

Bovine Milk in Andean Peru: Pastures

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Abstract

Modern world faces a malnourishment crisis; two billion people with micronutrient deficiency and around 200 million children under five are either stunted or low-weighted. In rural areas such as that of Peruvian territory, the scenario is more prevalent and linked to poverty. Milk as a dietary complement produce is poorly consumed in Peruvian Andes and in Peruvian territory, early estimates indicate that no more than 10 kg/year/person of milk is consumed in the Andes. A comprehensive initiative to increase milk production and cheaper market offers are required to invest as a starting point on pasture—Scarcity and Diversity, both issues concern the landscape of The Andean Mountain Range. A long-term initiative directed at increasing milk production and consumption at lower prices should both increase income for agroproducers and decrease nutrient-deficiency malnourishment in urban and rural areas. Similar approaches should be assessed by under-developed and other developing nations.

Keywords: Human nutrition, bovine milk, Peruvian Andes, poverty, pastures

INTRODUCTION

Malnourishment affects every individual of the *Homo sapiens* species given its sedentary status where food supply becomes monotonous and/or lacking due to poor offer diversity at local, regional and nation-wide scales and/or because of low purchasing capacity of some economic strata also at local, regional and nation-wide scales. Even for individuals who might eventually possess both purchasing capacity and a high-diversity offer lack of nutrition-related knowledge might render in decisions which would put them at risk of malnourishment. In general, it can be stated that because of such factors and their interplay any individual of *H. sapiens* species has, is and/or will be at any given moment of its lifespan at a state of malnourishment, however, the global scenario requires a different point of observation. As per a report in 2015, about 2 billion people experienced micronutrient malnutrition

(iron deficiency included) and 212 million children under five were either short or weighted below the standard [1]; for instance, a scenario which remained the same in the subsequent years [2–4]. In general, malnourishment in all of its forms but obesity is related to poverty. Both food security and nutrition started being monitored since 2017 by the Food and Agriculture Organization of the United Nations to meet no hunger nor malnourishment in the planet goals [5]; significant results should be expected in the coming decade.

Child malnourishment in Peru, it has been linked to poverty [6] and according to the published data, prevalence is higher in rural areas (37.3%) as compared to urban areas (11.8%) [7]. Recently it was suggested to focus on Andean bovine milk production as a mean to increase both incomes. Nowadays mostly substantial farming and availability of the nutrient-

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rich produce are considered for the general population at lower prices who throughout the country are offered canned milk at 8–10 times the selling price of the farmer; context of which has resulted in low dairy consumption for the country where milk per capita should not be above 10 kg/year/person, one twentieth the average for a developed country citizen. As a starting point, a focus on pasture management for the Andes was proposed, the matter of discussion hereby.

LAJAS DISTRICT, PERU

For Lajas district (Chota Province, Cajamarca Region, Peru; 2 134 m.a.s.l.; Average temperature 15.1 °C; and 916 mm annual precipitation as per the closest Climatic Station and around 120 km², Figure 1), two main drivers has been identified for low bovine milk production and consumption—pasture scarcity and pasture diversity—to support a balanced diet for cattle. The scenario of local region which is being a matter of constant scrutiny by the authors is believed to be generalized to the Andean region of Peru which share similar social constructs and landscape rendering context of similar nature putatively. In this regard, patchy land ownership as observed in Figure 1-C is also believed as a generalizable observation for Peruvian Andes. Southern Peruvian Andes should vary in context given that icy weather is recurrent over the year which is not the case for the North where a relative temperate climate can be argued.

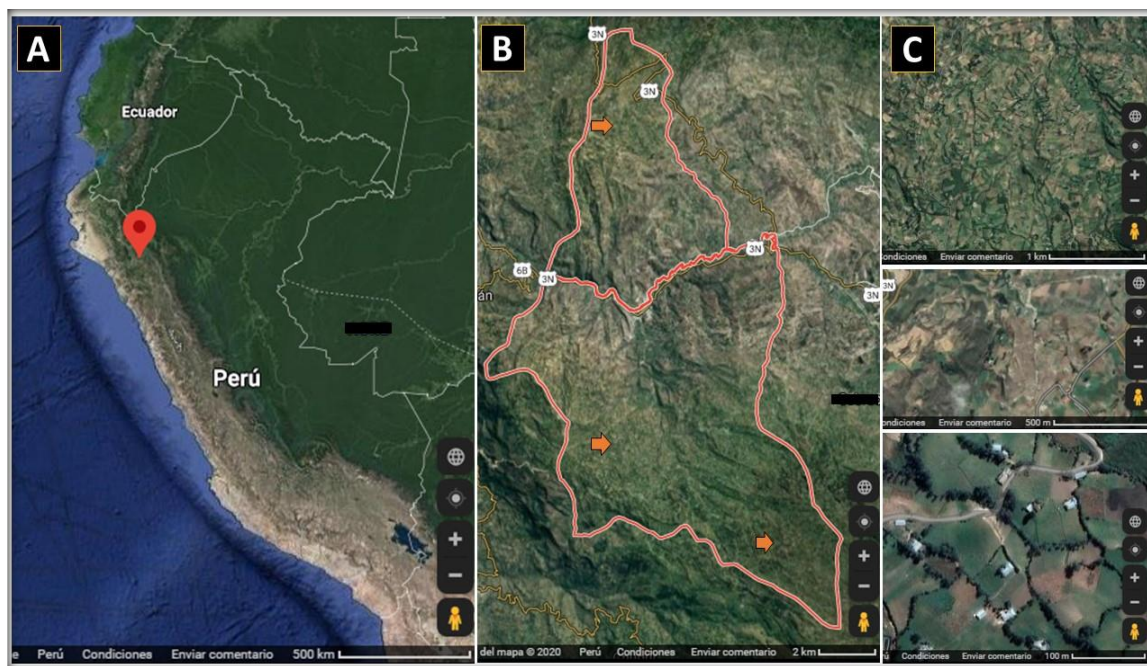


Figure 1. Geographic Localization of Lajas District in Peruvian Territory (A, B). Note the patchy ownership of land in C (Orange arrows show points of amplification). Source: Modified from Google Maps 2020.

LAND OWNERSHIP IN ANDEAN PERU

Inferences given the actual data of the authors are possible with restrictions in the predictions and further research is suggested. Observations are considered initial for quantitative data and can vary to the North, Middle and South of the Andean Peru. In general, close-to-urban settlements have generationally divided land property reducing property to a few hectares/family. Furthermore, because of low demand for lands far from urban areas number of hectares/family is higher ranging at estimates from 10–20 hectares/family; exceptionally for some local areas and very well-known families which own in the range or more than such land area comprising around 20% rural land property in Andean Peru. On the contrary, at the Jungle (Amazon Forest) Region of Peru land ownership is much higher due to high offer and low demand rendering low prices/hectare; an educated estimate should be at 500–1000 Peruvian Units of Exchange (Nuevo Sol S/, PEN) as compared to Andean prices which can be

50–100 times that of Jungle estimated hectare price of land. In Peru, jungle lands are directed to meat production as per the preference of the agroproducer.

PASTURE SCARCITY

Scarcity of pasture for Lajas Municipality is believed to be caused by water scarcity both by [8] Physical, influenced by seasonal raining; and Economic scarcity due to lack of infrastructure to maintain a constant flux of the resource year-round. Natural ponds are usually maintained for human consumption; their use if considered for agro production should be linked to a proper Forest Regeneration Programme to sustain long-term water availability. Programmes aiming at increasing forest coverage through the Micro-Stream Technique rationale [9] should also increase caudal of existing rivers which with proper infrastructure could be directed to agro production. Nowadays, such initiatives are lacking, in such scenario farmers have opted towards low density cattle/hectare.

PASTURE DIVERSITY

Long-term pasture management initiatives do not meet the need of the land owner which is in principle diverse due to uneven terrains throughout the Andes. Usually, a proper management includes a diverse set of grasses and legumes [10–13] to meet soil type, light availability and animal nutritional requirements. Although it can be observed that observation such as grass and legume mixtures in some fields can not be generalized (Figure 2). Programmes aiming at educating farmers and providing the means to diversify pasture species in accordance with local regions and the land of the farmer are needed. Furthermore, initiatives such as The School of Pastoralist in Africa in which groups of pastoralists are engaged in conversations to share experiences [14] might be useful in Andean Peru where information follows a chain-of-trust pattern.



Figure 2. Vásquez_030 (V_030, Lajas) Cattle Breed Mother and Young Calf. At the background, grass coverage.

The generalized pasture system for cattle in the region is rope-tied in which the animal is provided with an area to feed during the day restricted by the length of the rope. It is advised to invest in continuous grazing which is a low-labor, low-cost system where cattle are reared free to range in a given area for the grazing season [13]. Altogether, long-term water sustainability initiatives, proper pasture management and continuous grazing system should increase throughput in Andean farms.

CONCLUSION

Nutrition and food security in Andean Peru and in Peruvian Territory is multifactorial. Here, it is advised to focus on pasture management to increase both its availability and continuity throughout the years and diversity to meet land ownership and cattle nutrition in Andean landscapes. Thus, increasing farmers income, availability of milk produce and milk products at lower prices thus complementing proper nutrition in urban and rural areas. Milk produce presentations, cheaper and long-lasting should

be a matter of interest of national relevance whose priority should have been pointed out many years ago.

Conflict of Interest: The authors declared no conflict of interest.

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