

Elements to Form the Industrial Cassava Value Chain in Corozal, Sucre

Elementos para la conformación de la cadena de valor de la yuca industrial en Corozal, Sucre

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Abstract

This research allowed establishing the elements to form the industrial cassava value chain in Corozal, Sucre, understanding that cassava is a major crop in Colombia. Based on data from the Ministry of Agriculture and Rural Development and the National Administrative Department of Statistics (DANE in Spanish), cassava, after rice, is an agricultural product contributing to the gross domestic product (GDP). A non-probabilistic sample was applied to 27 industrial cassava producers at the municipality in 2022. The results were determined by written surveys and field visits, and then they were consolidated, analyzed, and interpreted for this segment to the cassava value chain. The agricultural technique is ancestral and manual inherited from their ancestors, and much of the land is rented; its products are dried and fresh cassava. Most of the agricultural stores of the municipality and some stores of other parts of the department are among the suppliers of raw materials necessary for production. Moreover, the production link opens with the land preparation, which includes cleaning the residues of the previous harvest, and the compost or fertilizer usage, normally made in summer season. And the processing and transformation link, considering that the physical infrastructure of one of the country's two industrial cassava processing plants is located in the municipality of Corozal. Based on the results, it is concluded that the associative model and the elements to form the chain value of industrial cassava in Corozal focus on producers, who need to receive support from the other actors, in order to obtain agricultural products with high yield and quality levels.

Keywords

Associativity; value chain; processing; transformation; cassava.

Resumen

Esta investigación permitió establecer los elementos para la conformación de la cadena de valor de la yuca industrial en Corozal, Sucre, entendiéndose que la yuca es un cultivo muy importante en Colombia, considerando datos del Ministerio de Agricultura y Desarrollo Rural; según el DANE, la yuca después del arroz, es un producto agrario que contribuye al producto interno bruto (PIB). Se aplicó una muestra tipo no

probabilística a 27 productores de la yuca industrial del municipio en el año 2022. Los resultados fueron determinados por las encuestas escritas y por las visitas de campo realizadas, posteriormente fueron consolidadas, analizadas e interpretadas a este segmento de la cadena de valor de la yuca. La técnica agrícola es ancestral y manual heredada de sus antepasados, gran parte de los terrenos son alquilados, sus productos son la yuca seca y la yuca fresca; entre los proveedores de materias primas necesarios para la producción, se encuentran en su mayoría los almacenes agropecuarios del municipio y algunos de otras partes del departamento; el eslabón de la producción, se apertura con la preparación del terreno, que incluye la limpieza de los residuos de la anterior cosecha, uso del abono o fertilizante, normalmente se hace en épocas de verano; en el eslabón de procesamiento y transformación, teniendo presente que en el municipio de Corozal, se encuentra la infraestructura física de una de las dos plantas de procesamiento de yuca industrial del país. Soportado en los resultados de la investigación se concluye que el modelo asociativo en conjunto con los elementos para la conformación de la cadena de valor de la yuca industrial en Corozal debe estar enfocados en los productores, que necesitan recibir el apoyo de los demás actores, con el fin de obtener productos agrícolas con elevados niveles de rendimiento y calidad.

Palabras clave

Asociatividad; Cadena de valor; Procesamiento; Transformación; Yuca.

Introducción

Cassava has been a source of food, jobs, and economic income for a long time in agricultural communities in developing countries in Asia, Africa, and Latin America. The planting of cassava progresses in terms of the technologies used for its production and in the post-production stages. (FAO, 2007). In Latin America and the Caribbean, production represents less than 20% of global production. However, even when more markets have been developed for products such as food and starch, these are not enough, considering that the sector's development in the territory has been slow. (FAO & IFAD, 2000).

According to Aristizábal and Sánchez (2007), low productivity, high production costs, and inappropriate processing techniques are among the main factors considered as difficulties preventing the strengthening of cassava planting in various countries. From the national context, the Colombian Caribbean region has the most cassava production. However, obtaining this crop maintains a yield below the national average, bearing in mind the predominance of plantings with traditional techniques, without the appropriate use of technologies in the soil preparation, fertilization, and use of high-quality seeds. (Díaz, 2012).

The department of Sucre contributes 0.8% of Colombia's gross domestic product (GDP), which has remained between 1981 and 2013. (DANE, 2014, p. 64). Thus, the primary sector that was the most important in the 1960s moved from 56.3% in 1960 to 12.9% in 2013 (DANE, 2014, p. 65). In summary, the Sucre department has 51.4% of land trending for agricultural activities in most of the territory (IGAC, 2012). Although the land used for agricultural crops only reaches 10.6%.

The municipality of Corozal, founded in 1775, is located at the northeast of the department of Sucre, at 13 kilometers of distance. It has an area of 27,540 hectares; 533,02 hectares correspond to urban area, and the rest (27,006.98 hectares) to rural area. From the rural land, 3,369 hectares are used for the agricultural sector, forests form 143 hectares, and 1,005 hectares are focused on other activities. The agricultural sector is the essential support of the economy and it is essentially focused on typical maize, yam, and cassava plantings. Agricultural activity is estimated at 238,824 hectares in temporary and annual plantings. (Sincelejo chamber of commerce Sucre, 2019)

This study allowed establishing the elements to form the value chain of industrial cassava in Corozal, Sucre. Jointly articulates the value chain and promotes dynamic strategies aimed at strengthening productive and economic activity, making the agro-industrial area of the department more competitive and thus stimulating management for the agroindustry progress.

Theoretical framework

The prospective strategic plan 2027, Sucre Florece con Liderazgo Caribe (Sucre Blossoms with the Caribbean leadership in English), related in the (PEDCTI 2013, p 117), establishes among one of its perspectives for the year 2027, the progress of outstanding production chains, such as cassava and some of its derivatives. Thus,

contributing to the construction of an associative model, defined by Aiquipa, Bello, Changra, and Mosto (2017), cited by López (2019), associativity as “a device of collaboration between medium and small companies, where each one maintains its managerial independence, legal autonomy, and decides to participate freely in a group effort with the other actors for the pursuit of a general objective” [Translated quote from its original in Spanish].

According to Krugman (1992), other factors that can be considered in the structuring and evolving an industrial consolidation are historical and combined activities, progressive utilities at scale, and accidental and arbitrary mechanisms. Thus, the inter-company meshes, according to Freeman (1991), are a narrow group of selected links, explicit, and with preferential standards given in a cumulation of companies from advantages and market connections, assuming as the primary goal the dynamic and static reduction of uncertainty (Freeman, 1991, pp. 499 - 514).

Considering Garud & Van de Ven (1989), the new industrial zones represent the consolidation of the goals undertaken by a community, where companies and actors converge symbiotically, investing in resources to convert discoveries into technological innovations. This industrial and social structure is articulated and strengthened with the implementation of grouped subsystems such as: (a) materials (acquisition of financial, human, and scientific resources, etc.), (b) institutional (regulations, rules, legitimation, etc.), and (c) instrumental (manufacturing, distribution, marketing, etc.).

According to Martínez (2017), one of the main problems is that “there is distension between the links of the chain” (p. 84, translated quote from its original in Spanish). In addition to this situation, the author postulates, “only part of the data of the link in which it is immersed is handled and known; thus, somehow leading to isolation and absence of a horizontal promotion of articulation and holistic perspective of the global chain” (Translated quote from its original in Spanish) In this sense, the different links in the productive chain of cassava are disjointed, producing a limited output of information that is exploited by market agents and generating systematic inefficiencies in the chain. (Acuerdo de Competitividad de la Cadena Agroindustrial de la Yuca en Colombia, 2014).

Among the themes and variables related to the value chains and associative models in microenterprises and companies aligned to the study of the elements

to form the value chain of industrial cassava in Corozal, Sucre, different studies have been disseminated in international, national, and local settings. Globally, Ruiz Cedeño (2016) evidences a perspective related to structuring the value chain, in which small growers must practice agribusiness through an associative prototype that facilitates optimizing their business power, reducing costs, and becoming genuine interlocutors with the private sector and the government. In the national context in Colombia, some research can be emphasized, including that carried out by Vargas et al. (2019), related to associativity for linking productive chains in Colombia. The theme of small growers of creole potato in Subachoque, where the associativity is formulated as an instrument that facilitates economic, social, and organizational strengthening in the creole potato growers in the municipality of Subachoque, Cundinamarca; in this way, it is intended to create competition in the sector and the local spectrum. In the local environment, Rios (2017) determines the factors immersed in the associative procedures of groups and evidences how associations were articulated in Montes de Maria, Sucre, with entities and institutions present in the territory, the factors and means allowing the articulation, the way they execute the projects, strategies to strengthen their situation, and their main partners.

On the other hand, Del Río Cortina et al. (2019), in their research, characterize the value chain of the industrial cassava subsector in San Pedro, Sucre, taking as its start the cassava value chain model proposed by Martínez (2017). It begins with suppliers of services and goods, continues with production, then destiny, and ends with the transformation process, and marketing.

Methodology

As stated by Ortegón (2010, p. 19), the population “is the set of individuals, objects, and measures, that retain a characteristic with a view, supported by four factors: temporal location, elements and units, and content and spatial location” (Translated quote from its original in Spanish). In this particular research topic, the population is represented by all industrial cassava producers in Corozal, Sucre, during 2022.

The research is characterized as descriptive, according to what Torres, A. & Camargo, L (2009, p. 81) stated, “the particularities of an area of interest, population, or situation are systematically represented.” Thus, the elements to form the value chain of industrial cassava in Corozal, Sucre are inspected, and a non-experimental

outline is projected, taking into account that the events are analyzed as they are shown, to be later analyzed, that is, no particular situations are structured, those that exist are contemplated without being intentionally induced. Thus, (Hernández Sampieri et al., 2004) postulate that non-experimental studies are carried out without deliberately manipulating the indicators, the phenomenon is observed as evidenced in its original environment, and then it will be analyzed because it is close to the studied reality. Hence, with an analysis not as strict as the experimental, the survey was used. As stated by Torres, A. & Camargo, L (2009, p. 173), “are the data obtained through the use of opinion polls and massive questions, regularly anonymous, in order to establish the behavior of the preferred by the public concerning the situation or event to be studied,” the questionnaire is applied as an instrument, supported by the data collection obtained in a documented way through closed-ended, dichotomous, and open questions.

Results

The research was carried out in the department of Sucre, municipality of Corozal, by applying the non-probabilistic sampling rule (snowball type), defined as “a technique for finding research subjects. One subject gives the researcher with the name of another subject, whom in turn provides the name of a third, and so on” (Atkinson & Flint, 2001: p.1). This technique is associated with descriptive, qualitative, and exploratory studies in the research in which the population surveyed is reduced in quantity or a high level of confidence is required to develop them. The population sample was 27 producers of industrial cassava.

Table 1

Percentage and gender distribution of respondents in the area of industrial cassava production in Corozal, Sucre

Description	Men	Women	Total
Number of respondents	27	0	27
(%) Percentage	100%	0%	100%

Source: Author’s own elaboration according to the population surveyed and aligned to the production area of industrial cassava in Corozal, Sucre

It is established, through the different analyses and information provided in the field visits and the surveys process, to set the elements to form the value chain of industrial cassava in Corozal, Sucre, by using online digital applications to develop

the interviews, which were then tabulated and interpreted statistically delivering the following results:

Regarding the possession of the land where industrial cassava is planted in Corozal, Sucre, and considering what has been stated by the different actors linked in this production process, they agreed is a rented land, which in some way becomes a limiting condition or a weakness for entrepreneurs, since the leasing rate substantially increases production costs. It is also important to consider as a strength the practice of ancestral planting transmitted by previous generations and executed in an artisanal and a manual manner. Moreover, it is found that many of the producers, since they are not the land owner, they show apathy or minimal interest in optimizing the physical infrastructure conditions (Construction or adaptation of warehouses, deposits, and/or stores) that can eventually be used as collection centers of harvests, thus achieving to enhance and strengthen the productive and commercial process, considered as an essential factor among the elements to form the value chain of industrial cassava in Corozal.

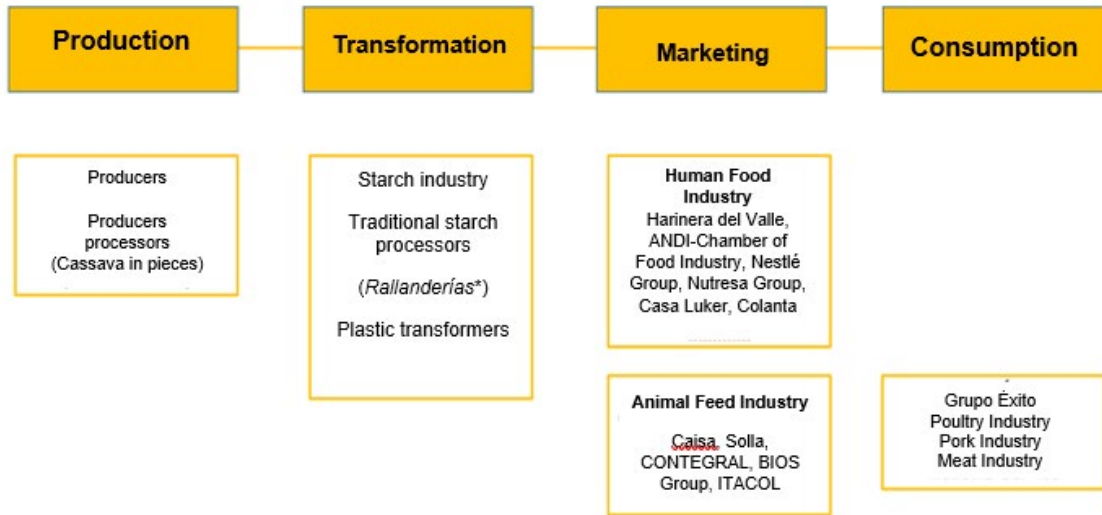
Design of the associative model

Considering this research about the elements to form the value chain of industrial cassava in Corozal, it must be noted that at the national level, according to the Agricultural and Forestry Chains Directorate (2021), cassava is the fifth agricultural heritage produced in the country, after bananas, sugar cane, rice, and potato. It is also planted in the 32 departments but outstanding in the Eastern Plains, the Atlantic Coast, and Cauca. In the national territory, various types of cassava are planted; commercial production is classified into table cassava and sweet cassava, basically oriented to human consumption, and bitter or industrial cassava, focused on the technical areas of processing into flours and, lately, into packaging. Cassava is the food support of the indigenous peoples native to the continent. In Colombia, this production predominates in subsistence and backyard crops in the Amazonas, Vichada, Guainía, and Guaviare departments.

Currently, the value chain of industrial cassava in Colombia is articulated according to the model proposed by the Agricultural and Forestry Chains Directorate. The group of fruit and vegetable and permanent crops of the national technical agency of the sweet potato, yam, and cassava chains (2021, p. 12)

Figure 1.

Organization of the value chain of industrial cassava, in Colombia, according to the Agricultural and Forestry Chains Directorate. Group of fruit and vegetable and permanent crops of the national technical agency of sweet potato yam and cassava chains (2021)



*[Rallandería is an artisanal process to obtain cassava starch]

Source: Agricultural and Forestry Chains Directorate. The group of fruit and vegetable and permanent crops of the national technical agency of the sweet potato, yam, and cassava chains (2021, p. 12)

Description of the basic elements of companies producing industrial cassava in Corozal, Sucre, articulated with the associative model of the value chain.

Industrial cassava cultivation has gained much strength at the national level; the main production centers in the country are located in the departments of Córdoba, Sucre, and Cauca (Minagricultura, 2021).

This research proposes an articulation of the associative model of the value chain of industrial cassava in Corozal, taking as reference some links of the industrial cassava value chain model in Colombia, proposed by the chief of the Agricultural and Forestry Chains. (Set of fruit and vegetable crops and permanent crops of the national technical agency of the sweet potato, yam, and cassava chains, 2021)

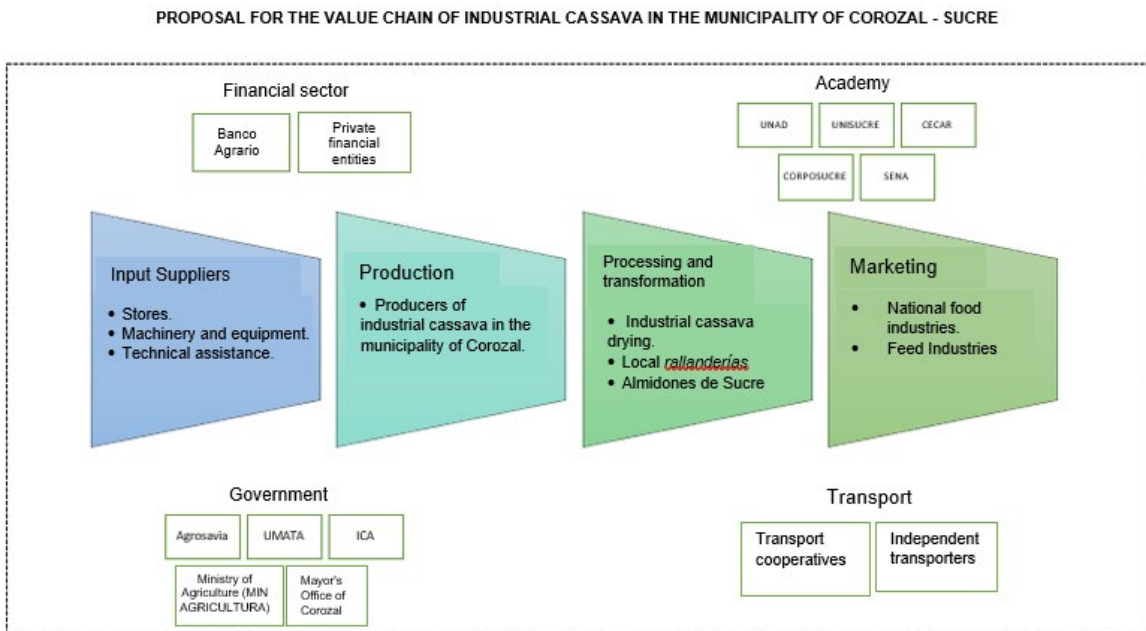
Proposal for articulating the associative model of the value chain of cassava in Corozal, Sucre

The Sucre department, especially the municipality of Corozal, has great advantages in cultivating industrial cassava since the region has the key players to articulate

the crop’s value chain in its territory and, thus, be much more competitive. Hence, the following value chain of the associative model is proposed, composed of different links of cassava industrial production.

Figure2.

Value chain of the associative model of cassava in Corozal, Sucre



Source: Author’s own elaboration, adjusted from the characterization of the red bean production chain in El Salvador (2020), family agriculture plan, Ministry of Agriculture and Livestock, Republic of El Salvador, C.A. (p. 16)

In the study by Mendoza, Hernández, and Vergara, where it is stated that cassava planted in Sucre is carried out in an artisanal way, something very interesting was found in the discussion of this study. “The CSA (agri-food supply chain, for its Spanish acronym) of cassava in Sucre belongs to a decentralized chain, in which each link responds to its own benefits and interests and function independently” (Mendoza et al., 2021, translated quote from its original in Spanish). So it is necessary to study each of the links that would form this associative model and thus

know what would be the link related to each other. Among the actors forming the different links proposed are:

Input Suppliers Link

According to the information provided in the field visits by representatives of the different unions and associations related to the production of industrial cassava in Corozal, including the ANPPY (Association of Cassava Growers and Processors, for its Spanish acronym), the suppliers of raw materials required for the industrial production of cassava are mostly the agricultural stores of the municipality and some of the other parts of the department of Sucre, responsible for supplying agricultural raw materials, such as fertilizers, pesticides/insecticides, seeds, among others. Other stores that supply and/or rent machines, equipment, and tools are also found.

Currently, the National Association of Cassava Producers and Processors (ANPPY in Spanish), as an entity, has a store that purchases directly from commercial houses with which there are agreements such as Vecol, Invesa, Microfertisa, Diabonos. ANPPY for associates (producers and processors of industrial cassava) offers special prices different from the general public. It works as follows: acquires the agro-inputs to then provide the union members with everything they need in the production of cassava, such as fertilizers, seeds, and other necessary elements; after that, the producers pay the value of these inputs through the sale of the cassava crops. There are different payment plans, like timely and/or advance payment of the bill due date that provide discounts on interest rates. The goal of ANPPY is to generate a working capital that allows the definitive elimination of the interests because they are charged to the associates so the association can pay the interest on the loans it takes out with the banks in order to have financial muscle, given that its working capital depends entirely on the financial entities that grant it the credits to be able to function.

Production Link

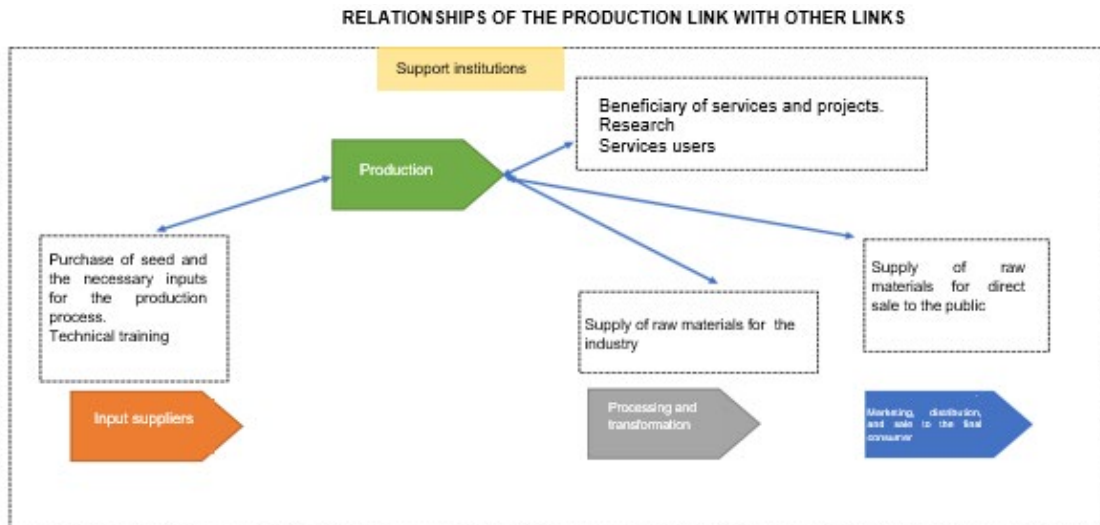
In the value chain of industrial cassava in Corozal, the production link is opened with the soil preparation, which includes cleaning the residues of the previous harvest, and compost or fertilizer usage, normally done in summer. Cassava producers still maintain manual and ancestral practices, as discussed in the previous link (suppliers of raw materials), the ANPPY stores supplies the seeds or stem cuttings

of the last harvest, or they can be acquired in the different agricultural stores of the municipality or other places of Sucre department. Then, the seeds or stem cuttings are planted in the suitable ground for this purpose; with the passing of the days, the brush or parasitic plants that appear in the crops are manually cut and eliminated; in a few cases, the producers of industrial cassava resort to agrochemical inputs to eradicate these brushes. When the plant reaches its maximum size, the harvest of cassava production begins, which is preferably carried out manually, usually by people hired on day wages, because producers are still unreceptive to the use of agricultural machinery for the harvesting process of crops.

In particular, this link needs a lot of support from the other links to be competitive since it can be considered the chain’s central axis. Currently, it is affected by many needs and shortcomings, as seen in the instrument applied.

Figure 3.

Relationship of the production link with other links in the value chain of the cassava associative model in Corozal, Sucre



Source: Author’s own elaboration, adjusted from the characterization of the red bean production chain in El Salvador (2020), family agriculture plan, Ministry of Agriculture and Livestock, Republic of El Salvador, A.C. (p. 19)

Processing and Transformation Link

After to the production link, the processing and transformation continue. Taking into account that one of the two industrial cassava processing plants of the country locates in the municipality of Corozal, in this particular case, reference is made to Almidones de Sucre S.A.S., which is a company situated between the city Sincelejo and Corozal.

It is an indirect semi-public company at the national level, which is part of the Ministry of Agriculture and Rural Development. It carries out the operation and construction of starch production plants, marketing of these products, and other activities complementary or related to the starch sector. (Almidones de Sucre, 2022) also ships its products in a mixed way, at the national and international level; it has a processing production potential of approximately 200 tons of cassava per day; however, it currently processes about 50 tons of industrial cassava per day because producers do not have the availability of land for the necessary crop that meet the maximum production requirements per day.

Based on the information provided by the ANNPY representatives in field visits, Almidones de Sucre eventually offers training to the staff of industrial cassava producers in Corozal, although there is some disregard to receive it by some producers; nevertheless, this company permanently shows its willingness to train the different actors involved in this process of cassava production, in everything related to crops, finances, and new programs.

Currently, Almidones de Sucre is presenting new proposals, in which ANNPY is a beneficiary; it suggests analyzing the feasibility, that in future harvests, a pilot project of a new model is implemented to leverage the producer from the land lease to the harvest of cassava.

Considering the processing and transformation link, the marketing link is next in the value chain of industrial Cassava in Corozal, which covers the sale of natural starch and some derivatives that Almidones Sucre markets to other organizations at the national and international level, such as Nutresa, among others.

Likewise, this finished product is part of the input for other industrial applications such as food and beverages, paper and cardboard, textile, adhesives, cosmetics, and pharmacy.

Finishing with the support institutions in the value chain in Corozal, it must be considered that these institutions do not belong to a link in the productive chain of cassava; their linkage is essential for the proper functioning and articulation of thereof and enhancing its competitive improvement.

The support entities include:

Academy: Considering the field visits to the different actors of the industrial cassava production sector in Corozal, it is found that the training are provided regularly by the University of Sucre when requested by interested actors. Similarly, other institutions have programs that can contribute to developing the sector, such as Caribbean University Corporation (CECAR in Spanish), National Open and Distance University (UNAD in Spanish), Coorposucre, and National Training Service (SENA in Spanish).

In connection with the trainings are also Agrosavia, Interactuar Corporation (a social non-profit development corporation that accompanies with a general model integrated to businessmen and entrepreneurs of micro-enterprises in Colombia), Almidones de Sucre, the Chamber of Commerce, and DIAN. Other sector supporting trainings are suppliers and commercial houses, providing training in topics related to the handling of inputs or any other aligned to their business purpose, which are usually requested by the interested parties, especially those in which they have shortcomings; these talks are often 2 or 3 per month.

Transporters: According to information provided by the ANNPY representatives, the associates or producers of industrial cassava in Corozal participate in the market with 2 products: dried cassava and fresh cassava, also with starch.

Concerning fresh cassava, there is currently no agreement with the transporters, since informal transport is used without hiring duly constituted companies. Similarly, the producers have the necessary information to establish communication with the informal transporters in the zone because producers require their services to mobilize the cassava harvests every year. And ANNPY has a database of the drivers of the area. Furthermore, it should be noted that producers search for the truck to dispatch it bound for Barranquilla or Almidones de Sucre in the case of fresh cassava. If fresh cassava is to dispatch to the Cauca department, who buys the cassava usually coordinates the logistics operation of the truck.

Dried cassava transportation is handled differently; with this type of cassava, a contract is established with a formal transporter, who secures the cargo and is responsible for all the logistics of the goods shipment, thus guaranteeing the success of the transport operation. It usually applies to the Valle del Cauca, Cauca, Barranquilla, Monteria, and Medellin destinations.

Government: Referring to support institutions, the government plays a key role in binding activities in the articulation and functioning of the value chain of the cassava association model in Corozal, Sucre. These institutions include the financial services aligned to the agricultural sector, offered by the Colombian Agricultural Institute (ICA in Spanish), Banco Agrario de Colombia, Municipal Agricultural Technical Assistance Units (UMATA in Spanish), and the Colombian Agricultural Research Corporation (AGROSAVIA in Spanish).

Bancamía, which has different credit programs for industrial cassava producers, is another support entity in the agricultural area in Corozal regarding financial services specialized in microfinance.

Discussion

Among the results of the applied instrument and field visits from the perspective of the elements to form the value chain of industrial cassava in Corozal, Sucre, in 2022, it is found that the cropland of industrial cassava is normally rented and the planting practice is artisanal, transmitted by previous generations. Most producers are residents or born in Corozal or neighboring municipalities. In terms of the articulation proposal of the cassava value chain associative model, Corozal has in its region the key players to articulate the value chain of the crop in its territory and thus be much more competitive. Along the same lines, Mendoza et al. (2019) argue that cassava cultivation in Sucre is done in an artisanal way and the “CSA (agri-food supply chain, for its Spanish acronym) in this department, belongs to a disseminated chain model, in which each of the links responds to benefits and own interests, and function independently” [Translated quote from its original in Spanish]

Other results, such as the inputs suppliers link for the industrial production of cassava, are largely the agricultural stores of the municipality and Sucre department, responsible for supplying agricultural raw materials such as fertilizers, pesticides/insecticides, and seeds, among others. Likewise, other stores offer to provide and/or rent machines, equipment, and tools. It must be considered that there

are some common factors in the chapter of Del Río Cortina et al. (2019) research, in their studies on the suppliers of inputs or goods required for producing industrial cassava in San Pedro, for example, the agricultural stores or warehouses responsible for providing raw materials such as fertilizers, seeds, and agrochemicals, utensils, tools, and machinery. Similarly, there are suppliers offer other services such as machine rental to plow the land, heavy-duty transport, and specialized and technical assistance.

The production link in the value chain of industrial cassava in Corozal, Sucre, begins with the preparation of the land, which includes cleaning the residues of the previous harvest, compost or fertilizer usage, and the seeds or stem cuttings of the last harvest. This link needs major support from the other links so it can be competitive because it can be considered as the chain's central axis. This agrees with the study by Puentes Márquez et al (2019), in research where they express that cassava is a tuber widely planted in Sucre, meeting to a large extent the dietary requirements of its inhabitants and becoming a source of economic income for its growers because to cultivate it, they do not need large investments or specific soil environments or climate.

Concerning the processing and transformation link results, the physical infrastructure of one of the country's two industrial cassava processing plants is located in the municipality of Corozal. The marketing link involves marketing natural starch and derivatives marketed by Almidones de Sucre to national and international companies, like, Nutresa.

Continuing with institutions supporting the value chain of the cassava associative model in Corozal, Sucre, it must be considered that these institutions are not part of the link in the productive chain of cassava; their linkage is essential for the proper functioning and articulation of thereof and enhancing its competitive improvement. For example, the academy such as CECAR, UNAD, Coorposucre, and SENA; Agrosavia, the Interacting Corporation, Almidones de Sucre, the Chamber of Commerce, and DIAN also offer training. The government plays a key role, among its institutions are the financial services aligned to the agricultural sector provided by ICA, Banco Agrario de Colombia, UMATA, and AGROSAVIA. When comparing them with previous studies of Del Río Cortina et al. (2019), which focused on the production of industrial cassava in San Pedro, there is the presence of financial suppliers aligned to the agricultural environment, such as Banco Agrario in terms of services to carry out production in that municipality.

Finally, according to the results, through the statistical verification of the surveys, corresponding to the purpose of this study, with the elements to form the value chain of industrial cassava in Corozal, Sucre, in 2022, it is inferred that most producers depend on this ancestral agriculture to support their family nucleus. It is supported by previous research carried out by Canales, N., & Trujillo, M. (2021); López Quintana, J. (2019); Mora, S., & Mendoza, K. (2017); Camacho et al (2018); Núñez Pérez, C. et al (2018).

Conclusions

Based on the information provided in this investigation, the elements to form the value chain of industrial cassava in Corozal, Sucre, can be established, bearing in mind that it has the necessary actors to articulate it. Among other things, it is worth noting that there locates one of the starch processing plants existing in the country, Almidones de Sucre.

When characterizing the companies producing industrial cassava in Corozal, Sucre, it can be seen that they have major shortcomings in terms of infrastructure since their main problem is the availability of land for crops; thus, it is difficult for them to access productive credits, as they have no way to support them. It is also reflected in production since when carrying out their activities on lands under the rental modality, the activities cannot be technified, which in some way restricts the increase in production.

The axis of this partnership model, together with the formation elements, must be focused on producers, who must receive all the necessary support from other actors in order to obtain a product with high-quality levels and performance.

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