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Actions for the management of bovine species with agroforestry techniques in the entity "The Vaquerito"

Acciones para el manejo de especies bovinas con técnicas agroforestales en la unidad de producción "El Vaquerito"

Yusniel Dago Dueñas¹

Universidad de Pinar del Río "Hermanos Saíz Montes de Oca". Pinar del Río, Cuba.
E-mail: yusniel.dago@upr.edu.cu

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ABSTRACT

The work was developed in the town of Plan Café, Consolation del Sur, Pinar del Río, with the purpose of designing actions for the management of bovine species with agroforestry techniques in the entity "El Vaquerito". Surveys and interviews were carried out to workers of the area to determine the main elements that provoked the low milk yield. It was evaluated by means of a main FODA. Through the Relative Value Index of each of the variables in the matrix, it was determined which of them had the greatest weight in the analysis. The current situation of the town of Plan Café belonging to Consolation del Sur, with regard to the handling of the bovine livestock, places it in an offensive position, with a total of 25 points. On the base of the obtained results they intend actions to foment the handling, upbringing, multiplication of the bovine one in this cattle production system.

Keywords: bovine; management; main FODA.

RESUMEN

El trabajo se desarrolló en la localidad de Plan Café, Consolación del Sur, Pinar del Río, con el propósito de elaborar acciones para el manejo de especies bovinas con técnicas agroforestales en la unidad de producción "El Vaquerito". Se realizaron encuestas y entrevistas dirigidas a trabajadores de la zona para determinar cuáles eran los principales elementos que incidían en el bajo rendimiento de las producciones lecheras. Se evaluó mediante una matriz FODA. A través del Índice de Valor Relativo de cada una de las variables de la matriz se determinó cuáles de ellas tenían mayor peso en el análisis. La situación actual de la localidad de Plan Café perteneciente a Consolación del Sur, con respecto al manejo del ganado bovino, la coloca en una posición ofensiva, con un total de 25 puntos. Sobre la base de los resultados obtenidos se proponen acciones para fomentar el manejo, crianza y multiplicación del bovino en este sistema de producción pecuario.

Palabras clave: bovino; manejo; matriz FODA.

INTRODUCTION

Since its appearance on Earth, human beings have developed the ability to exert certain control over natural resources, a situation that allowed their success on the planet. According to FAO (2012), land, water, climate and biological diversity form the basis of agriculture, essential for rural development and sustainable livelihoods. Growing human demand for resources has destabilized the environment. This situation puts at risk the ability to provide goods and services by eroding biodiversity, depleting land and water resources. Achieving food security requires economic, social and technological improvements in a context of conservation and management of natural resources and preservation of the environment.

Agriculture is one of the human practices that has distorted man's relationship with the environment. Deforestation, water and soil pollution are examples of man-made environmental damage (Oblitas, 2012). However, Agroforestry Systems (AFF) constitute an alternative to the problem of monocultures; they allow displacement because they involve the combination of forest trees with other crops, with domestic animals, or both. In addition, it optimizes production per unit area, while at the same time respecting the principle of obtaining sustainable yields. (Torres *et al.*, 2015)

Through the integration of trees into farms and agricultural landscapes, production is diversified and sustained to increase social, economic and environmental benefits for farmers at all levels. (Anchundia *et al.*, 2018)

According to Oblitas (2012), a management plan consists of having a clear idea about how and when the management tasks of the agroforestry system should be carried out. To develop this plan, it must be known the structure and function of the production system. Adequate management must be integrated:

- a) Soil management;
- b) Management of areas with tree and shrub species;
- c) Protection of water bodies and improvement of production.

However, in Cuba, the basic foods used in the production systems are milk, pasture and fodder, as well as their conserved forms, as they constitute an economic source for obtaining food that ruminants take advantage of efficiently and allow their exploitation throughout the year. In most of the countries of tropical America, serious problems of deterioration of pastures have been found, reaching approximately 50 % of the surface with an important decrease in the economic and production indicators (Machado González, 2008).

Feeding and management are the main factors that limit the growth and productivity of the herd, mainly in the two critical links of the production chain: the early incorporation of the heifer to the reproductive programs and the recovery of the cow after childbirth (ACPA, 2010).

Taking into account the above, the present research work aimed to develop actions for the management and care of existing bovine species in the entity "El Vaquerito".

MATERIALS AND METHODS

The production center "El Vaquerito" is located at km 4 on the road to Puerta de Golpe: Plan Café, belonging to the municipality of Consolación del Sur, Pinar del Río. It has 268.4 ha of surface and the type of Ferrallitic Yellowish Leached soil predominates, according to Hernandez and others (2015), with pH of 5.2; Ca: 2.5%; Mg: 1.2 %; Na: 0.36 %; K: 0.75 % and MO 1.3 %. Among the predominant plant species are *Leucaena leucocephala* Lam (leucaena), *Saccharum officinarum* L (cane), *Manihot esculenta* Crantz (yuca), *Morus alba* L (mulberry) and a spontaneous flora of *Acacia farnesiana* Mill (aroma), *Mimosa púdica* L (dormidera), *Roystonea regia* Kunth (palm).

The compilation of the SWOT matrix, to determine the main elements involved in the management and care of existing bovine species, was carried out from the opinions of the residents surveyed in the area, say agricultural workers, livestock and leaders.

The process of elaboration of the SWOT matrix was developed in working sessions. In these sessions, the participants, organized in small groups and in plenary discussions, applied techniques for generating ideas and seeking consensus and arrived at the identification of the main weaknesses, threats, strengths and opportunities.

These elements were analyzed according to strengths and weaknesses, with opportunities and threats; the value of the impacts was weighted on an incidence scale between 0 and 3. The total value of each quadrant is a consequence of the algebraic sum of the impacts, which allows, according to the highest score, to place it in one of the positions posed by the SWOT analysis (offensive, defensive, adaptive and survival) and to project the strategies and actions that correspond to each case.

The relative value index (RVI) of each of the variables in the SWOT matrix was calculated to determine which of them had the greatest weight within the matrix. This is the result of the quotient obtained by dividing the subtotal obtained in the aspect analyzed by the total of the quadrants to which it belongs and it is expressed in percent Moracén and others (2014).

The information obtained was recorded and processed in an Excel spreadsheet and descriptive statistics were used for the organization and characterization of the variables under study. The statistical program SPSS ver. 21.0 for Windows was used.

RESULTS AND DISCUSSION

Strengths

- They have a qualified staff in its administrative structure: an Agricultural Engineer and a Doctor of Veterinary Sciences, who visit the entity every week and a technician in veterinary medicine, as well as workers with more than three years of experience.
- The facilities have the necessary conditions: some metallic structures need to be repaired, but the barracks are fenced with electricity. They are located east west and have a cement floor with very strong cement columns; the roof is made of Venezuelan zinc with a height of approximately 4 m and the naves

are painted white inside. In addition, they have an adequate feeding space and maternity paddocks.

- They fulfill the biosecurity measures: perimeter fences, rat extermination, brucellosis test, insect extermination and quarterly shipment to the laboratory of fecal feces, water, fodder, etcetera. The ships are cleaned daily and painted weekly.
- The rotational grazing method is being introduced: the entity is inverting in quartering the pastures, which allows it to be able to use rotational grazing with a better profit and rational use of the pastures, since this is based on the animal consuming as much grass as possible but always allowing the grass to have enough time to reach its growth flare and not to be presented to two successive cuts by the animal's tooth (González, 2014, p. 1).
- The product has a good demand: in Cuba, strategies have been taken to achieve a greater production of milk in the private sector, allowing to satisfy the demand of the population and cover the milk needs of all children from 0-7 years old.
- Possibilities of using technology: there is a windmill for water extraction, mechanized milking, tractors and other equipment.

Weaknesses

- Low quality and availability of pastures: the available pasture /day is 833.7 Kg/day; available pasture /animal 33.3 Kg/animal. This available grass does not satisfy the needs of the animal because it must consume 50 kg of green matter /day.
- The excreta are not evacuated properly: in the entity there are no measures to treat the residuals, so they leave it in the field and then when they consider it they collect it for use in the farm of Puerta de Golpe.
- The cows are not dried correctly: the cows sometimes dry after seven months of gestation, causing cases of mastitis and a decrease in milk production for the next lactation.
- It does not present the totality of the quartered areas: it has 3601,93 ha and 40 % of these are quartered.
- There is no source of water *adlivintum*: the entity presents only a well and a lagoon as a source of water supply, which do not supply the needs of that institution.
- Inadequate management of the areas of exploitation and the animals: in "El Vaquerito", the system of production that is used is the semi-extensive one. The pastures are not controlled, they have large expanses of land and they take the animals out to pasture in the morning after milking is finished and they collect them from 5:30 to 6 pm and the cows in milking are given feed in the stump and the rest of the animals are not given these by-products.

Threats

- Economic blockage: it negatively influences the development of the institution, because it limits the entry of some technologies, medicines, and in turn, the sale of the product obtained in the entity.
- Imposed plans: these are the plans that are drawn up in the entity. Example: an entity's plan of 4700 liters /year to obtain an actual of 3585 liters /year.
- Damage by pests and diseases: the entity is affected by pests by 20 %.
- Damage from inclement weather: the entity suffers damage from inclement weather due to cyclones and tropical storms.

Opportunities

- Demand greater than supply: in Cuba, demand is greater than supply, due to the nutritional qualities of the milk product, since the performance of this product in Cuba has been affected by the inadequate handling of animals and the supply of low quality food.
- Link with other entities: the entity has several institutions in the locality in which it can support on to use new food sources and thus open new markets for the sale of its products.

Table 1 - SWOT matrix of the agroecosystem analyzed

		Debilidades						Fortalezas							
amenazas		1	2	3	4	5	6	Total	1	2	3	4	5	6	Total
		1	1	0	0	0	0	0	1	2	2	2	2	1	1
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	2	0	0	0	0	0	2	3	1	3	1	0	1	9
	4	0	0	0	0	0	0	0	1	3	1	0	0	0	5
	Total	3	0	0	0	0	0	3	6	6	6	3	1	2	24
oportunidades	1	1	0	1	0	0	0	2	2	1	3	1	3	1	11
	2	0	2	1	0	0	2	5	3	3	3	0	3	2	14
	Total	1	2	2	0	0	2	7	5	4	6	1	6	3	25

The position of the entity "El Vaquerito" is advantageous in the market, since it falls in the fourth quadrant and the strategy is offensive, which means that the internal strengths of the zone must be used with the purpose of taking advantage of the opportunities and simultaneously attenuate or eliminate the effect of the current weaknesses and threats, starting from the strengths and through the use of the positive capacities that the productive entity has (Table 1).

From the calculation of the relative value index (RVI) of each one of the variables of the SWOT Matrix, it was determined that within the strengths variable, the most important were: they have qualified personnel (F1); the facilities have the necessary conditions (F2) and compliance with biosecurity measures (F3). Of the opportunities variable, the one that most affects the zone is the need to link with other entities (O2).

In relation to the IVR of the variable weaknesses, the low quality and availability of pastures (D1), the correct drying of the cows (D3) is not carried out. The above-mentioned diagnosis allowed to focus a set of actions aimed at the management of the bovine species existing in the entity.

In relation to the tendency to increase the demand of the dairy service for food production, within the framework of the process of updating the Cuban economic model and the guidelines of the state, the following actions are defined for the promotion of bovine breeding in the entity, without damaging the environment, ensuring the survival of flora and fauna:

- Establish associations of grasses and legumes for protein banks.
- To guarantee the conservation of fodder for feeding during the dry season, by means of silage.

- Designate a worm farm for the production of *humus*, destined to the fertilization of the pastures.
- Train technicians and workers in the problems related to herd management.
- To establish an adequate quartering of the areas for a use of the rotational shepherding *voisin*.
- Establish tree species such as *Morus alba* L (mulberry), *Gliricidia sepium* Jacq (flowering pine nut), *Hibiscus elatus* (majagua), *Cedrela odorata* (cedar). To act as windbreaks, wood provisioning and provide shade to animals.
- Elaborate a project for the construction of a well based on renewable energy sources.

The residents surveyed in the Plan Café locality do not recognize the benefit of management in livestock and recognize that the greatest impacts on milk yield and production are drought, as well as the absence of food in these periods.

The SWOT analysis indicated the use of the area's internal strengths in order to take advantage of opportunities and simultaneously mitigate or eliminate the effect of current weaknesses and threats, starting from strengths, through the use of positive capacities, encourage the breeding, multiplication and management of existing species.

The group of measures proposed for the management and care of cattle will contribute to the increase and conservation of production in the "El Vaquerito" entity, supporting the indications of the guidelines in the political, economic, social and ecological order.

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