



# SOCIOCULTURAL DIAGNOSIS OF SOY CULTIVATION IN SAN JUAN DE PUEBLO VIEJO, ECUADOR

## Diagnóstico sociocultural del cultivo de soya en San Juan de Pueblo Viejo, Ecuador

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**ABSTRACT.** In Ecuador, soybean (*Glycine max* L.) production represents an important item in the agricultural sector linked to this activity; it is grown both on the coast and in the mountains. The objective of this work was to identify the level of current knowledge of the producers in the management of soybean cultivation and their perception about technological innovations in Pueblo Viejo municipality. Establishing a baseline with respect to the adjustments that would be necessary for the improvement of the yields of the plantation. For this study, spaces were created to disseminate the findings in the crop management process, training spaces were opened, surveys were carried out and a socialization workshop was developed. The study sample consisted of 20 soybean producers from the study area. The main results showed that the educational level is between secondary and higher level, the largest number of producers were male, more than half of the respondents were owners of the farms, 70 % of the producers live within their properties, the variety used for planting is transgenic and in the socialization workshop the lack of technological knowledge of the crop was identified by the producers.

*Key words:* farmers, *Glycine max* L., yield, technology

**RESUMEN.** En el Ecuador la producción de soya (*Glycine max* L.) representa un rubro importante en el sector agrícola vinculado con esta actividad; se cultiva tanto en la costa, como en la sierra. El objetivo de este trabajo fue identificar el nivel de conocimiento actual de los productores en el manejo del cultivo de soya y su percepción acerca de innovaciones tecnológicas en el municipio Pueblo Viejo, estableciendo una línea base con respecto a las adecuaciones que serían necesarias para el mejoramiento de los rendimientos de la plantación. Para este estudio se crearon espacios de difusión de los hallazgos en el proceso de manejo del cultivo, se abrieron espacios de formación, se aplicaron encuestas y se desarrolló un taller de socialización. La muestra de estudio estuvo conformada por 20 productores de soya de la zona. Los principales resultados reflejaron que el nivel educacional está entre secundario y superior. La mayor cantidad de productores fueron de sexo masculino y más de la mitad de los encuestados eran propietarios de las fincas. El 70 % de los productores viven dentro de sus predios, la variedad utilizada para la siembra son transgénicos y en el taller de socialización se identificó la falta de conocimientos tecnológicos del cultivo por los productores.

*Palabras clave:* agricultores, *Glycine max* L.,  
rendimiento, tecnología

## INTRODUCTION

In Ecuador according to the III National Agricultural Census carried out in the country<sup>A</sup>, 54 350 ha were distributed as follows: 52 176 ha in the interior of Los Ríos province and the remaining 2 174 in the province of Guayas (1). For that year, the yield was 1.73 tons per hectare (2).

The national yield for the summer cycle of soybean cultivation in Ecuador in 2015 was 2,04 t ha<sup>-1</sup>. The province with the highest yield was Los Ríos with 2,16 t ha<sup>-1</sup>. The municipalities that stood out with a performance superior to the national average were Baba and Vinces in Los Ríos and Urbina Jado in Guayas. In contrast, the municipalities with the lowest yield were Ventanas and Pueblo Viejo in Los Ríos and Milagro in Guayas. Among the most used varieties of soy are INIAP 303, INIAP 304, INIAP 305 and Jupiter.

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<sup>A</sup> Instituto Nacional de Estadísticas y Censo, 2002. Censo Nacional Agropecuario (CNA). <http://www.ecuadorencifras.gob.ec/censo-nacional-agropecuario>. Accedido 2017-03-21 10:43:05.

The cultivation of soybeans takes place at heights between 0 and 1 200 m a.s.l., and at temperatures ranging between 20 and 30 °C (3).

One of the problems of managing soybean (*Glycine max* L.) in Ecuador is the use of biocides that are causing negative impacts on the environment where plantations are developed and on the health of living beings (4). On the other hand, the indiscriminate use of products of high toxicity, during the realization of the crops, causes a decrease in yields due to the fact that the normal development of the crop is affected (5).

The soybean growers in the summer cycle of 2015, carried out their sowings under conventional system without soil leveling and rained at the mercy of the rains that generally occurred, on an average surface of 6.41 ha (6). They mostly used seed of the INIAP 304 variety and implemented the broadcast sowing method; fertilization of the crop with homogeneous application of nitrogen, phosphorus and potassium fertilizers; and mechanization for soil preparation. The main problem reported by the farmers was rust (7). Therefore, knowledge of the soybean plant and its growth is necessary for a better application of integrated pest management (8).

Based on this background, this work was carried out with the objective of identifying the level of current knowledge of producers in the management of soybean cultivation and their perception of technological innovations.

## MATERIALS AND METHODS

The present investigative work was carried out in the Pueblo Viejo municipality belonging to the Los Ríos province, Ecuador, which has an average annual temperature of 25,4 °C, average annual relative humidity 78,3 %; precipitation of 935,4 mm; with South Latitude of 01° 47'49", West Longitude 79° 32'00" and an elevation of 7 m a.s.l, area 89,88 km<sup>2</sup> (9).

For the determination of this study, one of the most important soybean producing areas in the country was taken as reference. As an initial activity, a workshop was held with producers of the agricultural sector, with the aim of knowing the main problems that occur in this crop, which affects production and yield per hectare.

### SELECTION AND PREPARATION OF SOCIAL ACTORS

A socialization workshop was held with the soy producers, in Pueblo Viejo municipality, with the purpose of knowing the conditions in which the farmers carry out the daily tasks of soybean cultivation. A communication strategy was designed to

create spaces to disseminate the findings in the crop management process, but with social participation to control the resources used in order to enable the generation of critical awareness about the issue (10).

The study sample consisted of 20 producers out of a total of 43, representing 46,51 % of the soybean producers in the study area. A survey was applied to them, addressing the subjects of schooling, gender; land tenure, current permanence in the productive area, production technology: variety, knowledge about the cultivated variety and type of planting (11). The data obtained from the survey were processed through descriptive statistics, for which a descriptive statistical analysis was carried out to calculate the absolute frequency of each variable under study.

## RESULTS AND DISCUSSION

The socialization workshop carried out with the farmers was related to the set of skills each one has to complete various tasks and activities, when working within the same environment. This allowed the producers to complete their training in relation to the cultural work that must be done within the soybean crop to improve production (12). From this work, the opening of training spaces and programs that allowed the socialization of soybean cultivation practices among the producers of the area was achieved.

It identified the benefits of the use of amino acids (cytokine) in the soybean crop, which helps the development of the plant, strengthening its defense mechanisms and decreasing the incidence to the presence of pests that affect the development of crops. Amino acids are an alternative to direct fertilization to plants, where this method would prevent the chemical transformation of nitric and ammonium nitrogen inside the plant into amino acids and therefore would lead to significant energy savings, which would help it overcome, so many situations of stress, such as to encourage their growth and development (13). Soy is a plant with high sensitivity to photoperiod (duration of the day) and influences the duration of the crop cycle, which with the proper use of amino acids helps improve yield and productivity (14).

The main problems they have during the establishment of the soybean crop are: the lack of implementation of an irrigation system, soil in the process of erosion due to the deficient application of organic matter for the improvement of the soils and they do not execute crop rotations with the purpose of helping to restore the structure of soils in the area.

The producers identify that the new knowledge has been learned through observation and consistent practice, until generating an own experience. Facilitating the appropriation of innovations, leaving aside selfish attitudes to assume a full participation in its development and integration, in agreement with the expressed by Moreno and Salvador (15).

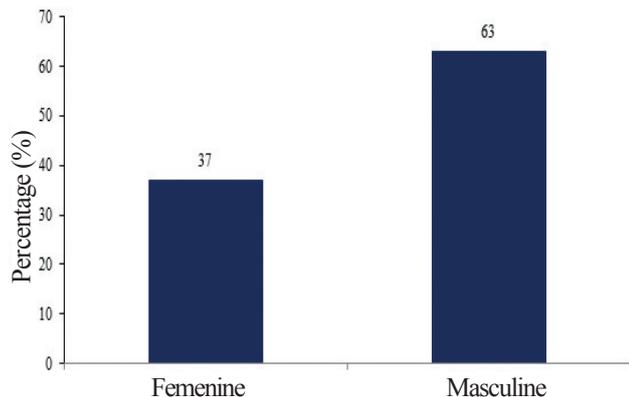
**RESULTS OF THE SURVEY TO SOYBEAN PRODUCERS**

The survey of producers showed that 63 % of the respondents were male and 37 % female (Figure 1).

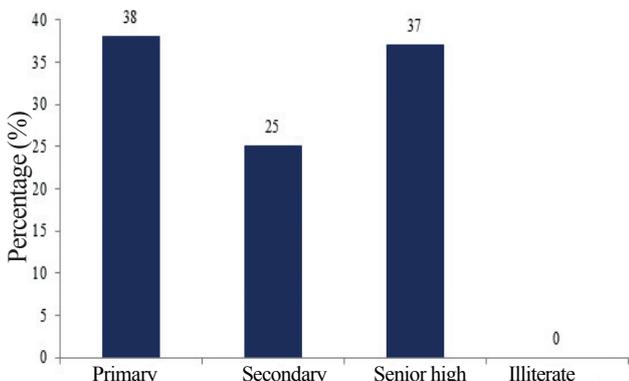
Regarding the preparation level, it was possible to identify that the highest number of respondents has primary education level, 25 % secondary, 37 % higher (Figure 2).

Regarding whether the owner of the farm where he/she sows soy, it was found that 63 % of the respondents said that they owned the farms and 37 % were tenants (Figure 3).

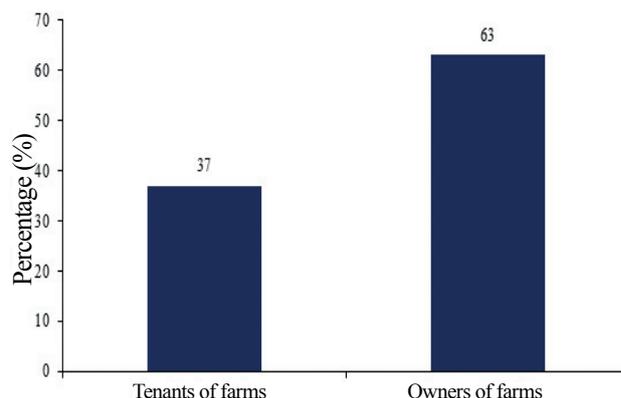
In order to determine where they live, they were consulted, and 37 % of the producers did not live in the farm they had and 63 % indicated that they are living inside their farms (Figure 4).



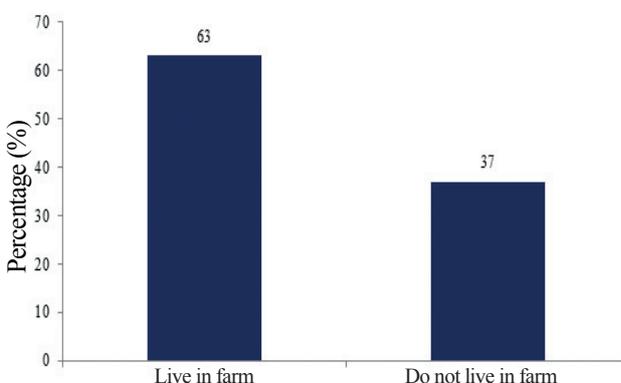
**Figure 1. Sex of the respondents**



**Figure 2. Education level of the respondents**



**Figure 3. Owners of farms that grow soybeans**



**Figure 4. Percentage of producers who live on their farms**

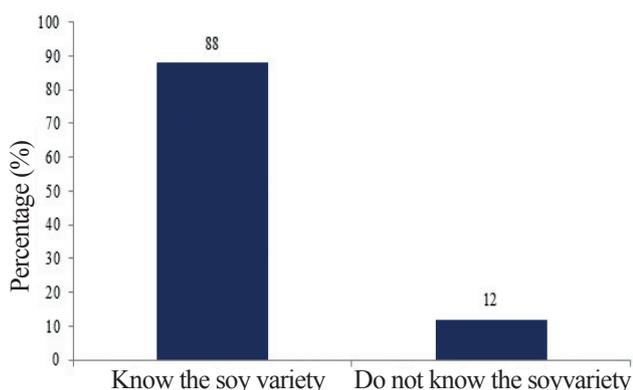
It was determined if the producers knew the variety of soybeans that they used for sowing, where it was possible to show that 88 % describe that they already have identified the variety to be used because of the result it provides (Figure 5). However, in the workshop developed it was possible to detect that the soy farmer’s main problem is the ignorance of the way of cultivating the variety of soybean established in their farms in relation to the development and production of it (16).

Regarding the variety used for sowing, it was identified that 80 % of farmers sow INIAP 306, 8 % sow INIAP 304; while, the remaining 12 % could indicate that they did not know what variety they sowed (Figure 6). In order to get producers to adopt this crop, it is necessary to have adequate varieties and sowing systems, in order to obtain high yields that help with obtaining better income (17,18).

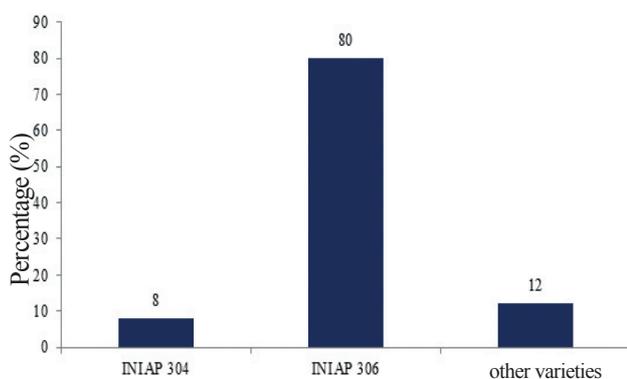
The evaluation was made to the soybean farmers where it was determined that they are small producers of this oilseed in relation to the established hectares of this crop they owned; 50 % between 5-10 ha; 30 % between 2-4,9 ha and 20 % less than 2 ha (Figure 7). It is important that the soy sector promotes

the generation, validation of transfer of innovative technologies that allow the good use of agricultural practices that allow the improvement of the crop and the expansion of production hectares (18,19).

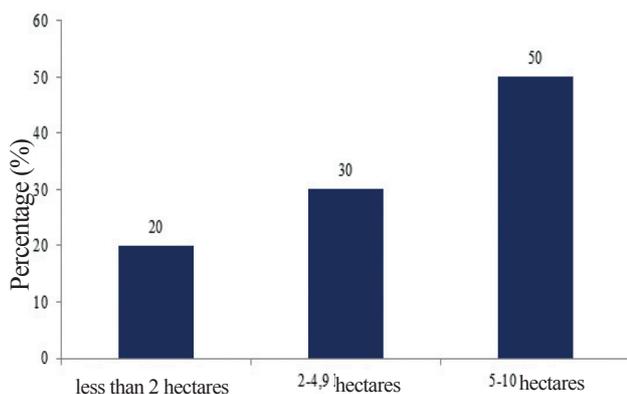
According to the type of planting carried out, it could be determined that 100 % of the respondents used broadcast planting to establish the crop in the area under study (Figure 8). Nowadays, with the rupture of the traditional production model, the use of fertilizers has increased, constituting a new focus of environmental contamination and another limitation for the small producer (20).



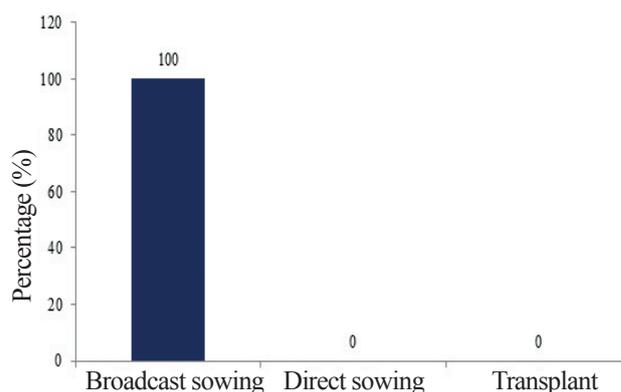
**Figure 5. Percentage of producers who know the variety of soybeans**



**Figure 6. Varieties planted by producers**



**Figure 7. Area planted by producers**



**Figure 8. Type of planting used by producers**

The previous scenario places us in front of a soybean deficiency, but also in front of a field of opportunity for the producers. To do this, it must be converted into profitable crops for which there are various forms for commercialization.

It was found that in rural areas, when an average person has completed primary education, the probability of being in food poverty decreases (6), which agrees with this study that determines that education contributes positively to reducing rural poverty. Therefore, greater investment is required in education and capacity building in rural areas and in the agricultural labor force. But it is not only about higher spending on education, the quality of education also has significant impacts on the level of gender involved and the discontinuity of improving income due to lack of land property titles, which when they are rented, they increase costs of production (15).

## CONCLUSIONS

- ◆ The socio-cultural characterization of the soy producers of San Juan de Pueblo Viejo municipality showed that the educational level is medium, the production is supported by male producers, that 63 % of the property of the farm is in the hands of the producers, of these, 70 % of the producers live inside their farms, so continuity of soybean production may be at risk.
- ◆ It is necessary to develop specific actions to increase soy production, taking into account that the training, associated with the use of transgenic varieties, requires increasing the technological knowledge of the crop by the producers, as an important pillar in the proper management of the culture.

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