El Oro”, *Revista Universidad y Sociedad*, Vol. 8, No. 3, pp. 51-7.
- Lockie, S. and Carpenter, D. (2010), “Agriculture, biodiversity and markets”, in Lockie, S. and Carpenter, D. (Eds.), *Agriculture, Biodiversity and Markets Livelihoods and Agroecology in Comparative Perspective*, Routledge, London, pp. 1-14.
- Maldonado, L. (2009), “Urban agriculture as a livelihood strategy in Lima, Peru”. In Redwood, M. (Ed.), *Agriculture in Urban Planning: Generating Livelihoods and Food Security*, Earthscan, Canada, pp. 49-70.
- Messer, N. and Townsley, P. (2003), *Local Institutions and Livelihoods: Guidelines for Analysis*, FAO, Rome.
- Ministerio de Agricultura y Riego – MINAGRI (2017a), *Diagnóstico de Crianzas Priorizadas para el Plan Ganadero 2017-2021*, MINAGRI, Lima.
- Ministerio de Agricultura y Riego – MINAGRI (2017b), *Plan Nacional de Desarrollo Ganadero 2017-2027*, MINAGRI, Lima.
- Ministerio de Agricultura y Riego – MINAGRI (2019), *Perfil productivo y competitivo de las principales especies y productos pecuarios*, MINAGRI, Lima.
- Ministerio de Agricultura y Riego – MINAGRI (2020), *Perfil productivo pecuario regional*, MINAGRI, Lima.
- Ministerio de Desarrollo Agrario y Riego – MIDAGRI (2015), “Alimentos balanceados”, available at: <https://www.midagri.gob.pe/portal/datero/40-sector-agrario/situacion-de-las-actividades-de-crianza-y-producci> (accessed 28 February 2022).
- Ministerio de Desarrollo Agrario y Riego – MIDAGRI. Programa Nacional de Innovación Agraria – PNIA (2020), “Empleo de tecnología silvopastoril mejora la productividad de la ganadería en Ucayali”, available at: <https://www.gob.pe/institucion/pnia/noticias/127700-empleo-de-tecnologia-silvopastoril-mejora-la-productividad-de-la-ganaderia-en-ucayali> (accessed 28 February 2022).
- Porter, M. E. (1985), “Competitive Advantage: Creating and Sustaining Superior Performance”. *Free Press*, New York.
- Red de Comunicación Regional – RCR (2019), “MINAGRI ha potencializado el ganado vacuno en cinco regiones del país”, available at: <https://www.rcrperu.com/minagri-ha-potencializado-el-ganado-vacuno-en-cinco-regiones-del-pais/> (accessed 28 February 2022).
- Springer-Heinze, A. (2018), *ValueLinks 2.0: Manual on Sustainable Value Chain Development*, Eschborn, GIZ, available at: <https://www.valuelinks.org/material/manual/ValueLinks-Manual-2.0-Vol-1-January-2018.pdf> (accessed 28 February 2022).

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