

Sustainable practices of safe production in the production of Hass avocado**Prácticas sustentables de producción inocua en la producción de Aguacate Hass**

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Abstract

The region of Xalisco, Nayarit in recent years has become a Hass avocado producer, however, it has not taken care of the environment or practices for the care and preservation of farmland. This research investigates the cultivation practices that prevail in the region and makes a proposal framed in the local economic development for producers to acquire good safety practices. The methodology and research approach are qualitative participatory research, through interviews and questionnaires, as well as active participation in the organization and training of producers for the adoption of good safety practices. However, the task is not an easy one, due to the producers' resistance to change.

Preservations, Economic Development, Cultivation Practices

Resumen

La región de Xalisco, Nayarit en los últimos años se ha convertido en productora de Aguacate Hass, sin embargo, no se ha tenido el cuidado del medio ambiente ni de realizar prácticas para el cuidado y preservación de las tierras de cultivo. En la presente investigación se indagan las prácticas de cultivo que prevalecen en la región y se realiza una propuesta enmarcada en el desarrollo económico local para que los productores adquieran buenas prácticas de inocuidad. La metodología y enfoque de investigación son la Investigación participativa de corte cualitativa, mediante entrevistas y cuestionarios, así como participar activamente en la organización y capacitación de los productores para la adopción de las buenas prácticas de inocuidad. Sin embargo, la tarea no es sencilla, debido a la resistencia de los productores al cambio.

Preservación, Desarrollo Económico, Prácticas de Cultivo

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Introduction

Hass avocado is an economic activity of the primary sector, which has gained popularity among the different products harvested in the state of Nayarit and particularly in the town of Xalisco. This product has displaced other crops, such as sugar cane, coffee, among others, due to its profitability and the climatic conditions that allow its production.

In this sense, the government through the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA), has data and information about the different products of the primary sector, with which it designs master plans that show the situation of the hass avocado and other products of the field. This is how the interest arose to contrast the situation that the government points out with the reality experienced by the producers in the town of Xalisco.

The information obtained from official sources is contrasted with the position of local economic development, which according to Alburquerque (2020) and the needs of the research itself, should be viewed from four dimensions, the first from the social and human development that implies improving the forms of social and solidarity economy, secondly, environmental development that considers valuing the natural heritage as an asset for development, promoting ecological and eco-efficient agriculture as well as responsible consumption. Thirdly, institutional, political and cultural development through cooperation between different actors and the mobilisation and participation of citizens. Finally, the fourth dimension involves economic, technological and financial development through support services and the improvement of infrastructure.

The present research was carried out within the methodological framework of participatory research, where reference maps are generated using ArcMap 10.8. It is important to point out that as part of the project, training courses were organised through GLOBAL G.A.P. and SENASICA, to certify the Productive Units that are willing to work in a participatory way for the economic development of the town of Xalisco.

Problem statement

The problems detected in avocado production in the state are discussed below, based on the latest official study, the Plan Rector del Sistema Producto Aguacate (2012). These problems are contrasted and interviews are conducted with local actors in Xalisco, in order to make a comparison between the official problems and the problems faced by producers in the region.

According to the Plan Rector (2012) of the Comité Nacional del Sistema Producto Aguacate A.C., in the state of Nayarit there are 2,629.05 census hectares (see figure 1 and figure 2), which are mostly of traditional production, where technological packages are implemented with extensive use of agrochemicals for pest control, weed control and fertilisation. In the municipality of Xalisco, the total number of Hass avocado producers is 2,353 (SAGARPA, 2018).

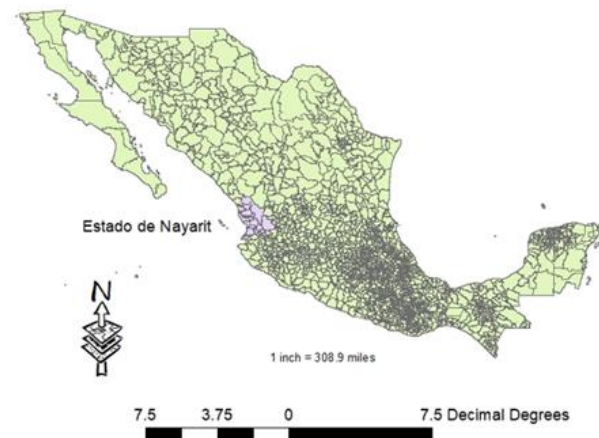


Figure 1 Macro location of the study site
Source: ArcMap 10.8

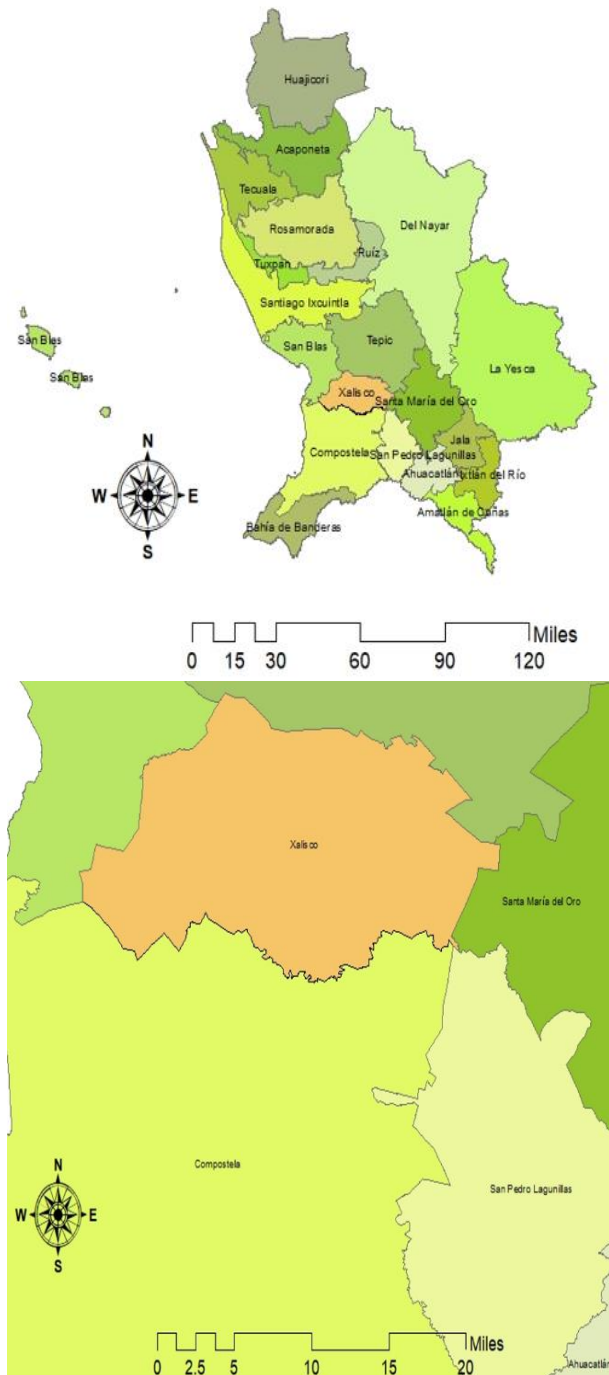


Figure 2 State of Nayarit and the town of Xalisco
Source: ArcMap 10.8

In the diagnostic part of the Plan (2012), there are inconsistencies in Hass avocado production in the town of Xalisco. These range from production, organisation, infrastructure, financing and the value chain.

Production area. Low field profitability with an average of 6 to 8 tons per ha, low fruit sizes, 80% second quality fruit, fruit damaged by diseases such as thrips, anthracnose and scab, marketing limitations, high production costs, poor orchard management, and quarantine pests, the main impediment to export.

Organisational area. Less than 50% of the producers belong to one of the existing associations, the existing organisations lack business plans, lack of credibility in the social sector organisations, the producers do not have a business culture, there is no reference of a successful producer.

Area of Financing

In the absence of formal and institutional financing for cultivation in the territory, there is a high dependence of producers on other subjects (loan sharks, relatives, friends, among others). There are institutions that offer financing to producers, but these are limited, since most of them are for consumption and not for production.

Value chain

The local collector. These are facilities that deal directly with the producers and generally seek to establish themselves with the producers. This corresponds to all those collection centres that are distributed in the different zones of the municipality of Xalisco, these centres are characterised by being packers, premises, or buying houses.

Intermediaries. They are those actors who take the middle part of the process, they are external to the collection centres, they are also known as "coyotes", they have the economic capacity to buy large volumes.

Wholesalers in supply centres. The wholesaler is an actor that buys on a large scale from intermediaries and collection centres, they are established in the central supply centres.

Retailer. This is an actor that sells to the final consumer. An example of a retailer are those shops that are established in every city, town, village, colony, rural area, etc.

On the other hand, the value chain involves different actors that operate simultaneously during production, thus giving rise to different problems, ranging from production, organisation, purchase prices, sales prices and access to different types of financing. However, it should be noted that the analysis of the Master Plan (2012) does not consider sustainability among the issues addressed.

When we talk about local development, sustainability means looking at, talking about and discussing the quality of life not only for present generations but also for future generations. Currently in the field of hass avocado production in the municipality of Xalisco, although the situations reviewed above are present, no studies have been found on the traditional forms of production that result in a direct aggression to the environment, as well as in health risks for day labourers and final consumers, due to the intensive and extensive use of agrochemicals.

Traditional versus sustainable production

Chemical-based forms of production are used by the majority of producers. For example, 50% of food production worldwide depends on fertilisers, especially nitrogen fertilisers, Singh (1995) and Ladha (2005). According to (SEMARNAT, 2005), in Mexico from 1992 to 2002 there is an increase in the consumption of pesticides per hectare, whose maximum record is 1.8 tons per thousand hectares between 1999 and 2002, while during 1992 and 1995 it was 1.3 tons per thousand hectares.

According to (Isiordia, M, personal communication, 19 September 2020), "in traditional production, farmers have no restrictions in the treatment of orchards". In contrast, sustainable production requires certain regulations, processes and guidelines that are not carried out within the traditional framework.

Current forms of production contain a number of problems as discussed throughout the study. In addition to what sustainability entails, there is disorganisation among the avocado producers themselves, lack of productive financing for the maintenance and equipment of the orchards, as well as a lack of infrastructure that would allow the products of the field to be used to their full potential.

Therefore, organic agriculture is a production system that maintains and improves the health of soils, ecosystems and people. It is fundamentally based on ecological processes, biodiversity and cycles adapted to local conditions, without using inputs that have adverse effects. Organic agriculture combines tradition, innovation and science to benefit our shared environment and promote fair relationships and a good quality of life for all those involved (IFOAM, 2008, p.594).

In this sense, Gómez Cruz et al. (2010), points out that:

Organic agriculture is an economic activity with the potential to generate employment and foreign exchange. Its adoption requires 30% more labour per hectare compared to traditional production, thus contributing to job creation. (Gómez Cruz et al., 2010, p.598).

Therefore, traditional avocado farming in comparison to innocuous production has different qualities that are reflected in the practices, relationships and behaviours of local actors, which condition the possibilities for local development. It is here where the interest of the research focuses on making the actors reflect on traditional production, as well as on the characteristics and practices that could help them in terms of safe production, with the aim of knowing the possibilities and limitations of building alternatives that favour local development.

Research questions, objective and specific objectives

Main question. How to promote safe practices with the producers of hass avocado in the town of Xalisco, from the perspective of local economic development?

Secondary questions: What type of strategies and actions are most relevant for the incorporation of safe practices with avocado producers in the town of Xalisco and how to implement them, how does the learning process take place among producers for the incorporation of the practices?

General objective. To facilitate the incorporation of safety practices with avocado hass producers in the town of Xalisco, from the perspective of local economic development.

Specific objectives. To define the strategies and actions that are most relevant for the incorporation of safe practices with avocado producers in the town of Xalisco and how to implement them. To understand the learning process of producers in the incorporation of sustainable practices. 1.2 Nayarit, physiography and agricultural production.

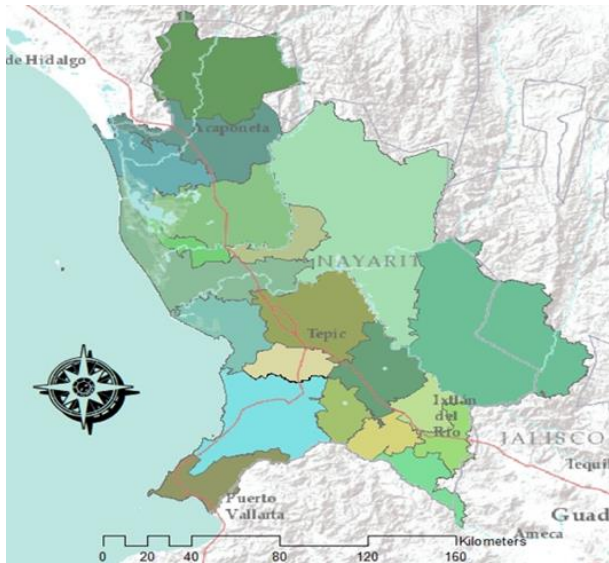


Figure 3 Physiography of the state of Nayarit
Source: ArcMap 10.8

Physiography of the state

The success of Hass avocado production is due to the natural wealth of the state; Nayarit is composed of four physiographic regions: i) the Pacific coastal plain, ii) the Neovolcanic axis, iii) the Sierra Madre Sur and iv) the Sierra Madre Occidental. The state has a territory of 2,335 square kilometres, and an altitude of up to 2,400 metres above sea level; it has a temperate temperature northwest of the capital and a tropical climate along the Pacific coast; four types of microclimates are found: 91.5% warm and sub-humid, 2% dry and semi-dry, 6% temperate and sub-humid, and 0.5% warm-humid. It should be noted that the high mountainous areas are inhabited by 4 indigenous peoples: Huichol, Cora, Mexicaneros and Tepehuanos.

Nayarit and its agricultural production

Worldwide, the main avocado producers are: Mexico, United States, Indonesia, Colombia, Brazil and Chile. Mexico occupies the first place in production and exportation; it is worth mentioning that Michoacán is positioned as the state with the highest production in the Mexican Republic, and in second place is the state of Nayarit, where the municipalities with the highest number of avocado hectares are: Tepic, Xalisco and San Blas.

Nayarit is a state with a great agricultural potential, it is said among the population that everything that is sown is harvested, based on the production of different varieties of crops, such as: Hass avocado, sugar cane, mango, beans, sorghum, corn, watermelon, jicama, rice, red tomato, among other agricultural products. Based on its natural wealth, Nayarit generates multiple agricultural production options that meet the conditions and standards of production and consumption both nationally and internationally, however, the current conditions of traditional production require aiming towards sustainability in terms of local economic development.

In the municipality of Xalisco, Hass avocado has been seen as an economic opportunity since approximately 50 years ago; since then, avocado farmers started to leave traditional crops such as sugar cane, coffee and others; it is important to highlight that it was not only in Xalisco but in the different zones and regions of the state of Nayarit.

According to (M. I, personal communication, September 19, 2020), "when Hass avocado was seen as an opportunity, some producers stopped growing sugar cane, coffee and other fruits, and started with hass avocado"; however, this required the use of technologies and technological packages that they did not have at the beginning, and they were also confronted with the natural character of high productivity, which entails the use of chemicals and pesticides.

Theoretical framework

In this chapter, different theoretical approaches to the concept of development are analysed in order to identify theoretical and methodological tools that contribute to the achievement of the research objectives and understanding in terms of sustainability that will allow for the transformation of traditional Hass avocado agriculture in the municipality of Xalisco, Nayarit. Therefore, in the chapter, a journey is made through the different concepts of development, in order to show a trajectory in relation to the theorists, starting from an approach towards sustainable development.

Theories of sustainable development

According to Aguilar (2002), the 1990s saw the emergence of environmentalist social movements that sought to face the challenges of development, which, as previously mentioned, stood out for their criticism of the models of accumulation, which enriched certain fragments of the world population (developed countries), the idea that the use of the world and its resources was unlimited, which led to the birth of sustainable development. Such movements by civil society and academia make a strong critique of industrialisation models and their effects on the environment.

Centralism as part of the first world has created a vicious circle of overexploitation and depletion of natural resources for its own supply and accumulation of capital. In 1987, the Brundtland report was published by the United Nations World Commission on Environment and Development, which is concerned with social criticism that seeks to promote sustainable development, taking into account the environment, the population explosion, poverty, equity, culture and biodiversity. According to González (1997), Godard (2002), Vivien (2005), Saldívar (1998), Smouts (2005), sustainable development must have three dimensions: economic, ecological and social.

Given the above, Albuquerque (2020) agrees to a large extent with the aforementioned authors who focus on the dimensions of sustainable development, considering the following dimensions: social and human development, environmental development, political and cultural institutional development, economic, technological and financial development. In this sense, sustainability will be part of environmental development, where the following parts are broken down; valorisation of the natural heritage as a development asset, promotion of ecological and eco-efficient production and promotion of local production and responsible forms of consumption.

Forms of production and environmental impact

Sustainability has a classic current that is directed towards sustainability according to the Brundtland report (1987), which is defined in a context of economic growth through the use of natural resources, so that sustainability is a concept that goes beyond just the economic. (Gómez Cruz et al., 2010) point out that "organic agriculture has acquired importance within the agri-food system in more than 154 countries; there are around 67 million hectares certified organic.

The problem lies in the environment where the Hass avocado is produced, initially in the forms of production that are based on fertilisers and pesticides, which are used by most producers and this leads to a deterioration for the land, for the fauna and for the consumers of chemical-based products. In this sense, according to Ongley, (1997) pesticides and industrial chemicals are currently used, it is found that 50% of the world's population depends on fertilisers, especially nitrogenous fertilisers, for food production (Singh et al., 1995; Ladha et al., 2005). According to (SEMARNAT, 2005), in Mexico from 1992 to 2002 there was an increase in pesticide consumption per hectare, with a maximum of 1.8 tons per thousand hectares between 1999 and 2002, while the minimum was 1.3 tons per thousand hectares during 1992 and 1995.

Traditional Hass Avocado Production

Talking about traditional production, about 80% is extracted in the national territory, therefore, it represents a health risk for producers, consumers and animals, derived from poor orchard practices and the extensive use of chemicals to the detriment of future generations demand at the expense of satisfying current demand. According to (Armoní et al., 2021), environmental impacts are environmental, economic and social impacts due to overuse of land using pesticides, destroying soil and water resources.

Harmless production (good practices) in Hass avocados

Safe production refers to good agricultural practices involving the use of Hass avocado knowledge packages that consider and protect the environment. According to (Tafur Garzón, 2009), good agricultural practices are a means of integrated pest and crop management, beneficial for animal health, consumers and environmental protection, within a commercial framework that achieves sustainability of production and safety of the consumer product.

It is worth mentioning that in food safety there are certifications by political and private bodies both at political and federal level, SAGARPA accredits the orchards through SENASICA, on the other hand, the private body that provides the same service is GLOBAL G.A.P., both consider the same infrastructure conditions, except that the SENASICA certification process is free, although at the cost of a bureaucratic process that is difficult for producers.

Organic production in Hass avocado

According to (CIAO - Comisión Interamericana de Agricultura Orgánica, n. d.), there is the Participatory Organic Certification (SCOP) through the public organism SENASICA, intended for organised producers who give final presentations to their products, and who seek to be recognised by markets in other countries, which is assimilated to safe certification, carrying guidelines and evaluations for certification. The SCOP certification processes by SENASICA are free of charge according to the same institution.

(Vargas et al., n.d.) states that organic nutrition is an alternative for soil nutrition, yield and fruit growth, with greater nutritional efficiency and less harmful to the environment. However, in the social aspects, he points out that avocado producers are reluctant to organic production, due to the idea that it has less nutrition, lower yields and smaller size of the avocado, which is the same situation as in the central region of Nayarit.

Methods and tools

According to (Dieñas-Salmán & García-López, 2012), participatory methodologies allow us to observe important moments of any organisation, whatever its nature, such as the origin and trajectory of the organisation, the values, both individual and collective (organisational), that have sustained and oriented the process of change towards its growth; identification of problems encountered during the process and how they were overcome or can be overcome; shortcomings observed in the organisation when trying to define its objectives; the key points of the process and the decisions that had to be taken; and building or rebuilding strategies for the organisation through the definition of projects.

Given the above, within the participatory process of food safety certification with producers from the town of Xalisco, Nayarit and the public and private organisations SENASICA and GLOBAL GAP, the participatory observation technique was carried out through the application of logs during the training stage given by the certification organisations, and within the ejidal commissariat of the municipality, mainly with the aim of carrying out the certification and also to learn about the organisation, values, concerns, problems, shortcomings, strategies, among other aspects that were recorded throughout the process. The techniques used in the participatory research are participatory observation, surveys, in-depth interviews with key actors, and participatory diagnostic workshops.

Within the methodological stage, techniques were used to obtain data, using participatory observation, in-depth interviews with key actors, surveys to define the production unit and participatory diagnostic workshops. These were approached on the basis of participants and key informants. In this sense, the techniques selected and the instruments elaborated are related to the research question: How to promote safety practices with the producers of avocado hass in the town of Xalisco, from the perspective of local economic development? The characteristics that could be useful to people in terms of development and safe production were determined, through certification with the GLOBAL GAP and SENASICA bodies.

Selection of key informants and participants

In order to characterise the production unit, a sample was selected under the criterion of diversity, applying 15 questionnaires to different types of producers, including women and men, young people, adults, older people, with heterogeneously different traits and above all from outside the town of Xalisco. In this sense, the application of questionnaires was determinant to know the production unit and also to contrast it with the theorists themselves.

Through the qualitative research approach and its techniques, different participation mechanisms were applied, among them: observation logs that allowed us to know the interest of the producers during the safety certification stage with the public and private organisations Global GAP and SENASICA, as well as social, economic and political aspects that arise in the course of the process. The categories of analysis are based on the theorists in the field of Economic Development, supported by Chayanov and Barta, and which are still in force today, they speak to us about the importance of the productive unit, which contains; the forms of production, the family proportion, self-consumption, types of crops, organisation, among other categories.

Proposal

During the participatory process of food safety certification with the producers of the town of Xalisco and the trainers of the public and private organisations GLOBAL GAP and SENASICA, the logbook was an instrument that was applied from 15 March 2022 to the present day in the Ejidal Commissariat of the Municipality of Xalisco, information was collected on the requirements for certification, the interest of the producers, attendance, physical and verbal expressions, difficulties, qualities, knowledge, economic situation, infrastructure and access to policy and financing.

Within the participatory certification and the logbooks, the requirements and guidelines of the certifying bodies GLOBAL GAP and SENASICA must be complied with, where a payment of 1400 USD per certification of 200 hectares must be made; to be legally registered as a group of producers, to have the infrastructure required by the certifying bodies (bathroom, eating area, table, chairs, sink, warehouse, mixing area and signs throughout the orchard, specialised equipment to apply fumigations), to comply with chemical, physical and biological requirements through laboratory tests, to comply with the proper use and handling of pesticides, to comply with hygiene in the orchards, water use, pH recognition, water chlorination and the preparation of disinfectant solutions; Certification is issued once the producers are ready with the infrastructure aspects, after which the audit is carried out and the certificate is tentatively issued in September-October.

Given the above, the producers, who initially numbered 15, agreed to comply with all the requirements of the schemes, so that the payment is divided according to the number of hectares that each producer has considered for certification. As for the legal figure, a member of the same group was unanimously selected, who will be responsible for granting the certificate when the other producers require it. Throughout the courses and on repeated occasions, the producers receive training in the proper use and handling of pesticides, pH, water chlorination, preparation of disinfectant solutions, among other topics that have been and will be discussed.

With regard to the categories that were collected with the logs, the producers' interest, attendance, physical and verbal expressions, difficulties, qualities, knowledge, economic situation, infrastructure and access to policy and financing. In this sense, it is worth mentioning that at the beginning there was an attendance of 15 producers with the interest to be certified, this was segregated over time and currently there are 9 producers, sometimes attendance and especially punctuality is a worrying factor at the time of confirming the meetings and training, sometimes only 50% of them attend and the other part does not bother to notify. It is found that there is a high degree of unpunctuality, with some producers arriving up to an hour after the scheduled appointment time.

One of the reasons why the group continues to prevail is due to the possibilities of new national and international markets once they have certification, which offer a better payment for the purchase of the fruit, which is representative for the producers themselves. The training has also helped producers to become aware of the importance of sustainability and safety in the production of Hass avocado, realising that traditional forms of production contain a series of risks due to the products used, forms of implementation, consumption, environmental and market risks. The plots of land that are prospective for certification are presented below (see figure 4).



Figure 4 Prospective production unit
Source: ArcMap 10.8

Results

It could be observed within the systematisation, that within the aspects of family proportion, the young and middle-aged producers, ranging from 25 to 45 years old, live with their children in the same household, and even in a couple of cases it was found that the children themselves already have a family within the household. This contrasts with the example of older adults, where all of them live only with their wives.

Within the domestic units, education is not an important factor for the heads of households, where women and children have a higher level of education than the head of the household, the children of young families are studying, occasionally working in the fields or in commerce. Given the above, the work force comes from the head of the household and during the productive cycle 50% of the direct family is involved, the other 50% hire local day labourers, for both cases the producers answered that the work day is paid at \$300 pesos to day labourers and the same family, during the questionnaire only one elderly producer answered that the work force comes from the same family and that they are not paid any pesos. Within the domestic units, agriculture was found to be the main activity, and it is worth mentioning that in all cases it is accompanied by commerce and various trades, such as: grocery shops, lunch shops, hamburger and carnitas shops, economic kitchens and various trades. Given the above, according to the producers, the domestic unit is sustained by the same activities of the family cell. In the types of crops, it was found that Hass avocado producers in Xalisco have good quality ejido land, which is characterised by specialisation - monoculture, i.e. they only focus on producing avocado, sugar cane or soursop, so there is no diversity of crops in the orchards, in this sense, self-consumption does not play an important role in the households.

Regarding the production methods, it can be seen that all producers operate in the same way, i.e. in the application of inputs, fertilisers, insecticides and herbicides, so that sustainability, environmental and land use aspects are not considered by the producers, and even in one questionnaire they answered that they do not use organic products because "the fruit does not grow". The investment to sustain the production cycle "inputs and production costs" comes from the activity itself, only 10% of the cases mentioned that they turn to banks and solidarity funds.

It was found that the location is a determining factor in the productive cycle, in such a way that the producers that have their properties in high zones harvest in the monthly period of October-January, for them there is a better purchase price due to the fact that in this period the Hass avocado starts to be scarce.

Producers located in the lower and middle zones harvest between July-September, and those who cut from July (early harvesters) sell at a good price.

Producers sell their harvest to local packers who offer the best price (variable), and the packers are also responsible for collecting the harvest, cutting it at the foot of the orchard and transporting it. It was also found that the producers do not receive any government support, except for one family that received support from the FERTILISERS FOR WELL-BEING programme (4 packages of sulphate, 2 packages of diammonium phosphate, 1 dose of biofertiliser), this support ranges between \$12,000 pesos. With respect to the risks that exist within the agricultural activity, the main factor was found to be pests, secondly, fires, and thirdly, drought and water shortages. In this sense, 80% of the producers have catchment pans, the other 15% do not have an irrigation system, and the remaining 15% have gravity irrigation.

There is no organisation on the part of the producers, and in this sense it seems that most of the older producers have lost interest, who comment that when they organised themselves they went through fraud among producers themselves and actors in the political sector. When they were asked whether it was important or not, it could be observed that they were aware of the results that a good organisation could generate for them, however, mistrust, insecurity and partly ignorance prevent these possibilities.

Conclusions

Taking up the elements considered by Chayanov (1985) and Bartra (1982), these are: Self-consumption, types of cultivation, proportion of family and labour force, location, organisation and forms of production. These are essential categories in the system of the domestic unit, in the application of the different instruments it was possible to determine the modus operandi and thus obtain criteria for the production unit in the locality of Xalisco.

In relation to self-consumption, the information obtained from the questionnaires applied shows that 90% of the producers do not consume what they harvest.

Regarding the types of crops, it was found that the producers cultivate only one product, as they state that this generates more profit for them. On the other hand, the participation of the family as a work force has been reduced in the last few years, and the producers have had to pay their children as if they were day labourers, which means a decrease in interest on the part of the family members in the crop.

In relation to location, it was found that producers with orchards in elevated areas obtain higher profits. Regarding organisation, there is uncertainty and distrust on the part of the producers to make changes. Of the 15 producers who participated in the project, only one has made changes and has been able to create a marketing and collection centre, from where it exports and markets to different countries, taking very seriously the aspects of safety, sustainability and certifications.

The production units in the town of Xalisco do not consider environmental care, and use inputs that deteriorate the soil, eliminate flora and fauna, and therefore generate risks in the work of producers and workers, which increases the probability of contracting carcinogenic diseases. The insertion of good safety practices through certification bodies is a good proposal for production units, which allows them to position their products in better markets, as well as promoting organisation, avoiding chemical and biological risks, as well as promoting sustainability and improving consumption habits. Empirically, it was found that traditionally production units do not carry out practices that are responsible with the environment, the economy and consumption habits.

Finally, it is important to point out that in comparison with traditional practices, the insertion of good safety practices, through the participatory method with producers and through certification bodies, is proposed on the basis of development for the production units, which values the natural environment, allows the insertion of products into better markets, strengthens the local productive fabric, incorporating environmental and organisational innovations.

The challenge is undoubtedly great, due to the resistance of producers to training and accreditation of crops in order to adopt safety practices and increase production and profits, but also, most importantly, to protect the environment and ensure that the land continues to have the necessary quality to continue growing avocado hass in the region of Xalisco, Nayarit.

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