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Social capital and the Sembrando Vida program in Ejido Nuevo Bécal, Calakmul

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Abstract

The Sembrando Vida Program (PSV, by its Spanish acronym) was analyzed as a public policy that evidences the relevance of social capital in rural development. The objectives of this study were: (1) to analyze the influence of social capital in the implementation of the Program's components, and (2) the structural limitations that affect the sustainability of the results. A mixed approach was used through surveys and interviews semi-structured in Ejido Nuevo Bécal. The results show that social capital, articulated through the Farmer Learning Communities (CAC, by its Spanish acronym), is the main catalyst of the Program. However, the weakness of external social capital limits the scalability and long-term sustainability. The restrictions identified are: dependence on subsidies, the scope of technical applications and the institutional barriers inherent to the agroecological transition in Mexico. Likewise, PSV faces regulatory challenges in natural protected areas, and there is a need to harmonize the Rules of Operation with forestry legislation in order to streamline the Program's operation. In conclusion, PSV generates immediate improvements through social capital; nonetheless, the sustainability of its impact requires intersectoral approaches that strengthen community autonomy and contribute to more balanced and resilient food systems.

Keywords: social capital, sembrando vida, agroecological transition, sustainable development.

Introduction

In Latin America, rural development programs have sought to promote food security, social well-being and environmental sustainability through public policies aimed at strengthening productive and organizational capacities in rural communities. The context of rural development faces structural challenges such as poverty, inequality and food security, problems that affect the well-being of communities (ECLAC, 2024).

In Mexico, the Sembrando Vida Program has been implemented since 2019 with the objective of promoting food self-sufficiency, regenerating ecosystems via reforestation and reactivating rural economy through direct support to agroforestry producers (Rules of Operation of the Production for Welfare Program of the Ministry of Agriculture and Rural Development for fiscal year 2024, 2023). Its design incorporates an organizational model based on Peasant Learning Communities (CAC), biofacto-

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ries, community nurseries and agroecological techniques; these elements are intended to encourage collective participation and sustainable resource management. In Mexico, the Program seeks to address these issues through monetary transfers and technical support to promote agroforestry production in vulnerable areas such as Ejido Nuevo Bécal, in Calakmul, Campeche. This study focuses on social capital, defined by Putnam et al. (1993) as the networks, norms and trust that facilitate collective action, and in this case, its relationship to the implementation of PSV components, such as CACs and technical training.

Social capital is a determining factor in the effectiveness and sustainability of this type of intervention. According to authors such as Coleman (1990), Putnam et al. (1993), Fukuyama (1998) and Ostrom & Ahn (2003), social capital is constituted by networks of relationships, shared norms and mutual trust that facilitate collective action and reduce cooperation costs. In rural areas, these links make it possible to build local governance mechanisms, exchange knowledge and collectively face the structural challenges of development (Durston, 2002).

The interaction between these elements and public policies —together with their specific components— demands a contextualized empirical analysis. In the municipality of Calakmul, for example, the ejidos and communities have built a solid trajectory of socio-territorial management since their foundation. This experience has been strengthened through alliances with non-governmental organizations (national and international), as well as with local institutions such as the Calakmul Biosphere Reserve (RBC, by its Spanish acronym) and the Municipal Council for Sustainable Rural Development (CMDRS, by its Spanish acronym). The latter, established under the Sustainable Rural Development Law (2001), has accumulated a decade of continuous operation, which evidences its role as a key institutional structure in the articulation of actors and the generation of social capital.

The objective of this study is to analyze the relationship between the social capital of the Program beneficiaries in the ejido and the application of PSV components in the Nuevo Bécal ejido. The Calakmul region is characterized by its biodiversity, its membership in the RBC, and by a history of ejido organization focused on forestry, environmental, tourism and beekeeping activities. Through the analysis of variables such as trust, reciprocity, participation in the CACs, perception of the effectiveness of the Program's components and their influence on production, this article explores how social capital influences the implementation of the Program and its relationship with the agroecological transition process and sustainable development. Since they are substantial in the process of building the welfare state, as referred to by Sen (2000).

The study has a sociological approach and is based on the hypothesis that the existence and identification of active social capital strengthen the effective application of the PSV, while its absence or fragmentation limits the process and consequently the results of public policy programs. It is suggested that the analysis of social capital not only makes it possible to evaluate the performance of beneficiaries within the Program, but also to identify structural opportunities and restrictions for the sustainability of collective processes promoted by public policy programs.

Well-being, according to Sen (2000), implies the expansion of human capabilities in health, education and income, while food security, according to FAO (2009), requires continuous access to nutritious food. Food self-sufficiency, on the other hand, refers to the capacity to produce food locally (CONEVAL, 2020). In Ejido Nuevo Bécal, the PSV has sought to integrate these concepts, but its success depends on social and structural factors. Pellegrini and Tasciotti (2014), highlight that agricultural diversification improves diet and income, while CONEVAL (2024) distinguishes the traditional PSV production approach over comprehensive social or agroecological objectives.

This article analyzes how social capital articulates the implementation process of the PSV components, considering their relevance in the context of agroecological transition and sustainability. The objectives were (1) to analyze the influence of social capital in the implementation of the Program components and (2) to explore the structural constraints that affect the sustainability of the results achieved.

Materials and Methods

The study was conducted in Ejido Nuevo Bécal, in the municipality of Calakmul, Campeche, Mexico, characterized by poor soils and high marginalization. The research employed a descriptive-exploratory design with a mixed approach, combining quantitative and qualitative data collected in the period January to March 2025.

This article is based on a cross-sectional approach, aimed at analyzing the way in which social capital mediates the implementation of the components of the Sembrando Vida Program (PSV), as well as the structural conditions that limit the sustainability of its results in the Ejido. The study is based on the conceptual framework of social capital as a key analytical tool for understanding the processes of collective action, community governance and rural sustainability (Coleman, 1990; Durston, 2002; Fukuyama, 1998; Ostrom & Ahn, 2003).

Methodological design and sample

The study used a non-experimental design and a descriptive analytical strategy. The main data collection technique was a structured survey applied to PSV beneficiaries in the Nuevo Bécal ejido.

The methodology used in this research integrates criteria from the International Forestry Resources and Institutions

(IFRI) manual (Wertime et al., 2011) version 14 and the Institutional Analysis and Development (IAD) by Elinor Ostrom et al. (2005). The IFRI provides standardized tools to analyze factors such as community collaboration and organization, resource use and stakeholder relationships (Wertime et al., 2011), which are essential in the analysis of social capital and forest management.

For its part, the IAD is incorporated as a complementary analytical framework to interpret the underlying institutional and social dynamics. It structures the interactions between rules, actors and outcomes, highlighting aspects such as trust, norms and coordination (Ostrom et al., 2005). Its focus on governance, social capital and commons management allows for the analysis of common practices.

The instrument designed for this study combined questions shared between both methodologies, optimizing a practical and systematic approach. While the IFRI, predominates in the collection of empirical data, the IAD enriches the theoretical interpretation, linking trust, networks and reciprocity with results such as sustainability and well-being (Ostrom, 1990). This mixed integration not only strengthens the diagnosis of social capital in forest communities but also facilitates comparisons and feedback for public policies.

The procedure for applying the methodology was as follows:

- A documentary and statistical review of the general and particular context of the Sembrando Vida Program (PSV) at a municipal level was carried out, using official sources such as INEGI and the single register of PSV beneficiaries of Calakmul, Campeche, to characterize the target population.

- A questionnaire aligned with the IFRI and IAD instruments was designed for PSV beneficiaries in the Nuevo Bécal ejido.

- The sampling frame was defined based on the list of active PSV beneficiaries in Nuevo Bécal (n = total population of beneficiaries in the ejido), selecting a probability sample of 41 questionnaires, calculated with the formula:

$$n = \frac{Nz^2_{a/2}pq}{d^2(N-1)+z^2_{a/2}pq}$$

Wherein:

n	=	103	Population size: PSV beneficiaries in the ejido at the time the questionnaire was applied.
d	=	0.1	Estimation precision.
$z_{(a/2)}$	=	1.64	Value of the standard normal distribution for a 90% confidence level.
$p=q$	=	0.5	Maximum variance for binary events with equal probability.

Substituting the values:

$$n = \frac{(103) * (1.64)^2 * (0.5) * (0.5)}{(0.1)^2 * (125-1) + (1.64)^2 * (0.5) * (0.5)}$$

The sample size is obtained:

$$n = \frac{69.26}{1.69} = 40.92 \quad \textbf{Tamaño de la muestra}$$

The estimated sample size was n=40.92, which was rounded up to the nearest whole number, determining the application of 41 questionnaires, and 46 were applied in the fieldwork.

The statistical analysis derived from the use of this formula to calculate the sample size has an inferential approach, which allows generalizing the results obtained from the questionnaires to the total population with an acceptable level of precision and confidence. This guarantees that the collected data are representative of the studied population, which allows validating or refuting the proposed hypotheses and obtaining well-founded conclusions on the relationships between the variables analyzed, specifically social capital and valuation of the Program's components.

Instrument and analyzed dimensions

The survey was designed to evaluate key aspects such as social capital, trust, collaboration and Program implementation, and included closed, scale-type and dichotomous questions, organized in four main dimensions: a) Sociodemographic characteristics; b) Organizational, collaboration and trust dynamics; c) Perception of Program components and e) Conditions for post-program sustainability.

Data processing and analysis

The data were processed using Microsoft Excel (version 2502). Validation procedures were carried out to validate internal consistency, purge outliers and verify the integrity of captured records to ensure consistency and reliability. The analysis included descriptive statistics (frequencies, percentages), elaboration of a composite indicator (Aguilar-Martínez & Valtierra-Pacheco, 2021) and graphic representations that allowed exploring patterns in the interaction between social capital and the Program components. Likewise, qualitative inferences were incorporated from open-ended responses that complemented the quantitative analysis. This methodological approach made it possible to identify the characteristics of social capital as it interacts with the Program components.

Justification of the approach

The analysis was conducted from rural sociology and agroecological transition, considering that social capital constitutes a central resource for the implementation of public

policy programs, the sustainment of collective practices, community resilience and the management of common goods (Altieri & Nicholls, 2017; Ostrom, 1990). The study not only analyzed the implementation of the Program but also examined the institutional design and how the structure and social capital of the ejido modulated its impact in terms of productive sustainability and participation. The analysis was linked to the process of agroecological transition that frames the public policy programs of welfare in Mexico from 2019, and that as a perspective seeks to contribute to the welfare of rural populations, integrating the environmental, social, cultural dimension, the recovery of knowledge and agroecological forms of production, whose goal is the construction of sustainable and balanced food systems (Heredia Hernández et al., 2024).

Results and Discussion

Organizational configuration and cohesion of the working groups

Seventy-two percent of the beneficiaries joined the Program in its first year of operation (2019), which allowed them to have more than 3 years of participation, and with this they can be considered a homogeneous population, which can respond uniformly to the research objectives.

The results related to organization show that internal cohesion is supported by high levels of trust and mutual support. This is evidenced by the fact that 76 % of the respondents positively evaluate group coordination and 98 % consider that the internal rules are understandable and effective.

The results related to organization show that internal cohesion is supported by high levels of trust and mutual support. This is evidenced by the fact that 76 % of the respondents positively evaluate group coordination and 98 % consider that the internal rules are understandable and . The existence of shared formal norms is one of the fundamental conditions of social capital (Coleman, 1990; Durston, 2002; Fukuyama, 1998), which in this case has facilitated work organization and the achievement of collective goals.

Trust with local stakeholders

The performance of the Program's key actors in the ejido was evaluated with a mostly positive perception towards the CAC coordinator and the technicians, considering them fundamental for the operational success.

Trust within the groups is high; for example, 98 % trust that members will comply with the tasks, and 100 % perceive that there is mutual support. Program technicians and CAC coordinators are perceived as trustworthy actors (91 % and 87 %, respectively); in contrast, local authorities have a divided valuation, as 56 % consider that they do not adequately fulfill their role (Figure 1). This perception of local authorities identified them as uncommitted or inconsistent in their support, while a minority recognized their contribution in a positive way. This divergence suggests that the authorities fail to consolidate themselves as trustworthy figures in comparison with the coordinators and technicians, who are seen as operational pillars within the community.

High trust in coordinators and technicians reflects the consolidation of *bonding* social capital (Putnam, 2000), based on internal networks of cooperation and clearly defined roles. Nonetheless, the lack of trust towards local authorities exposes the lack of participation related to *bridging* social capital (Woolcock & Narayan, 2000), essential to link communities with external institutional structures. It should be considered that the Program at community level does not require an active and direct participation of these local stakeholders, except at the beginning of the Program and eventually to meet particular interaction requests from the CACs, which are not constantly presented. This perception may limit intersectoral articulation, a risk frequently identified in programs with a centralized approach (Fox, 2003), which undermines sustainability by relying excessively on internal actors.

As Woolcock (2001) points out, the effectiveness of public policies requires balancing both types of social capital, since while *bonding* facilitates initial cohesion, *bridging* guarantees legitimacy and scalability. Therefore, the identified gap demands strategies to strengthen multi-level governance, integrating local authorities in the Program's co-responsibility and fostering participation mechanisms directed towards the ejido's objectives.

As Woolcock (2001) refers, "*trust in local institutions strengthens the social capital of linkage, connecting communities with broader structures*". This gap suggests that, in order to maximize the Program's benefits, it is crucial to strengthen the articulation between beneficiaries and municipal representation authorities.

Collaboration and organization among working groups

High levels of satisfaction were identified (87 % in group interaction, 87 % in organizational efficiency and 89 % in nursery collaboration) evidencing a robust *bonding* social capital, supported by previous experiences of community work within the ejido, particularly in forestry projects (CONABIO, 2023; Putnam, 2000). This previous base of cooperation facilitated the adoption of the agroecological components of Sembrando Vida, as trust networks and collective decision-making mechanisms are institutionalized (Ostrom, 1990). This is attributed to the fact that the community, having an organizational tradition due to productive issues, parental affinities or previous experiences, can more

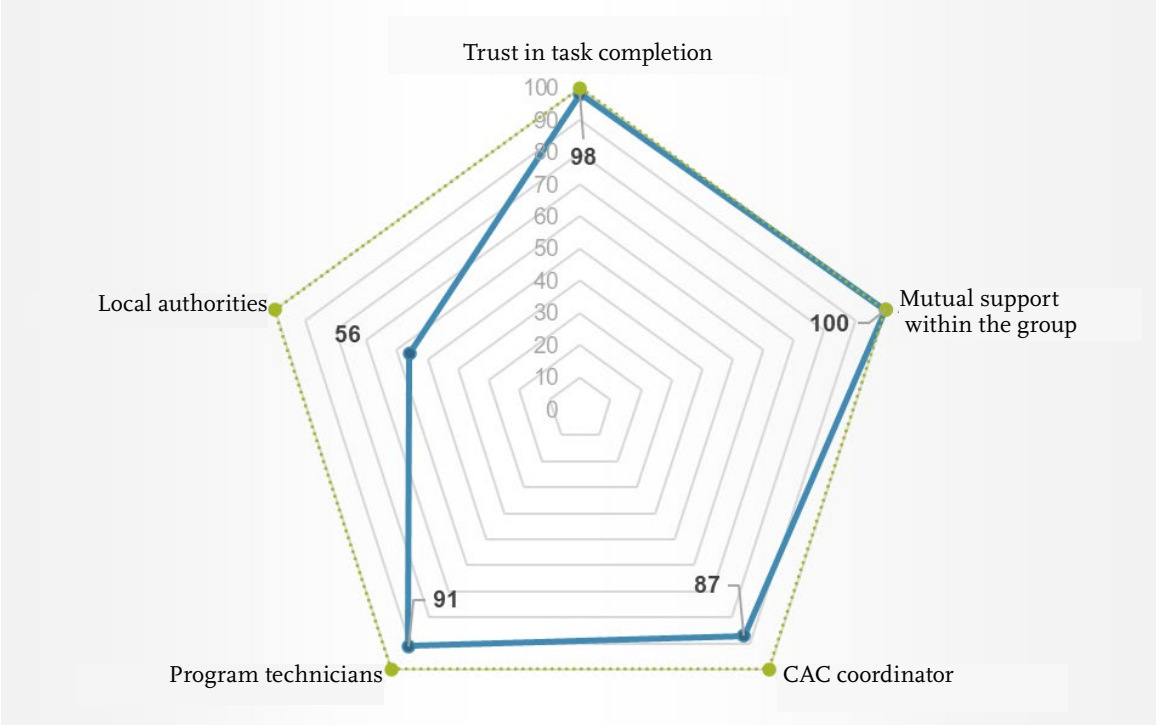

Figure 1. Composite indicator of trust with program stakeholders.

Source: Authors' self-made based on field data. The methodology of the composite indicator was adapted from Valtierra-Pacheco, E. and Salas-González, J. M. (2025; personal communication).

quickly internalize public policy programs, as long as they respect their endogenous dynamics.

The organizational configuration related to parental ties and experience in productive or community management translates into operative efficiency, as observed in the nurseries and biofactories, spaces that demand technical and logistical coordination, and are now perceived as "organized" by 89 % of the beneficiaries. This suggests that the Program design, when articulated with pre-existing community structures, enhances synergies between local knowledge and external technical supplies (Altieri & Toledo, 2011). In this sense, the position of the representatives of each CAC is that of catalysts, mediating between the Program's guidelines and local capacities, as stated in the Program's Rules of Operation (ROP, by its Spanish acronym) (figure 2).

However, this relative success should not be interpreted as self-sufficiency. Dependence on *bonding* networks can generate an "efficiency bubble" that requires the search for structural vulnerabilities, which are identified in other areas of the integral implementation of public policy programs; for example, although 87 % value the organization positively, limitations persist in access to markets or unconditional financing, areas where *bridging* social capital with external actors is crucial (Woolcock & Narayan, 2000). This level of efficiency could respond to the satisfaction perceived at a general level of the Program and to the prioritization of other areas that are not the direct objective.

In summary, the data confirm that previous social capital is a strategic asset for initial implementation but also reveal that its exploitation requires public policies that avoid the instrumentalization of community networks. As proposed by (Woolcock & Narayan, 2000), the challenge is to scale up these local experiences through institutional linkages with integral objectives that guarantee lasting resources that strengthen sustainability, autonomy and community governance in relation to development projects. This is the only way to move from punctual organizational effectiveness to integral sustainable development.

Program Implementation

Novelty of the program's tasks

The Program was designed to strengthen the food security of beneficiaries through the articulation with the agroecological transition by means of agroecological components and local practices. In this regard, 41 % of beneficiaries perceive the Program's tasks as "completely" or "mostly" new, while another 41 % consider them partially new, which evidences a balance between the introduction of agroecological techniques and the reuse of traditional knowledge (Durston, 2002).

This integration seeks to link innovation with local knowledge, which is essential for agroecological transition in rural contexts with challenges such as low productivity and scarce infrastructure (Figure 3).

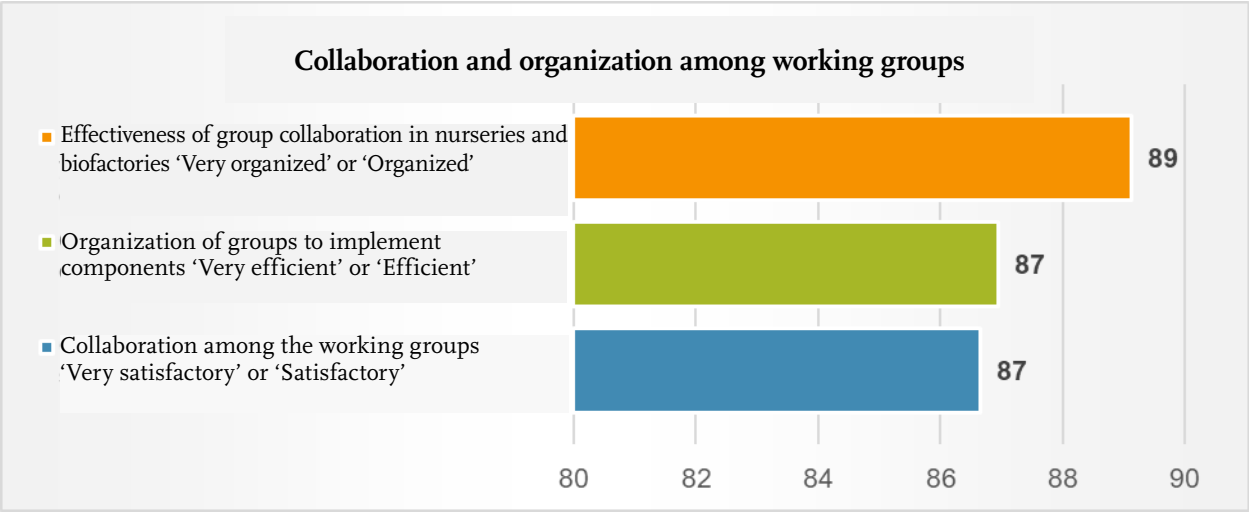

Figure 2. Collaboration and organization among the working groups
Source: Authors' self-made (2025).

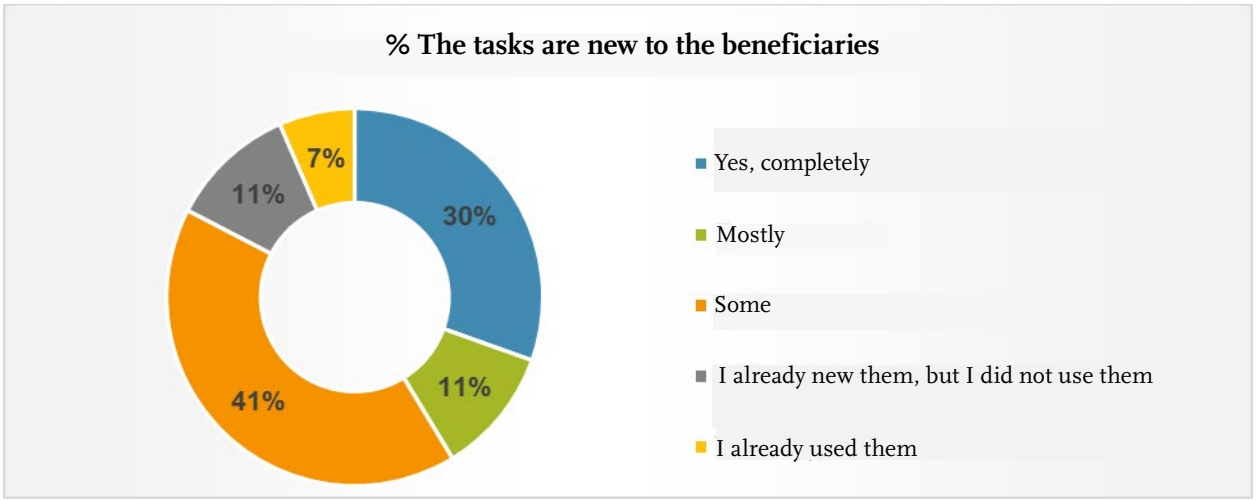

Figure 3. Novelty of the program's tasks.
Source: Authors' self-made (2025).

However, the partial novelty of the activities implies challenges, since the adaptation of known practices facilitates the initial adoption, although barriers such as resistance to change and insufficient technical training persist. These factors, added to structural limitations, may restrict the Program's effectiveness if continuous training and institutional support processes are not institutionalized. As Durston (2002) points out, the sustainability of these initiatives depends on overcoming cognitive gaps and ensuring that progress transcends the temporary cycle of the PSV.

Structural barriers and program sustainability

The implementation of the Program's agroforestry techniques faces multifaceted barriers. Twenty-six percent of beneficiaries identify lack of technical knowledge as the main obstacle, followed by insufficient training and low commitment (24 %). Other challenges include material shortages (20 %), economic constraints (17 %), internal conflicts and communication problems (15 %); only 13 % report no difficulties. These data reflect a triple set of problems composed of deficits in technical skills, fragility in group cohesion and material constraints, aspects that are interconnected in rural contexts (Adger, 2003; Diaz-Albertini, 2003). These obstacles highlight the need to strengthen these areas to facilitate the implementation of the Program's agroforestry techniques and reinforce knowledge transfer mechanisms and continuous technical support (Figure 4).

According to Christmann (2023), it is essential to "*involve diverse local actors in innovation processes*", otherwise, the impact of the PSV on agroecological transition and community welfare could be limited and

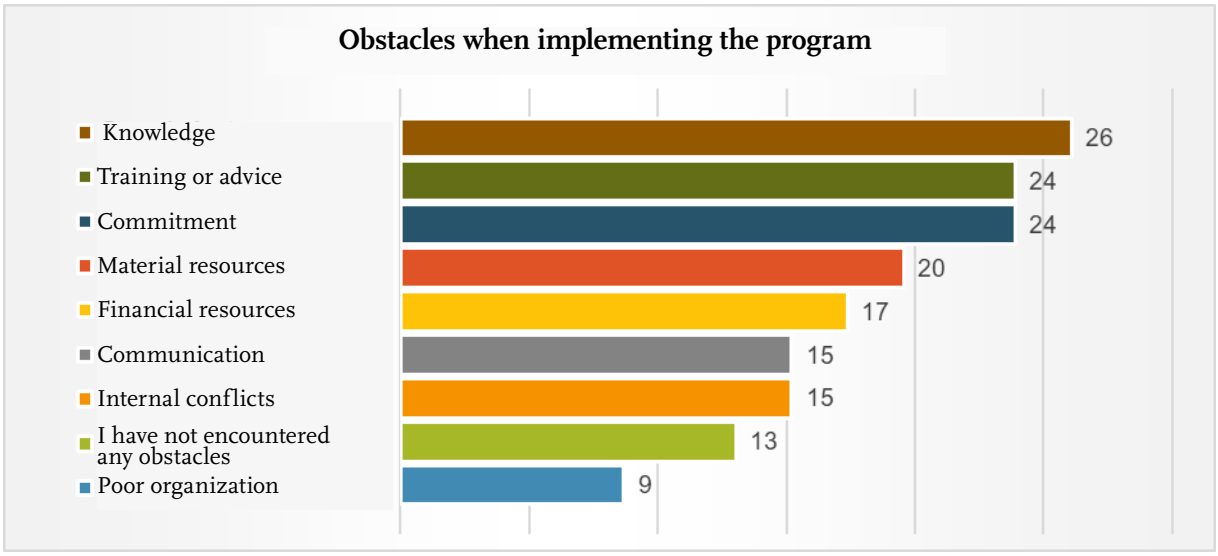

Figure 4. Obstacles when implementing the program's agroforestry techniques

Source: Authors' self-made (2025).

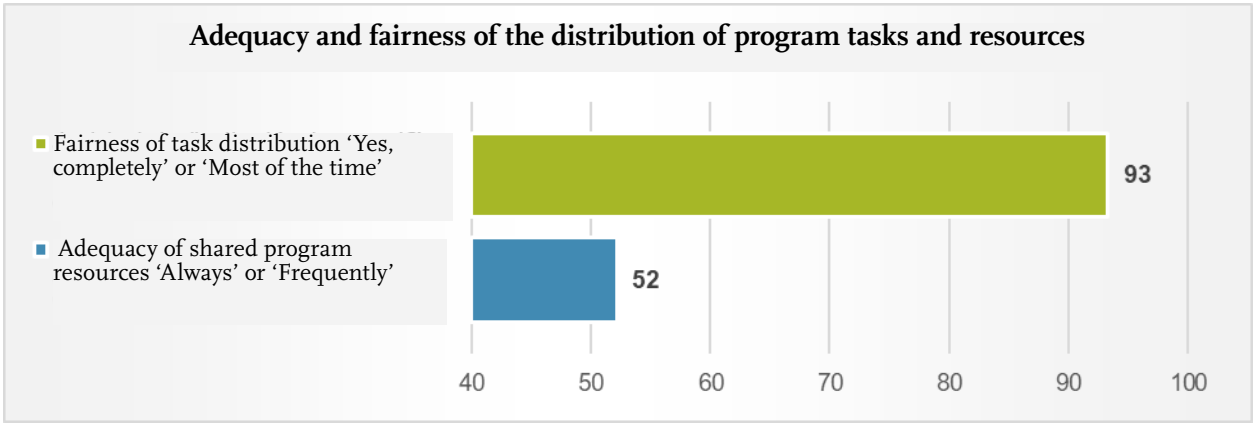

Figure 5. Percentage of sufficiency of resources and fairness in the distribution of tasks.

Source: Authors' self-made (2025).

distant. This shows that it is a priority to design Program components that continuously and progressively address aspects such as technical training, material and/or structural resource limitations.

Adequacy of resources and fairness in the distribution of program tasks

The perception of fairness in the distribution of tasks and resources in the implementation of the Program is high, since 93 % of the beneficiaries qualifies it as "completely unfair" or "mostly fair". This reflects a social capital based on equity standards that facilitate collaboration (Diaz-Albertini, 2003). However, the sufficiency of shared resources (tools, nurseries) shows polarization, given that 52 % consider them "always" or "frequently" sufficient, compared to 48 % who perceive them as "occasionally" or "never" adequate.

This disparity suggests that, although internal dynamics are equitable, structural limitations in supply persist, which could affect the Program's operational effectiveness in the medium term. As Díaz-Albertini Figueras (2003) points out, social capital optimizes collective management, but depends on material availability. Recurrent shortages of supplies, even in contexts of high cohesion, could erode trust and commitment if not addressed through programmatic forecasts of constant provision (Figure 5).

In summary, the Program evidences strengths in internal equity, but requires reinforcing access to resources to sustain its impact.

Use, sufficiency and quality of the biofactory's supplies

The Program's biofactory supplies show a high operational integration, since 78 % of the beneficiaries use them "always"

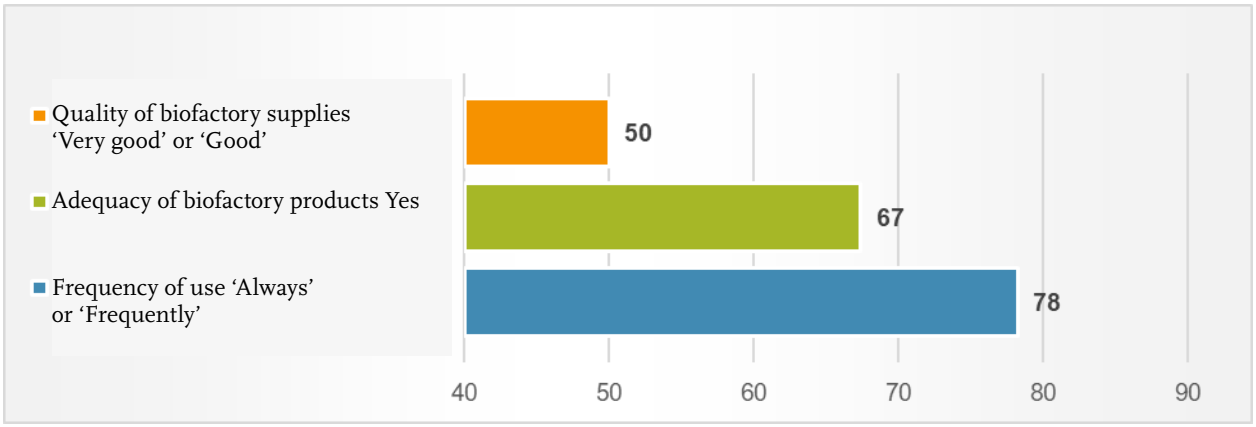

Figure 6. Percentages of use, sufficiency and quality of the biofactory's supplies.

Source: Authors' self-made (2025).

or "frequently", and 67 % consider them sufficient for their productive needs. Nonetheless, only 50 % rate their quality as "very good" or "good", revealing a gap between availability and expected standards. This suggests that, although biofactories are strategic for the agroecological transition, there are inconsistencies in technical processes or unmet expectations, which could affect producers' motivation in the short term (González de la Rocha, 2005) (Figure 6).

Widespread adoption reflects that social capital facilitates collaboration in innovative practices (Kessler & Roggi, 2005). However, polarization in the perception of quality underlines the need to optimize production protocols (specialized training) and ensure standardized supplies. Trust in community initiatives depends on both accessibility and technical excellence. As stated by Kessler & Roggi (2005) *"the quality and availability of local supplies are key to sustaining trust in community agroecological initiatives"*. The divided opinion regarding quality may be related to possible unmet processes or expectations.

Importance of the Program components

One hundred percent of the beneficiaries identify CAC as the most relevant component to improve production, followed by nurseries (37 %) and biofactories (33 %), while fruit trees (7 %) and agroecological techniques (2 %) are less recognized. The low adoption of fruit trees is related to the late authorization of their cultivation (in the year 2022), which limited their development since the initial implementation of the Program. These results evidence an unbalanced approach between utilization and sustainability (Figure 7).

The centrality of the CAC reflects its role as a nucleus of training and collective articulation, where the exchange of technical and local knowledge strengthens social capital by fostering trust and cooperation (Coleman, 1990; Diaz-Albertini, 2003). This dynamic facilitates the adoption of innovations, such as sustainable techniques, which 35 % of beneficiaries integrate with conservation practices. However, the lower relevance assigned to fruit trees and agroecological techniques suggests obstacles in their adoption, such as the lack of clear criteria that limit the Program's adaptation to the official regulations present in contexts such as the Calakmul Biosphere Reserve.

The preference for nurseries and biofactories, despite their lower perceived impact compared to CAC, evidences their instrumental value in immediate production. Nevertheless, their potential is limited by previously identified challenges, such as the variable quality of supplies and the lack of experience in achieving technical standards to ensure the effectiveness of these components.

The late introduction of fruit trees exposes a disconnection between program design and local needs, a recurrent pattern in public policies with vertical approaches. To transform this limitation, strategies are needed to link agroecological innovation with production cycles and local markets, avoiding exclusive reliance on structures such as the CAC and the Program's technicians. This would ensure a sustainable transition, balancing collective learning with access to specialized material and technical resources.

The notion of Durston (2002) and Díaz-Albertini (2003) that *"rural learning centers enhance social capital by articulating technical knowledge with local practices, improving productivity"* is recovered. Thus, the CAC represents a pillar for productive development, and the Program could benefit from strengthening the components in an integral manner.

Importance of sustainable techniques in production

Eighty-nine percent of beneficiaries consider sustainable techniques "important" for collective welfare, while 9 % perceive them as useful, but not a priority, and only 2 % downplay their relevance. This reflects a broad, although heterogeneous, positive assessment (Figure 8).

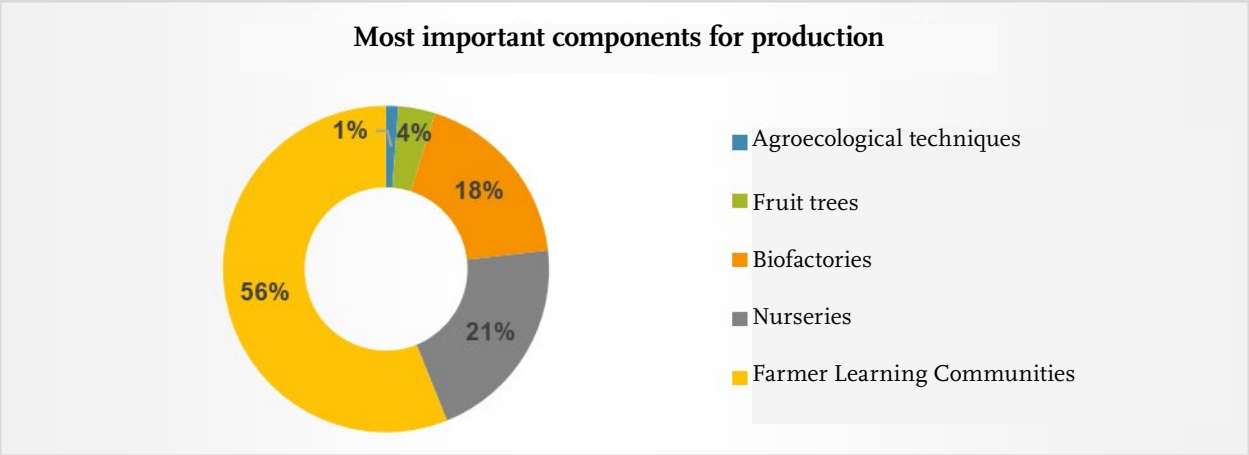

Figure 7. Most important components to improve production.

Source: Authors' self-made (2025).

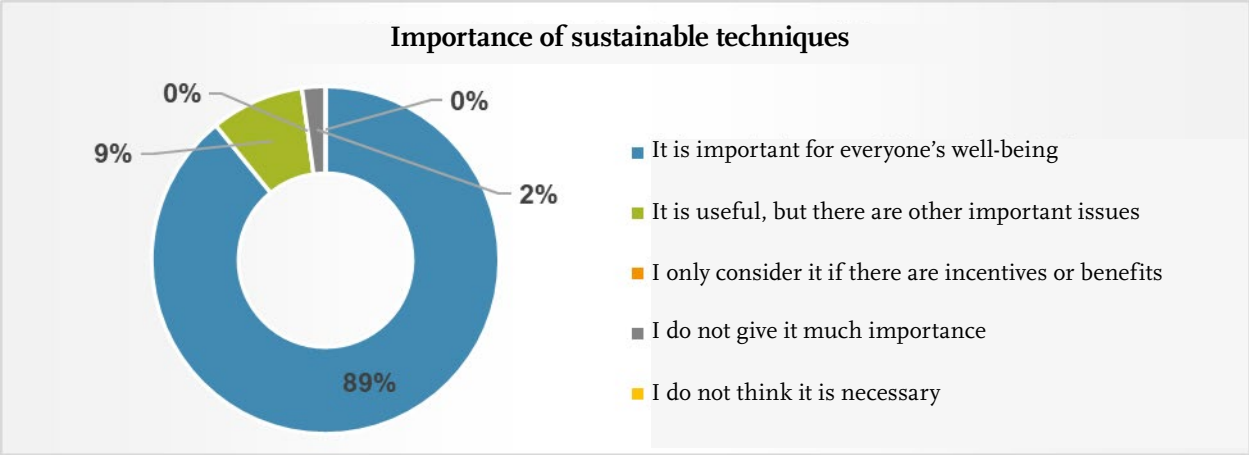

Figure 8. Importance of sustainable techniques in production.

Source: Authors' self-made (2025).

The recognition of sustainable techniques (89 %) evidences their alignment with agroecological principles that link production and community welfare (Heredia Hernández & Hernández Moreno, 2022). This trend suggests that the ejido's social capital, based on norms of reciprocity and collective vision, facilitates the adoption of environmentally responsible practices. However, the minority that underestimates them reveals spaces to raise awareness or broaden knowledge and abound on the compatibility of distinct approaches, for example productivist and sustainable, common in rural contexts with economic pressures (Altieri & Nicholls, 2017).

The peripheral perception in some groups could be linked to a fragmented implementation, where techniques are presented as complements and not as systemic axes. As Altieri and Nicholls (2017) warn, socioecological resilience requires integrating sustainability into the productive core, not as an optional addition. To this end, the Program can strengthen pedagogical processes that show its tangible impact on livelihoods, articulating technical knowledge with local knowledge and interests. This would not only consolidate their adoption but would also transform techniques into tools for community empowerment, transcending their instrumental role.

Knowledge of requirements and permits for forest product management

Seventy percent of the beneficiaries are aware of the legal requirements and permits for forest management, while 30 % are unaware of these processes. This knowledge, as well as previous social capital, is related to community participation in local projects and forestry activities (Figure 9).

Most demonstrate an understanding of forest regulations, reflecting a social capital base built through historical par-

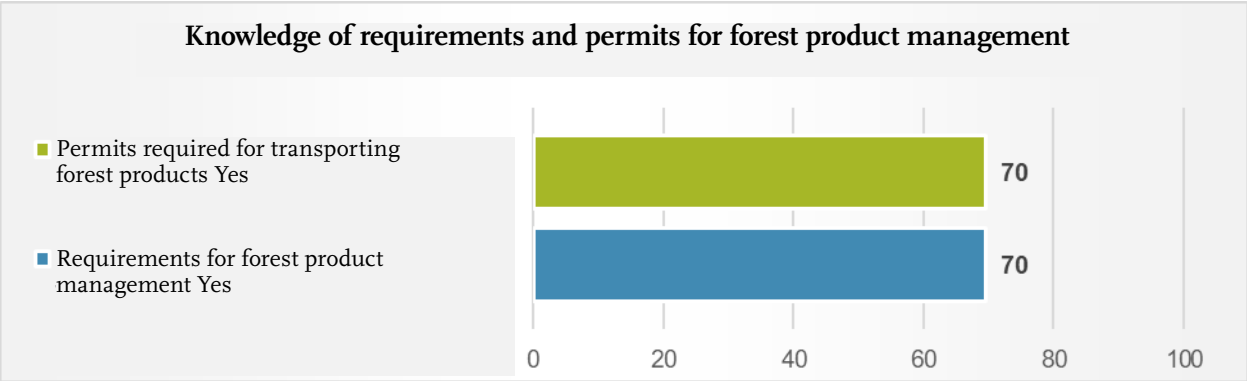

Figure 9. Knowledge of requirements for forest product management

Source: Authors' self-made (2025).

ticipation in community initiatives (Merino Pérez, 2004). This collective knowledge facilitates sustainable management and aligns Program actions with legal frameworks, strengthening autonomy in the use of common resources (Ostrom, 1990). Nonetheless, the 30% lack of knowledge exposes gaps that, according to Merino (2004), limit effective governance by hindering informed decisions.

The asymmetry suggests that, although the Program benefits from previous experiences, it requires targeted strategies to universalize access to legal information. This would not only close cognitive gaps, but would also enhance the ejido's institutional resilience, integrating environmental sustainability and procedural justice in forest management.

Requirements to maintain work areas at the end of the Program

The requirements identified by beneficiaries —financing (65 %), technical advice (46 %), labor (43 %), supplies (41 %) and commercial networks (41 %)— do not reflect passivity, but a critical participatory attitude, rooted in a social capital that prioritizes collective action to guarantee the continuity of agroforestry practices. This active posture underlines the awareness that sustainability transcends the operational phase of the Program, requiring institutional frameworks that articulate external resources with local capacities (Figure 10).

The prioritization of financing and technical assistance is evidence of a double dependence on state support and specialized knowledge. However, this is not merely a welfarist demand, but a recognition that productive autonomy requires economic and cognitive infrastructure. As Vallance et al. (2011) point out, overcoming post-program vulnerability requires the integration of three key capitals: financial (access to credit or stable markets), technical (adaptive innovation) and social (collaborative networks). In this sense, the mention of "marketing networks" and "community organization" reveals a strategic vision: the beneficiaries not only seek resources, but also mechanisms to scale their collective agency, transforming *bonding* social capital into *bridging*, such as links with markets and institutions.

The reference to "community organization" (explicitly mentioned in "other needs") reinforces that social capital is not static, but is energized through participatory governance structures, such as assemblies or committees, which allow for negotiating priorities and distributing responsibilities. This coincides with Ostrom and Ahn (2003) on the importance of adaptive local institutions to manage common goods. Nonetheless, the absence of mentions of "long-term public policies" in the data suggests a gap in which the Program has failed to institutionalize bridges with regional or national regulatory frameworks that support these demands.

To transcend this limitation, effective multifocal transition strategies are required:

a) Self-managed financing: promote revolving funds or savings cooperatives, linked to local markets.

b) Contextualized training: transform the CAC into a node of open innovation, where technical knowledge is co-constructed with traditional knowledge.

c) Solidarity-based commercial architecture: alliances with social enterprises or local governments to guarantee fair prices and distribution channels.

These actions would not only mitigate external dependence but would also turn social capital into an engine of institutional resilience, ensuring that agroecology is not a temporary project, but a system rooted in local and regional economy.

Reinvestment of support received

Ninety-five percent of the participants have used part of the Program resources for the development of program activities; acquisition of tools (39 %), materials (22 %) and equipment (20 %). Other investments include infrastruc-

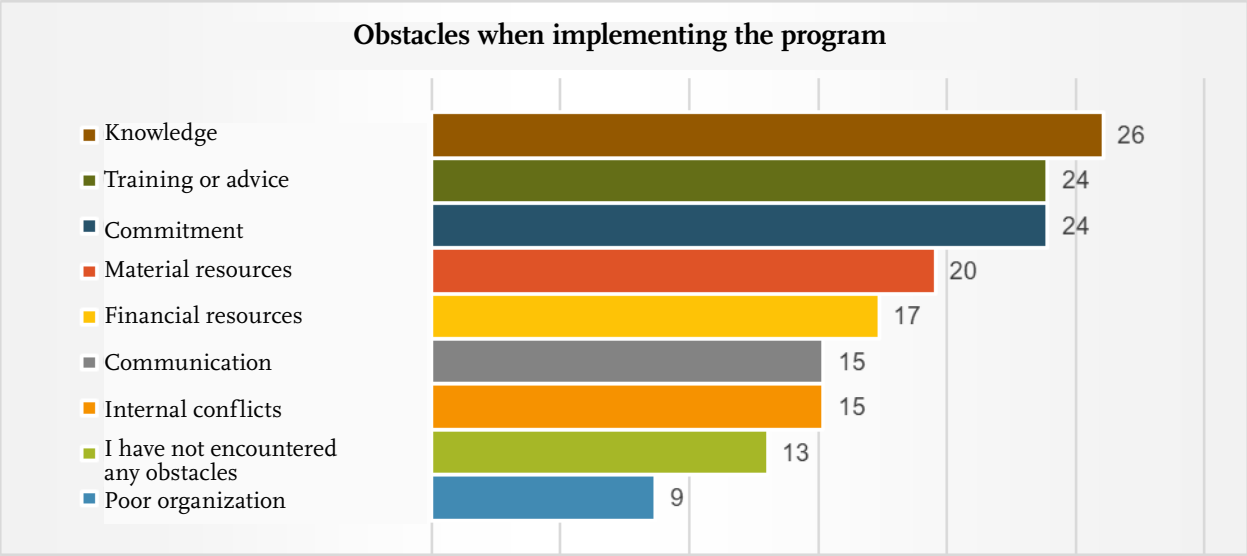

Figure 10. Requirements to maintain work areas at the end of the program

Source: Authors' self-made (2025).

ture improvements (9 %) and training (3 %). Regarding the monthly proportion reinvested, 47% allocate between 25 % and 50 % of the resources, while 29 % allocate between 50 % and 75 %.

This pattern implies a collective commitment to sustainability, where beneficiaries balance immediate investment (e.g., tools) with medium-term planning (e.g., infrastructure). However, the concentration on operating expenses (81 % on tools, supplies and equipment) suggests a prioritization of short-term productivity, with less attention to strategic components such as training (3 %), which could limit future technical innovation. The monthly percentage distribution (47 % invest ≤50 %) indicates a broad commitment to the development of activities, given that the investment they make corresponds to a large part of their monthly income.

In summary, although reinvestment is evidence of project ownership, incentives are needed to redirect resources towards specialized training and process technification, ensuring that investments go beyond mere supply substitution and are geared towards socioeconomic resilience in the ejido (Figure 11).

In communities such as Nuevo Bécal, these resources operate as green remittances, substituting income from activities that present regulatory obstacles or recent crises (e.g. beekeeping) and diversifying local economies through agroforestry and fruit trees. Nonetheless, their effectiveness faces barriers such as restrictive markets, labor shortages and high costs, endemic problems in rural areas. Here, social capital acts as a buffer, allowing for the redistribution of tasks, redistribution of ejido-owned work areas and optimization of collective supplies. However, without public policies that formalize its mechanisms, this dynamic will have fragile resilience.

Agroecological transition requires going beyond mere supply substitution, as it requires institutionalizing processes where community well-being (access to nutritious food, environmental health) and equity are intertwined with productivity. For example, in Nuevo Bécal, reinvestment in infrastructure (9 %) and commercializing (41 %) shows an incipient articulation between sustainability and income, but its scalability depends on long-term policies that in a general way:

a) Link financing to socio-environmental results, such as payment schemes for ecosystem services.

b) Strengthen local value chains through public-private partnerships that prioritize fair prices and traceability.

c) Invest in specialized training and the creation of a CAC network in an agroecological innovation hub.

Scoones (2016) warns that the commons, as referred to by Ostrom (1990) are sustainable livelihoods integrate material and social assets, which contrasts with the low investment in training (3 %) that not only limits technification, but also weakens the capacity of communities to negotiate with external actors (governments, markets). This highlights the paradox of programs such as Sembrando Vida, where although they mobilize existing social capital, they do not scale it towards multi-level governance to address structural obstacles (land tenure, access to credit, commercial and institutional infrastructure).

Community autonomy promoted by reinvestment is an achievement, but its sustainability requires redefining public policies as facilitators of institutional ecosystems, not as temporary providers of resources. This implies:

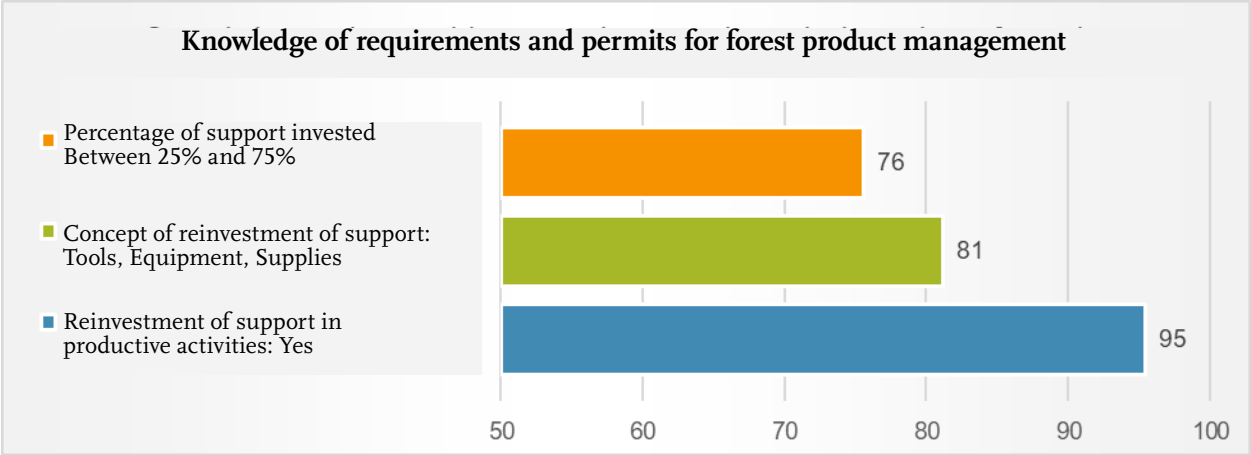

Figure 11. Reinvestment of support received in productive and sustainable activities.

Source: Authors' self-made (2025).

Community autonomy promoted by reinvestment is an achievement, but its sustainability requires redefining public policies as facilitators of institutional ecosystems, not as temporary providers of resources. This implies:

a) Guarantee funds for green credit, backed by development banks.

b) Integration with marketing platforms with agroecological seals (CONANP & GIZ, 2019).

c) Participatory monitoring systems, where communities evaluate impacts on well-being (e. g. poverty reduction, soil regeneration).

In short, integrating public policy into the socio-territorial context to add the efforts that have been previously achieved, since the strategic reinvestment observed is a symptom of active social capital, but its potential as a driver of sustainable development will only be realized through policies that understand agroecology not as a project, but as a model of territorial governance. Without this, the balance between immediate needs and sustainability will remain precarious, subject to the vagaries of political and economic volatility.

Program Implementation: Agroecological transition and sustainability

The Program has achieved significant advances in food security and immediate well-being in the ejido by prioritizing basic agrifood production with MIAF (Milpa Interspersed with Fruit Trees) and SIAF (Agroforestry Production Systems) production techniques. However, this orientation has been limited by the lack of soil restoration and preparation techniques, which are among the main obstacles in the ejido. For Altieri et al. (2018), agroecological sustainability requires the institutionalization of resilient systems that integrate biodiversity, conservation practices and community autonomy, which in the ejido has been limited by the obtained results from installed crops and by experience in the application of techniques. It is noted that the training needs to be expanded to allow, based on the results, to correct the procedures in favor of improvements that motivate the appropriation of the techniques. That as an agenda to keep active the techniques of soil preparation and perfection of the management of the cultivation of vegetables and fruit trees that, in the case of the latter, their cultivation was authorized to the beneficiaries in 2022 and 2023.

CONEVAL (2024) observes in the Program a traditional productivist model, which seeks to produce without taking into account a commercial destination, without reference to indicators, techniques and socio-environmental actions such as ecosystemic regeneration or intergenerational equity. The Program has achieved very diverse results, according to each population, even within the same municipalities and with neighboring localities, the results are contrasting. Therefore, it is important to channel social capital, participation and community values to promote strategies beyond the basic components of the Program, since the lack of infrastructure for storage or value addition and the absence of productive diversification plans (e.g., medicinal plants) limit the capacity to build municipal or regional value chains.

Social capital is an underutilized resource. Internal cohesion could be enhanced through alliances with regional cooperatives or local markets specializing in agroecological products. For example, the creation of marketing networks managed by the beneficiaries themselves would reduce dependence on intermediaries and add value to the crops. Nonetheless, beneficiaries lack a marketable production value, and the Program does not have components to scale up these initiatives, which is essential to complement the agroecological transition and strengthen sustainable development.

Discussion of the Latin American context

In Latin America, where 30 % of the rural population lives in food insecurity (United Nations & ECLAC, 2024), the PSV represents a relevant but insufficient effort. These institutions identify rural poverty as a "trap" linked to the lack of access to technology, inclusive markets and environmental education; problems that the PSV addresses only partially by focusing on direct subsidies and basic training. Although the Program has strengthened internal social capital (Putnam, 2000), it has not built solid bridges (Woolcock & Narayan, 2000) with academic institutions, social enterprises or long-term state policies, limiting its capacity to transform inequality structures.

As referred to by Valencia-Perafán et al. (2020) in order to achieve sustainable development and an effective agroecological transition, programs such as Sembrando Vida should prioritize the recovery of community social capital and the articulation of marketing components or agroecological specialization. Local governance and the active participation of community members are crucial for resource management and the development of sustainable projects. Strengthening producer organizations and promoting cooperation can facilitate the insertion of family production into production chains and access to markets.

For example, agroecological specialization based on sustainable soil management practices and the sustainable use of biomass not only contributes to the resilience of agrifood systems but can also create differentiated value-added products. Linking productive policies with inclusion programs and strengthening the technical and financial capacities of public institutions are essential to support this transition and promote endogenous solutions that take advantage of local leadership to ensure the relevance and appropriation of programs in the communities. This coordination between different levels of government and social actors is essential to create a favorable environment for rural territorial development with an agroecological approach.

In contrast, the PSV operates in a centralized manner, with little adaptation to the specific needs of territories such as Nuevo Bécal, where the lack of intersectoral articulation is evident in the disconnection with parallel programs that scale the results of the components, to diversify income and reduce the pressure of beneficiaries on the post-program scenario.

In addition, the Program's sustainability is threatened by unresolved structural barriers, which, as challenges, reflect a regional paradox (ECLAC et al., 2021), where, despite the fact that Latin America is home to 40 % of global biodiversity, its rural policies continue to privilege traditional models that lack a comprehensive vision of resource management with local stakeholders. The agroecological transition requires, as Altieri et al. (2018) point out, a paradigm shift that links social justice with environmental innovation, to align programs with local needs and to achieve intersectoral articulation, a weak aspect that can be leveraged with social capital in Nuevo Bécal.

Conclusions

The Sembrando Vida Program in the Nuevo Bécal Ejido demonstrates that internal social capital, driven through trust networks and CACs, is the main catalyst for the implementation of the Program's components. However, this impact is limited as part of the agroecological transition process and the search for sustainability of results. To overcome this barrier, it is essential to articulate productive and social objectives, standardize agroecological training and strengthen external networks.

The initial success of the Program is related to the social dimension through social capital, rather than to technical or productive execution. This asymmetry coincides with the technical and institutional barriers identified in the literature on agroecological transition in Mexico. In addition, the implementation of the PSV in the ejido faces challenges in the definition of conservation and harvesting criteria in forest management areas, highlighting the need to harmonize the Program's ROPs with consolidated forestry regulations and protected natural areas.

Finally, the PSV in Ejido Nuevo Bécal shows that welfare policies can generate immediate improvements through social capital, and that the technical components are adequately articulated, but the sustainability of their impact depends on overcoming traditional public policy schemes. As in the Latin American context, this implies adopting intersectoral approaches that articulate the different actors —beneficiaries, communities and institutions— with local objectives and the agroecological transition to achieve the effective implementation of the Program, since only through reforms that encourage community autonomy will it be possible to transform the rural poverty «trap» into a path towards balanced and resilient food systems.

End of English version

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