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Article

Analysis of the basic components in technical support programs in Mexico

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Abstract

In the Mexican agricultural sector, there is a wide diversity of producers, from large and specialized to multi-active and subsistence producers. The latter are related to small production units, which are the subject of attention from government programs aimed at advising them. Nevertheless, the efforts of public technical support programs are characterized by being dispersed and disjointed. This research aimed to analyze the environmental, economic, social, and pedagogical-andragogical contributions of technical support programs in Mexico in the 2019-2023 period through the exploratory analysis of regulatory documents and scientific research on the government programs 'Production for Wellbeing' and 'Sowing Life', in order to identify points for improvement in future interventions. The results indicated that the agroecological approach within the programs analyzed is partially congruent with the objectives set. The need to develop markets that value sustainability and generate benefits for the program beneficiaries was identified. The component with more options for improvement is the development of indicators to analyze the progress of the proposed objectives.

Keywords:

andragogy, capacity building, rural extension.

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Introduction

The agricultural sector faces numerous challenges, including climate conditions, changes in consumer tastes, growing food demand, and new quality and safety standards, among others (FAO, 2020). Due to the above, this sector is called to develop increasingly efficient processes, with the adoption of innovations being a necessary practice for rapid and effective adaptation. Innovation is necessary in agricultural production processes that require changes in both products and processes.

In the case of Mexico, government support is primarily focused on small units that are more susceptible to adverse conditions and have greater difficulty accessing innovations. The agricultural technical support systems are aimed at disseminating innovations focused on promoting economic and productive efficiency in production units (Amaro-Rosales and Gortari-Rabiela, 2016); an example of previous years is the Proagro program in its Proagroproductivo component, which promoted the conservation agriculture approach and a reduction in agricultural inputs (Royo *et al*., 2018). However, such support is characterized by dispersed and disjointed efforts (Rendón Medel *et al*., 2015) with limited reach (Roldán-Suárez *et al*., 2016).

Technical support systems are a strategy usually present in support programs for food production systems. Increasing the efficiency of these strategies is necessary, since the optimization of government resources becomes relevant due to the budgetary decrease that this type of support presents. In addition, the expected results for such programs must address increasingly broad problems; an example of which is the incorporation of approaches such as sustainability (Smaal *et al*., 2021), which involves understanding and motivating changes in environmental, economic, and social aspects. These three axes are considered basic for technical support strategies. In this research, the incorporation of the pedagogical-andragogical component is considered as an element for analyzing assistance strategies. The main positions and approaches found in the literature for these four components are described below.

Regarding environmental issues, the areas to be considered are increasingly diverse due to the environmental and ecosystem disturbance generated by the primary sector's activities (Leroy *et al*., 2020). One way to mitigate the growing scarcity of resources is to increase efficiency in their use (Duro *et al*., 2020). Nonetheless, such increases may end up in the promotion of agricultural intensification, the concept of which is a subject of great debate among various authors (Godfray, 2015).

For economic issues, agriculture is recognized as critical to the livelihoods of millions of people, in both rural and urban areas (Diehl, 2020). The benefits of intensification with a sustainable approach are sometimes recognized (Godfray, 2015; MacDonald *et al*., 2016); other authors argue that intensification and sustainability are two contradictory words (El Bilali *et al*., 2019).

Climate change is a relevant issue in food production systems (Baldos *et al*., 2020; Wegren and Trotsuk, 2020). Several authors claim that there is a direct link between agrifood systems and climate change, concluding that the productive sector participates through greenhouse gas emissions (Ritchie *et al*., 2018); on the other hand, the sector is affected by the consequences of climate change itself (Baldos *et al*., 2020; Tortorella *et al*., 2020) in a sort of dual effect. Actions aimed at mitigating climate change should be considered (Ritchie *et al*., 2018; Tortorella *et al*., 2020), such as adapting production systems to it (Baldos *et al*., 2020). Therefore, the agrifood sector is an alternative for contributing to strategies aimed at reducing poverty and vulnerability.

Social issues are the least addressed and are associated with the concepts of food democracy (Fernandez-Wulff, 2019) or food sovereignty (Bernstein, 2017), which are strongly linked to the way the food system is governed and managed and the inclusion of the different actors involved in the decision-making process.

Pedagogical/andragogical issues are usually a component mentioned less frequently, but they become relevant because technical support is carried out through communication. Pedagogical tools are relevant within technical advisory programs because they provide the necessary tools for

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an efficient process of knowledge appropriation. Andragogical elements are a specialized branch of adult education; therefore, they are a more appropriate approach when talking about interventions in technical support processes with producers. However, andragogy can be complemented with pedagogical elements, allowing a combination of tools that help enhance the significant learning process (Batista de los Ríos *et al*., 2018). Combining pedagogical andragogical elements allows for the standardization of good practices for knowledge exchange while preserving the technical advisor's flexibility, freedom, and individuality to adapt the practices to their teaching style and even to the region served. Thus, it is necessary to have a base of theories of knowledge transfer that establishes the appropriate mechanisms and considers the nature of the proposed innovations and the ways in which the beneficiaries of the programs learn (Ferro, 2017).

Among the various efforts to promote agriculture, this research considered programs with technical advisory components in the current government (2018-2024), which seek to support small production units through the promotion of technical innovations. The objective of this research was to analyze the contributions of the technical support programs to the beneficiaries in environmental, economic, social and pedagogical-andragogical issues in Mexico in the 2019-2023 period, through the exploratory analysis of normative documents and scientific research on the production for Wellbeing (PfWP) and sowing life (SLP) programs, to identify the points of improvement to be considered in future interventions. This work allowed us to determine the contributions of the current public policy and to identify the relevant pedagogical-andragogical elements, along with the three pillars of sustainability, to be considered in the design of technical support interventions.

Materials and methods

The present research was descriptive and qualitative. It was conducted in 2024, selecting current government programs with an agricultural assistance component. The study subjects were the production for Wellbeing (PfWP) and sowing life (SLP) programs since both have technical support components. In these programs, their contributions in the environmental, economic, social and pedagogical-andragogical elements were analyzed. Normative documents, studies and evaluations published for the programs were reviewed using the exploratory literature method (Gómez, 2022). The sequence of analysis was carried out at two levels. The first described the problems addressed by the programs, proposed objectives, types of support and the operational dynamics of the technical advisory components; at the second level, the expected results in the environmental, economic, social and pedagogical-andragogical aspects were analyzed.

Results and discussion

According to the rules of operation, the problems addressed by the SLP are little or insufficient technical knowledge of agroforestry systems for the cultivation of the land; weak organizations or lack of community associations that promote agricultural production and community development; insufficient inputs for production and scarce monetary resources, which translates into insufficient income to make the land productive (Sebien, 2021). The problem addressed by the PfWP is the low productivity in farms and production units of small- and medium-scale producers limited by insufficient working capital; limited access to financing and credit; limited access to and adoption of sustainable technological innovations, appropriate to the conditions of small- and medium-scale producers (SADER, 2020).

Although both programs share similarities, crucial differences must be considered; one of the most relevant being the difference in the responsible agency. The SLP is the responsibility of the secretariat of Wellbeing and is a social care program that seeks to improve the beneficiaries' living conditions. The PfWP is coordinated by the Secretariat of Agriculture and Rural Development (SADER), by its Spanish acronym, so attention to productive issues is of greater relevance.

The offer of technical support is one part of each program's efforts, so the types of support established in each program are described below. According to the ROP 2022, the SLP has three types of support: economic, in-kind, and social and technical support (DOF, 2021). The PfWP has three strategies (SEGOB, 2022): i) direct support to producers (DSP); ii) technical support strategy (TSS); and iii) strategy to promote access to financing (SPAF).

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Both programs are interested in the transfer of agroecological practices. The SLP focuses more on implementing agroforestry systems, and the PfWP focuses on transferring agroecological practices. The incorporation of the agroecological approach into technical advisory systems in Mexico should be analyzed for its relevance and effectiveness in contributing to the objectives of these systems. The general aspects of the technical support of these programs are shown in Table 1.

Table 1. General aspects of the technical support of sowing life (SLP) and production for Wellbeing (PfWP) programs.

	SLP	PfWP
Approaches	Promotion of community organization and strengthening of agroforestry systems (AFS)	Agroecological transition
Technicians	Social and productive technicians	Agroecological and social technicians
Objective	To analyze the productive conditions and design the AFSs and MIFT (milpa interspersed with fruit trees); to promote and strengthen community organization, social finance, and the culture of savings to regenerate the social fabric; to promote cooperation that contributes to achieving food self-sufficiency, contribute to improving and diversifying incomes, as well as to restore the environment; a community nursery and a biofactory can be operated	To facilitate the adoption of agroecological and sustainable practices and increase yields in farms and production units, as well as to strengthen the implementation of productive linkage services

Prepared with data from the ROP and technical appendices (SADER, 2020; SEBIEN, 2021).

Finally, the results will be described separately for each identified basic element. The collective subject through which the practices are disseminated is different for each program. For the SLP, technical support is carried out within the peasant learning communities (PLCs), which are the sites for decision-making and knowledge exchange, where beneficiaries receive the three types of support offered by the program in accordance with its operating rules (ROP, 2022). For their part, for the beneficiaries of the PfWP, the core of work for the technical support strategy is the Farmer Field School (FFS), which is a site of learning and knowledge transfer, which must be located in plots of beneficiary producers, perceiving this as a basis for experimentation (ROP, 2022).

To accompany producers, both programs have a pair of technicians: one with a social orientation and the other with mainly technical training. The incorporation of this pair in both programs allows the joint work of two approaches: social support for community organization and technical support for strengthening agroecological knowledge.

Social element

The elements of contribution to social issues are among the least relevant in research and official documents of both programs. CONEVAL (2022) process evaluation reports that, for the SLP, the activities that will contribute to regenerating the social fabric are not specified, and clear goals to be achieved in the social aspects are not established (Cano-Castellanos, 2024), nor are their indicators. Regarding the PfWP, CONEVAL (2022) process evaluation observed that the degree of involvement of the beneficiaries of the FFS in activities and the adoption of technologies is lower than expected (Gómez, 2022). For both programs, process evaluations highlight that technical staff have an overload of administrative responsibilities, which could lead to a decrease in the efficiency of technical activities.

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Economic element

In process evaluation, CONEVAL (2022) identifies a possible saturation of local or regional markets that can absorb the production (overproduction) of fruit trees and agroindustrial crops (Montes-Ramírez and Sánchez-Juárez, 2024). This situation is critical for the beneficiaries since an oversupply would imply a reduction in sales costs and therefore a reduction in profits. For the PfWP, the adoption of agroecological practices does not allow an increase in the profits of producers if they do not have access to markets that value and pay for environmental benefits (López and Sorondo, 2020); for this reason, interventions in production increases must be accompanied by the promotion of markets and promotion channels to increase consumption (Ramírez, 2024). The foregoing is consistent with what was identified in the design evaluation of the program, where it is argued that the specific objective is inconsistent with the central problem reflected in the diagnosis (CONEVAL, 2020b).

Environmental element

The environmental contributions of both programs seem to be assumed by incorporating the agroecological approach and promoting agroecological practices, as there is no clarity regarding the objectives for environmental improvements or the indicators that demonstrate the possible contributions. In addition, CONEVAL (2020a) indicates in the SLP design evaluation that the conceptual aspects of production systems based on AFS and MIFT are not defined and that there is no delimitation of the expected results in the establishment of such systems.

On the other hand, CONEVAL (2022) mentions that the establishment of goals based on coverage indicators does not respect the AFS or MIFT models initially designed, which are the basis of the Program to achieve the basic food needs of the Planters' families, or the benefits obtained in environmental improvements (Ortiz-Timoteo and Sánchez-Sánchez, 2024). The incorporation of the agroecological approach into the technical support strategy in the PfWP is incongruent with the expected productive results, since low yields are identified as a problem, and the objective is to increase productivity, an element that contrasts with sustainability in the agroecological approach (Sevilla-Guzmán and Soler-Montiel, 2010). This is consistent with what was identified in the design evaluation of the program, which indicates that the specific objective is inconsistent with the central problem reflected in the diagnosis (CONEVAL, 2020b).

Pedagogical-andragogical element

Although this pillar has not been studied extensively or incorporated into research on these programs, it is indirectly observed that knowledge transfer processes have limitations. CONEVAL (2020b) recognizes in the PfWP design evaluation that the technical support is insufficient in budgetary terms, limiting the number of producers who had the possibility of accessing this component; in addition to this, the technical staff has an overload of administrative activities that hinders the ability to implement activities for an efficient technological transition process. In addition, no indicators of evolution are shown regarding the adoption of the proposed practices.

In summary, it is observed that the effort to incorporate the sustainable approach into government programs is relevant due to the environmental situations that the Mexican agricultural system faces; nevertheless, incorporating this approach into the PfWP and the SLP leaves lessons learned. One of these lessons is that the incorporation of agroecological practices is partially congruent with the objectives set since the productive aspects in which it is proposed to influence would not be achieved solely through the adoption of agroecological practices. Another lesson is that it is necessary to promote ecological economies that foster markets that value sustainability and generate benefits for the program participants. Thus, the establishment of a battery of verifiable indicators to determine progress on social and environmental issues and the adoption of innovations has important areas for improvement.

The efforts made in technical support for the rural sector across different periods of government have not been consolidated as public policies of the state, but rather have been limited to the vision of government officials at the time. For the last six years, efforts in terms of technical advice to farmers have been based on the work of two government secretariats.

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Conclusions

Technical support in Mexico lacks clarity of measurement parameters; whether they are environmental, economic, social or pedagogical-andragogic. Therefore, among future developments of new studies, it would be advisable to consider the design of relevant indicators to measure the performance of technical support programs and thus contribute to both impact assessment and accountability.

Although it is a fundamental element for the transfer of knowledge, the pedagogical-andragogical axis is not explicitly addressed in the operation or in the analysis documents of the assistance processes of the two programs analyzed; however, it is identified that there is no standardization of processes that contribute to achieving significant learning of the actors involved. In addition, there are no clear objectives for the expected learning of the program beneficiaries, coupled with an excessive workload for the technicians, which could reduce the time allocated to training in technical and social issues.

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