Agricultura, Sociedad y Desarrollo

# FAMILY AGRIBUSINESS FROM THE APPROACH OF SYSTEM DYNAMICS

Blanca Ireri **Camacho-Carrasco**[1], José Carlos Alejandro **Rodríguez-Chávez**[2], Encarnación Ernesto **Bobadilla-Soto**[3], Fernando **Ochoa-Ambriz**[1], Mauricio **Perea-Peña**[1*]

[1]Instituto de Investigaciones Agropecuarias y Forestales, Universidad Michoacana de San Nicolás de Hidalgo, Km 9.5 Carretera Morelia-Zinapécuaro, Tarímbaro Michoacán, 58880.
[2]Instituto de Investigaciones Económicas y Empresariales, Universidad Michoacana de San Nicolás de Hidalgo, Ciudad Universitaria, Francisco J. Mújica S/N, Morelia, Michoacán, México. 58030.
[3]Catedra CONACyT, Instituto de Investigaciones Agropecuarias y Forestales, Universidad Michoacana de San Nicolás de Hidalgo, Km 9.5 Carretera Morelia-Zinapécuaro, Tarímbaro Michoacán, 58880.
*Corresponding author: mauricio.perea@umich.mx

## ABSTRACT

The objective of this study was to determine the elements and interactions that affect the dynamics of a family agribusiness in Indaparapeo, Michoacán, during the agricultural cycle of spring-summer 2017. An exploratory and descriptive case study was conducted, using the participatory action research method, and the system dynamics approach to construct the causal model. The agribusiness was legally constituted in 2014 as a Limited Liability Rural Production Society whose main activities are production, stockpiling and trade of white corn, credit and cash sales of agrochemicals and seeds; it is made up of eight partners who are family, but only two manage and execute it since the beginning of its operation. In 2017 the society traded approximately 1/6 of the corn production in Indaparapeo, corresponding to the cycle 2016. The causal diagram elaborated represents a systemic and integrative vision of agribusiness that graphically shows its activities and 18 elements, where the variables that make up the nine circuits that self-regulate, transform and differentiate them from other systems in the market are determined, eight are feedback circuits and one is a balance circuit that provides stability. In the diagram, human capital stands out due to the number of direct and indirect interactions (eight) between it and the other elements and structures of the system.

**Keywords:** contract farming, human capital, causal diagram, gender roles.

**Citation:** Camacho-Carrasco BI, Rodríguez-Chávez JCA, Bobadilla-Soto EE, Ochoa-Ambriz F, Perea-Peña M. 2022. Family agribusiness from the approach of system dynamics. Agricultura, Sociedad y Desarrollo https://doi.org/10.22231/asyd.v19i3.1272

ASyD 19(3): 262-278

**Editor in Chief:**
Dr. Benito Ramírez Valverde

Received: December 02, 2019.
Approved: November 03, 2020.

**Estimated publication date:**
November 16, 2022.



## INTRODUCTION

Several authors such as Valentim *et al. (*2006), IICA (2010), Alvarado (2010), Meza (2011) and Olarte (2012) define agribusiness as the set of activities or system of value networks centered on satisfying the demands and preferences of the consumer, which range from inputs, production, processing, transformation, storage, distribution and commercialization. The term agribusiness does not exist for the Real Academy of the Spanish language, and it is not current in the economic system or in the national laws. However, it is convenient to point out that two definitions have been in force, one of them in Article 2 Fraction 28 of the Operation Rules of the Fund for Shared Risk Program for the Promotion of Agribusinesses. Based on this, the definition of agribusiness for the purpose of this study is the following: "Any activity that generates economic profitability in the agricultural, livestock, aquaculture and forestry subsectors, from production to final consumer, which promote development in the rural sphere" (FOMAGRO, 2006).

The system studied is an agribusiness that shows a close relationship between the life of the business and the life of the family, so this study will added this particularity to the

concept, taken from the definition of the family business made by Maseda *et al.* (2018). Agribusiness is understood as an organization formed by a complex set of elements: family, property and management groups, each of them with their own norms for acting, which are dynamically intertwined, according to the three-circle model.

Therefore, and solely with the intention of clarifying the view of the authors on the concept of family agribusiness, and not of going into conceptual debate, for this study it is defined as any activity conducted by organizations in which the family's participation can happen, which also generates economic profitability in the agricultural, livestock, aquaculture and forestry subsectors, from production to final consumer, promoting development in the rural sphere.

In its statistical and geographical yearbook of Michoacán de Ocampo 2016, the National Institute of Statistics, Geography and Information (*Instituto Nacional de Estadística, Geografía e Información*, INEGI) points out that, in the year 2014, the micro and small businesses (MIPYMES) represented 95% of those existing in Mexico. In the year 2016, family businesses generated 67% of employment at the national level, and in Michoacán during the same period, 83% of the businesses were family-sized, 58% of them microbusinesses. These data reflect the importance that micro and small-scale family companies have in the State and National economy; however, the information available currently does not give details about the number of agribusinesses that there are in the state, their characteristics, or the value that they represent in income-generation for the families. The last agriculture, livestock production and forestry census from the year 2007 points to the existence of 192,499 production units in Michoacán, of which 172,302 are described as agricultural, although it does not specify whether it is primary production, if they give any added value to the product, or if they perform more than one activity that generates income.

During the spring-summer cycle of the year 2016, in the modalities of irrigation and rainfed systems, the municipality of Indaparapeo planted 5,220 hectares (ha) of white corn, with a production of 27,320 tons (t), according to data published by the Municipal Development Plan of this period (2016). On the state level, the data published by the agrifood and fishing information service (SIAP, 2017) indicate that during the same cycle, the state planted a total of 491,030 hectares of grain corn, with a production of 1,421,158 tons. During the period of 2006 to 2015, Michoacán remained in the fourth place in white corn production, after Sinaloa, Jalisco and Estado de México (FIRA, 2018). According to the national survey on education and employment (INEGI, 2017), Michoacán was the first state with highest loss of rural population due to migration during the years 2014 and 2015, with a rate of 135.1 migrant people for every 10 thousand inhabitants. The reason why 77.4% of them migrate is to search for work and better income; the survey also showed that for every two people who carry out an international migratory movement, one of them is a young person in productive age.

This reflects a social and economic reality that is experienced in the farming sector in the state, although Michoacán is leader in primary production and occupies one of the first places in corn cultivation at the national level. The agriculture and livestock sector

in Michoacán observes a lack of growth, abandonment and ageing, and only few people decide to establish an agribusiness and who achieve their consolidation and stability in adverse conditions. For these reasons, this study addresses the following research questions: How should a family agribusiness be structured so it can remain throughout time? Which elements and interactions influence its dynamics? When answering these questions, the study attempts to evidence the model that could be followed for the promotion and encouragement of the generation of agribusinesses similar to the one examined.

Therefore, the objective of this study was to determine the elements and interactions that influence the dynamics of a family agribusiness in Indaparapeo, Michoacán.

## METHODOLOGY

The unit of analysis was a rural production society, devoted to the cultivation and commercialization of inputs and grains located in Indaparapeo; the study was carried out during the 2017 spring-summer agricultural cycle, which is from April 2017 to January 2018 (including the time it takes for the commercialization process of the grain harvested). The participative action research method and system dynamics were used for the construction of the causal model. This method included the following steps: a) Observation of the behavior of a real system; b) Identification of its components and fundamental processes; c) Identification of the feedback structures that allow explaining its behavior; d) Construction of a formalized model on the basis of the quantification of its attributes and relationships; and e) Introduction of the model in a software (Arnold and Osorio,1998).

It is important to point out that the researcher knows the system of study and its environment since its conformation, which is why at the time of conducting this study, there was already a bond of trust between the operators and the researcher that allowed full access to the information and ensures its truthfulness. Data collection was carried out based on the participative action research method proposed by Merriam (1998), and included a stage of observation, design, validation and application of semi-structured interviews; then the group data analysis was conducted, centering the attention in the participation of actors and the relationships between them.

Participant observation, which according to Taylor and Bogdan (1994) involves the social interaction between the researcher and the informants, was done *in situ*. For this purpose, 20 visits were made, 10 of them previously arranged with the members of the system and 10 without previous notice. The purpose was to study the behavior of the system's operators in circumstances of their daily life, and observation of the following was done during the visits: the physical context of the place where the daily activities of the agribusiness are conducted, from the point of sale, the input storage and administrative office. Observation of some of the activities that operators of the system carry out, how they are organized and how they divide the work, the relationship between them, the treatment and willingness to take care of clients, their relationship with suppliers, neighbors and producers of the region, and their personal and family relationships was also done. The administration system, its documental and digital archive were reviewed, and observation notes were taken from these for their later analysis and systematization.

To obtain information about the system and the way in which it interacts with its environment, the actors interviewed were segmented according to the relationship that they maintain with the agribusiness. Four groups were formed: agribusiness operators, corn suppliers, input suppliers, and corn buyers. A semi-structured interview was applied to each of the members of these segments, based on the recommendations from Martínez-Miguélez (1998). Members of the system validated the data collection instruments before they were applied.

Two people made up the segment of agribusiness operators, and a guide was written with questions grouped by themes in order to obtain information from them. There were questions about income from sales; utilities obtained; outdated portfolio; contracts elaborated with corn suppliers, buyers and inputs; volume of corn sold; technological use capacity; suppliers, partners, clients, competitors; degree of commitment, trust, empathy and cohesion with clients and suppliers; degree of motivation; short, medium and long term vision in relation to the agribusiness; their person, family and community; the roles they play; and finally, information about the corn production process.

The segment of corn suppliers was made up of 20 members, and 75% of them participated in the contract farming scheme during the agricultural cycle observed and by at least one more, and 25% of them sold their corn production through the agribusiness in that cycle for the first time. The guide that was elaborated to carry out the interview with this segment included questions about the time of relationship between the interview respondent and the system, their degree of commitment, trust, empathy and cohesion. The reasons why they decide to have a commercial relationship with the agribusiness, the competitive advantages they find in it, the abilities and aptitudes observed in its operators, as well as some negative experience with the business studied or with some other, in case there were any.

The segment of input suppliers was made up of three seed distributors, two of agrichemicals, which represent 100% of the suppliers of products that are sold in the agribusiness. Information was obtained from them through a semi-structured interview, applying the same questionnaire than for the group of corn suppliers. To conduct the interview, two of them went to the company's facilities, and the third requested to get the questionnaire by email and then interviewed via telephone.

The segment of corn buyers was made up by a single member, since the grain has been sold to the same company in the past three years. The interview was applied based on the questionnaire used for the segments of corn and input suppliers. To conduct the interview, an appointment was made with the commercial manager of the corn purchasing company, who requested to receive the guide by email before it was applied and then interviewed personally.

After the information was obtained, the data collected were ordered and synthesized and a database was made in Microsoft Excel®, where the components and main activities of the agribusiness were identified. From these, the 18 defining variables in the system were established, considering that from the systemic perspective those elements were considered as defining in a coordinated way and with constant interaction to seek reaching objectives

in common (Arnold and Osorio, 1998).

Stemming from the systemic perspective and using the *Powersim Constructor Lite® version* software, the system was characterized through a causal diagram that reflects the elements and the interactions of the agribusiness, as well as the feedback structures that allow observing its dynamics.

## RESULTS AND DISCUSSION

The family agribusiness is a Limited Liability Rural Production Society (*Sociedad de Producción Rural de Responsabilidad Limitada*, S.P.R de R.L.) which was legally constituted in April 22, 2014, with eight partners of whom only two participate in the operation and administration of the agribusiness.

The managers are a woman and a man who are 33 and 34 years old, respectively, who have known each other for 18 years and have been married for 11; they are both originally from the region in which they established the agribusiness. She is originally from the locality of Indaparapeo, Michoacán, where she has always lived with her family of origin; she studied high school in the local school; she did not have any experience in business administration or commercialization, subsidy management or client service. She has two small children and comes from a family where women are traditionally homemakers and men are devoted to the production of basic grains, which is the main activity to generate economic resources for her brothers, father and grandfather. They are all producers in the region, who have owned livestock and sporadically some other crops, and sometimes rent out their machinery to other producers of the region. However, none of them has an agribusiness similar to hers, who despite the role of businessperson and manager, tries to give greater importance to caring for her family, followed by the activities of the agribusiness. For her, the welfare of the people with whom she coexists holds special importance, primarily her family, her community, with values such as honesty and client service. Her life plan includes studying a bachelor's degree in business administration, growing the company and including her children in it, at some point. These results agree with those found by Compeán *et al.* (2015), who concluded that the search for improving their living conditions and quality of life have projected women beyond what their parents could achieve. The authors add that presently women play a primordial role in the business-family-society balance, since they continue to be the ones who contribute to the formation of new generations, create foundations to conserve traditions, maintain and construct values, and at the same time, they are entrepreneurs. Similarly, Aguilar *et al.* (2013) conclude that in maternity, together with professional development, give sense to the business manager's life, where she is the one mainly responsible for her children's education and attention, as well as tending to her husband. As described by González and Castellanos (1995), a woman who works not only for economic reasons, but also seeks her personal and professional development in a vital project and simultaneously in the private sphere, continues to fulfill the same demands that traditional culture has imposed on women until today.

The other partner is originally from Queréndaro, Michoacán, he studied two years of high

school, did not have experience in business administration or in commercialization or subsidy management. From his perspective, he has narrow experience in grain production, since it is limited to what he obtained as a small boy when helping his grandfather in corn and sorghum cultivation; his close family does not perform agricultural tasks in the farmland and they are not businesspeople. He lived in Mexico City and worked for several years in the United States giving maintenance to houses and buildings. His family, community and the environment are important to him, as well as offering solutions and not products, treating the client well, continuing to train and to generate opportunities for the agribusiness and for people related to him. In the future, he sees himself coordinating the activities of the family business, in different municipalities, promoting good agricultural practices, and generating better living conditions for the people who are around him. Aguilar *et al.* (2013) refer that traditional masculinity is quite associated to physical strength, good performance, body roughness, efficacy, and competition, exercise of power, direction and definition of rules. The agribusiness partner shows these characteristics, since he conducts the activities that require physical strength and those of legal representation, including some decision making and actions that he considers necessary or convenient to carry out the company's activities. Despite of this, he has deep affective commitments, expresses his feelings without minding if his manhood is questioned, exercises his paternity, and assumes himself as the one in charge of providing and forging disciplinary habits in his children, characteristics that Kleinman *et al.* (1992) refer to the so-called new masculinity.

Both operators have developed attributes such as assertiveness, safety, intellect, leadership, independence and the ability to direct the economic path of the family, as referred by Fernández-Rius (2005), and they are people with needs for professional and social development, sensitive and worried over social problems, for whom love life and family life are important. The study observed the way in which decision making processes happen in the agribusiness, where both partners, without gender distinction, contribute ideas and their voice and vote is worth the same as their partner. In addition, they obtain income that is destined to family expenditures, being directed in this sense towards equity and relaxation of the traditionalist scheme, as pointed out by Fernández-Rius (2005). In the system observed, the masculine figure ceases to be the provider in face of parity in the economic contribution, and when the woman becomes a provider also, the authority in the family is also shared and a greater participation of men in the household and family tasks takes place, as described by the operators themselves. The rest of the formal partners do not participate in any of the processes conducted by the agribusiness.

Table 1 details the activities that generate income for the system, highlighting among them the ones that the man carries and those that the woman executes. The observations show that the woman develops primarily the administrative part of the business, and does so based on the ancestral knowledge of homemaking, giving priority to the collective interest (Castiblanco and Suelen, 2013). She seeks to achieve a greater cohesion among participants, and prioritizes stability and safety in face of profit generation, described by the four groups of interview respondents who refer that this is how the agribusiness

**Table 1.** Role of activities by gender in agribusiness.

| | Activities | M | F |
|---|---|---|---|
| 1 | Coordinate corn production (cultural activities are done by temporary workers and rented machines) | ✓ | |
| 2 | Periodic reviews of crops that receive financing | ✓ | |
| 3 | Purchases of supplies | ✓ | |
| 4 | Negotiations with costumer and clients | ✓ | |
| 5 | Prepare dossiers for subsidy management | ✓ | |
| 6 | Negotiations with Goverment agencies, funding sources, City councils, etc. | ✓ | |
| 7 | Make contracts with producers and customers | ✓ | |
| 8 | Coordinate the reception and sale of corn | ✓ | |
| 9 | Counter´s sale | ✓ | ✓ |
| 10 | Facility care manager | ✓ | |
| 11 | Make grain and input payments | ✓ | ✓ |
| 12 | Documenting agribusiness operations | | ✓ |
| 13 | File documents and prepare business accountancy | | ✓ |
| 14 | General business administration and management software handling | | ✓ |
| 15 | Carry out sales, inventory and expense controls | | ✓ |
| 16 | Document credits granted to grain producers | | ✓ |
| 17 | Bank account´s management | | ✓ |
| 18 | Cash control | | ✓ |

Source: own elaboration.

interacts with its environment and operates its business model. The man, in turn, is in charge primarily of the operative part and contributes to the permanent growth strategy of the business, the visionary and innovator spirit, the motivation, perseverance, optimism and trust, intrinsic aspects that according to the study by Sastre (2013) are important requirements to undertake.

The order of income generation obtained from the agribusiness during the agricultural cycle studied is the following: white corn sale, providing technical assistance services for commercialization, input sale for grain production, and white corn production. Technical assistance for production is also offered as a service, and although it does not produce a direct income, it does contribute to the value generated in the production and commercialization processes.

During the 2017 agricultural cycle the partners planted a surface of 20 hectares of corn, with average yields of 7.5 tons/hectare, the sale price of the grain was $4,000.00 per ton. The agribusiness sold close to 4,200 tons of white corn, 15.30% of the production of its municipality in the year 2016, which was 27,320 tons (SIAP, 2017).

The physical facilities are found on the road that crosses the locality and unites it to other municipalities and localities, on which producers of the region habitually travel. The place includes a sale point with storage, in the locality of Indaparapeo, Michoacán; there is an office in it where the administration and control of the agribusiness is located, and this space has, according to its operators' opinion, the sufficient equipment to carry out their activities. During the *in situ* observation, researchers found the information and digital

and documental files to be in order and updated, which is why the information is available at the time when those interested request it. The place stores agrichemicals and corn and sorghum seeds that are sold to the public in general to address the needs of its buyers; the place has an area for clients to wait while they are looked after, and a parking lot. On the shop front, the brands and some of the products that are sold there are clearly shown, so for those interested it is easy to identify, and the clients who request advice for their crops are visited in their plots if necessary. They do not have storage of their own for grain stockpiling, and during the study period, as in prior years, they signed a leasing contract of the facilities for storage.

From this study, it is understood that the agribusiness was planned after its operators were left without work after five years of having worked in an agribusiness, when it was declared in commercial bankruptcy. In that agribusiness, they carried out similar activities to the ones they conduct. Months after the bankruptcy of that company, with the experience acquired and the business idea, they sought advice about different themes and began to make alliances, with the objective of undertaking the agribusiness that they now have. The system analysis shows that this previous experience and the knowledge acquired, positive and negative, have allowed the operators of the agribusiness to make better decisions and to make their activities more efficient obtaining the results described in this document.

The business model that the entrepreneurs developed generates advantages in the production process, since they obtain their inputs at a wholesale price because they are distributors in the region and have a line of credit with suppliers, which is why, in general, they have them on time; as consequence they ensure their supply at a lower cost than the market. During the spring-summer cycle, they sow hybrid corn, adapted to the agroecological environment of the region, with the conditions that the market demands. In the financial sphere, they have specialized software in business administration and accountability, with which they keep inventory, administration and accounting; however, they also have a physical documental file with the most important operations that they perform in this establishment. Some aspects that stand out are the fact that they only have credit lines with suppliers, they do not conduct profitability analysis or economic projections, and do not have an established merchandising strategy. Despite having its image and logo defined, the company is currently only positioned at the regional level, and it does not have an operation manual and although they have controls, they are also not contained in manuals, and they do not have a written business plan. The human capital of the agribusiness receives scarce training and formal counsel, the only constants are accounting and tax counseling and, when required, legal and technical counsel for production. They have few input suppliers, which is the same that happens with their corn suppliers and grain buyer clients. They have been careful to provide a quality service, strengthening ties of loyalty and trust with them, as well as fostering a win-win relationship, correct strategy that generates a lasting and close interaction in any type of business, according to Peñaloza (2004). This author refers that in the marketing world, beyond transactions he observes relationships, where seller and buyer trade value in function of utility (in monetary terms) or benefits received, generating an effect where the value contribution leads to satisfied

clients and this translates into clients who are captive, committed and loyal with the agribusiness.

Although the clients are less loyal, more knowledgeable and more demanding in globalized markets, in the rural area, beyond performing a purchase-sale operation, the consumers seek to satisfy a need or to resolve a problem, to be treated as a person and to be looked after by a courteous employee, and to have commercial relationships based on values such as certainty, honesty and transparence. These characteristics were found in the agribusiness studied, whose vision and mission, the same as its scale of values, agree with those of its managers. They share a life plan that seeks to ensure the welfare of their family, to expand the business, to integrate family members to it, have financial stability, develop links of trust with whoever they interact, promote good agricultural practices, the moderate use of natural resources and generate jobs in their region. Their scale of values stands out in the worldview of the managers, and the sense of belonging and rootedness to the place where they live, as well as their purpose of creating networks that allows the growth of participants. This is why the business model which they implemented includes contract farming, which provides legal certainty to the parts involved, since the conditions in which the transaction will take place are determined from the start, seeking to maximize the benefits for participants, who decide to continue participating in the process once they see their expectations fulfilled, making it more solid.

Table 2 lists the components and activities identified as defining of the agribusiness, and the causal diagram with the *Powersim* Software resulted in the characteristics of the system (Figure 1). The elements (tangible and intangible), the interactions, feedback and balance structures, which can limit or favor the consolidation of family agribusinesses in similar conditions to those observed in companies which, as the one studied, perform activities that are part of many links of the value chain, such as production, stockpiling and commercialization.

The variables included in Figure 1 show some elements that differentiate it from the description made by the current theory about agribusiness. Ceroni (2018), in a study about agribusiness in Latin America, identifies the following as its main characteristics: entrepreneurial concentration, which links different actors of the agroindustrial chain; alliances between companies; the productive base (which in most cases is a monocrop), capital accumulation, incorporation of innovation and technology, reconfiguration of relationships between participating subjects. The land value as a production factor and not as patrimony, capital rotation, knowledge as central factor, and optimizing capital of the coordination of the tasks; financing of planting as an investment fund associated to goods and services belonging to actors of the agriculture and livestock sector. Ceroni (2018) highlights that most of the agribusinesses operate with external variable capitals, that is, from people who do not own lands or machinery; with very professional financial, economic, commercial and agronomic management; and with the objective of undertaking an agricultural activity during a specific period with the goal of obtaining the greatest economic benefit. This characterization, according to the author, shows the central elements of the agribusiness model in Latin America, although the system observed is far

**Table 2.** Variables included in the causal diagram of agribusiness.

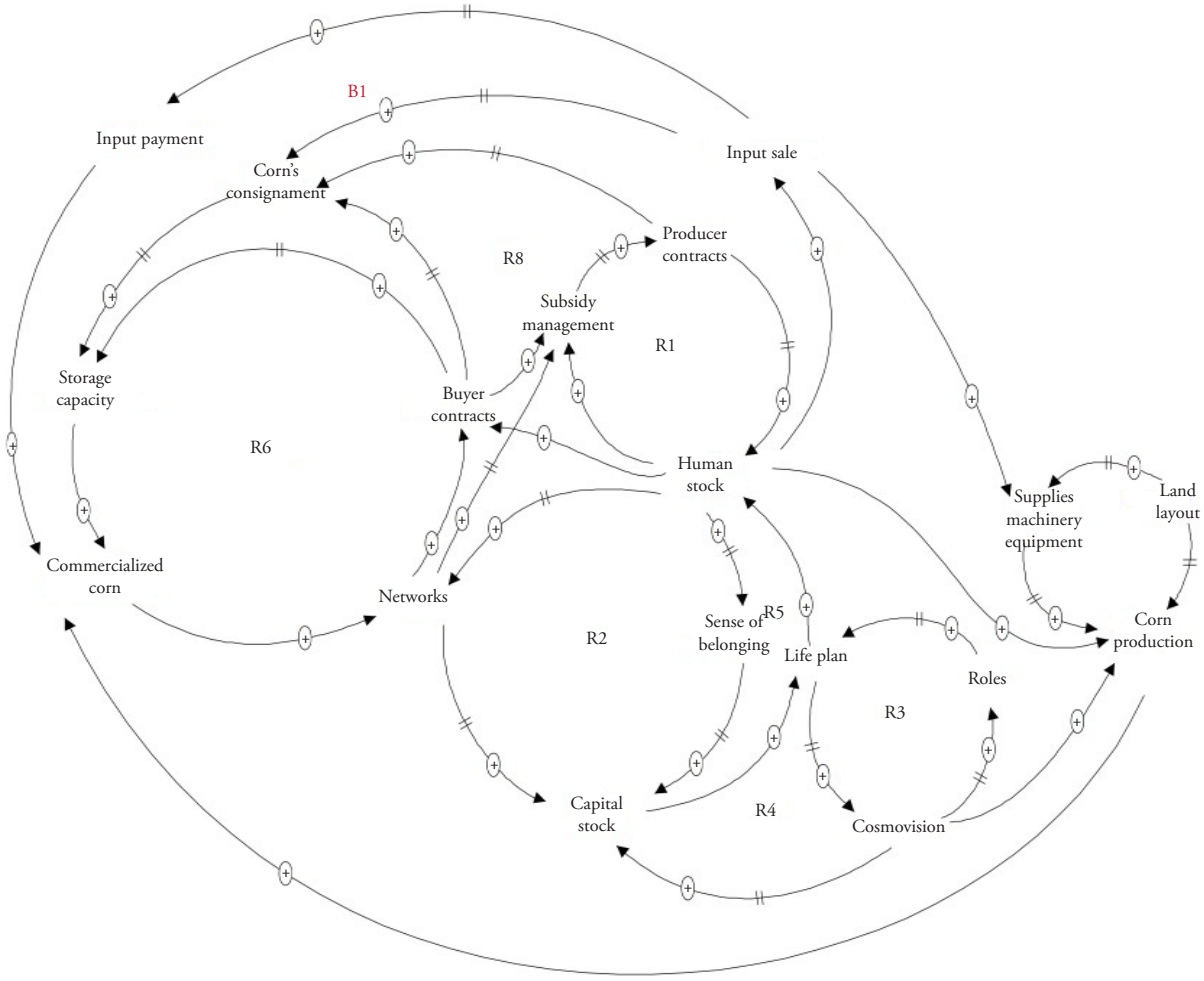
| Short name | Full variable name |
|---|---|
| Input sale | Sale of inputs for grain producers |
| Producer contracts | Corn purchase contracts with producers |
| Input payment | Cash payment of inputs financed in kind at the beginning of the crop cycle |
| Corn´s consignment | Corn received on consignment without prior contract |
| Storage capacity | Corn storage capacity |
| Subsidy management | Management of subsidies for the commercialization of basic grains |
| Commercialized corn | Corn marketed by agribusiness |
| Buyer contracts | Contracts signed by agribusiness with corn end buyers |
| Human stock | Human abilities, knowledge and experience |
| Networks | Social networks |
| Sense of belonging | Sense of belonging |
| Social stock | Relationships between people, such as trust and reciprocity |
| Life plan | Life plan |
| Cosmovision | Cosmovision |
| Roles | Roles |
| Supplies, machinery, equipment | Provision of inputs, machinery and equipment for corn production |
| Land layout | Land available for corn production |
| Corn production | Corn production |

Source: own elaboration.

from agreeing faithfully with the description of agribusiness. The welfare and satisfaction of the needs and interests of participating subjects in the agribusiness stand out as its aim, especially of the family that operates it, and the corn suppliers. The company seeks the care and rational use of natural resources and recognizes land as a link of belonging to the community. This sort of difference derives from the interaction of certain elements or intangible variables that the R4 and R5 feedback circuits of Figure 1 show, which are not included in the models currently proposed by the theory. For example, the influence of the worldview and the life plan of agribusiness operators, and the affective links that they have formed with their community, generate a genuine interest for creating a climate of trust and a set of symbolic constructs that facilitate the interaction between participants in the system. Table 2 details the short name given to the variables.

Once the observations and the view of all the interview respondents were conjugated, the *system's model* was constructed conceptually. In words by Luhmann (1984), through identity and difference, distinguishing it from its environment, which is valid for its structures and for the elements themselves which integrate it, also identifying the internal operations to simplify its complexity, which in words by Espejo and Reyes (2016) refer to the number of relevant distinctions or behaviors selected by an observer. To characterize the system, components and main activities were identified, as well as feedback structures that explain its behavior in a specific temporality.

Figure 1 highlights visually what its creators, clients and suppliers consider as essential, valuable and which distinguishes the agribusiness from others. The flow diagram, according to Arecil and Gordillo (1997), helps in itself the easy comprehension of the




Source: prepared by the authors.
**Figure 1.** Causal diagram of the agribusiness, where R is the feedback circuit and B is the balance circuit.

dynamics, since the brain processes the images in a different way than it does with words. Velásquez (2007), for his part, maintains that we can only perceive what we already know, since knowledge is in the mind and perception is a synthesis found in it. From this perspective, the reality that we perceive is a construction from our own schemes and not that objective and absolute entity that we can apprehend through the senses (empiricism) or reason (rationalism). Starting from this premise, the system shows similar activities from those conducted by other regional agribusinesses, such as administration, financing, sales and technical assistance for crops, although their agribusiness model, understood as the way in which the company carries out its business (Ricart, 2009), has been modified and enrichened with the passing of time. This happened based on the experience and training that they received from the backing program to the Productive Chain of Corn and Bean Producers (*Cadena Productiva de los Productores de Maíz y Frijol*, PROMAF) for

three agricultural cycles. They both received training in themes of management and file assembly for grain commercialization; the woman was in business administration; and the man received a certification for seed application and treatment from the suppliers, and training for grain production, leaf application, weed management, and high-yield production of corn. In addition they received accounting counsel that they continue to receive permanently, as well as legal and technical counsel, when the business requires it; this has also contributed to the feedback model of its clients and suppliers. Something deduced from the observations is that the knowledge and the development of capacities and abilities of human capital for management of an agribusiness are a differentiating condition in the life of the company prior to the undertaking, since they provide entrepreneurs with information and experience that allows them to make better decisions and to integrate elements into the system which are valuable for its creators and to give it an identity that distinguishes it from others. Sastre (2013) describes this, when pointing out that it is advisable in the previous and nascent stage of entrepreneurs, to direct the training towards issues that reinforce the personal development of their capacities and abilities to contribute to a deeper knowledge about the business.

The method used to elaborate the causal diagram (Figure 1) allows integrating quantitative and qualitative variables, which opens the possibility of observing the influences that are produced between them systemically; the variables that integrate the system can refer to conditions, situations, actions or decisions that may influence or be influenced by other variables (Morlan, 2010). The arrows or links represent a relation of causality or influence between two variables, and their possible delays in time are also shown on them, which implies that the effects will not be immediate and the polarity of the influence. The polarity can be either positive (of reinforcement) meaning that if one increases the other will as consequence, or negative (of balance) implying that when one decreases the other will also decrease (Arecil and Gordillo, 1997).

Velásquez (2007) refers that the organization is an open sociotechnical system that has entry relationships that constitute its inputs, exits that are their products, and feedback or return cycles that allow modifying its structure, operation, function or purpose, and make its permanence in time possible. This author adds that these internal processes of re-adaptation, construction and self-reparation empower it to be adequately interrelated with its environment. The agribusiness, understood as an economic organization, reflects dynamics integrated by eight feedback or reinforcement circuits and one of balance that counteracts the growth and balances them. The structure shows the basic relationships between variables, highlighting human capital with eight direct interactions, followed by corn production, the contracts with buyers and the networks with five; however, it should be taken into account that each of the parts of the system are connected and affected directly or indirectly by one another, generating a series of causes and effects where each action influences the subsequent ones.

Figure 1 shows how the variables of the production process, including the disposition of the land, inputs, machinery and equipment, do not form a circuit; the first influences the production volume and the amount of inputs, machinery and equipment used during

the process, but none of them feed into it. In truth, the agribusiness does not have land, machinery or equipment of its own for corn cultivation, which is why in each cycle, depending on the availability of lands there are for renting an on their cost, they make the decision of sowing a specific surface, which limits or balances the productive process. However, the amount of corn produced does have an impact on the volume of corn traded and in the generation of income from the agribusiness, since as mentioned, the following are taken advantage of: the preferential price at which the inputs are obtained to generate higher utility, the opportunity with which they are obtained, the obtainment of subsidies and backing for corn commercialization, the technical assistance for production, and the provision credit provided by suppliers of seeds and agrichemicals, and which the company transfers to some of its clients in kind for them to pay with grain or in cash during the harvest.

One of the largest circuits that contain the causal model is R8, where the influence that the life plan of participants in the agribusiness has on human capital can be observed, which refers not only to the people who participate in it but also to their capacity for decision-making and carrying out actions based on the sum of knowledge, experience, values, abilities, and accumulated capacities. This is in particular for the management of subsidies for commercialization, offering a sale scheme called "contract farming", which in the particular case of the system to study, has provided corn producers certainty in the price, the possibility of receiving additional compensations on the occasion of the sale, and the timely payment of its grain. This model has been managed with full transparency and honesty between the parts, which has made the agribusiness into a reliable and safe option that has fostered the stability and constant growth of the operations volume of the company. It has satisfied its clients, promoted the loyalty of all the participants and influenced the business to receive volumes of grain by deposit from producers who are not participant in the contract farming scheme, but who search for aspects that are defining for them at the time of choosing the scheme and place of sale of their product. For example, the price offered by the buyer, the certainty of payment, the use of verified scales, the honest humidity determinators; or else which allow it to receive a higher volume of corn from a producer with whom a prior contract had been signed, than what was originally agreed on.

According to García (2000), actions such as the ones mentioned are of great value for the company, since they strengthen the links generated between those involved in the process, reinforce the link of trust, loyalty and certainty based on the fulfillment in time and form of the obligations which they agree on, and attain for participants to be happy and satisfied with the buying-selling operation. Because of this, the social capital has been consolidated, which allows feeding into, replicating and reinforcing the dynamics, and as consequence, this experience has modified positively the life plan of the members of the system, their business plan, and the agribusiness itself, since most of the corn suppliers interviewed refer that they trust him and will conserve their commercial relationship.

The causal diagram shows that human capital directly influences corn production, input sales, contracts with buyers, and subsidy management, which indirectly determine the

amount of grain that is captured, stored and sold. Figure 1 reflects the influence that human capital has on the sense of belonging and the social capital of the company, from the moment when its partners make the decision of opening the agribusiness in their place of origin, where family members, neighbors and acquaintances live, and they are occupied with creating affective connections and building solid networks in which values have a particular importance. Tünnermanch, cited by Valbuena *et al.* (2006), defines values as the beliefs selected and incorporated to the behavior, which direct the life of the person, allowing to make decisions more easily, choosing between many alternatives in a given moment, as well as resolving conflicts. The authors add that the "value system is reflected in beliefs, attitudes and relatively stable behaviors, which are frequently developed during infancy and manifested in the adult age" (Valbuena *et. al*. 2006). This belief system translates into a way of life, foundation of the business model to which it is incorporated, and generator of benefits for not only people and businesses that apply it, but rather, in this case, for all the participants of the processes.

Najul (2011) argues that: "in every organization, human capital is a fundamental element to reach the objectives and goals that allow it to carry out the mission proposed and for this, it is necessary for this resource to be trained from the professional, technical, moral and cultural point of view" (Najul, 2011: 28). In the system analyzed, the business model is sustained on values such as trust, honesty, loyalty, transparency, team work and certainty, which, incorporated to the lifestyle of the operators and the organizational culture, are the bases on which the service is provided and the daily operations of the agribusiness are carried out; this mode of acting, according to the result of the interviews applied, differentiates them from their competition.

According to González and Atencio (2010), client service based on values, as a differentiation strategy, consists in seeking for the service to be perceived as unique by the clients; this perception can be attained through various paths (which in the case of the system in study, is by generating trust), with the objective of achieving the loyalty of clients and suppliers and forming social capital through a solid interaction network that contributes to decrease possible risks and generates at the same time benefits, due to the commitment of reciprocity established by participants in it (Herreros, 2004).

As pointed out by Luna and Velásco (2005, p.137), cited by Galaviz (2013), the trust present in the interaction networks constitutes the social capital of an organization, and is founded on the calculation of the preferences and resources, the reciprocity, the solidarity based on principles and norms, as well as the prestige of its members. The latter is understood as the synergy of capacities and competencies, that is: "(…) economic, information, knowledge, infrastructure resources, capacity for organization [and] ability to relate (...)" (Galaviz, 2013: 44 and 45). The prestige to which the author refers can be attributed both to individuals and to organizations that are part of the network in which they interact. From this perspective, trust in the agribusiness observed is also based on the experience, knowledge and abilities that operators of the system have accumulated. Also, in the way in which they handle the information they obtain and make decisions; their capacity for organization, for managing risks, solving conflicts and contingencies; their

ability to relate, and the timely and transparent fulfillment of the offers and agreements reached between the participants. All of this has allowed them to remain in the market, make their operations efficient, and increase their profitability.

As consequence of the passing of time and the results obtained in the agribusiness, the motivation and sense of belonging of its operators increases. Their personal life plans become increasingly fused with entrepreneurial plans, and their personal goals are related largely with the professional and economic ones that are fixed in the agribusiness; an example of this is that both operators visualize their children incorporated to the organization. It was also found that the worldview, that is, the way in which the participants in the system interpret the world, based on the conceptions, ideas, beliefs and ritual practices of their daily lives, influences their family, social and business roles. The operators combine their roles as entrepreneurs with those of spouse, son or daughter, mother, father, brother, sister, uncle, aunt, etc., without losing the gender focus acquired culturally, which also impacts their life plan, since they fulfill their family and personal responsibilities, generating the balance described by Compeán *et al.* (2015), between company – family – society and seeking to improve their living conditions and quality.

The feedback observed in circuits 3 and 4, between the life plan and the worldview, in the circuit towards social capital, and in another to the roles of agribusiness operators, this part of the system dynamics is of the principal ones in design, structure and restructuring of the agribusiness. Based on their worldview, the attitude that Sastre (2013) refers and the roles that they now carry out in their family and business, the operators carry out collective and welfare actions for participants, whether they are members of the company or not. This feeds into their life plan, easing the interaction between participants and the growth of the business in the medium and long term. The climate of trust generated is taken advantage of, thus creating an influence and positive growth in the family sphere, in groups of influence, and in their personal life and worldview, provoking for the system to be stabilized, to remain and to grow in the market.

## CONCLUSIONS

The family agribusiness in Indaparapeo, Michoacán, is made up by eight partners united by family ties, although only two manage it and operate it since the beginning of its operations. The people who operate the system combine the family roles with those of the entrepreneurs and have transferred their own worldview and value scale to the business. With the passing of time, this has made the business plan of the company to increasingly coincide with the family life plan of its managers, since they have been giving each other feedback from the experiences lived and the results obtained, to fulfill their purpose, which is the welfare and satisfaction of the needs and interests of the subjects who participate in the agribusiness, especially of the family that operates it and the corn suppliers.

Including qualitative and quantitative variables in the causal diagram of the business allowed obtaining an integral view of the system and identifying 18 defining elements in the agribusiness, their interactions allowed recognizing eight feedback or reinforcement circuits that give it stability, self-regulation, transform it or differentiate it from other

existing ones. A balance circuit was also observed, which counteracts its growth and balances it; the structure shows the relationships between variables, with the human capital element standing out with eight direct interactions between it and corn production, input sale, contracts with buyers, subsidy management, sense of belonging, networks, contracts with producers, and life plan, emphasizing the influence of this element in the system's dynamics and as consequence, in the results that it has obtained.

In number of interactions, corn production, contracts with buyers and networks with five direct links follow. These influences show how the grain produced is as important for the agribusiness as the certainty in the commercialization, and the links generated between participants.

As can be seen, this business model, based on the contract farming scheme, strengthens the links between those involved in the process and reinforces the bond of trust, loyalty and certainty forged from the value system with which the business operations are conducted, strengthening with this the prestige and social capital.

## REFERENCES

Aguilar-Montes de Oca YP, JL Valdez-Medina, NI González-Arratia, López-Fuentes, S González-Escobar. 2013. Los roles de género de los hombres y las mujeres en el México contemporáneo. Enseñanza e Investigación en Psicología, 18(2): 207-224.

Alvarado-Martínez TE. 2010. Líneas de investigación en administración de agronegocio. Revista mexicana de agronegocio, 27: 443-449.

Arecil J, F Gordillo. 1997. Dinámica de sistemas. Alianza Universidad textos: Madrid.

Arnold-Cathalifaud M, F Osorio. 1998. Introducción a los conceptos básicos de la teoría general de sistemas. Cinta de Moebio 3: 40-49.

Ayuntamiento Constitucional de Indaparapeo, Michoacán 2016. Plan de Desarrollo municipal 2015-2018. http://leyes.michoacan.gob.mx/destino/O6089po.pdf. Consultado en enero de 2019.

Castiblanco M, E Suelen. 2013. La construcción de la categoría de emprendimiento femenino. Revista Facultad de Ciencias Económicas: Investigación y Reflexión, 21(2): 53-66.

Ceroni M. 2018. Rasgos centrales del agronegocio en Latinoamérica: la experiencia en Uruguay. Perfiles Latinoamericanos 26(52), doi: 10.18504/pl2652-004-2018.

Compeán-Flores MG, I Belausteguigoitia-Rius, MM Navarrete Jiménez. 2015. Una investigación sobre mujeres emprendedoras y propietarias de organizaciones familiares y no familiares en México. http://cedef.itam.mx/sites/default/files/cedefitammx/noticias/aadjuntos/2017/09/mujeres_empresarias_y_propietarias_.pdf. Consultado en septiembre de 2018.

Espejo R, A Reyes. 2016. Sistemas organizacionales. Ediciones Uniandes: Bogotá.

Fernández-Rius L. 2005. Género, valores y sociedad: Una propuesta desde Iberoamérica. Octaedo-OEI: Barcelona.

FIRA. 2018. Panorama Agroalimentario. https://www.gob.mx/cms/uploads/attachment/file/200637/Panorama_Agroalimentario_Ma_z_2016.pdf 2016. Consultado en julio de 2018.

FOMAGRO. 2006. Modificación a las reglas de Operación del Programa del Fondo de Riesgo Compartido para el Fomento de Agronegocio. https://www.ecolex.org/es/details/legislation/modificaciones-a-las-reglas-de-operacion-del-programa-del-fondo-de-riesgo-compartido-para-el-fomento-de-agronegocios-fomagro-lex-faoc070331/. Consultado en julio de 2018.

Galaviz-Armenta T. 2013. La interacción de la confianza en los procesos de consolidación de paz. Revista de ciencias sociales de la Universidad Iberoamericana. 8(16): 35-66.

García-Rodríguez MJ. 2000. La importancia de mantener la fidelidad de los clientes como un activo estratégico de gran valor para la marca. Esic Market. (107): 37-54.

González B, E Atencio. 2010. Estrategias de servicio: Elementos para el éxito empresarial. Multiciencias. 10(2): 139-145.

González-Hernández A, B Castellanos-Simons. 1995. ¿Desaparecerán los géneros cuando muera el sexismo?. Sexología y Sociedad. 1(2): 18-19.

Herreros F. 2004. The Problem of Forming Social Capital, Why Trust?. Palgrave Macmillan. New York.

IICA. 2010. Desarrollo de los agronegocio y la agroindustria rural en América Latina y el Caribe Conceptos, instrumentos y casos de cooperación técnica. http://repiica.iica.int/docs/b1708e/B1708e.pdf . Consultado en noviembre de 2018.

INEGI. 2016. Anuario Estadístico y Geográfico de Michoacán de Ocampo 2016. http://internet.contenidos.inegi.org.mx/contenidos/Productos/prod_serv/contenidos/espanol/bvinegi/productos/nueva_estruc/anuarios_2016/702825082055.pdf. Consultado en diciembre de 2018.

INEGI. 2017. Encuesta nacional de ocupación y empleo (ENOE) población de 15 años y más de edad. https://www.inegi.org.mx/programas/enoe/15ymas/. Consultada en diciembre de 2018.

Kleinman R, N Pérez, C Repetto. 1992. Varones y mujeres, que se espera, que queremos. Revista Argentina de Sexualidad Humana, 6(1): 57-73.

Luna M, JL Velasco. 2005. Confianza y desempeño en las redes socialesRevista Mexicana de Sociología, 67(1): 127-163.

Luhmann N. 1984. Sistemas sociales. Editorial Anthropos. Frankfurt.

Martínez-Miguélez M. 1998. La investigación cualitativa etnográfica en educación. Trillas. México.

Maseda-García A, BA De-la-Torre, T Iturralde-Jainaga. 2018. Familia empresaria y empresa familiar: estructuras de gobierno. https://www.ehu.eus/documents/2819611/2882007/Familia_empresaria_y_empresa_familiar.pdf. Consultado en enero de 2019.

Merriam SB. 1998. Qualitative research and case study applications in education. Jossey-Bass Publishers. San Francisco.

Meza-Lararús Á. 2011. Consideraciones acerca de los agronegocios. Revista Judicial Costa Rica. 99 p.

Morlan-Santa Catalina I. 2010. Modelo de dinámica de sistemas para la implementación de tecnologías de la información en la gestión estratégica universitaria. http://www.ehu.eus/i.morlan/tesis/. Consultado en octubre de 2018.

Najul-Godoy J. 2011. El capital humano en la atención al cliente y la calidad de servicio. Observatorio Laboral Revista Venezolana, 4(8): 23-35.

Olarte-Calsina S. 2012. Un nuevo paradigma de agronegocio sostenible: análisis y propuesta teórica. Revista agroalimentaria, 18(35): 31-42.

Peñaloza de García M. 2004. La clave para el éxito empresarial… ¡la satisfacción del cliente!. Visión gerencial, 3(1): 39-50.

Ricart JE. 2009. Modelo de Negocio: El eslabón perdido en la dirección estratégica. Universia Business Review. (23): 12-25.

Sastre RF. 2013. La motivación emprendedora y los factores que contribuyen con el éxito del emprendimiento. Ciencias Administrativas, (1): 1-10.

SIAP 2017. Estadística de la producción agrícola 2017. http://infosiap.siap.gob.mx/gobmx/datosAbiertos.php, 2016. Consultado en julio de 2018.

Taylor SJ, R Bogdan. 1994. Introducción a los métodos cualitativos de investigación. Ediciones Paidos Ibérica S.A. España

Valbuena M, RMorillo, D Salas. 2006. Sistema de valores en las organizaciones. Omnia, 12(3): 60-78.

Valentim P, P Carvalho De Melho, J Gomes. 2006. Mercados Futuros de commodities agropecuarias: Exemplos e aplicações aos mercados brasileiros. Bolsa de mercadorias y futuros: Río de Janeiro.

Velásquez-Contreras A. 2007. La organización, el sistema y su dinámica: una versión desde Niklas Luhmann. Revista Escuela de Administración de Negocios, (61): 129-155.