

Diagnosis of beef production systems for meat in Tejupilco, State of Mexico

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Abstract

In Mexico, cattle ranching is the second most widespread productive activity in rural areas after agriculture, its importance lies in generating self-employment in the rural sector. In the municipality of Tejupilco, State of Mexico, there are 1 839 beef cattle producers, who contribute 30% of the meat production of the Tejupilco district and 14.9% statewide. Currently, there is an information gap that allows to know the conditions in which producers of cattle for meat in the municipality are immersed. The objective of the research was to diagnose beef production systems for meat from two communities in the municipality of Tejupilco, and identify alternatives for improvement. The methodological approach contemplated the application of a structured questionnaire in three thematic axes: 1) socioeconomic profile and available resources of the family; 2) socioeconomic and agronomic indicators; and 3) productive technical management of beef cattle. The production of cattle for meat is very diverse in terms of available resources, technical productive management; the lack of technical training and financial resources, and an inefficient organization are widespread, manifesting themselves in a technical-productive backwardness and dependence on external inputs. It is recommended to establish a training and accompaniment program that addresses the main limitations encountered.

Keywords: characterization, bovine meat system, indicators.

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The cattle farming is the most widespread productive activity in rural areas, after agriculture. In 2012, livestock generated jobs for 738 567 people and contributed 29% of the PIB of the primary sector (3.4%) (DOF, 2012). In Mexico, 81% of the agricultural production systems are small units, with great heterogeneity in the size of the herd, socioeconomic condition, destination of production, technological management, among others (Leos-Rodríguez *et al.*, 2008; Piedra *et al.*, 2011; Hernández *et al.*, 2013).

In the municipality of Tejupilco, State of Mexico, there are 288 925 head of cattle for meat managed by 1 839 ranchers, who contribute 30% of the production of the district of Tejupilco and 14.9% at the state level (PGN, 2015). These systems face challenges associated with environmental deterioration, dependence on external inputs (fodder, balanced feed), limited diffusion of technology, incidence of diseases, poor organization and marketing systems, low profitability, migration, insecurity and inefficient public policies (Cavalloti, 2014).

This scenario demands the reorientation of these systems towards sustainable production forms; that improve and optimize production processes, promote resource conservation, viability and economic solvency, fair markets (Hernández *et al.*, 2011; Hernández *et al.*, 2013) among others.

This challenge requires a systemic vision to diagnose, design and implement improvements to its environmental and socioeconomic determinants (Serrano and Ruiz, 2003). Based on these elements, and considering the socio-economic importance of bovine meat production systems in the municipality of Tejupilco and the lack of information on their current status, the present investigation was proposed with the objective of diagnosing bovine production systems meat (SPBC) in two communities of the municipality of Tejupilco, State of Mexico, to identify possible alternatives for its improvement.

The municipality of Tejupilco is located in the southwest of the State of Mexico (18° 45' 30" an 19° 04' 32" north latitude and 99° 59' 07" and 100° 36' 45" west longitude). The 94% of the territory is dedicated to agricultural activities (COMPLADEM, 2012). The agricultural area is 20 245 ha, of this, the pasture cultivation occupies 53% (INEGI, 2011). The bovines are produced under dual purpose systems, extensive cow-rearing and intensive fattening in pens. The systemic approach was applied to qualitatively diagnose beef production systems for meat. The study was carried out with 14 breeders from the community of vines and 15 from the community of Almoloaya of the Granadas.

A structured questionnaire was applied in three themes: 1) socioeconomic profile and available resources; 2) socioeconomic and agronomic indicators. State indicators proposed by IDEA (Vilain *et al.*, 2008) and MGAP (2008) were used. The value of the indicators was expressed in ordinal scales from 0 to 3. The value of 0 corresponded to the least desired level and 3 to the desirable or optimum level. The results were presented in radar graphics; and 3) productive technical management of cattle. This included technical-productive records, reproduction, phytosanitary management and feeding. The results were presented in radar graphs, indicating in percentage the practices that are carried out by the producers.

The beef producers for meat have an average age close to 60 years and with a level of education equivalent to the level of primary level. They have more than two decades of experience in livestock activity. The average availability of agricultural area, grassland and grassland was 7, 94

and 17 ha, respectively for Bejucos and 3, 27 and 12 ha in Almoloya of Granadas. The total number of animals was 28, and in Bejucos of 71. The stallions belong to the Charolais, Beef master, Simbra, Brahaman, Simental, Suizo and Indobrasil breeds. These characteristics have configured very different SPBC (Piedra *et al.*, 2011), and have determined the existence of different strategies for the use of resources and management practices.

The socio-economic and agronomic indicators are presented in Figure 1. It is observed that most of the indicators are located at a medium level. Likewise, there are marked differences among the communities in the indicators of organization, technical assistance, food production and incorporation of organic matter. In the organizational aspect, in Bejucos stands out, because the producers belong to the local livestock organization and some belong to regional and national associations.

However, organizations only perform liaison functions between federal-state agencies and producers, as well as to manage supports as an organization. Technical assistance in both communities is minimal. Consequently, there is insufficient training on technologies aimed at improving management practices and optimizing resources; this has promoted greater pressure on the environment, generating overgrazing and low feeding rates.

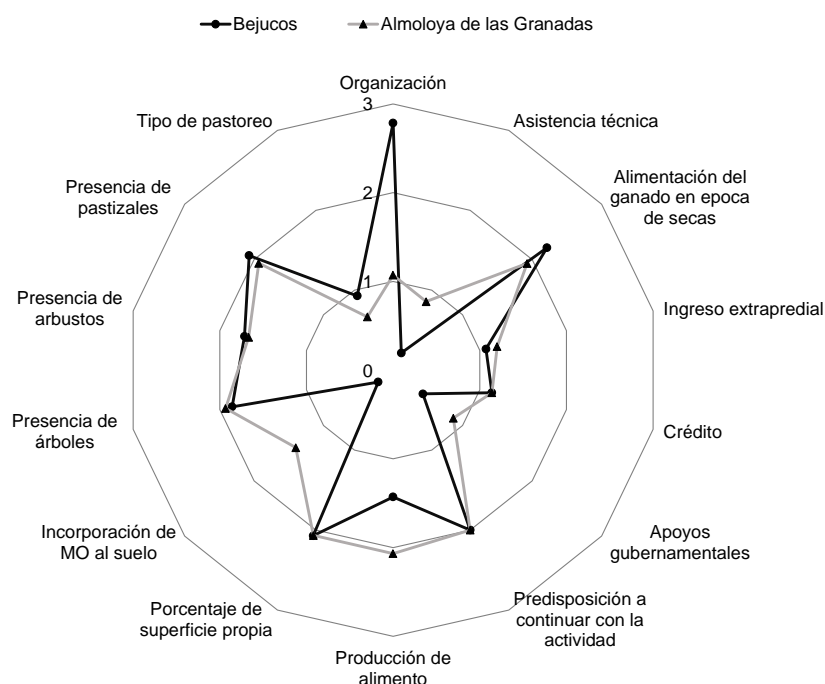


Figure 1. Socioeconomic and agronomic indicators of bovine meat production systems in two communities of Tejupilco, Mexico.

In the region, the limited generation and transfer of technology appropriate to the agroecological context of producers is common (Hernández *et al.*, 2011). Although public livestock policy instruments have been implemented in different components (technical assistance, competitiveness, etc.), their implementation and monitoring have not had an impact on the SPBC

studied, the common denominator is production lag, low profitability and the consequent abandonment of livestock. The farmers consider that the succession in the activity is assured, that is, at least one of their children will continue with the livestock activity.

The succession expectations of the SPBC depend on economic, labor and social status (Serrano and Ruiz, 2003). However, there is little transmissibility of knowledge and skills developed in the successors, who in general, have other work activities. This implies the need to get involved in the productive, administrative and management activities of the SPBC. On the other hand, farmers have not been beneficiaries of credit, for fear of indebtedness and ignorance of the steps for their acquisition. Only a small number of producers (6.9%) have requested a loan for the purchase of replacements and increase the size of their property. However, government support has been insufficient.

Not having a loan can be positive, with the understanding that there is no dependence on these external sources. However, the lack of economic resources is a limiting factor, since in a short and medium term no investments can be made to improve the infrastructure and the application of good practices or innovations inherent to the breeding of cattle for meat. Additionally, it is important to mention that, in the study region, insecurity (extortion) is one of the serious problems faced by producers limiting the investment and improvement of SPBC.

The production of fodder to satisfy the demand of consumption of the animals in time of drought, is very variable between the two communities. In Almoloya of the Granadas, farmers produce 63% of the livestock's food needs, while Bejucos produces 38%. This implies that they face shortages of forage, having to resort to the purchase of hay, stubble and concentrates (Amendola *et al.*, 2005).

The use of external inputs for livestock feed represents between 70 and 80% of production costs (García *et al.*, 2011; Hernández *et al.*, 2013), which reduces the profitability of meat production. This determines that extrapredial sources of income are sought to satisfy their economic needs. To deal with this situation from a technical point of view, the rotational management of pastures, their maintenance and the haying of surpluses during the rainy season are practices that must be implemented to ensure the availability of quality forage for the most part of the year, at the same time, the dependence on balanced food is reduced and, in the medium to long term, it will reduce production costs and improve profitability (Muñoz and Rodríguez, 2013).

The management of biodiversity through the presence of trees, shrubs and grasslands, has an average value in both communities. This diversity is a source of livestock feed and can potentially be used to develop agrosilvopastoral systems to cope with food shortages. The dominant grazing system is extensive, the meadows are deteriorated because of the continuous management to which they are subjected.

There are no well defined grazing periods. The species that is mainly used in the meadows in Bejucos is the llanero grass (*Andropogon gayanus* Kunth), and to a lesser extent the grass mombaza (*Panicum maximum* Yaci var. Mombasa) and Tanzania (*Panicum maximum* Jacy var. Tanzania). In the case of Almoloya of the Granadas the chontalpo (*Brachiaria decumbes* Stapf) is used and star of Africa (*Cynodon plectostachyus* (K. Schum.) Pilg) are used and in a smaller proportion there

are purple grass (*Pennisetum purpureum* Schumach) and maralfalfa (*Pennisetum violaceum* cv. maralfalfa). The establishment of new pastures is null, which is attributed to the lack of economic resources, ignorance of the species that adapt to the edaphoclimatic conditions of the region and their agronomic management.

The own surface of the cattle ranchers, that varies between 51 and 75%, in the majority of the cases does not satisfy the needs to guarantee the maintenance of the herd, reason why they are forced to rent lands. The incorporation of organic matter to the plots via manure produced in the SPBC is scarcely practiced. The producers consider that their soils are fertile, although in both communities they are of low fertility, retain little moisture and are susceptible to erosion (INEGI, 2009).

The Figure 2 presents the practices carried out for the production of cattle. Supplementation during the dry season, mineral supplementation, generation of replacements, continuous breeding, external and internal deworming are widespread activities in both communities. The conservation of forage, selection of replacements are management practices not widespread in Bejucos with respect to Almoloya. In the same way, the registers or the information that the farmers gather in economic and production aspects are scarce in Almoloya of the Granadas, in Bejucos they are carried out by a quarter of the producers. The lack of productive and economic records prevents knowing the production trends, it restricts the taking of adequate and opportune decisions for the definition of strategies of improvement of the SPBC (Hernández *et al.*, 2011).

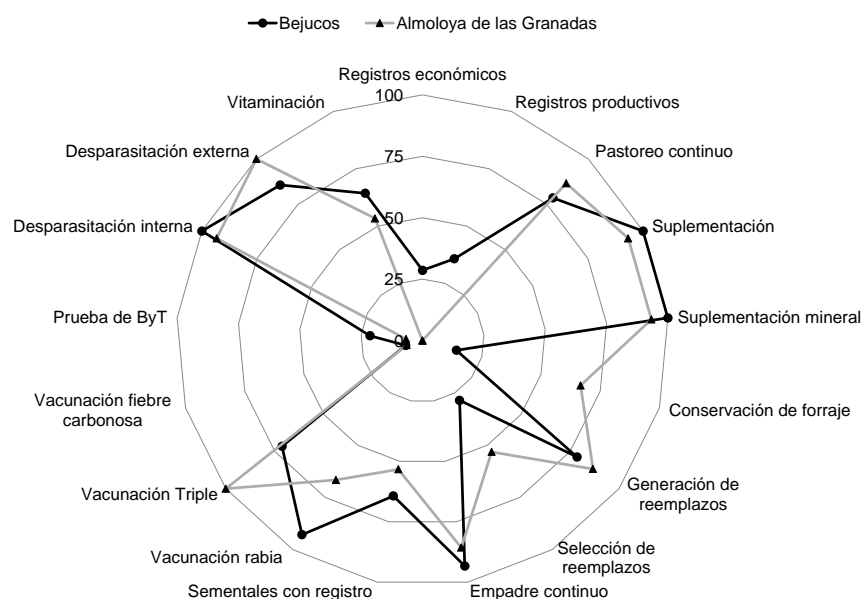


Figure 2. Technical-productive practices and the proportion in beef cattle production systems of two communities of Tejupilco, Mexico.

In the sanitary management of the seven practices reported, only three of them are carried out in a generalized way in Almoloya of the Granadas, while in Bejucos, only two practices are common. Health management practices, such as the range of application of vaccines, external and internal dewormers and vitamins, tend to be differentiated between the two communities.

These practices are carried out based on the experience generated, but at the same time they lack fundamental knowledge that allows them to make a better decision in time and form. This increases the mortality of animals, limits their mobility to be marketed and alters the quality of the final product, the latter being a current requirement and it is through technical production practices that the safety of the products must be guaranteed (Bernues *et al.*, 2007).

Although the breeds used are accepted on the market, crosses without planning between European breeds, makes animals more susceptible to environmental factors and parasites such as ticks and prevent them from expressing their genetic potential. The sale of the calves is done at the end of the rainy season in the region, which generates the price decrease due to a greater supply.

Conclusions

The production of cattle for meat is an activity directed by farmers close to older adults and with a basic school grade. There is intra and inter-community variation regarding the area they have, herd size, infrastructure, productive technical management; in addition, they have little technical training and financial resources and a little functional organization. Characteristics that manifest themselves in a technical-productive backwardness and dependence on external inputs.

With a view to designing and implementing strategies focused on the sustainable management of SPBC, support and training programs are necessary according to their needs, potentials and limitations of the farmers and promote a comprehensive vision of this production system. In the short and medium term, it is recommended to establish a training program that addresses the main constraints encountered: a) grazing systems, establishment, management of pastures and grasslands; b) forage conservation methods; c) management of manure as an organic source of crop nutrition; d) management of the production unit; and e) sanitary management of the herd.

Regarding the scope and limitations of the methodological approach used, qualitative information was obtained that helped to understand in a general way the characteristics and problems of beef production systems for meat. However, it is necessary to study in greater depth quantitative information during a productive cycle, which includes indicators of the three dimensions to have a greater number of elements for the definition of strategies to improve these systems.

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