

The 'Sembrando Vida' program as a driver of local economies: an analysis of the commercialization potential of annatto seed [Bixa orellana L.] in the Chontalpa Region, Tabasco

Programa 'Sembrando Vida' como dinamizador de economías locales: un análisis del potencial de comercialización de la semilla de achiote [Bixa orellana L.] en la Región Chontalpa, Tabasco

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Abstract

This research analyzes the potential of the "Sembrando Vida" program as an agent for dynamizing the local economy in the Chontalpa region of Tabasco, through the commercialization of annatto seed [Bixa orellana L.]. Using a diagnosis of existing production [derived from Phase 1 of project] and a preliminary market exploration [projected in Phase 2], opportunities to improve producer income and strengthen the rural economy are identified. This analysis lays the groundwork for the development of a specific commercialization model, contributing to the improvement of the quality of life in rural communities and encouraging people to remain in the countryside.

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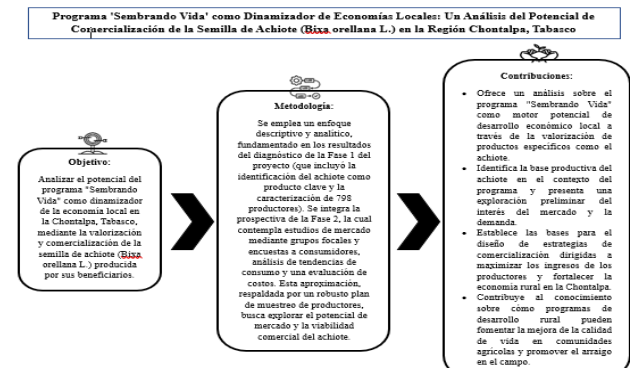
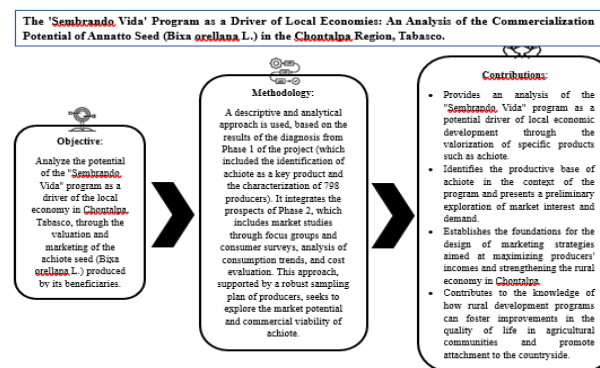
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Resumen

La presente investigación analiza el potencial del programa "Sembrando Vida" como agente dinamizador de la economía local en la Chontalpa, Tabasco, a través de la comercialización de la semilla de achiote [Bixa orellana L.]. Utilizando un diagnóstico de la producción existente [derivado de la Fase 1 del proyecto] y una exploración preliminar del mercado [proyectada en la Fase 2], se identifican las oportunidades para mejorar los ingresos de los productores y fortalecer la economía rural. Este análisis sienta las bases para el desarrollo de un modelo de comercialización específico, contribuyendo a la mejora de la calidad de vida en las comunidades rurales y al fomento del arraigo en el campo.



Marketing, Local economy, Development Regional

Comercialización, Economía Local, Desarrollo Regional

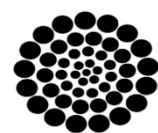
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Introduction

The "Sembrando Vida" program, implemented by the Mexican government in 2019 [Gobierno de México, Secretaría de Bienestar, 2023], aims to combat rural poverty and deforestation, simultaneously promoting economic development and the well-being of small farmers [Ramírez, s.f.].

In the Chontalpa region of Tabasco state, this program has had a remarkable impact, involving over 10,825 farmers and benefiting a much larger population, estimated at 48,712 people. This context of social and productive transformation is the starting point for analyzing how "Sembrando Vida" can act as an effective dynamizer of local economies. In this context, the reality of small agricultural producers in regions like Tabasco is often characterized by the presence of deficiencies in their productive systems, limited access to technologies that optimize their yields and distribution, and economic vulnerabilities that undermine their competitiveness in increasingly demanding markets. These systemic issues have been identified in previous studies conducted in the region, underscoring the need for development proposals aimed at strengthening the primary sector and improving its integration into more efficient value chains [De León-De Los Santos et al., 2018]. Furthermore, recent studies have begun to evaluate its impact on aspects such as forest cover and poverty alleviation [Análisis cualitativo de la contribución de "Sembrando Vida", 2024; Madero et al., 2025; Pérez Ponciano & Rojas, 2025].

Among the diversity of products generated, annatto seed [Bixa orellana L.] has emerged as a crop of particular interest [INIFAP, 2022; Universidad Tecnológica Equinoccial, 2020]. The Chontalpa region is known for its production of this seed, valuable in various industries [Centro de Investigación Científica de Yucatán, 2021]. The first stage of the present research, conducted between January and December 2024, carried out a diagnosis that identified key products and concluded that the commercialization of annatto seed is crucial for improving the quality of life and economic development of the program's producers.

This diagnosis included the identification of the quantity of annatto trees planted per municipality and the species harvested by 798 beneficiary producers in the region.

This article aims to analyze the potential of the "Sembrando Vida" program as a dynamizer of local economies in the Chontalpa, focusing specifically on the opportunities offered by the commercialization of annatto seed. It is argued that, through the development of an efficient commercialization model, this product can generate a significant positive economic impact for producers and the region in general.

Methodology

This analysis is based on an applied research project that adopts a descriptive and analytical approach. The information supporting this study primarily comes from the consolidated results of the first phase of the project, developed between January and December 2024. During this initial stage, an exhaustive diagnosis was conducted in the Chontalpa region, which allowed for the identification of products with the highest commercialization potential generated by the beneficiaries of the "Sembrando Vida" program.

A relevant conclusion of this diagnosis was that the commercialization of annatto seed is a crucial factor for the economic development of local producers. Furthermore, the existing productive base was characterized, identifying the quantity of annatto trees planted per municipality, their precise location, and the type of species harvested, involving a total of 798 producers in the region. This diagnostic information is fundamental for estimating the productive potential of annatto and its consequent capacity to dynamize the regional economy [Chapa & Castillo, 2025].

Complementarily, this article relies on the prospective of the second phase of the project, scheduled to be developed in 2025. This subsequent phase will focus on deepening the understanding of the market and commercial viability. For this, a Market Study is contemplated as the primary objective, which will include the organization of focus groups with consumers. A discussion guide designed to explore consumption habits, perceptions, needs, and interest in annatto seed will be used, with an emphasis on annatto produced in the Chontalpa region under the "Sembrando Vida" program.

Additionally, consumer surveys will be designed and applied to quantitatively identify preferences, purchasing habits, and willingness to pay for annatto seed.

The combined objective of these instruments is to comprehensively determine consumer demands and needs. A Consumption Trend Analysis will also be carried out through an exhaustive documentary review and analysis of secondary data, with special emphasis on annatto seed. Likewise, a Cost Evaluation associated with production and commercialization will be conducted to identify opportunities for optimization and increased profitability. For the collection of primary data directly from the identified annatto producers [N \approx 798], a robust Sampling of Producers.

Producer Sampling

This includes the calculation of a representative sample size [n \approx 260], using a formula for finite populations that ensures a 95% confidence level and a $\pm 5\%$ margin of error. Stratified random sampling is planned, using the municipalities of the Chontalpa region as strata, to ensure adequate geographical and contextual representation of the producers.

This methodological approach will allow for the collection of detailed information on productive practices, costs, and commercialization perspectives, whose detailed results will be analyzed in later phases of the project and presented in future publications.

Results

The findings from the focus groups conducted with consumers in the Chontalpa region, as part of the preliminary market exploration, offer valuable information on consumption habits, perceptions, and the market potential for annatto seed.

General Habits of Condiment Purchase and Consumption: When inquiring about the most used condiments, annatto was the most mentioned by participants [70%], who consider it fundamental in Tabascan cuisine, followed by habanero chili [60%] and herbs like cilantro and epazote [45%]. Regarding the frequency of condiment purchase, half of the participants [50%] indicated acquiring them once or twice a month, while 30% do so weekly.

Local markets are the preferred place of purchase for most [60%], arguing for freshness and trust in products, followed by grocery stores [25%] for convenience, and a minority [15%] who prefer to buy directly from the producer.

A notable appreciation for the local origin of products was observed, as 70% of participants stated preferring products from Tabasco, mainly due to perceived freshness and support for the regional economy.

Knowledge, Use, and Specific Perceptions of Annatto: Annatto is strongly associated by consumers with its quality as a "natural coloring" [80%], its "unique flavor for cochinita" [65%], and as part of "family tradition" [40%]. A large majority [85%] of participating households use annatto, with a reported frequency of two to three times per week, mainly for dishes such as cochinita pibil [90% of those who use it], tamales [70%], and fish [50%]. The preferred format is paste [60%], followed by whole seed [30%]. Of the 15% who do not use annatto, the main reasons were lack of knowledge on how to cook with it [50% of this group] or preference for industrialized condiments [30%]; however, 70% of those who do not use it would be willing to try it if its uses were explained to them. Annatto is primarily purchased in markets [55%], supermarkets [30%], and directly from local producers [15%]. The most mentioned commercial brands were "El Yucateco" [40%] and "Doña María" [25%], although 35% indicated buying it in bulk without a specific brand. The predominant purchase criteria are price [50%], origin [30%], and intense color of the product [20%].

Perceptions of Annatto from Chontalpa and the "Sembrando Vida" Program: Achiote not only has an intrinsic economic value, but it is also linked to the cultural and gastronomic identity of Tabasco, contributing to the unique flavors of its traditional dishes, as part of a rich culinary heritage that is promoted through gastronomic tourism [Oropeza-Tosca et al., 2024]; Regarding annatto of Tabascan origin, 60% of participants stated having tried it, associating it with being "more aromatic" [45% of this group] and "made by peasant families" [30%]. However, 40% do not identify or are unaware of annatto production in Tabasco.

Knowledge about the "Sembrando Vida" program was divided, with 50% knowing about it and associating it positively with farmer support, and 50% not recognizing it [cf. Domínguez & Baltazar, s.f., on the promise of well-being in rural communities].

Significantly, when presented with the possibility of acquiring annatto produced by beneficiaries of the "Sembrando Vida" program from Chontalpa, 65% of participants indicated that they would buy it. The main reasons for this preference were "support for local producers" [70% of this group] and "perceived superior quality" [40%]. Within this favorable group, there was a willingness to pay a premium of between 10% and 15% over the usual cost of annatto.

Thirty-five percent of participants would not change their purchasing habits, prioritizing price. Regarding the desired information on the packaging of such a product, consumers highlighted an interest in knowing the "producer's story" [50%], the "environmental benefits of the program" [30%], and "traditional recipes" [20%].

Unsatisfied Needs and Improvement Proposals for Annatto: Participants suggested various improvements for annatto available in the market, such as greater availability in easily accessible stores [40%], the offer of smaller and more practical packaging [30%], and clearer information on its culinary uses [20%]. When conceptualizing an "ideal annatto" from Chontalpa, characteristics such as "organic, in paste, with biodegradable packaging" and a narrative that "shows photos of producers and their community" were mentioned. Finally, at the close of the sessions, a desire for greater promotion of local annatto [60%] and the organization of workshops to learn how to cook with it [25%] stood out.

Conclusions

The "Sembrando Vida" program has established a robust socioeconomic platform in the Chontalpa region, Tabasco, generating positive impacts on employment, beneficiary incomes, and the social fabric of rural communities. Based on this, the present analysis has sustained and evidenced that the strategic commercialization of specific products, such as annatto seed [Bixa orellana L.], possesses significant potential to act as an important dynamizer of local economies.

The findings from the first phase of the research project confirm the relevance of annatto as a priority crop within the program and the existence of a considerable productive base, with 798 producers dedicated to its cultivation in the region.

Preliminary market explorations, as a consumer response, consistently reinforce this potential. There is an identified existing demand for annatto and a particular interest in products that not only offer quality and authenticity but also incorporate social value and a clear, traceable origin [Salgado et al., 2024], attributes that annatto from "Sembrando Vida" could effectively capitalize on. The willingness of a segment of consumers to value and potentially pay a premium for these differentiating elements underscores the feasibility of developing an offer with its own identity.

The development of an efficient and profitable commercialization model for annatto seed, which is the central objective of the second phase of the project, is revealed as a crucial step to materialize the potential analyzed here. By improving market access, optimizing distribution channels, and strengthening the organizational and entrepreneurial capacities of producers, substantial increases in their incomes, the generation of additional employment in related activities, and a general strengthening of the regional economy can be expected. These results would not only directly contribute to the objectives of the "Sembrando Vida" program [Ramírez, s.f.] but also foster more sustainable, inclusive, and resilient rural development in the Chontalpa. The implications of this potential analysis are significant for both the design of public policies supporting the rural sector and the strategies that producer organizations may adopt. It is recommended that future interventions and technical support focus on strengthening the management capacities, quality production, and commercial articulation of the "Sembrando Vida" beneficiaries.

Facilitating access to market information, promoting associativity, and developing quality and origin hallmarks can be key strategies [Moreno & Montoya, s.f.]. This initial study, focused on delimiting and arguing the potential of annatto seed, lays the groundwork for subsequent essential research. Future articles derived from this project will address in detail the specific design of the proposed commercialization model, strategies for optimizing the annatto supply chain, and mechanisms for productive articulation and empowerment of producers from a social economy perspective [Chapa & Castillo, 2025; Domínguez & Baltazar, s.f.].

These complementary works will be fundamental to translate the potential identified in this first analysis into tangible, measurable, and sustainable benefits for annatto-producing communities in Chontalpa.

Annexes

Below is a description of the graphs generated to illustrate the findings and context of the study "The 'Sembrando Vida' Program as a Driver of Local Economies: An Analysis of the Commercialization Potential of Annatto Seed [Bixa orellana L.] in the Chontalpa Region, Tabasco."

Box 1

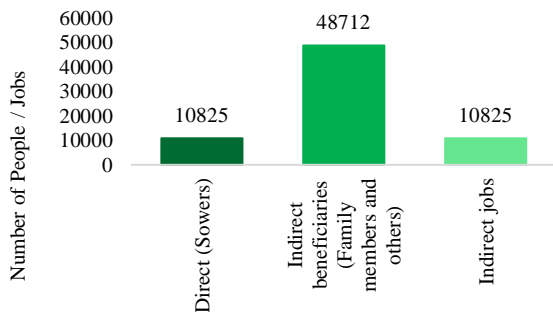


Figure 1

Socioeconomic Impact of the "Sembrando Vida" Program in Chontalpa

Data Source: Own elaboration

Visualizes the number of direct beneficiaries [farmers], indirect beneficiaries [family members and others], and indirect jobs generated by the "Sembrando Vida" program in the Chontalpa region, with the purpose of illustrating the magnitude of the program's basic socioeconomic impact, establishing the context of its scope and influence in the study area.

Box 2

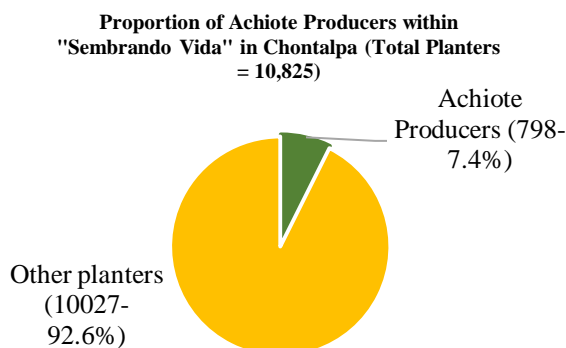


Figure 2

Proportion of Annatto Producers within "Sembrando Vida" in Chontalpa

Data Source: Own elaboration

Shows the proportion of annatto producers [798] relative to the total number of farmers [approximately 10,825] enrolled in the "Sembrando Vida" program in the Chontalpa region.

Box 3

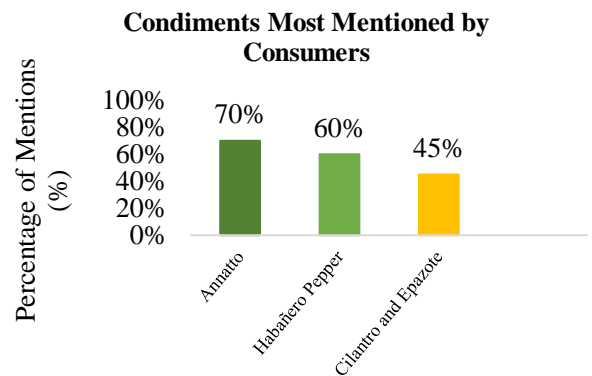


Figure 3

Importance of Local Origin when Buying Condiments

Data Source: Own elaboration

Illustrates the percentage of consumers who stated valuing the local origin of condiments [70%] compared to those for whom this factor is not a priority [30%].

Box 4

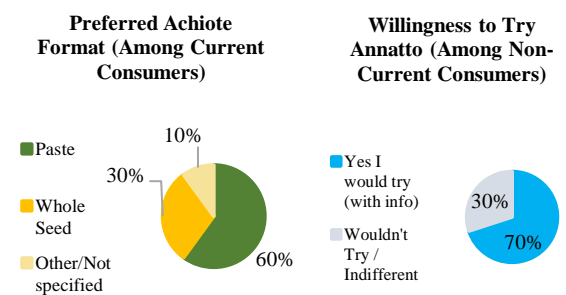


Figure 4

Preferences and Openness towards Annatto Consumption

Data Source: Own elaboration

Details the preferred annatto format [paste 60%, whole seed 30%, other/unspecified 10%] by current consumers.

Subgraph 4b [Willingness to Try]: Shows the percentage of non-current annatto consumers who would be willing to try it if information on its uses were provided [70%].

Box 5

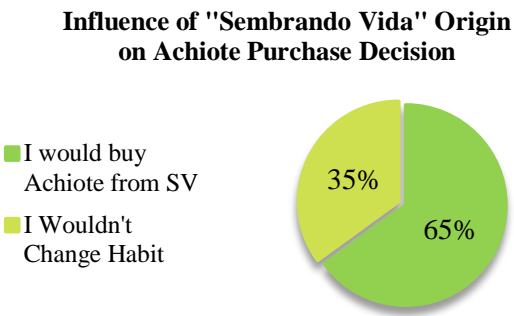


Figure 5
Influence of "Sembrando Vida" Origin on Consumer Purchase Decision
Data Source: Own elaboration

Presents the percentage of consumers who indicated they would buy annatto if they knew it came from "Sembrando Vida" program producers [65%], in contrast to those who would not change their purchasing habits [35%].

Box 6

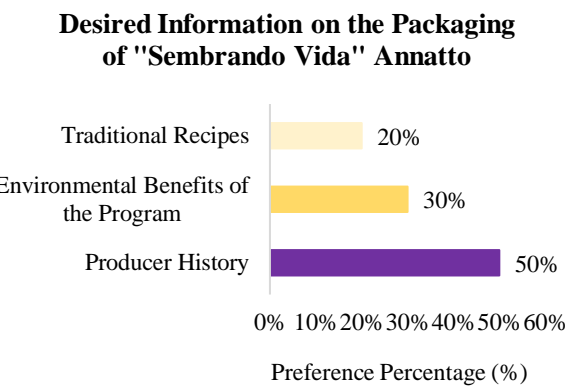


Figure 6
Desired Information on "Sembrando Vida" Annatto Packaging
Data Source: Own elaboration

Shows consumer preferences regarding the information they would like to find on the packaging of annatto from the "Sembrando Vida" program [Producer's story 50%, Environmental benefits of the program 30%, Traditional recipes 20%].

Declarations

Conflict of interest

The authors declare that they have no conflicts of interest. They have no known competing financial interests or personal relationships that might have appeared to influence the article reported in this article.

Author Contributions

Castro-De la Cruz, Jucelly: Contribution to the main research idea, as well as the methodology to be used.

Eliseo-Dantés, Hortensia: Contribution to methodology design and data collection.

Madrigal-Eliseo, Jose Luis: Contribution to methodology design and data collection.

Jauregui-Wade, Lucila: Contribution to methodology design and data collection.

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Abbreviations

L.: Linnaeus [abbreviation of the botanist Carl Linnaeus, used in the scientific nomenclature *Bixa orellana* L.]

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