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Cattle management plan. Experience with communal lands holder

Plan de manejo ganadero. Una experiencia con communal lands holder

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Abstract

A systematization of a workshop course that took place in 2018 in the ejido of Nuevo Ideal, Durango, with the aim of agreeing actions to start a management plan, is presented. The workshop derived from work done to provide producers with tools and techniques that are useful for livestock exploitation, in addition to raising awareness of the need for actions for the protection and conservation of the natural resources offered to them by summer pasture ecosystems. The workshop was designed with five themes: Our Ejido, Livestock Management Plan, Grazing System, Infrastructure and Agreements. It is important to note that the agreement between PRONATURA northwest and the ejido for the implementation of a program that will help in the grazing system was the product of the workshop. The document is divided into three parts: Ejido, Design and implementation of the workshop, and Conclusions.

Course-workshop, Rural environment, Communal lands holder

Resumen

Se presenta la sistematización de un curso taller que se llevó a cabo en el año 2018 en el ejido de Nuevo Ideal, Durango, con el objetivo de acordar acciones para iniciar un plan de manejo en su ejido. El taller se deriva de un trabajo realizado para ofrecer a los productores herramientas y técnicas que son útiles para la explotación ganadera, además de concientizar sobre la necesidad de acciones para la protección y conservación de los recursos naturales que les ofrecen los ecosistemas del agostadero. El taller se diseñó con cinco temas: Nuestro Ejido, Plan de Manejo Ganadero, Sistema de Pastoreo, Infraestructura y Acuerdos. Es importante destacar la toma de acuerdos entre PRONATURA del noroeste y el ejido para la implementación de un programa que ayudara en el sistema de pastoreo fue el producto del taller. El documento se divide en tres partes: Ejido, Diseño e implementación del taller y, Conclusiones.

Curso-taller, Medio rural, Communal lands holder

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Introduction

The territory of the United Mexican States, better known as Mexico, is divided between 32 federal entities, of which Durango is one of them, being the fourth largest state in the Mexican Republic, it is subdivided into 32 municipalities, thanks to its extension and variety of climates and orography, the State allows its division into four regions: semi-desert, valleys, mountains, and ravines (Jiménez and Medina, 2011).

Nuevo Ideal is located in the region of the valleys, adjacent to three municipalities: Santiago Papasquiaro, which is located from the north to the west; Coneto de Comonfort, from the north to the east and Canatlán from the east to the south.

Durango has 1,118 ejidos and communities registered with the Ministry of Agrarian, Territorial and Urban Development (SEDATU, 2019), of which 29 belong to the municipality of Nuevo Ideal, where there is an ejido with the same name, and it was where it was carried out. the work experience that is systematized in this article.

Ranchers were offered a workshop with the objective of agreeing on actions to initiate a livestock management plan in their ejido. This workshop was important because it was part of a larger project where the objective was to offer the producers of the ejido of Nuevo Ideal, Durango, the tools and techniques useful for livestock exploitation, seeking above all to raise awareness of the need to apply protection and conservation of the natural resources offered by the ecosystems of the rangeland and with the workshop all the previous work was completed.

For this, several phases were carried out, from the collection of maps in the area, visits to the farm, to identify livestock, critical grazing points, impact on their development or recovery, in addition to sampling in the rainy season and comparing the grassland growth and development.

It is worth mentioning that this work was financed by PRONATURA northwest.

The document is divided into three parts: Ejido, which explains what an ejido is, its legal characteristics and the place where the work was carried out is dimensioned; Design and implementation of the workshop, where the structure and development of the workshop and the last part of Conclusions are explained, where the findings, agreements and what was observed during the workshop process, which was not part of it, are discussed.

Ejido

To contextualize the ejido, it is important to mention that it deals with agrarianism and communal lands, which are important not only for Mexico but for the entire world, since even the United Nations Food and Agriculture Organization, known as FAO for its acronym in English, commented since 2007 that although its conferences had decreased since 1979, “agrarian reform continues to be an important instrument for providing land to poor people in some countries” (Id. Ibid., p. .2) issuing guidelines for grazing reserve, agricultural exploitation and gender issues in land titles.

In Mexico, in accordance with article 27 of the Political Constitution of the United Mexican States (CPEUM) (1917), the bases for the acquisition and use of lands and seas are established, in addition to recognizing the forms of ejido and community.

For this, it is considered that an ejido is “a society of social interest, made up of Mexican peasants by birth, with an initial social patrimony made up of the lands, forests and waters that the State gives them free of charge as property” (Ruiz, 1990, p. 245), who is part of the ejido is known as ejidatario, and the communities are defined as the “population nucleus with legal personality and holder of agrarian rights (...) over their lands, pastures, forests and waters (...), which function according to the principles of internal democracy, cooperation and self-management according to their traditions and customs ”(Id. Ibid., p.236), who make up the communities is known as comunero.

According to the Agrarian Law [LA] (1992), the ejidos, in addition to having legal personality and their own patrimonies, the communal lands holder are owners of their lands, they must operate with internal regulations and register them in the National Agrarian Registry, there they must establish "The requirements to admit new communal lands holder, the rules for the use of common use lands, as well as (...) the others that each ejido considers pertinent" (Article 10)

Each ejidatario must make a list of heirs and register it before the National Agrarian Registry or before a notary public or notary public, in case of not doing so, his rights would be registered with the following order of preference: "to the spouse; to the concubine or concubine; one of the sons of the ejidatario; to one of his ancestors; and to any other person who is financially dependent on him "(L.A., 1992, article 18).

The organs of the ejidos considered in the Agrarian Law (1992) are:

- Assembly. Considered as the supreme body and where all the communal lands holder participate, decisions are made there for the benefit of the communal lands' holder.
- Commissariat ejidal. He is the one who executes the agreements of the assembly, and they are made up of a president, a secretary and a Treasurer with their respective alternates. They are elected in assembly, with a duration of three years.
- Supervisory Council. It is also made up of a president and two secretaries with their alternates, elected in assembly and for a duration of three years.

Ejido lands are divided into those that are destined for human settlement, those of common use and parceled lands (Id. Ibid.). The Nuevo Ideal ejido has 439 landowners, all of whom have the right of common use, but only 41 communal lands holder exercise that right. Of the 100% of the ejido surface, only 48% is suitable for cattle grazing, taking as a reference slopes less than 30%, considering that on higher slopes the cattle do not gain weight and lose energy in search of their food.

The ejido is located in the municipality with the same name, with an elevation that ranges between 2,073 and 2,879 meters above sea level; It has a grazing area of 1000 hectares, where approximately 600 animals are fed, of which 400 individuals are adults with a weight per individual between 600 and 800 kg. Some producers have equine cattle, and they do not have or apply a pasture management plan, they only take the animals in the month of May and lower them in December; for its management in the pastures of land for crops feeding on waste, stubble or some grasses that remain after sowing.

The Ejido Nuevo Ideal has several climates semi-dry temperate, temperate subhumid with rains in summer and semi-cold subhumid with rains in summer. The rainfall regime has its maximum precipitation of 100 to 180 mm in the months of June to September, while the period with low rainfall that is usually less than 20 mm occurs between the months of November to May.

The main species of vegetation identified are grasses (grasses), ferns, cacti, organs, biznagas, nopales, agaves, maguey sotol, huizaches, thorny bushes, manzanillos, oaks, tepozanes, táscate, mint and strawberry trees agave lechuguilla that is elusive, but it has little forage utilization. During the differentiation of the pastures in the pasture, the species of grass were detected: bermuda, pángola, barbón, foxtail, black grass, blue grass, medium fastuca, pink, navajilla and roder.

The hydrological zones are in very remote places in relation to the grazing sites of the animals, so they have to travel very long distances to meet their water needs, causing damage in hot season with subsequent consequences of dehydration and / or death in those with little physical resistance. In this way the animals generate a stay near the water holes, impacting on the soil structure, causing a phenomenon called compaction, which affects the retention, permeability and filtration of water.

Workshop design and implementation

The workshop was designed with the objective of agreeing on actions to initiate a livestock management plan for the Nuevo Ideal ejido, to which the following structure was established:

- Framing. To get to know the communal lands holder, their assistance interests and make decisions on how to carry out the workshop.
- Our Ejido. With the aim of making the communal lands holder aware of what their ejido is, the characteristics of the livestock they have and the species of pasture they have.
- Livestock management plan. To inform the communal lands holder of the livestock management plan and help them to make agreements.
- Grazing system. Where the communal lands holder is made aware of the proposed grazing system.
- Infrastructure. They are made aware of the infrastructure required for the implementation of the grazing system within the livestock management plan.
- Agreements. The communal lands holder is assisted to establish agreements to carry out the livestock management plan.

After preparing the descriptive letter corresponding to the course, its approval was requested, and it was implemented with the communal lands' holder.

The workshop was attended by 22 communal lands holder, of which 19 had livestock (the information on whether the attendees were all communal lands holder who had livestock, or if some were missing is unknown). This allowed the organization of 3 permanent teams according to how they felt comfortable with the other members,

At the beginning of the workshop, during the Framing, the communal lands holder were asked to introduce themselves and mention the reason (s) for which they were summoned or were there, in addition to reaching agreements that during the workshop the opinion of the residents would be respected. In addition, all those present committed themselves to participate in the activities and it was decided that instead of having long breaks, each one could get up during the work session to enjoy coffee or simply to stretch their legs.

After announcing the objective of the workshop, in the first topic Our ejido, an extract of the Agrarian Law was worked on as a team: team 1 read articles 9, 10 and 11 that deal with the internal regulations and provisions for exploitation collective of the ejidal lands, mentioning that the decisions are resolved through the assembly. Team 2 read articles 21, 22 and 41, which establish the organs of the ejidos, emphasizing the functions of the commissariat, with respect to the registry book and the integration and operation of community councils, which should be established in their regulation. In team 3, articles 43, 44 and 45 of the law were reviewed, where the types of land in the ejido are established, in addition to mentioning that these can be the object of an exploitation contract, as long as it is carried out by the ejidal population and no older than 30 years. In plenary, all the teams established that they are an ejido, making it clear that, although they have their differences, it is important to discuss it among themselves.

For the second issue of Nuestro Ejido, the characteristics of the cattle were reviewed, showing images of six types of cattle: Aberdanangus, Angus, Beer master, Brangus, Cebu Brahmán and Charoláis, where they are asked to identify how much cattle they have among those who make up the team, resulting in that most have Charoláis, and they added the Criollos that did not come in any image presented, (See table 1).

Cattle breed	Number of livestock per team			Totals
	Team 1	Team 2	Team 3	
Calf	1	15	43	59
Aberdenangus	2	0	24	26
Angus	35	0	0	35
Beef master	4	1	30	35
Brangus	0	20	0	20
Zebu Brahman	9	0	0	9
Patent leather	88	3	480	139
Criollos	0	64	29	93

Table 1 Number of cattle by teams and race.

Source: Own creation with information from the workshop

They were also asked to write what the average weight is for each breed, so it was observed that the Brangus is the heaviest and there is a wide variation between the Criollos and the Beef master, (see table 2).

Cattle breed	Approximate weight per breed in Kg			Average weight
	Team 1	Team 2	Team 3	
	Calf	350		
Aberden Angus	350		400	375
Angus	350			350
Beef master	350	600	400	450
Brangus		756		756
Zebu Brahman	350			350
Patent leather		400	450	400
Criollos	0	640	350	495

Table 2 Average weight of cattle by breed in kg.

Source: Own creation with information from the workshop

In the third activity of our ejido, the communal lands holders were asked to identify the type of pasture that their lands have, showing images of those that were registered, but between team 1 and team 3 they only identified 5 hectares of pink grass. and 5 hectares of Navajita grass, also when they were asked to write if they knew of another grass that was not among the images, these two teams identified in the parceled hectares:

- Zacate Johnson: 13.5 hectares.
- Zacate Grama: 43 hectares.
- Chinese grass: 28 hectares.

Regarding the lands considered as common use, team 1 and team 2 indicated the following:

- There are 1000 hectares of grass grass.
- There are 2,600 hectares distributed in three types of grass: foxtail, grass and Chinese, with 6.7 hectares remaining per ejidatario ¹.

In covering the pasture, 3 questions were reflected on: What benefits do I obtain from cattle? What do I need to get better results? Is the grass eaten by the cattle in my ejido enough?

They were asked to reflect on the questions for themselves so that the answers could be written, but when they read the third question in unison, they answered that the grass eaten by cattle in their ejido was not enough.

Afterwards, five more questions were presented, which they worked as a team presenting their answers in Table 3.

Question	Team 1	Team 2	Team 3
How much grass does a cow require to feed itself properly?	One hectare per cow on flat land and 10 hectares on hilly land per cow	10% of your weight, if you weigh 400 kg you require	20 kg in daily green
Is the amount of grass on my property enough?	No	No	No
If we add the cows that are owned and the grass that is compared, is it enough for the total number of cows?	No	No	No
If a cow dies of hunger, whose problem is the owner or the ejido?	From the owner of the cattle	From the owner of the cattle	Of the owner
If there are feeding problems with cattle, when is it the ejido's problem and when is it the owner's problem?	It is the problem of the ejido when there is no support and of the owner when he does not give adequate attention to the cattle.	It is a problem for the ejido when there is over-exploitation of common use land. Food is the owner's problema	Personal problem

Table 3 Question and answers by teams regarding the diagnosis of grassland cover

Source: Own creation with information from the workshop

At the end of these activities, the decision is made in plenary to join the issues of grazing systems with the livestock management plan, where the issues are explained to the communal lands holders and it is proposed that they can feed their livestock with hydroponic forage during the dry season.

¹ The members of team 2 divide 2,600 hectares between 388 communal lands holder

The Infrastructure explains that it would require the construction of a space, where it is suggested that at least 200 cows get together to graze during the months of June and July, so that the opportunity is provided for the grazing areas in the part middle and upper part of the ejido are recovered, and to delimit at least a first pasture.

It is worth mentioning that the representative of PRONATURA northwest offered the institution financial support for its construction. At the end of the workshop, the communal lands holders discussed the boundaries and identified the delimited area, suggesting that an assembly meeting be scheduled to make the proposal, since the construction was proposed in a common area, an assembly was necessary for the decision final, and they were organized with 2 communal lands holders who would present the proposal in the assembly.

Acknowledgments

PRONATURA northwest is thanked for its financing and without which this process with the farmers would not have been concluded.

Conclusions

At the end of the workshop, the objective of reaching an agreement was achieved, especially that they were aware that the way in which they are grazing their cattle is not working as they expected, despite the fact that it was desirable that the Decisions were made at the end of the workshop, this was not possible, due to the regulations that prevail in the ejidos.

It is important to mention that, of those attending the workshop, a third did not know how to read or write, one of them had hearing problems, so he took his son to do or help him with the activities, another was the first one time he attended an ejido meeting, and another one attended with walking problems.

Despite these difficulties and the fact that the room where the workshop was located did not have the necessary acoustics for good listening, its ceiling was made of sheet metal and it was raining very hard, the communal lands holders showed solidarity and support for the attendees, they read to them, they They helped to understand legal concepts, among other actions that made the workshop run successfully.

Regarding the breed of cattle, it was found in the workshop that the largest amount is between Charolais and Criollas, of which, according to their own report, they have an approximate weight of 400 and 495 kg per head, which is not coincides with what was reported by the veterinarian who reports that "400 specimens are adults with a weight per individual between 600 and 800 kg" that is because, if the 59 reported calves are counted, they add up to 416 animals and the average does not reach 600 kg.

It was also observed that a team mentions that there are 1000 hectares, which coincides with the first report received, but one team mentions 2,600 hectares, mentioning that this is in common use, but when making the division, the team performs it between 388 communal lands holder instead of 439 that was initially reported, which implies a lack of knowledge in the total of the holder communal lands and the total of hectares that are of common use or parceled out.

The communal lands holders were aware of the need for a livestock management plan, that they need to agree to graze the cows, so that everyone benefits, which means changing routines and sharing delimited areas among their livestock.

It was interesting to note that some ranchers were hesitant to accept financial support and spend it where recommended (on an electric fence), but they agreed that the decision had to be made in the assembly, so it was not possible to decide at that time.

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Education and development factors for social welfare

Educación y desarrollo factores para el bienestar social

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Abstract

This article addresses education as one of the factors that limit or encourage the development of regions; the objective is to analyze the relationship between education and development in one of the municipalities of the state of Guerrero, so quantitative methodology tools were used, which led to a diagnosis in the study municipality, as well as statistics from sources. UNDP High Schools, Global Competitiveness Report, Organization for Economic Cooperation and Development, which allowed to frame and identify the level that Mexico saves and therefore the state of Guerrero internationally at the educational levels. The research results reveal low educational levels which has limited development in the municipality.

Resumen

El artículo aborda la educación como uno de los factores que limitan o propician el desarrollo de las regiones; el objetivo es analizar la relación que existe entre educación y desarrollo en uno de los municipios del estado de Guerrero, se utilizaron herramientas de la metodología cuantitativa lo que consintió levantar un diagnóstico en el municipio de estudio, así también se tomaron estadísticos de fuentes secundarias del PNUD, Global Competitiveness Report, Organization for Economic Cooperation and Development, lo que permitió enmarcar e identificar el nivel que guarda la República Mexicana y por ende el estado de Guerrero a nivel internacional en los niveles educativos. Los resultados de la investigación revelan bajos niveles educativos lo que ha limitado el desarrollo en el municipio.

Education, Development, Poverty

Educación, Desarrollo, Pobreza

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Introduction

Education is one of the parameters that allow societies to observe their development and progress by enriching attitudes, knowledge and values that allow people to empower themselves and actively participate in the decisions that are made in the community, which copes with processes of improvement in families by linking them, this being the generator of development and not an effect or cause of it. Unesco (2013).

The increasing diversification of access to education, especially in the twentieth century, has been perceived as one of the most noticeable characteristics of modern countries (Meyer et al., 1992: 129-149), which is the result of the different strategies that international organizations have been implementing, Strengthening the extension and promotion of education such as the Dakar Global Forum on Education in the Dakar Framework for Action (2000), "Education for All: Our Common Commitments," however it is relevant to be able to carry out an analysis of the impacts that have been had on Latin American and Caribbean countries in education and above all what has been their consequence in Mexico as a factor of development conditions in the population.

Authors such as Didriksson (2012), Ortega & Casillas (2013), and Acosta (2014), set out the issue of higher education from the perspective of its evolution, proposals for the future, the quality of teacher performance and taught programs, as well as funding and teaching in research, where Didriksson approaches it from the perspective of Latin America, as the other two authors focus on the country of Mexico.

Global education trends

The insertion of young people who graduate from their studies into the labour market is a concern that is lived daily in each of the countries, since only those who are better qualified and with sufficient skills manage to put the most in a job, that is why education is not only a problem of the state but a problem that involves the whole of society; according to UNESCO Director Irina Bokova in the introduction of the World Education Monitoring Report 2017 – 2018, she says that the population is very little involved in education systems by mentioning:

"Everyone has a role to play in improving education. This begins with citizens, with the support of civil society organizations and research institutions, which point to gaps in quality and equitable education".

The importance of assigning better budget ceilings for education is a way to have better technological tools and greater training that allows graduates to strengthen skills and acquire knowledge that responds to the globalized and contemporary world that demands it, leading to better opportunities for citizens.

According to the Annual Global Competitiveness Report 2017-2018" the ranking of the best-educated countries in the world was released (Table 1), which warns of the absence of the countries that make up Latin America and the Caribbean, which leads to a retrospective of the quality of education offered to young people, as well as the commitment for citizens as to their level of well-being.

The evaluation is carried out considering variables such as:

1. The time it takes for people to complete their college education or equivalent.
2. Questions to the social actors (entrepreneurs) of each country, about how much it covers the education provided to graduates in relation to the competitive needs that they demand.

The score ranges from 1 to 7, where 1 is the lowest parameter and 7 is the highest, with Switzerland and Singapore being observed (in Table 1), that the two countries best assessed and meeting the expectations of the business sectors are Switzerland and Singapore.

	Country	Punctuation 1-7 (best) 2018	IDH	HDI rating
1	Switzerland	6.1	0.939	Very high human development
2	Singapore	6.1	0.925	Very high human development
3	Finland	5.9	0.895	Very high human development
4	Netherlands	5.8	0.924	Very high human developmen
5	United States	5.7	0.920	Very high human developmen

6	Qatar	5.7	0.856	Very high human development
7	Canada	5.6	0.928	Very high human development
8	New Zealand	5.5	0.915	Very high human development
9	United Arab Emirates	5.5	0.840	Very high human development
10	Denmark	5.4	0.925	Very high human development

Table 1 Countries with the best quality of education in the world

Source: Own with data del Global Competitiveness Report 2017–2018 y el Informe sobre Desarrollo Humano 2015 - 2016 PNUD

The ten countries considered to be the best quality of education worldwide in the Global Competitiveness Report, they show very high human development rates, this index created by the United Nations Development Programme (UNDP), determines the level of development that countries in the world have, which allows not only to know the level of economic income of a country's population, but also to assess the state it holds, by providing its citizens with environments where they can develop a better project and living conditions.

Therefore, better education provides for greater opportunities for project development and prosperity conditions, linking that a society with high levels of education tends to achieve better levels of social welfare and economic growth, shortening economic and social inequalities while fostering their strengthening.

Education in Latin America and the Caribbean

Authors such as Hanushek & WöBmann (2007) and Dante Canlas (2016) agree that investing in education is essential because it promotes the development of countries, because human capital is a priority factor in strengthening economies and boosting growth, so lack of resources and budget ceilings for this area creates unflattering conditions for their citizens. In Latin America, however, pedagogical entities have many shortcomings.

According to Schwartzman (1999), he acknowledges that educational institutions in Latin America have difficulty responding satisfactorily to the requirements to offer greater access to higher education since governments, despite all the needs that exist, allocate the same resources and in some cases these, tend to be cut down by committing the quality of education, transparency in the functioning and results of them so that education is a component that produces improvement in the lives of citizens of a society and educational progress leads to a development which has a reciprocal relationship (Chabbott and Ramirez, 2006).

Of the countries best evaluated in Latin America and the Caribbean, Costa Rica, Trinidad and Tobago and Jamaica stand out, which are among the top three places with the best educational quality in Latin America and the Caribbean (Table 2). Mexico, on the other hand, ranks ninth only above Peru. Globally, however, they rank 30, 43, 48, 102 and 115 respectively, denoting the gap in opportunities and social welfare of these countries with respect to the former in Table 1.

It can then be a series of deficiencies and lack of development in Latin American and Caribbean countries and therefore a population facing fewer opportunities, greater poverty and poverty, since they do not meet the expectations and demands of the productive and business sectors.

	Country	World Ranking	Rating 1 - 7 (best) 2018	IDH	Classification
1	Costa Rica	30	4.8	0.776	High human development
2	Trinidad and Tobago	43	4.5	0.780	High human development
3	Jamaica	48	4.4	0.730	High human development
4	Chile	62	4.1	0.847	High human development
5	Uruguay	73	3.9	0.795	High human development
6	Colombia	77	3.8	0.727	High human development
7	Argentina	85	3.8	0.827	High human development
8	Panama	90	3.7	0.788	High human development
9	Mexico	102	3.5	0.762	High human development
10	Peru	115	3.3	0.740	High human development

Table 2 Top 10 Countries with The Best Quality in Education in Latin America and the Caribbean

Source: Own with data del Global Competitiveness Report 2017–2018 y el Informe sobre Desarrollo Humano 2015 - 2016 PNUD

Mexico education overview

According to the Organization for Economic Cooperation and Development (OECD, 2016), the average annual gross income per full-time employee per capita in Mexico is \$15,311, while the OECD average is \$44,290 per year, i.e., Mexicans' revenues are 65 percent below comparatively on average with those countries, resulting in a deficit of \$28,979 per year.

The agency refers that in Mexico there is 64% in terms of low educational achievement and low grades in the Evaluations of the Programme for International Student Assessment (PISA); In terms of cognitive skills, only thirty-four percent were obtained, considered to be a comparatively high percentage of people suffering from deficiencies.

Likewise, the National Council for the Evaluation of Social Development Policy (CONEVAL 2015) shows figures where poverty has undergone changes in an unscreitionally in the last six years, as shown in Table 3. In 2016, 43.6 percent of the population is in poverty and 50.6 percent have an income below the welfare line. Barceinas (2005) reveals that households where there is a higher level of income are allocated, because heads of households have a high level of education, so it is essential for the author to have higher educational levels in order to have an impact on higher incomes and development in the population, which impacts on poverty reduction and quality of life improvements.

Paul Krugman (newspaper El Financiero 25 March 2014), Nobel Prize in Economics 2008, it states that one of the reasons why Mexico's economy remained stagnant for more than 10 years was because of the low level of education, but it also refers to the different economies in this country, indicating that the development of the northern states is superior to the southern states, which causes different Mexico's for citizens and thus the generation of poorer regions compared to others.

It also indicates that this affects greater purchasing power (those in the north), attributing it to the greater education budget in the border strip, which denotes disparities from one region to another and thus opens up a gap in development opportunities and conditions in the country.

Education in Guerrero

Who was Undersecretary of Higher Education in Mexico, Rodolfo Tuirán at the Newspaper La Jornada (2011), said that in Mexico only 20% of the most poverty-free young people in the country manage to access higher education, while those with the highest incomes are more likely (four times more) to pursue a college degree, I also assure you that the states with the lowest educational coverage after Querétaro are Chiapas and Oaxaca with 18 percent and Guerrero with 19 percent, which condemns young people to have job insecurity, low productivity and lower income, insufficient level of well-being and poor development, leading to exclusion and marginalization, as well as according to CONAPO 2015 data, the three states of the Mexican Republic with the highest margining rate are Guerrero, Chiapas and Oaxaca.

According to a report by the National Institute of Geography and Statistics (INEGI), corresponding to the second quarter of 2018, 12.5% of the economically active population works in the primary sector, i.e., 6.7 million Mexicans; In addition, in the states of Oaxaca, Guerrero and Chiapas located in the southeast of the country, it is where a greater population with incomes below five minimum wages is concentrated, which leads to lower well-being and social inequalities.

Indicators	Percentage, number of people in poverty 2010-2016							
	United Mexican States				Millones de personas			
	2010	2012	2014	2016	2010	2012	2014	2016
Poverty								
Population in poverty	46.1	45.5	46.2	43.6	52.8	53.3	55.3	53.4
Population in moderate poverty	34.8	35.7	36.6	35.9	39.8	41.8	43.9	44
Population in extreme poverty	11.3	9.8	9.5	7.6	13	11.5	11.4	9.4
Population vulnerable to social deficiencies	28.1	28.6	26.3	26.8	32.1	33.5	31.5	32.9
Vulnerable population by income	5.9	6.2	7.1	7	6.7	7.2	8.5	8.6
Non-poor and non-vulnerable population	19.9	19.8	20.5	22.6	22.8	23.2	24.6	27.8
Welfare								
Population with income below the minimum welfare line	19.4	20	20.6	17.5	22.2	23.5	24.6	21.4
Population with income below the welfare line	52	51.6	53.2	50.6	59.6	60.6	63.8	62

Table 3 U.S. Mexican Poverty Measurement Comparison, 2010 - 2016

Source: Consejo Nacional para la Evaluación de la Política de Desarrollo Social 2015

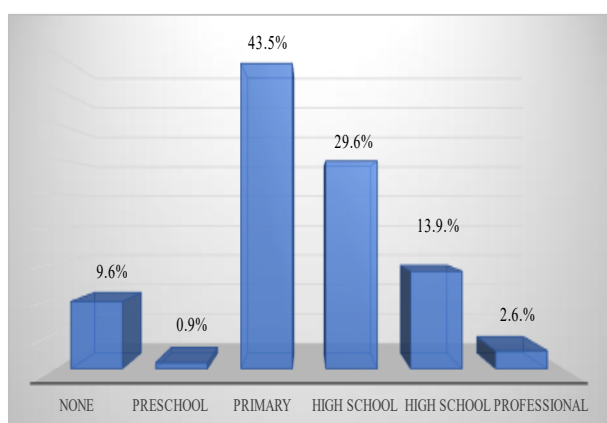
Results

This study was carried out in the municipality of Técpan de Galeana which is located in the Costa Grande region of Guerrero state, where the following points were addressed:

1. Municipal school level.
2. Certainty in employment.
3. Monthly income.

One of the guarantees set out in the Political Constitution of the United Mexican States in article 3, it is precisely the right to education and with regard to the educational levels of the municipality it was observed that at the undergraduate level only 2.6% of the population has it, which means that 97.4% of citizens lack a professional career, which leads to a very small percentage that can aspire to better working conditions and income. Graphic 1.

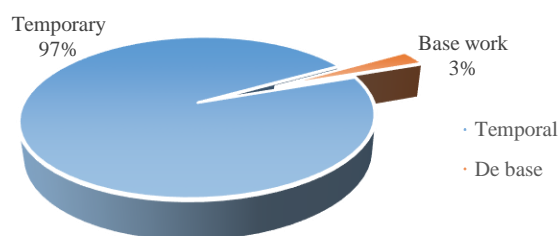
In the municipality of Técpan, the level of education where the population most affects is the primary level, with 43.5% of people being found to have basic education, so the capacities of the same are lower those who have a higher education (Graphic 1).



Graphic 1 Municipal school level

This is how education in relation to schooling has a significant impact on the individual with regard to job opportunities and income, but not only does it have repercussions individually but also at the regional or local level (Feldman 1998), which limits development in the region because the greater the degree of schooling there is a greater commitment to change social realities and yet in the municipality the main sector of sources of work is the primary sector, so that the secondary sector is developed in a scarce way and in terms of technology and innovation in transformation processes are practically zero.

Barceinas (2005), points out that higher education growth in incomes, better sources of employment and greater development, however, in the municipality the low level of education, has not allowed for development and 97% of jobs are temporary which leads to job insecurity (Graphic 2).

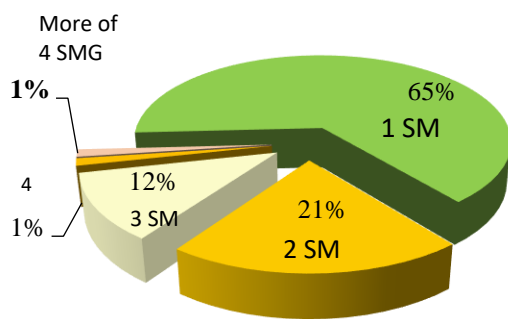


Graphic 2 Certainty in employment

In addition, salaries levied nearly 2 thirds of the municipality (Figure 3) are below the welfare line, which according to CONEVAL in July 2018 was \$2,975.27 per person and where the monthly minimum wage for the year 2018, in the country is \$2,686.14 pesos, which leads to virtually zero well-being making the population vulnerable.²

² The National Social Development Policy Assessment Council (CONEVAL) is a decentralized public body of the Federal Public Administration, to generate information on the situation of social policy and poverty measurement in Mexico.

Low educational levels produce productivity income level that does not meet the needs of the wellness line (food, education, housing, transport, health, among others)³, resulting in social inequalities, poor and lacking well-being since income is not sufficient for it to meet their needs and the low level of education limits the ability to develop their capacities that allow them to discover new alternatives that improve the quality of life and development in their region (Tuirán (2011)).



Graphic 3 Monthly employment income

Thus, in the municipality only 1% of the population has incomes greater than the four minimum wages (Figure 3), which correspond to the population with a higher academic level, that is, they have a bachelor's degree, confirming what some authors indicate (Barceinas 2005 and Tuirán 2011), noting that education is a change factor that allows better opportunities and entails well-being and development.

Conclusions

The results of the research reveal the low levels of education that prevail in the Municipality where only 2.6% of citizens have a bachelor's degree, this causes the opportunity for development in the region and localities to be limited by not counting on the human resource that allows to strengthen the natural resources that it has and to generate the transformation of processes for its development, companies, as well as jobs that consent to greater certainty in them and generate better conditions of well-being, in addition to being able to actively participate in decisions to improve and leverage the region's resources

There is a correlation between education and employment because the better prepared educationally a person is, there is a greater opportunity to obtain better jobs and working conditions.

Having a higher level of education allows for better sources of income, greater opportunities, access to better skilled jobs, but also allows citizens to actively participate and generate their own project proposals according to the strengths that exist in their territory, which leads to greater development and improvement of welfare conditions, so education allows equal opportunities.

However, as noted in the research carried out the higher-level educational levels are minimal in the municipality, so about two-thirds of the study population showed that citizens have lower incomes than those of the welfare line, i.e. the population is in poverty, not meeting the minimum required that CONEVAL marks for a good quality of life which attenuates poverty.

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³ For more information on the wellness line, see CONEVAL.

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Strategic diagnosis of rural populations

Diagnóstico estratégico de poblaciones rurales

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Abstract

The present project is part of an applied research carried out in the rural area called the southeastern micro-region of La Paz municipality in the state of Baja California Sur, which is formed by three towns: San Antonio, El Triunfo and El Rosario. The subject of study is the elaboration of a strategic diagnosis, which will emerge from an integrated study and will function as the foundation for the implementation of a future strategic plan containing proposals for alliances between the State, society, and the private sector, which allow economic, social and cultural development. The methodology used was the proposal of the Latin American and Caribbean Institute for Economic and Social Planning (ILPES) and the Economic Commission for Latin America and the Caribbean (CEPAL), presented by Silva Lira and Sandoval (2012). Additionally, Chiavenato's basic model of a Strategic Planning System was used in its first stage, competitive and operational knowledge, that is, its implementation is not included. Different tools were applied, such as interviews, questionnaires, sessions, etc., analyzing the information with the SPSS software and as a result, the Strategic Diagnosis is presented.

Development, Diagnosis, Tools

Resumen

El presente trabajo es parte de una investigación aplicada realizado en la zona rural llamada micro región sureste del municipio de La Paz en el estado de Baja California Sur, formada por tres poblados San Antonio, El Triunfo y El Rosario. El objeto de estudio es la elaboración de un diagnóstico estratégico, donde surgirá de un estudio integrado y servirá de base para la realización de un futuro plan estratégico que contenga propuestas de alianzas entre el Estado, la sociedad y sector privado que permita el desarrollo económico, social y cultural. Como metodología se utilizó la propuesta de Instituto Latinoamericano y del Caribe de Planificación Económica y Social (ILPES) y la Comisión Económica para América Latina y el Caribe (CEPAL), presentada por Silva Lira y Sandoval (2012). Así también, se recurrió al modelo básico del Sistema de Planeación Estratégica de Chiavenato, en su primera etapa, el conocimiento competitivo y operacional, es decir, no se incluye la implementación de este. Se aplicaron diferentes herramientas, como entrevistas, cuestionarios, sesiones, etc., analizando la información con el software SPSS y como resultado se presenta el Diagnóstico Estratégico.

Desarrollo, Diagnóstico, Herramientas

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Introduction

In several regions of the United Mexican States, the social, economic, and cultural development has been heterogeneous throughout its history. Similarly, the welfare indicators, particularly in terms of education, health, infrastructure and industrialization show ancient and profound imbalances.

The problem of the inequitable progress of the regions constituting the Republic covers two dimensions: the first one is the pronounced inequality (demographics, employment, and productivity, among others) in the northern, central and southern macro-regions, and the Gulf and Pacific coastlines. The second one corresponds to the micro- regions, which present conditions of economic and social disadvantage in every State. Undoubtedly, as stated in the National Development Plan 2013-2018 (PND), any strategy capable of boosting the regional economy must take a stand against both challenges.

Although rural areas exist, “rural” does not necessarily imply poverty, since even between adjacent regions there are remarkable contrasts in the quality of life of its inhabitants. Provided that a segment of the rural economy is strongly linked to agriculture, fishing and forestry, other rural areas have diversified their economy towards the manufacturing and service sectors. On the other hand, there are tourism-oriented rural areas, and many others containing untapped natural and cultural resources.

The described situation evidences that Mexico must conduct transcendental transformations and face several challenges with regards to rural policy in order to abolish the manifested social gaps; these include: 1) reduction of rural poverty, 2) provision of basic utilities, 3) reinforcing and diversification of rural economy, and 4) better exploitation and preservation of underused cultural, natural and energy resources (OCDE, 2018).

Baja California Sur (BCS) is located in the northwest of Mexico with a territorial extension of 73,909 km² which represents 3.8% of the national area with a population of 637,026 inhabitants distributed into its five municipalities, and it has a privileged geographic and oceanographic area concentrating 23.3% of the country’s coastlines.

Moreover, it possesses a wide marine biodiversity and exceptional natural resources. The geographical position and its natural resources are factors that influence the opportunities to increase competitiveness and productivity through development strategies that promote the regional strategic sectors.

According to the Official Gazette of the Federation (DOF), the state of BCS possesses a relative marginalization index due essentially to the effect exerted by the county seats over the rural areas; in that sense, the state manifests a different behavior from the rest of the country, which shows a higher degree of marginalization. The predominant economic sector in the state is the tertiary sector, which constitutes 7.2% of the state’s Gross Domestic Product (PIB) (INEGI, 2019), and the working population is grouped in this economic sector.

The communities of El Rosario, El Triunfo and San Antonio form the Southeastern Micro-region of La Paz Municipality; these are structured into groups of families creating support networks in order to solve their own problems, usually related to jobs and services. Such communities tend to settle primarily through grassroots organizations (clubs, community groups, common land, etc.).

The local government must design and execute collaborative programs between social activities and participatory activities that benefit an appropriate organization and distribution of the available resources; thus, better economic conditions will be generated for the manufacturers, entrepreneurs and the inhabitants of these communities.

The local government also prioritizes the innovation in the public policies to incorporate research, science and technology in the design of specific business support programs, in such way that the applied research contributes to the development of technologies and innovation aimed to create new products, processes or services.

Unquestionably, one of the options for growth and generation of capital gains in any public or private organization is the sustainable growth, which constitutes a very important challenge for being the support that allows citizens to have a dignified life.

Nowadays, the local governments demand a vigorous economic system, productive and reliable, which considers the equitable and sustainable use of resources to fully satisfy the needs of the population. Therefrom, if a micro-region wishes to be competitive it must execute actions that boost its economic growth.

By reviewing the state of the art carried out for this research, it is deduced that the organizations drawing up plans are those registering the highest performances, thereby they have a greater chance of success than such others that do not draw up projects. Therefore, the integration of a strategic diagnosis for the micro-region will emerge from an integrated study and will be used as a foundation for the implementation of a future strategic plan containing proposals for alliances between the State, society and the private sector to promote or enhance the socio-economic development and the efficient use of the region's natural resources.

The three rural communities to the southeast of La Paz municipality in the State of Baja California Sur has alternately experienced periods of prosperity and decay. Nowadays, the sustainable regional development is a concern within the state and municipal contexts. The lack of a long established mining activity has completely stopped the economic development given that mining was the region's natural labor.

The localities present a medium low degree of marginalization, and as a result of not having intended objectives for a strategic planning, which promotes the economic and social development, the micro-region is experiencing the collateral effects of this omission, such as poverty, population dispersion and even a technological gap.

As an alternative solution for their development, those three communities may have the foundation for a future strategic planning that guides and organizes the efficient use of their natural and economic human resources through a strategic diagnosis that allows the assessment of internal and external factors, in order to establish strategic objectives that contribute to the physical, social, productive and cultural integration.

Research methodology

The methodological design that was used results from the research of different strategic planning theories, all of them focused on business organizations. For this reason, it was necessary to find a methodological combination, in which all factors that influence its economic development were considered, in order to apply it to the micro-region. Therefore, the proposal of the Latin American and Caribbean Institute for Economic and Social Planning (ILPES) and the Economic Commission for Latin America and the Caribbean (CEPAL), presented by Silva Lira and Sandoval (2012) is of utmost importance. Similarly, Chiavenato's basic model of Strategic Planning System was used, which was the result of comparing the revised theories and their suitability for the region to study the qualities, characteristics and important patterns of the micro-region. Subsequently, a strategic diagnosis will be developed, adapted to the needs of the selected region object of this research.

Phases	Content	Tools/ Techniques	Results
First phase	Profile of the micro-region	Documentary research	Importance of the micro-regional planning Historical background Definition of the micro-region
Second phase	Micro-regional diagnosis (Internal and external analysis of the environment)	Interviews, Observations, Questionnaires Potential matrix, limitations and problems. SWOT Analysis	Demographic structure Review of expectations of internal and external interests Current situation Productive labor
Third phase	Definition of strategic objectives		Micro-regional strategic objectives boosting the development

Table 1 Methodological design for the strategic diagnosis
Source: Own elaboration, based on Silva Lira and Sandoval (2012)

Due to the homogenous population type, the sample will be small and stratified. To determine the size of the sample, the statistic formula for finite population was used (less than 500,000 elements). To estimate the sample, a confidence level of 95% was considered, with a standard error of 5%. The population being considered are those inhabitants over 18 and under 65 years old; which is 469 people; giving a total of 211 people.

Sample	Percentage of population	Sampling per area
El Rosario	1%	3
El Triunfo	42%	88
San Antonio	57%	120
Totals	100%	211

Table 2 Distribution of sample
Source: Own elaboration

The Operationalization of variables is as follows:

Strategic diagnosis. The external environment is considered (it studies the factors and external forces, its relationships, effects and potentials) and the internal (considers the organization's resources) where its limitations are detected (Chiavenato 2011). As an operational definition, it determines the Strengths and Weaknesses of the organization's fundamental resources. It allows estimating the importance of such Strengths and Weaknesses through Threats and Opportunities derived from the environment.

They are measured through interviews and questionnaires. Methodology (Silva Lira & Sandoval, 2012).

The dimensions considered are Political Aspects (regulations and common land stability, common land organization, projects on the state), Economic Aspects (main economic activities, resource access, level of development); Social Aspects (lifestyles, consumption habits, cultural level) and Technology and Infrastructure Aspects (integration of technology, services offered).

Three data collection instruments were developed: the interview, observation guide and a questionnaire.

The unstructured interview was designed to be applied to each one of the town's regional representatives and deputy regional representatives. As referred by Ríos and Ramirez (2017), these type of interviews are not guided by a rigid model, since they accept a certain degree of freedom to pose questions and answers, but by basic guidelines to not deviate from the objective, and what is important is to obtain a broad picture of the data.

The verification and observation list has as a foundation the document developed by Silva Lira and Sandoval (2012); for purposes of this research, the previously mentioned document was adapted or localized to be used in the localities of the micro-region.

Similarly, a questionnaire was developed, which was subjected to a validation process before a panel of experts in the different areas related to the research. The questionnaire consists of 22 affirmations with the Likert scale regarding five dimensions: a) The first one refers to the political aspects and consists of 6 items measuring the regulations, common land stability and the localities' projects; b) The second one is the economic aspect and consists of 5 items measuring the resource access and main economic activities; c) The third one is the social aspect measuring consumption habits and lifestyles; d) The fourth one is the technological aspect and it consists of one item measuring the integration of technology; and e) The infrastructure, consists of 4 items measuring the localities' infrastructure. Both are merged in the previous table.

To obtain the reliability from the previous measurement instrument, a pilot test was performed to 5% of the population (a small sample), in other words, to 10 people. Hernández, Fernández and Baptista (2010) mention that pilot tests are applied to people with similar characteristics to those of the sample or target population. Taking the pilot test as a reference, it was found that the instructions are clear and understandable, such being the reason why the 22 questions were not modified, since the items worked correctly.

In addition, with the SPSS program, the document's level of reliability was estimated, which got a Cronbach's Alpha scale score of .808, indicating that results will be consistent and coherent.

The information analysis for the applied questionnaire was performed through the data matrix from the IBM SPSS Statistic (SPSS, 2011). The statistical data of frequency was analyzed for each one of the variables and a display thereof was presented through graphics and tables exported to Excel, as well as their respective definition and interpretation.

Results

Hereunder, a matrix of potentials, limitations and problems is presented, which arises from the applied instruments in the localities, such as the semi-structured interviews performed to the regional representative and deputy regional representative, the questionnaires and the verification list, in which the aptitude or capacities of the micro-region will emerge from each variable to achieve its development. Understanding that potentials are all of those human, technological, economic, financial, sociocultural and other factors that can be used more effectively to encourage the local development, limitations represent those factors and situations that hinder development of potentials.

Technological and Infrastructure	Remodeling and restoration of old buildings with foreign investment Strategic location for commercial and tourist traffic New technologies for the development of local products and domestic use.	Lack of transportation, medical services, potable water Few municipal support for local development High cost of properties Access roads	Some accesses are impassable roads in rainy season
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Table 3 Matrix of potentials, limitations and problems
Source: Own elaboration

This SWOT analysis is part of a comprehensive study of the state of the art of three rural localities in the Southeast of the State of Baja California Sur and their current situation. Said analysis results from the applications of the measurement instruments as well as from the Matrix of potentials, limitations and problems; in such way, all situations that positively influence the achievement of objectives and that can be controlled are the strengths; on the other hand, everything that has a negative influence but that somehow can be controlled are the weaknesses; all positive and uncontrolled situations are understood as opportunities; and the threats are all of those external factors that have a negative influence, considering the information contained in the municipal plans and the characteristics of the local and regional context.

All these factors have been taken into account, and as argued by Chiavenato (2011), in addition to the external and internal diagnosis, it is necessary to define the premises and weigh the events in order to visualize the possible future consequences with the purpose to minimize the inherent risks of decision-making.

Aspects	Potentials	Limitations	Problems
Political	Proper functioning of the local authority Support from educational institutions for the development of sustainable plans and programs Support from non-profit organizations	Lack of incentives for project development Lack of development goals	Low-level coordination
Economic	Entrepreneurs with vision Network of artisan producers Encourage social innovation programs Development of regional and foreign tourism Use of natural and historical resources; rural tourism, ecotourism.	Shortage of some services (infrastructure) Indifference of some inhabitants Lack of financial support Poor training Lack of entrepreneurial spirit Low-skilled jobs and low pay.	Informal employment The services offered are very scarce and of poor quality.
Social	Population willing to receive orientation and training Population with cultural identity Improve the population's standard of living.	Lack of training options and orientation Little diffusion of the population's cultural identity Little support for jobs and entrepreneurship	Low educational level

		Internal Analysis of the Micro-region	
		Strengths	Weaknesses
SWOT MATRIX OF THE SOUTHEAST MICRO-REGION OF BAJA CALIFORNIA SUR		Cultural identity Interaction between its inhabitants and leaders to create economic development. Towns with Historical Heritage Natural and historical attractions as a tourist destination Attractive craft production processes (product demand) Regional Cuisine Flora and fauna	Shortage of services (transportation, ICT; telephone, emergency, lodging, food) (quality and quantity) Youth migration Poor development in production Lack of interest of some inhabitants. Low-skilled jobs and low pay. Water pollution Not accesible high school education
	EO	Opportunities Network of services between populations Entrepreneurs for an increased production and distribution of products Increased environmental awareness in economic activities and in everyday life. New technologies for the development of local products and domestic use. Support from non-profit organizations and educational institutions for the development of sustainable plans and programs.	WO (overcome weaknesses and seize opportunities) Encourage the connection with the three communities of the micro-region for the formation of a Network of cultural tourism services. Encourage the use of ICTs, as well as the training of residents.

Threats	ST (Use strengths to deal with threats)	WT (Seek support for entrepreneurs from the Ministry of Economy Conduct training and create constant interest in the inhabitants. Conduct better services for the micro-region.)
Consequences of the country's economic crisis. Policy discontinuity in local development Other towns with the Magical Town category/ competition in artisan products and easy access through the 4-lane road Water pollution Product quality requirement Lag of the microregion	Encourage the interest of the historical heritage and natural resources of the localities as tourist attractions. Conduct municipal and government support for the growth of the micro-region.	

Table 4 Matrix of Strengths, Opportunities, Weaknesses and Threats

Source: Own elaboration

As mentioned above, the rural communities are located on the border of a protected natural area and their natural resources represent a great opportunity to try to diversify their rural economic activities towards a green economy. They are distinguished by their historical heritage and biodiversity. Culture and heritage constitute an axis of cooperation between the localities, which may form a very active service network that allows them to redirect a new course for their economy, mainly through tourism and the sale of local artisan products.

Regarding transportation, the transpeninsular highway is the only access that connects them; this allows strengthening the interconnection between such localities, as well as with the state capital and other southern towns without this having consolidated an economic development in the micro-region.

Transportation remains a pending task; well- maintained rural roads are known to favor commercial transactions. However, there are rural roads between the communities that are difficult to access by car, and the only way to get there is by foot or with pack animals.

The isolation, derived from the limited access to communication routes, as in the case of El Rosario, aggravates the negative effects of the population's dispersion.

Geographically speaking, the communities, in particular El Rosario which is the least populated, is deficient in all services and also the most remote compared to San Antonio and El Triunfo, which foster the elderly population and the economically active population without employment and limited resources. One of the challenges of the micro-region is to guarantee the maintenance of the population and economic activity in those localities implementing actions in terms of service, constitution of companies and employment creation to overcome social inequalities and poverty.

Although of poor quality, possibilities to access phone lines and internet are more notorious at El Triunfo and San Antonio since the service exists, but at El Rosario, this is completely unavailable. The applications are much more developed in micro or small companies. It should not be forgotten that application domains are increasingly numerous and common and they constitute a key role in the development of localities. The ICTs offer is a major growing sector and allows a response to the development of rural areas, enabling them to improve their quality of life and competitiveness.

It is evident that there are significant local resources that should be valued in order for the positioning of the relevant sectors to be strengthened, anticipating changes and incorporating innovation and new technologies in companies. It is important to promote a balanced and environmentally sustainable development between the most attractive areas and those less developed or with difficulties.

Cooperation of different non-profit organizations and universities will allow leveraging innovation in different localities, while the research and its results will lay the foundations for the formation of service networks and clusters.

The strategic objectives that emerged from the SWOT analysis for the three localities are listed below:

1. Encourage the collaboration with the three localities for the formation of a cultural-tourism services network.
2. Encourage the use of ICTs as well as the training of inhabitants.
3. Encourage the interest of the historical heritage and natural resources of the localities as tourist attractions.
4. Conduct municipal and government support for the growth of the micro-region.
5. Encourage the population to undertake provision of services, distribution and production of artisan products.
6. Conduct support form non-profit organizations and educational institutions for the development of sustainable plans and programs.
7. Conduct better services for the micro-region.

Conclusions

Based on the results, it is concluded that according to the research problem approach, it was possible to obtain a document containing the strategic diagnosis, in which both the external and internal context of the three localities were analyzed, emphasizing the strategic objectives. Such diagnosis is the essential preliminary stage to subsequently develop a strategic planning including viable and possible alternatives in order for the micro-region to direct its efforts towards its development. Therefore, the general and specific objectives set out in this research were effectively fulfilled. Undoubtedly, literature reviewing was very useful for a better understanding and structuring of the ideal model in order to integrate the diagnosis subject of this research. In chapter III, the Methodology for the Elaboration of Local Development Strategies from the Latin American and Caribbean Institute for Economic and Social Planning (ILPES) and the Economic Commission for Latin America and the Caribbean (CEPAL) (Silva Lira and Sandoval, 2012), was merged with Chiavenato's Basic Model of Strategic Planning System, only considering the internal and external diagnosis, without reaching the development of strategies, their implementation or monitoring.

As a result from the analysis carried out on the internal and external factors obtained through the application of the data collection instruments: the Observation guide, Interviews and Questionnaires, it is concluded that:

Political aspects: The towns' authorities and their regulations are considered good, but it is essential that local authorities continue their administrative management functions and even seek the participation of social calls for the development of their communities. Their attractions have enough potential to reactivate tourist inflow.

The change agents that should be in charge of promoting the development process affirm (Silva Lira & Sandoval, 2012) they are both public and private and they are basically summarized in local authorities, universities, business chambers, training centers, local development agencies and others. It is important they go through some confidence-building processes that will enhance their actions.

Economic aspects: Economic activities are not sufficient and they can adapt to new methods to increase their economic development. The area of the three communities is not very extensive and it is distinguished by its historical heritage and biodiversity. Culture and heritage constitute an axis of cooperation between localities, which enables the implementation of service network strategies, production and distribution of its services. Information flow is important in order for the costs to be reduced, and the provision of services and sale of good quality artisan products for the economic, social and cultural development of the area to be achieved. It is urgent to offer a tourist service in a good quality environment, in which the inhabitants contribute their points of view, and the technical, social and environmental aspects are included in these considerations, in order to generate sustainable tourism services for the region. Regarding the production of artisan products, the making and marketing of regional and stationary consumer products should be encouraged, sufficient and attractive, taking care of presentation and packaging details.

(Silva Lira & Sandoval, 2012) claim that starting from the conviction that possibilities of local development are based on the feasibility of exploiting the potential of endogenous resources of a given territorial space, a key issue to work on is using it and activating it, by a possible set of local change agents that intend to achieve certain development objectives that, generally expressed, can be summarized among others, in the constitution of companies and creation of jobs, technological innovation, cooperation networks, training of human resources and social development.

Social aspects: Training and advice are extremely important. From this derives the urgent need to promote, support and strengthen the training and advice of the inhabitants who show a great interest in undertaking new activities that generate benefits and hope for sustainable development.

(Silva Lira & Sandoval, 2012) add that the way of understanding successful local development processes is fundamental, since they are associated with the "existing degree of confidence between the social actors of a society, civic behavior norms practiced, and the degree of associativity which characterizes them.

Technological aspects and infrastructure: It is a priority to compensate for the lack of services. The local, municipal and state authorities must take decisive actions so that an economic reactivation of the area really emerges. The ICTs offer is a major growing sector and allows a response to the development of rural areas, enabling them to improve their quality of life and competitiveness. Similarly, the promotion of information technologies will allow greater learning and optimization of time and costs. The commitment and participation of inhabitants is also required, which includes the training and specialization of the workmanship, provision of physical spaces and infrastructure for the execution of some actions proposed by the inhabitants. To this effect, it would be useful to take advantage of the approaches that already exist between non-profit organizations and higher education institutions and carry out the necessary arrangements to obtain the necessary support in the preparation of architectural plans for renovations, regional development and others.

The strategic diagnosis product of this research was designed to understand the internal and external context of the studied areas, and thus, being able to propose strategic objectives to design the respective strategic planning with the goal of promoting economic development among the three communities.

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Importance of human capital in the agricultural development of Durango

Importancia del capital humano en el desarrollo agrícola de Durango

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Abstract

Studies carried out in the agricultural field of Durango must assess the sociodemographic factors that this sector presents, such as academic training, age and experience. These factors determine the capacities and competencies of the people who make up the Family Production Unit (FPU) (Unidad de Producción Familiar - UPF) to deal with their daily tasks and to resolve eventualities. The human capital index was calculated through the Portela index, since this formula allows us to analyze the experience acquired over the years along with the level of studies that the people subject to the analysis have. The findings reflect the relatively low rate that occurs in the academic training of FPU owners which has a negative impact on their results. The core of the agricultural sector's backwardness is the lack of academic training and the loss of experience due to generational replacement being limited. This study shows the determination of the human capital of the people who form and are in charge of the family production units, analyzing the differences presented in each agricultural District, having as its main contribution an index of comparison between the producers of the different agricultural Districts.

Human capital, the agricultural sector and marginalization

Resumen

Los estudios efectuados en el campo agrícola de Durango deben valorar los factores sociodemográficos que presenta este sector, como son formación académica, edad y experiencia. Estos factores determinan las capacidades y competencias de las personas que forman la Unidad de Producción Familiar (UPF) para enfrentar su quehacer diario y la manera de resolver las eventualidades. Se calculó el índice de capital humano a través del índice de Portela ya que esta fórmula permite analizar la experiencia adquirida a través de los años con el nivel de estudios que sustentan las personas sujetas de análisis. Los hallazgos reflejan el índice relativamente bajo que se presenta en la formación académica de los propietarios de las UPF lo que repercute de manera negativa en sus resultados. Como punto medular del rezago del sector agrícola se manifiesta la falta de formación académica y la pérdida de experiencia al estar limitado el reemplazo generacional. El presente estudio pone de manifiesto la determinación del capital humano de las personas que forman y están a cargo de las unidades de producción familiar, analizando las diferencias presentadas en cada Distrito agrícola, teniendo como principal aportación un índice de comparación entre los productores de los diferentes Distritos agrícolas.

Capital humano, sector agropecuario y marginación

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Introduction

Academic training and experience allow comprehensive progress in the development of any economic activity, the agricultural sector, as it operates both in the production and in the exchange of goods and services, requires skills in the technical, administrative and financial fields. The analysis of the sociodemographic factors that agricultural producers possess allows us to establish the real panorama of its evolution in the development of the activity and to lay the foundations to establish the supports to whom the efforts should be directed for the benefit of the sector. Human capital is evaluated in companies in order to determine the ability to anticipate any problems that may arise. In the agricultural sector, greater importance is given to determining the results obtained from the government support provided to the field., however, it is important to determine the root of the problem that is established with the lack of academic training to face not only the issues, but the series of diverse situations that the field faces in agricultural activities. Within the Agricultural Innovation System (Sistema de Innovación Agrícola SIA) one of the essential functions is the mobilization of resources to carry out agricultural activities, where in addition to financial and capital resources, human resources play an indispensable role in the construction, maintenance and transformation of the productive and innovation sector (Torres-Ávila, Aguilar-Ávila, Santoyo-Cortés, & Martínez-González, 2021).

This article is divided into six sections, in the first one, the importance of the agricultural sector as an economic activity in the state of Durango is highlighted, the second reflects on the concept of marginalization, its classification, causes and consequences related to the agricultural sector, in the next section, human capital is conceptualized and the form of evaluation is exposed through the Portela human capital index, subsequently, the results obtained when determining the human capital index in the family production units of the agricultural sector of the state of Durango are explained, highlighting the same indicator for agricultural Districts I, III and VI, presenting their corresponding conclusions. The results obtained allow us to visualize the environmental conditions that have prevailed in these regions., the working capital and demographic characteristics of the producers in each District.

The Agricultural sector in Durango

Throughout its history, in the state of Durango, the agricultural sector has played an important role at an economic and social level, as a generator of jobs and at a productive level it contributes to the development and growth of the state. Agricultural activity generates around 9.7 million tons of various products and an average of 661,000 hectares of cyclical crops and 50,000 of perennial crops are sown. Most of the state's agriculture is seasonal, mainly in the spring-summer sowing cycle, the most harvested products are beans, green alfalfa, grain corn, fodder oats, fodder corn, barley, chili, forage sorghum, red tomato, bone cotton, pastures and sorghum. Regarding perennial crops, the cultivation of walnuts, asparagus, alfalfa, and blueberries, among others, stand out. (SIAP, 2018-2019). Fruits such as melons, apples, peron apples, quince, apricots and peaches are also grown in the valley region. The GDP (Gross Domestic Product) of the primary activities in Durango, in 2019, amounted to \$607,457.39 pesos, (as of the last quarter of 2019), which represents 3.82% of the total value and contributes 3.4% to the national primary GDP; this includes agriculture, animal husbandry and exploitation, forestry, fishing and hunting (INEGI, 2020).

The employed population in the primary sector represents 13.4% of the total employment of the state with 103,265 people (INEGI, 2019). Of the population employed in the primary sector, 80.7% corresponds to agricultural activities, 18.1% to livestock activities, and the remaining 1.2% to fishing activities (SIAP, 2019).

The value of agricultural and fishing production was \$34,579,830.84 pesos (at current prices) (SIAP, 2019). 72% corresponds to livestock activities, 28% to agricultural activities and 0.10% to fishing activities. The value of the agricultural production was \$9,793,165.90 pesos.

The 39 municipalities in the state of Durango carry out some agricultural activity. According to data from the Food and Agriculture Information Service (Servicio de Información Agroalimentaria y Pesquera - SIAP), as of 2018, the total area sown in the state was of 670,638.4 hectares (ha), which includes the three cycles of agricultural production that have been registered:

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1) autumn-winter cycle (AW), which is sown in the months of October-December and harvested in April-August, 2) the spring-summer cycle (SS) which is sown between March and August and harvested in September-February, and finally the 3) perennial crops (P) that are harvested in January-December.

The SS production cycle is the one that covers the largest area sown in Durango with 87.1% of the total, which means 84,015.39 ha. The P cycle is next with 8.7% and finally, with 4.2% of the total cultivated, the AW cycle. According to SIAP data, of the total area sown in the state, the agricultural modality of irrigation represents 27.8% and the temporary 72.3% (SIAP, 2018).

Around 72 agricultural species are cultivated in the state of Durango, from which, beans and green alfalfa with \$1,183,771.12 and \$1,769,514.48 pesos, respectively, stand out due to their contribution to the total value of production.

Durango is within the states where agricultural activity is concentrated in small regions and the rest of the area is without any economic activity. The percentage of the surface with agricultural and livestock activity is 14% and 17% respectively. 67% of the surface of the state is compromised of land without any economic activity (INEGI, 2017b).

The municipalities with the largest planted areas are Cuencamé (District III) with 62,473.46 ha which represents 9.3% of the sown area in the entire state. Next are Guadalupe Victoria (District III) with 59,192.66 ha (8.8%), Durango (District I) with 58,246 ha (8.7%), Gómez Palacio (District VI) with 41,567.33 ha (6.2%), Canatlán (District I) with 39,626.54 ha (5.9%), Nuevo Ideal (District I) with 35,296 ha (5.3%) and Santiago Papasquiaro (District V) with 34,912 ha (5.2%). The municipality with the smallest area sown is San Luis del Cordero (District VI) with 1% of the agricultural production, which translates into 790 ha (SIAP, 2018).

The state of Durango has irregular rainfall. The municipalities with the highest rainfall, for the year 2020, are those corresponding to District II, where Pueblo Nuevo and San Dimas stand out, ranging in between 761.6 to 1610 mm. The municipalities of District I have an average rainfall of 453.85 mm., among which are Durango, Mezquital, Vicente Guerrero, Súchil, Nombre de Dios, Poanas, Nuevo Ideal and Canatlán. The municipalities with the lowest rainfall in 2020 were those of District VI, Tlahualilo, San Pedro del Gallo, Mapimí, Nazas and San Luis del Cordero.

Average rainfall for the year 2018 was 623.8mm, in 2019 it was 364.3 mm, and for 2020 it was 364.2mm. Compared to 2018, it rained 41.62% less in 2020; in relation to 2019, precipitation was slightly lower with 0.0003%, which conditions the proper development of the crops grown in Durango (CONAGUA, 2019, 2020).

Durango is the fourth state in area size, being 6.3% of the national territory, which causes specific characteristics in its regions, presenting diverse environmental, technological, productive, social and access to markets conditions, the above causes the need for support programs that impact the agricultural Family Production Units (FPU) (Unidades de Producción Familiar - UPF) for the improvement of their conditions and processes. The composition of its soil and its orography make it impossible to technify all its processes, in addition to the scarce rains, there are regions that present a quarter of rainfall (semi desert region) in relation to those with the highest uptake (Quebradas region) in addition to the irregularity in the beginning and end of the rainy season, limiting the proper development of crops and pastures, affecting the agricultural and livestock production of the state (González, Galván, Soto, Rivas, & Pérez, 2018).

The most vulnerable segments require longitudinal and transversal government support that include support in kind, specialized technical advice and business management, in order to cause the integration of a cluster for regional specialization seeking competitive advantages and economies of scale in the main products (Ídem).

Marginalization

The National Population Council (Consejo Nacional de Población CONAPO) (2016: page) defines marginalization as: “A structural process in relation to the socioeconomic development achieved by the country, that hinders the spread of progress to all social groups, which affects the production structure and is expressed in territorial inequality”. Marginalized communities have high levels of vulnerability, that can hardly be diminished with individual actions, considering that the causes are generated by a model that offers unequal opportunities, favoring disadvantages of increasing marginalization and unfavorable scenarios (Téllez Vázquez, Almejo Hernández, Hernández Álvarez, & Romo Viramontes, 2015).

Marginalization is considered a structural phenomenon whose causes and effects are independent of individual decisions, therefore, in order to reduce marginalization, the intervention of the state in regulatory measures, support for productive activities, is essential, as well as to increase the capacities of producers and planning with a socio-territorial approach to a sustainable development (Ídem).

Durango, although it has a medium marginalization index and occupies the thirteenth place in the national context, stands out in two dimensions of marginalization “population in towns with less than 5,000 inhabitants” with 36.2% of its population dispersed in small rural localities and “employed population with incomes of up to two minimum wages” with 39.2% of the population, generating regions with high degrees of marginalization such as the municipality of Mezquital (District I) which is the second most marginalized municipality nationwide and 23% of the municipalities of Durango with Very High and High degrees of marginalization (National Population Council - Consejo Nacional de Población CONAPO) (2016).

The population is in poverty if it has at least one social deprivation and an income below the value of the poverty line, which means that the value of the income is less than that necessary to purchase the food basket and the non-food basket per month.

Poverty is categorized as *extreme poverty* when the population has three or more social deprivations and *moderate poverty* when it does not fall into *extreme poverty*. It is also considered when the population has *vulnerabilities* due to *social deprivation* when it is above the income level, but presents some social deprivation and *vulnerability due to income* is present when the population does not have social deprivations but the income is equal to or less than the welfare line or income poverty line (CONEVAL, 2020).

In 2018, 74.4% of the population of Durango presented a situation of poverty or vulnerability due to social deprivation at the income level, around 40,400 people, representing 2.2% of the total population, in *extreme poverty* and 35% in *moderate poverty*.

The 2018 Social Development Policy Evaluation (Evaluación de Política de Desarrollo Social) determined that the income of the poorest population consists of government support and remittances, not having a constant source of income generates vulnerability to eventualities, and its proposed that programs should be generated and implemented to increase productivity and provide long-term monitoring of productive projects, in order to increase the income of this population segment,. (Ídem).

Human capital and its measurement

Organizations as well as companies are founded by the knowledge possessed by the people who comprise them, It is a strategic asset located in the human capital made up of the members that operate it, whom conceive the environment, qualities and relationships of things using their experience and education. Knowledge is a factor that must be generated within the organization, being an intangible resource because it is difficult to perceive (Cabello, Díaz, & Bravo, 2018).

Human capital is the people who make up the organization and who maintain a reciprocal relationship by constituting a means of survival and individual and collective growth. This capital is formed by the intellectual competencies and skills that people possess producing wealth and value, integrated activities should be based on coordinated work (Delgado Cruz, Vargas Martínez, Rodríguez Torres, & Montes Hincapié, 2018).

In agricultural organizations, this knowledge is acquired through experience and is transmitted from generation to generation, however, schooling allows to acquire greater skill in resource management, so it is important to consider it.

By integrating these two concepts, human capital (people who make up the organization) and the knowledge (that these people possess to start the activities) intellectual capital is formed, however, for this to exist within the organization, it must be made up of people, the labor relations that are established through its structure and the relations that are maintained with the outside world.

For an organization to survive over time and achieve success it needs to manage its resources and generate differences that distinguish them from their competition. Such advantages should sustain their development and strengthen the resources and activities (Cabello et al., 2018).

Human capital is feasible to be measured through the Portela multidimensional index cited by Arrazola and De Hevia (2005), this index relates school training and work experience by homogenizing them through a multiplicative relationship, therefore, a measure of the deviation from the population mean is used. The calculation of the Portela Multidimensional Index (CHP) is carried out through the equation (1), this methodology allows us to equate the experience acquired over the years with the level of studies that the people subject to analysis have, it is important to consider the educational level of the people involved in agricultural activities, because this will allow them to have a comprehensive vision of their business unit, interact with suppliers and customers and take advantage of new technologies of vegetative material, fertilization and harvest and post-harvest work. Enabling them to raise the quality of their products, to be able to face the changing context, both environmental and market based, in a better way.

$$CHPi = MEDU \times \left(0.5 + \frac{\frac{(EDU_i - MEDU)}{DTEDU}}{1 + e^{\frac{(EDU_i - MEDU)}{DTEDU}}} \right) \times \left(0.5 + \frac{\frac{(EXPE_i - MEXPE)}{DTEXPE}}{1 + e^{\frac{(EXPE_i - MEXPE)}{DTEXPE}}} \right) \quad (1)$$

Where:

$MEDU$ = Average educational level of the agricultural population

EDU_i = Educational level of the i-th individual

$DTEDU$ = Standard deviation of said educational level

$EXPE_i$ = Work experience of the i-th individual

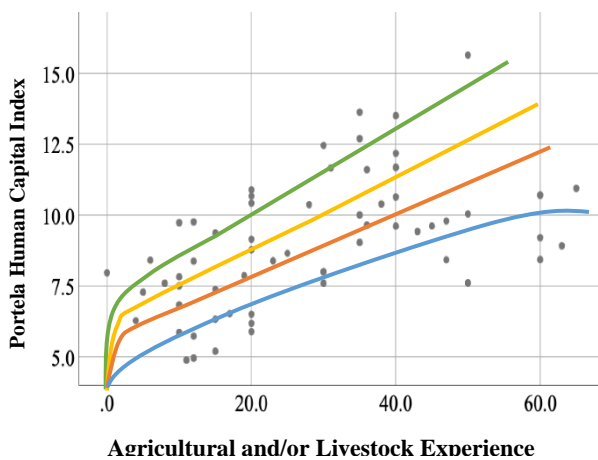
$MEXPE$ = Average experience of the agricultural population

$DTEXPE$ = Standard deviation of said work experience

Results

When analyzing the statistics of the agricultural sector through the *CHP*, which considers, as already mentioned above, the years of schooling and experience of the interviewed producers, as well as the mean of the population of these variables according to equation 1, it can be seen in graph 1, where the lines represent those producers who completed some level of education whether primary (blue curve), secondary (red curve), high school (yellow curve) or bachelor's degree (green curve). In this sector, a large number of producers who have truncated studies are identified, mainly at the primary level, this results in, having a wide standard deviation around the arithmetic mean of the years of schooling, the sectors' *CHP* significantly decreases having 20.6% of the producers with truncated primary, 19.1% with completed primary, 4.4% with truncated secondary and 16.2% with completed secondary, that is, 60.3% of the studied population is below the arithmetic mean corresponding to 9.23 years of schooling, this causes the dispersion measured with the standard deviation to be wide (5.12), which causes the *CHP* measurement of the sector to be very low. In addition to the other element that intervenes, which are the years of work experience which present a mean of 28.5, with a wide standard deviation of 16.7 (see table 1). This phenomenon can also be observed in the same graph (1), by not forming the curves of educational levels, since around 38% of producers have a truncated education, having more relevance the unfinished primary level, only 10% completed bachelor's degree and 6% postgraduate studies, generating an average *CHP* of 9.

Compared with other studies conducted on the manufacturing industry in the state of Durango, focused on the warehouse manager, an average educational level of 12.67 years of schooling was determined, a deviation of 3.05 years and an experience of 10.4 years with a deviation of 8.15, showing a CHP of 12.43 with a standard deviation of 3.44 (González Lazalde, Galván, Ismael, Pérez, Canales, & Olivera Armando, 2018). Statistics from the agricultural sector show that academic preparation, although it does not seem to be that low, is affected by the large number of producers that are below the arithmetic mean and also with truncated studies, however, the high years of experience impact the index negatively by showing a wide standard deviation, so the overall CHP for the agricultural sector in Durango is low, which limits a solid or integral development of the productive units, although some agriculturists are very productive, most of the Family Production Units (Unidades de Producción Familiar (UPF) are affected by a low human capital index.



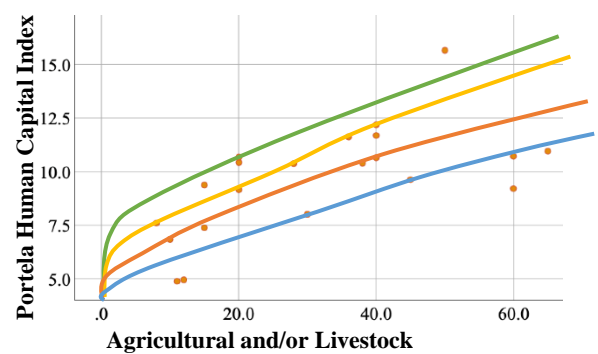
Graphic 1 Portela Human Capital Index all Districts
Source own elaboration with SPSS V. 25

	Statistics	Portela Human Capital Index	Years of schooling	Years of experience	Hectares of the UPF
Total	Mean	9.00	9.23	28.50	26.92
	Median	8.84	9.00	26.50	18.00
	Deviation	2.21	5.12	16.70	25.74
District I	Mean	9.55	9.50	31.50	25.45
	Median	9.99	9.00	30.00	14.50
	Deviation	2.43	4.55	17.35	25.04
District III	Mean	7.87	8.17	22.88	47.58
	Median	7.82	7.00	19.00	50.00
	Deviation	1.58	4.63	16.62	29.93
District VI	Mean	9.24	9.65	29.51	15.93
	Median	8.77	9.00	30.00	10.00
	Deviation	2.18	5.84	16.03	14.75

Table 1 Comparative of statistical agricultural areas of Durango
Source own elaboration

District I is located in the central region of the state known as the Valleys region, It encompasses the capital of the state being the main urban locality of the entity. The representative sample presented 51% of UPFs headed by men and 49% represented by women, 36% of the producers are in an age range of 51 to 60 years (table 2).

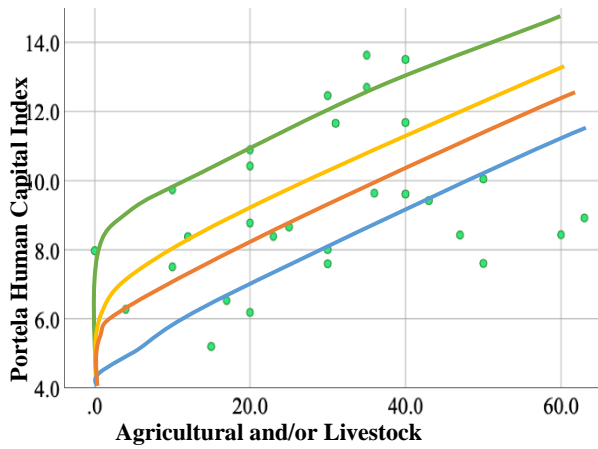
Graphic 2 shows Portela curves generated from the determination of CHP of the producers belonging to District I, which presents a higher arithmetic mean with 9.55, however, it is also the one with the highest standard deviation. This District is characterized by having the highest level of agricultural or livestock experience with 31.5 years on average (table 1) presenting a standard deviation similar to that of the other two Districts analyzed. It can be seen in graph 2 that also shows 36.4% with primary or less, that is, more than a third of the producers with less than six years of schooling and at the other extreme with higher high school studies 13.6%, on average their UPFs have 25.45 hectares.



Graphic 2 Portela Human Capital Index District I
Source own elaboration with SPSS V. 25

District III is located in the region known as Los Llanos, where agriculture stands out as the main economic activity, 65% of producers are men and 35% women, the main age group in this District is under 40 years old with 35.3% see table 2. Table 1 shows that the number of hectares of the UPFs is doubled compared to those owned by the producers of District I and for District VI it is more than triple, However, most of the crops are seasonal, which causes difficulties due to the climatic changes that have occurred in recent cycles. It is also a District that presents the lowest level of education with 8.17 years on average and the lowest level of experience with 22.8 years.

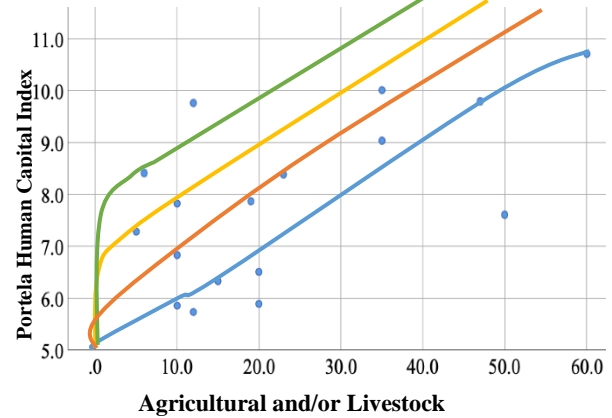
In this District, 47% have primary education or less and only 12% present levels of study higher than high school, counting an average level of schooling of 8.17 years (truncated secondary) causing it to be the District that presents the lowest CHP with a mean of 7.87 and a standard deviation of 1.58 as shown in table 1. It can be seen in graph 3 that about half of the observations are below the blue curve corresponding to the primary level.



Graphic 3 Portela Human Capital Index District III
Source own elaboration with SPSS V. 25

District VI is located in the region known as Laguna in the semi-desert area, where the urban towns are located., in second and third place, with the largest number of inhabitants of the entity. It is a region characterized by having irrigated agriculture since the two main dams of the entity flow into this region, it has a wide infrastructure of irrigation channels, the average of hectares of the UPF is 15.93 ha. (It is the lowest of the three analyzed Districts). 62% of UPFs are led by men and 28% by women. The age groups are more balanced than the other regions, standing out with 24% from 51 to 60 years and from 62 to 70 years, another 24% (table 2). This District has a schooling level of 9.65 years on average, being the highest of the three Districts, however, 38% of producers have primary school education or less, although, 31% of the producers have more than thirteen years of study, that is, finished high school or higher, as seen in graph 4 the high school level is identified with the yellow curve and the green curve marks the upper level (bachelor’s degree), meaning a third of the observations lie between these two curves, therefore by also having a high level of observations below the blue curve (primary education level), it has the highest deviation of the three Districts, decreasing the mean CHP of that District by 9.24 below District I and above District III.

The experience of the producers is similar to that of District I with 29.51 years on average and a standard deviation similar to the other two Districts studied with 16.03 years.



Graph 4 Portela Human Capital Index District VI
Source own elaboration with SPSS V. 25

	District I	District III	District VI
Under 40 years	18.2%	35.3%	17.2%
41 to 50 years	18.2%	17.6%	20.7%
51 to 60 years	36.4%	17.6%	24.1%
61 to 70 years	18.2%	11.8%	24.1%
Over 70 years	9.1%	17.6%	13.8%

Table 2 Age groups of producers by agricultural district in Durango
Source own elaboration

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Conclusions

The rural population that mainly makes up agricultural economic activities presents a series of multidimensional lags evident in its level of marginalization, among these lags, the level of the human capital index stands out. Durango has a third of the population dedicated to this sector with more than 61 years of age, that is, it exceeds or is very close to the retirement age. However, the high rates of marginalization in this sector force them to remain in charge of the UPFs. Having a relatively low CHP limits UPFs technological implementations or innovations that can help to improve their production and administrative processes, causing low levels of profitability and productivity.

The CHP of the agricultural sector of Durango is a reflection of the wide dispersion that exists both in the levels of education and in the years of experience, which causes a low index for the sector, that is, although there are many years of experience in agricultural work, the use of this practice is limited by not having an academic training that allows to apply improvements in the administrative and financial management of the productive unit to better face the changes that occur in the markets, environmental contingencies for the survival and growth of its UPFs. It requires comprehensive public policies that involve increasing levels of formal education (education at all levels and certifications) and informal education (training courses) related to their productive and business activity. The involvement of companies, government and academia is necessary with actions focused on this sector to break the social deficiencies that limit this segment of the population and be able to reduce vulnerability to eventualities.

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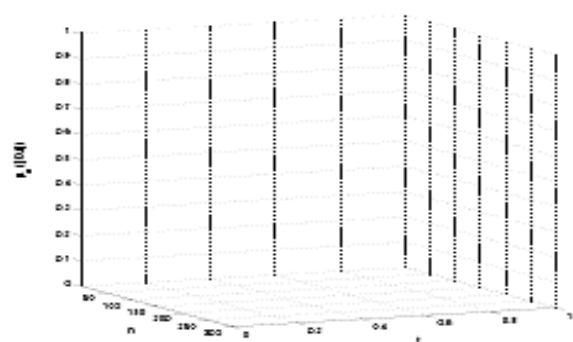
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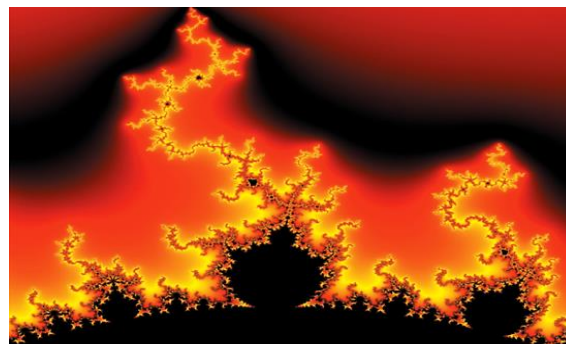


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