Characteristics of the agricultural sector of Aguascalientes, challenges and perspectives

Características del sector agropecuario de Aguascalientes, retos y perspectivas

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Abstract

This research aims to identify the characteristics of the population in the agricultural sector of Aguascalientes. This entity has comparative advantages due to its strategic geographic location to supply a demanding market for food products. It is estimated that there are approximately 17,234 heads of households dedicated to agricultural businesses with an average age between 49 and 57 years. Furthermore, 36.43% of the members have food insecurity problems (mild, moderate, severe). We used a logistic regression model; socioeconomic variables of the sector are analyzed. The results show that the agricultural population has high levels of social service deficiencies. It is suggested the importance of undertaking social public policies that address problems related to the rational use of water, protected agriculture, access and quality of public services, promote value chains in the sector, and undertake a process of productive reconversion.

Resumen

Esta investigación tiene como objetivo identificar las características de la población en el sector agropecuario de Aguascalientes. Esta entidad presenta ventajas comparativas por su ubicación geográfica estratégica para abastecer un mercado demandante de productos alimentarios. Se estima que existen aproximadamente 17,234 jefes de hogares dedicados a los negocios agropecuarios con una edad promedio entre 49 y 57 años; además, presentan un 36.43% de los integrantes tienen problemas de inseguridad alimentaria (leva, moderada, severa). Mediante un modelo de regresión logística se analizan variables socioeconómicas del sector. Los resultados arrojan que la población agropecaria cuenta con altos niveles de carencias de servicios sociales. Se sugiere la importancia de emprender políticas públicas sociales que enfrenten de problemáticas relacionadas con el uso racional del agua, agricultura protegida, acceso y calidad de servicios públicos, para impulsar las cadenas de valor en el sector y, emprender un proceso de reconversión productiva.


† Researcher contributing as first author.
Introduction

The objective of this research is to identify the main social and economic characteristics of the population dedicated to agricultural activities in the state of Aguascalientes. It is well known that the conditions of the Mexican countryside, for the most part, go through high levels of marginalization, lack of infrastructure in basic services and, above all, productive and marketing problems, fundamentally in medium and small productive units. To make the foregoing visible, quantitative analyses are carried out, in addition, a logistic regression model was generated to identify the prevalence conditions of food insecurity and its relationships with marginalization and socioeconomic characteristics of the sector. In this way, it seeks to have a contribution to decision makers of agricultural public policies so that they have the necessary tools in making efficient decisions for the benefit of the agricultural sector.

In the last decade, the state of Aguascalientes has presented an important economic growth promoted essentially by the automotive sector. This situation has allowed the entity to grow at a higher rate at the national level; For example, in the second quarter of 2019 the entity obtained an annual percentage variation of 1.35%, placing it in sixth place nationwide. In addition, the GDP of the primary activities in agriculture, breeding, and exploitation of animals, forestry, fishing and hunting, in 2019, generated a positive variation of the Gross Domestic Product (GDP) of 1.53%, in 2018 it was 1.52 % and in 2017 1.50% (National Institute of Geography and Statistics (INEGI, 2021). Of the three sectors of the economy, the primary sector, that is, agriculture, animal husbandry and exploitation, forestry, fishing and hunting These are strategic areas in expansion, above all, because in the entity there is an industry in gradual growth; likewise, the secondary sector is transcendental to offer added value to primary products. However, we must bear in mind the problems that Aguascalientes faces regarding the capture and exploitation of water resources (water) in order to guide sustainable technological strategies in municipalities with growth potential in the primary and agro-industrial sectors.

INEGI (2021) indicates that 1.4 million people live in the entity, representing 1.1% of the country's total. Of this total, 84% live in urban areas and 16% in rural areas, with an area of 0.3% compared to the national area. When examining the Module of Socioeconomic Conditions of the INEGI-MCS (2015) it is obtained that, in the entity, there were approximately 341,687 heads of households; and of this total, 5.04% (17,234) indicated carrying out activities related to the agricultural sector.

In 2017, the Non-Economic Active Available Population (PNEAD) in the primary sector reached 33,456 people and 55,497 for 2018 according to the Center for Public Finance Studies (CEFP) of the Chamber of Deputies, (2018). This situation is considered positive since the primary sector has human capital to be included as it begins to demand more labor. In addition, it is pointed out that the distribution of state employment is distributed as follows: 50.5% are paid subordinate formal workers, 5.8% are paid independent formal workers and 43.6% are employed informal workers (of which 29.2% are paid subordinates, 12.4% paid independent and 2.0% unpaid); For its part, the female gender presents high levels of problems framed in employability for the primary sector (CEFP, 2018, p. 29).

Characteristics of the agricultural sector

Regarding the primary sector, in 2019 the agricultural sown area was 128,199.70 hectares (ha) with a production of 2,447,498.88 tons (t) and a production value of 3,543 million pesos at current prices (SADER-SIAP, 2019). It must be recognized that the population dedicated to the primary sector faces daily market uncertainty (supply and demand) that translates into losses in marketing margins due to high transaction costs in agricultural businesses.

According to data from SADER (SIAP, 2018) the state of Aguascalientes, in 2017, reached 3.2 million tons (t) of agricultural production, 15.8 million tons in livestock and 3,763 tons in the fishing sector. These figures place the entity in the 21st place nationwide with a total agricultural production value of 19 billion pesos (current pesos); 29th in the agricultural sector; 8th in livestock and 32nd in fishing.
Regarding bovine milk production, it presented a production value of around 2,670 million pesos (current), which represented 3.78% of national production. For its part, the production of honey produced 29.8 million pesos, generating 652.75 t. Regarding the production of poultry meat, a value of 9,546 million pesos (338,387 t) was generated, which allowed the entity to occupy the 4th place nationwide in this item; egg production generated 143.9 million pesos (7,195.63 t); Bovine meat generated 2,852 million pesos (39,537.3 t; goat meat reached the value of 11.2 million pesos (185.4 t); sheep meat 34.7 million pesos, and pork meat 589 million pesos (table 1).

The reduction of the area dedicated to agriculture in the state (from 105,128 ha in 1980 to 86,427 ha in 2017), shows a gradual loss of land dedicated to seasonal agricultural activity coupled with an increase in the problem of the water deficit. According to Sainz-Santamaría & Martinez-Cruz (2019) they state that in the Aguascalientes Valley there is an extraction of more than 80% above natural recharge, which highlights the need to establish actions and new green technologies to a rational use of this vital liquid. In contrast, the value of real agricultural production increased by 0.57% in irrigation and 3.22% in seasonal (BANXICO, 2020; Base = 100 2QJuly, 2018).

Following the information from SADER (2017b), the participation of women in the value of agricultural production has been maintained in the last three years as follows: in 2015 it was 6%, 2016 6.48% and, 2017 6.12%. For its part, modernization, machinery, process plants and agricultural equipment, represents a real challenge in Aguascalientes due to the needs for efficiency over water resources.

According to SADER (2017) of 100% of the area sown with agricultural products, 93.94% is in mechanized conditions, placing the entity in 25th place in the country. Likewise, of the total of mechanized hectares, only 37.65% corresponds to irrigation and 62.35% to temporary. This reality is in tune with the edaphological characteristics and soils in the 11 municipalities.

On the other hand, it is necessary to consider the importance of soils to generate sustainable and sustainable agriculture. In this case, according to the National Commission for the Knowledge and Use of Biodiversity (CONABIO), Environmental Institute of the State of Aguascalientes (IMAE), Universidad Autónoma de Aguascalientes (UAA) it is contextualized that "In Aguascalientes there are thirteen of the 25 types of soils recognized worldwide.

### Table 1 Agricultural productive characteristics in the state of Aguascalientes (2017)

<table>
<thead>
<tr>
<th>Product</th>
<th>Production value (millions of pesos - mdp-current)</th>
<th>Production</th>
<th>Place it occupies at the national level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine milk</td>
<td>2,670</td>
<td>432,041.01</td>
<td>8</td>
</tr>
<tr>
<td>Honey bee</td>
<td>29.8</td>
<td>652.75</td>
<td>18</td>
</tr>
<tr>
<td>Bird meat</td>
<td>9,546</td>
<td>338,387</td>
<td>4</td>
</tr>
<tr>
<td>Egg</td>
<td>143.9</td>
<td>7,195.63</td>
<td>20</td>
</tr>
<tr>
<td>Beef</td>
<td>2,852</td>
<td>39,537.3</td>
<td>18</td>
</tr>
<tr>
<td>Goat meat</td>
<td>11.2</td>
<td>185.4</td>
<td>23</td>
</tr>
<tr>
<td>Sheep meat</td>
<td>34.7</td>
<td>530</td>
<td>24</td>
</tr>
<tr>
<td>Pork</td>
<td>589</td>
<td>15,207.8</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: Own elaboration based on data from SIAP-SADER, 2017

It is important to note that the entity reached 3,208 million pesos at current prices in the value of total agricultural production in 2017 (data obtained from SIAP, 2018) within an area of 27.24% of the entity's total (143,153.06 hectares - ha- sown) considering autumn-winter OI crops with 9,394 ha, spring-summer PV (115,453.69 ha) and perennials (18,305.37 ha). On the other hand, the entity has various factors (internal and external) that have had a downward impact on trends in the agri-food area planted, such as the lack of credit, profitability, reduced levels of marketing margins for small businesses, producers, climate, low rainfall; Namely, there is a reduction of the surface at an average annual growth rate (TCMA) of -0.53% in the rainstorm cycle and, a precarious increase of 0.43% in the irrigation cycle corresponding to the period from 1980 to 2017.
The most important due to their occupied extension are the Pheozems, Lithosols, Planosols and Xerosols, which together cover almost 80% of the state surface” (National Commission for the Knowledge and Use of Biodiversity -CONABIO-; State Environmental Institute de Aguascalientes -IMAE-; Autonomous University of Aguascalientes -UAA-, 2008, page 29), of this total the types of soils Feozem and Litosol concentrate 42.03% of the total, also being those such as Planosol, Xerosol, Regosol, Cambisols, Luvisol, Fuvisol, Rendzina, Castañozemes, Bodies of water, Ranker, Yermosol and Acrisol.

Regarding the aquaculture sector, the entity contributed only 0.083% of the national fish production in 2014 and 0.93% in 2016; this represented 0.086% and 0.075% respectively considering the value of production in the national total (3.8 million pesos in both years). This situation shows a potential opportunity to establish growth strategies and supply the demand in the central western region of the country with a high demand. The entity has 102 ha of records of facilities for Shadow House, Greenhouse, Macrotunnel, Microtunnel, Pavion, Shadow Roof, Nursery established (SADER, 2015). The production of fruit and vegetables stands out, such as strawberry, zucchini, green chilies (habanero, apple tree, bell pepper, poblano), cucumber, ball tomato, saladette, mainly. Protected agriculture also represents an area of opportunity to increase productivity and profitability levels, mainly to make the water resource more efficient, a situation that affects the entity. The implementation of technological projects in these two sub-branches of the economy will have very positive social effects and impacts for regional development.

Without a doubt, the most valuable of the primary sector in Aguascalientes is its people and its human capital. For this reason, an analysis of the conditions presented by the population engaged in agricultural activities will be carried out below. On these studies, there is evidence that focuses on examining the relationships between development conditions in the primary economic and social sector through logistic regression models, such as (Giannakis et al., 2018); Hernandez - Aguilera et al. (2018).

Methodology

To obtain the analyzes, it was necessary to work with the free access information from the Socioeconomic Conditions Module (INEGI-MCS, 2015) of the National Institute of Statistics and Geography and the Ministry of Agriculture and Rural Development. Those socio-economic variables representative of the agricultural population of Aguascalientes were selected; Likewise, the SIAP-SADER databases were analyzed. A logistic regression model was generated using the Stata® statistical program, where from the survey, the population variables were correlated; such as: vulnerability and food security, levels of education of the head of the household, size of the locality, number of household members, gender, age, mainly, to understand the relationships that households have and their income from direct support to the field (Procampo), Livestock Program (PROGAN), agricultural income, among others. To do this, we resorted to examining related research by other authors (Morales et al., 2000; Gutiérrez & Limas, 2008).

Two tools were used to analyze the information. On the one hand, by means of a logistic regression model, it was possible to determine the effects and probabilities of occurrence that a household has food insecurity because social development is related to the feeding circumstances given certain socioeconomic characteristics; and on the other hand, the food insecurity indicators were generated following the methodology of the Latin American and Caribbean Food Security Scale (ELCSA) proposed by the Food and Agriculture Organization of the United Nations (FAO, 2012). For this, algorithms were built in the Stata® V.24 program to construct the variables from the Socioeconomic Conditions Module (INEGI-MCS, 2015). The ELCSA establishes a classification in households, such as: Security, Slight Insecurity, Moderate Insecurity and Severe Insecurity. This measurement uses 15 questions that classify them into a) households made up of adults, and b) households made up of adults and those under 18 years of age, according to the qualitative response score (Annex 1). For the analysis of the database, the following procedure was followed:
a) A descriptive analysis of the population was carried out with 17,234 heads of households dedicated to agricultural production in Aguascalientes (INEGI-MCS, 2015). It is important to note that the expansion factor was used to create the representativeness of the households under study in the entity.

b) The information from the municipalities on the indicators of marginalization in the population from the CONEVAL (INEGI-MCS, 2015) was considered.

c) A logistic regression model was generated on the population responsible for agricultural households that stated that they were in conditions of prevalence of food insecurity, in addition, variables related to marginalization and socioeconomic characteristics of the sector were examined.

Logistic regression model

To identify the probabilities of occurrence of a phenomenon, it is essential to have tools that facilitate its understanding and relate the socioeconomic variables of the sector with food insecurity. The scientific contribution of this research will be relevant because it can be replicated in other federal entities and will help to study the phenomena that people and households in the agricultural sector present from a multifactorial perspective. In this context, it was necessary to generate a logistic regression model including mainly binary, quantitative and qualitative variables. In Equation 1 the set of selected variables are mentioned and in Table 2 they are described. It should be noted that the dependent variable was constructed from the results of the INEGI-MCS questions, (2015) on the qualitative aspects of household food insecurity and, on the basis of the ELCSA methodology.

\[
PR \left( \text{Insecurity} \right) = \frac{1}{1 + e^{-\left( a + b_1 \text{Age} + b_2 \text{Male} + b_3 \text{Income} + b_4 \text{Education} + b_5 \text{Food} + b_6 \text{Transportation} + b_7 \text{Expenditure} + b_8 \text{Health} + b_9 \text{Education} + b_{10} \text{Transportation} + b_{11} \text{Expenditure} + b_{12} \text{Health} + b_{13} \text{Education} + b_{14} \text{Transportation} + b_{15} \text{Expenditure} + b_{16} \text{Health} \right)}
\]

(1)

Table 2 Variables of the logistic regression model

| Source: Own elaboration data from the National Population Council (CONAPO, 2015); INEGI-MCS (2015) |

The Dependent Variable (insecurity) was formed with the population of heads of adult households and those under 18 years of age dedicated to agricultural activities and who present mild, moderate or severe food insecurity. On the other hand, the independent and relational variables were determined considering variables that seek to explain the objective of this research work. Núñez et al. (2011, p. 504) point out that a “logistic regression model is appropriate when it comes to a binary endpoint […]. The only thing we need to know about the endpoint is whether it is present or absent in each individual at the end of the study." In addition, through this tool it is possible to model the probabilities on the occurrence events based on other factors that influence the dependent variable (Mercado et al., 2012). Odds Ratios are values of the ratio of ratios expressed as the variations in the rate of occurrence of the event given the change in the independent variables (Long & Freese, 2014) (Equation 2).

Results

In the state of Aguascalientes there are 17,234 heads of households dedicated to agricultural businesses, of which 93.95% are led by a male head of household (16,192) and 6.05% by a female head of household (1,042).
The highest concentration of households according to the educational training of the head of the household is observed in those with incomplete primary (34.99%, with a total of 6,030), followed by households with completed primary (25.15%, 4,335), complete secondary (24.56%, 4,232), incomplete secondary (6.58%, 1,134), without instruction (5.16%, 890), incomplete professional (2.36%, 407), complete high school (1.20%, 206), according to data examined from INEGI-MCS (2015).

When classifying the dwellings by the number of members, it is evident that as the number of members increases, the socioeconomic challenges also increase; namely: households with 6/10 members are characterized by obtaining, on average, lower income from sales in agricultural production, mainly in the case of female heads of household compared to households with 1/5 members ($700 versus $12,378 quarterly pesos). On the other hand, the percentage of total quarterly income derived from agricultural activities is reduced to 29.98% for households with 6/10 members, in contrast to those with 1/5 members (35.26%); likewise, the average age is 49 years versus 57, respectively. On the contrary, the levels for quarterly income received by the population in the agricultural sector of the entity in government benefits are, on average, in a range of $2,453 and $2,050 pesos (quarterly currents) (data obtained from the analysis of the INEGI-MCS, 2015).

Of the total population dedicated to agricultural activities that has no education, there are 890 heads of households, of this total, 572 households have a destination for drainage to the public network and 318 have a pipe that will lead to a ravine. It should be noted that the total has a daily supply of water, in contrast, with 3,704 agricultural households whose supply of water has every third day. It is important to highlight that in the entity a very particular phenomenon occurs with the population that does not have educational instruction since the 890 households dedicated to primary activities present food security; This reality shows the dedication that the population has to its activities regardless of educational levels.

Regarding food security for adults and children under 18 years of age, the distribution behaves as follows: food security with 10,956 heads of households representing 63.57%, mild food insecurity 3,992 (23.16%), moderate food insecurity 1,491 (8.65 %) and severe food insecurity 795 (4.61%) (data obtained from the INEGI-MCS analysis (2015)).

The results of the logistic regression model between the variables specified as dependent and independent are shown in Annex 2. With a confidence level of 95%, the model is significant if p <= 0.05. In this case, it can be seen that the relationship between the coefficients of the model and the probability of finding a household in food insecurity (moderate, mild, severe) is $\text{Prob} = \text{Chi2} = 0.000$, which means that it is statistically significant. On the other hand, the Pseudo R2 = 0.436, this is 43.6%. With this, it is recognized that the model fits the data and the analysis continues.

The frequency of occurrence of an event is represented by the Odds Ratio (OR), then it can be noted that households with occupants in homes without drainage or toilet where the head of household (Od) lives increases the food insecurity ratio by 5,133 times, keeping the other variables constant (p <0.01). Similarly, households with water supply every third day (Da) increase the OR ratio of food insecurity with a factor of 3,764 times, representing a vulnerable sector in society. Likewise, for each additional unit of household member (Tr), the OR ratio increases by 2,055 times the prevalence of being food insecure in the entity.

In Annex 2, the columns of the OR coefficients, value (z), probability (P>|z|) of each of the analyzed variables are shown. In addition, changes in the reasons for an increase in the independent variable of a standard deviation (% StdX) and the percentage change levels (%) are appreciated. It stands out that those households located in municipalities with high levels of occupants in homes without electricity where the head of the household lives, the percentage of having food insecurity (Oe) increases greatly by 413.3%, as well as those families that have an agricultural business (Ig) 276,400% and with members of the household who are 65 or over (P6).
This situation highlights that families engaged in agricultural activities and businesses have problems, which may be due to a low profitability of the activities (this hypothesis places a line of research that could be addressed for a later study). The correct classification of the model is 86.21% (See Annex 3).

Discussion

Town hall

The targeting of public resources destined for agricultural and industrial social development in the entity must be generated based on a logic of addressing specific problems with the participation of the subjects - objective, in this case, with the small agricultural producers and their families. As mentioned by Daidone et al. (2019, p. 1042) "The results provide some indication of the conditions that allow cash transfer programs to have a stronger effect on transforming livelihoods and increasing productive activities." For this, it is necessary to have individualized information by locality and sub-branch, in order to be more effective and efficient with resources.

Social value

Undoubtedly, the agricultural sector in Aguascalientes presents high transaction costs generated by multiple factors, among them, the lack of quality basic services, disjointed value chains and lacks of infrastructure and investment coupled with an asymmetry of basic and useful information for which producers in different areas of knowledge. This reality is not alien to the contexts of other states and even other Latin American countries. In this context, it is necessary to strengthen social innovation and generate more value for agri-food products by increasing the income and well-being of families that are engaged in primary activities. Hamann et al. (2019, p. 1) indicated in their study in Colombia that “In the case of the agricultural sector, institutions and policies that affect economic agents in a homogeneous way (without causing distortions in relative prices) are more important […]”.

Evaluation

Undoubtedly, the measurement, monitoring and evaluation of public policy actions should not be subject to a single abstract and absolute indicator in the case of monetary amounts. The contribution of this research work is to generate other forms of information integration to examine in an interdisciplinary and multifactorial way the variables that surround the progress and development of agricultural primary and industrial activities. This work is only a contribution to knowledge in this new reality and circumstances in which the country is going through, in terms of transparency and efficiency of public resources.

Conclusions

It is paradoxical that the population that carries out agricultural activities presents significant levels of food insecurity. Therefore, it is proposed to create an incentive system to increase income to this sector, mainly those who live in rural areas to increase their level and well-being.

There is evidence of a reduction in income derived from primary activities and, this is in tune with the loss of competitiveness of most primary products, especially when economies of scale are small.

It is imperative to establish agricultural social public policies to improve urban and rural infrastructure in quality basic services, especially in localities dedicated to agricultural activities.

It is proposed to replicate, in the states, the logistic regression model considering the economic and social variables and their relationships with food insecurity for the population of the primary sector.

Acknowledgments

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Conclusions

The state of Aguascalientes is an entity that maintains sustained growth based on the automotive industry. However, it is essential to diversify risk and competitive capacities between sectors of the economy, mainly towards agricultural and agroindustrial activities. For this, it is important to establish a system for targeting resources towards new technologies and process innovation to increase productivity and competitiveness, both in the small scales of productive units, medium and large related to food to supply national and international demand. of the sector. In this context, the entity has comparative advantages by strategically positioning itself in a geographic space where there is a great demand for food in general.

Among its main challenges is to make efficient and rational use of the water resource, which is sorely lacking in most of the productive units of the municipalities. For this reason, it is essential to generate public policy strategies aimed at strengthening productive units with a high deficiency rate through protected agriculture in most producers in rural areas. Undoubtedly, the entity has an important base of human capital that needs to find opportunities through new jobs, mainly, with the more active participation of women dedicated to primary and transformation activities in the sector.

On the other hand, it is necessary to generate collaboration networks between the different Public Research Centers, Universities, Technological Institutes, among others, that are located in the entity, to encourage collaboration synergies and high-impact social-technological projects that are useful for small rural producers. In the different sub-branches of the primary sector, the livestock sector stands out; However, there are opportunities to increase the aquaculture production area, but, above all, to include industrial processes to add value to primary products, mainly among cooperatives and rural social organizations.

With regard to social investment, it is necessary to focus resources on modernization systems for local infrastructure in the collection of water, sustainable use of products according to the needs and requirements based on soil conditions, establishment of new technological packages for each of the agricultural products systems in the entity.

Likewise, it is necessary to invest in intangible issues related to productive empowerment, organization and integration of production chains through local agricultural actions and policies with the participation of stakeholders in general, social innovation, social and solidarity economy systems.

Annexes

Annex 1

Classification cut-off points in food (in) security according to type of household

<table>
<thead>
<tr>
<th>Type of household</th>
<th>Classification of food (in) security</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mild insecurity</td>
</tr>
<tr>
<td>Households composed only of adults</td>
<td>0</td>
</tr>
<tr>
<td>Households made up of adults and children under 18 years of age</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: FAO, 2012

Annex 2

Results on percentage changes in Odds Ratios

b = crude coefficient

\( z = z\text{-result for proof of } b = 0 \)

\( P > |z| = p\text{-value for } z\text{-test} \)

\% = The percentage change in probabilities for the unit increases by X

The% StdX = Percentage change in probabilities by SD increase by X

SDofX = Standard deviation (SD) of X
Annex 3

Logistic model of the household study

<table>
<thead>
<tr>
<th>Classifications</th>
<th>D</th>
<th>~D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>4,654</td>
<td>874</td>
<td>5,528</td>
</tr>
<tr>
<td>~</td>
<td>1,322</td>
<td>9,070</td>
<td>10,392</td>
</tr>
<tr>
<td>Total</td>
<td>5,976</td>
<td>9,944</td>
<td>15,920</td>
</tr>
<tr>
<td>Classified &amp; Pr predicted Pr (~D) &gt;= 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
<td>Pr (+</td>
<td>D)]</td>
<td>77.84%</td>
</tr>
<tr>
<td>Precision</td>
<td>Pr (+</td>
<td>D)]</td>
<td>91.21%</td>
</tr>
<tr>
<td>Positive predictive value</td>
<td>Pr (+</td>
<td>D)]</td>
<td>84.10%</td>
</tr>
<tr>
<td>Negative predictive value</td>
<td>Pr (+</td>
<td>D)]</td>
<td>87.28%</td>
</tr>
<tr>
<td>False + true rate for + D</td>
<td>Pr (+</td>
<td>D)]</td>
<td>8.79%</td>
</tr>
<tr>
<td>False – true rate for ~ D</td>
<td>Pr (~</td>
<td>D)]</td>
<td>22.12%</td>
</tr>
<tr>
<td>False + true rate for ~ D</td>
<td>Pr (~</td>
<td>D)]</td>
<td>15.81%</td>
</tr>
<tr>
<td>False – classification fee</td>
<td>Pr (~</td>
<td>D)]</td>
<td>12.72%</td>
</tr>
<tr>
<td>Correctly classified</td>
<td></td>
<td></td>
<td>86.21%</td>
</tr>
</tbody>
</table>

Source: Own elaboration based on the logistic regression model

References


Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO); Instituto del Medio Ambiente del Estado de Aguascalientes (IMAE); Universidad Autónoma de Aguascalientes (UAA). (2008). La Biodiversidad en Aguascalientes: Estudio de Estado. https://archive.org/details/biodiversidaden00Av il


