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Diagnosis of the Family Production Units of the Cacao Agri-Food Chain in Two Municipalities of La Region de la Sierra, in Tabasco, Mexico

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Abstract: This work was made in order to obtain for the first time, an approximation to the current situation of the cocoa agri-food chain in its sociodemographic context, in the municipalities of Tacotalpa and Teapa belonging to La Region de la Sierra of the state of Tabasco, Mexico. To achieve the objective, data were collected during the second half of 2019 about the sociodemographic profile of the producers, in addition to the characteristics of their family production unit. The results indicated that there are some similarities in sociodemographic aspects as well as in the characteristics of the family production units with respect to other producing areas in Mexico and the world. On the other hand, there were differences in the crop management conditions in this region, such as fertility (organic) and the varieties planted (Criollo), which gives an added value to the product that favours its development.

Key words: cocoa farmers, characterization, territorial development

1. Introduction

The development of a region depends on its ability to stimulate local initiatives, generate new companies and carry out a dynamic of territorial innovation. Territorial sustainability must be based on a multidimensional and systemic approach that considers biotic and abiotic, social, cultural aspects, as well as the management modalities of the territories and their governance. In the territorial approach to rural development, the opinion of the local community is the main foundation to build the development process, that is, the inclusion of participation as a principle becomes the basic process of democratization of territorial planning in rural areas [1].

Regards to the study zone, La Region de la Sierra of the State of Tabasco is geolocated at 17° N and 92° W, it includes the municipalities of Teapa, Tacotalpa and Jalapa. Highest elevations, in the state, are “La Sierra de Tapijulapa” at 900 meters and “La Sierra del Madrigal” at 540 meters of altitude, located in these municipalities [2]. In the state of Tabasco was produced 18,327 tons of dry cocoa in 2019. This production was obtained from a planted area of 40,800 ha, which are distributed in 11 municipalities. Both municipalities of Teapa and Tacotalpa contribute 2% of the total production volume; however, there are lands with optimal climatic conditions for crop, which currently have better yields than other municipalities belonging to Tabasco [3].

2. Material and Methods

A face to face survey was carried out to local smallholder. A total of 37 villages from the municipalities of Teapa and Tacotalpa were taken into account in the study. Survey was applied in the second half of the 2019, in the state of Tabasco. The sample size (76) was determined according to the statistical

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tools by the University of Granada [4]. Population was representative for the total of cocoa producers (316), at 99% level of confidence and 12% margin of error. Sample was distributed proportionally according to the total number of cocoa producers by locality. The sections were addressed to the sociodemographic profile of the producers, characterization of the family production unit and characterization of the crop. Descriptive statistics were make using the "Microsoft Excel 2016®" spreadsheet.

3. Results and Discussion

3.1 Sociodemography

Regards to gender analysis, it was identified that 82.9% of the producers are male and 17.1% are female (n = 76). The minimum age found was 24 years old and a maximum of 87 years old, the average age was 58.7 years old and the mode indicated that 65 years old is the representative age. Besides 47.4% (n = 76) were under 60 years old in contrast to 52.6% (n = 76) who were over 60 years old; these data showed that more than half of the producers are older adults. This special characteristic gives an advantage from the point of view of providing experience in cultivation practices. However sometimes it is difficult for them to carry out these labors due to their advanced age.

The low educational level of a significant proportion of farmers was revealed, since statistical mode says this is 9 years old, which means they only finished high school. In addition, it was found that 7.9% (n = 76) are illiterate; 22.4% (n = 76) have some years of study (primary school unfinished) and 25% of them (n = 76) finished it; 31.6% finished high school, 5.3% (n = 76) have a high school level and finally 7.9% (n = 76) have a professional career.

3.2 Characterization of the Family Production Unit (FPU)

The characterization of the geographic zone where FPU are located determined that 30.3% are located on flat ground, 15.8% on undulating soils (transition zones between flat and mountain range), 42.1% on hillsides and 11.8% on steep slopes. The rugged soil, where 69.7% of the cocoa plantations exists, make it difficult to apply the agronomic practices typical of the crop [5]. On the other hand, it can be a way to bio-remediate the soil by favoring the increase of organic matter and stopping erosion.

As for the assed amount of land resources, there is 377.98 ha of farmland, the average was 4.97 ha per farmer, and the mode was 1.5 ha. The minimum was 0.8 ha and a maximum was 35 ha. The cultivated land distribution is as follows: 57.7% (n = 76) is for crops, 31.4% for livestock and 10.9% is forest.

Regards to the 178.35 ha of agricultural use, 81.8% (n = 76) is planted with cocoa. The average showed 2.38 ha per producer and the mode was 1 ha; the minimum surface area of the FPU was 0.8 ha and a maximum of 18 ha. This last condition is related to the trend set forth both in America and in the world, by Arvelo et al. (2017) [6] in their study on the current state of production, trade and cultivation of cocoa in America. They mention that 90% of cocoa production is in the hands of small and medium farmers who have around two to four ha.

Regarding the type of crop, 15.3% of the surface is established with basic crops such as corn (21.83 ha) and beans (11.5 ha), the rest with bananas, oil palm and orange. Pastures are cultivated, in 118.75 ha, for rearing and fattening of dual-purpose (milk and meat) cattle. In relation to forest, 90.3% is occupied by timber as red cedars, mahogany and melina, 7.3% is left as a reserve in the acahual modality and in 2.4% rubber has been established. This diversity of species in the cacao agroforestry system is a prevalent fact in other regions of the world [6].

3.3 Characterization of the Cocoa Cultivation

Two morphotypes of cocoa are mainly established, 62% (n = 76) corresponds to Forastero, under two modes of reproduction: by seed and graft; 38% (n = 76) belongs to Neocriollo reproduced by graft. It is

important to highlight the high proportion planted with the criollo morphotype in the area, since according to previous studies; only 5% of cocoa farms planted criollo cocoa worldwide. Besides, it is well known that criollo cocoa gives the highly appreciated fine chocolate [5, 6].

In relation to the time of the plantations, it can be noted that 57.9% (n = 76) of them are relatively young with an age of two months to 20 years and the remaining 42.7% (n = 76) are from 30 to 80 years. The average is 23.9 years per plantation and the mode showed the presence of a greater number of plantations of 30 years, from which it is deduced that the cacao trees of the region are at their optimum level of performance because of their age in agreement [8]. Cocoa cultivation is carried out in a conventional way (78.9%, n = 76); it means involved the application of agrochemicals to control pests and diseases mainly; and organically (21.1%, n = 76). The latter is an option for the production of healthy and innocuous food with benefits to human health and the environment, since no type of chemical substance is applied. It is important to highlight the growing interest of farmers to hand their farms in organic way, whose demand is at each time arising in markets around the world [6].

4. Conclusion

The region studied has a good potential for the development of cocoa farming, because the data showed that its plantations are at the optimum yield age, coupled with a high proportion of high-value criollo cocoa in the market regards to other cocoa producing regions. Another positive aspect is the inclination of 21% of producers to handle the crop organically. However, sociodemographic aspects such as the advanced age of the producers and their low level of education must be overcome in order to achieve a better functioning of the agri-food chain.

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