Knowledge management for small-scale agricultural producers: a thematic proposal for strengthening rural economic units

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ABSTRACT

Objective: To establish a thematic proposal for the management of knowledge of small-scale agricultural producers (peasants) and the strengthening of rural economic units in the state of Querétaro, to energize the social fabric and improve the quality of life of the rural population.

Design/methodology/approach: A bibliometric study of the scientific production on peasant knowledge in Mexico was carried out, as well as an observational analysis focused on specific and general problems. According to the information obtained and the problems detected, three areas for knowledge management were established: technical-productive, managerial and entrepreneurial.

Results: In the technical-productive area, training in good agricultural practices should be addressed, along with technological innovation and the generation of added value. In the management area, issues related with strategic management with a broad entrepreneurial vision that could help create strategies for agribusiness development. Concerning entrepreneurship, the internal and external factors of the environment stand out, which allow awakening their interest, encouraging leadership and direction for business development, in addition to promoting associativity in farming regions. The implementation of the topics proposed in the research will strengthen and boost small-scale agricultural production in the state of Querétaro.

Limitations on study/implications: This study can serve as a reference for small-scale agricultural producers (peasant).

Findings/conclusions: There is a great opportunity through knowledge management to increase the capacities, knowledge and skills of small-scale agricultural producers (peasants) in the state of Querétaro regarding technical-productive, managerial and entrepreneurial themes, which will generate economic, social and environmental impacts for the benefit of this rural sector.

Keywords: small-scale farming, peasants, training, human capital, rural development.

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INTRODUCTION

In Mexico, agricultural production is considered the main activity in the farming sector and the one of highest economic relevance in relation to the livestock production, aquaculture and fishing sectors; likewise, it offers multiple social and environmental benefits (SADER, 2018). According to the National Agriculture and Livestock Production

Survey (INEGI and SADER, 2019), from the agricultural production of grains in Mexico, 0.5% is destined to sowing seed, 4.3% is devoted to family consumption, 7.8% is used as fodder for the livestock, and the remaining 87.4% to sale. From the latter, 53.1% is traded with intermediaries, 25.1% in direct deals with the final consumer, 11.5% are negotiated with storerooms, warehouses or stockpiling centers, 3.8% established under contract, 1.2% is destined to packinghouses or industrial use, 0.9% is sent to central markets, 0.3% is traded with shopping centers or supermarkets, and 4.7% with other types of buyers. These figures exhibit an excessive participation of intermediaries, weak negotiations, and low integration to the markets, resulting in important monetary losses for the rural economic units (REUs).

According to the diagnosis of the rural and fishing sector in Mexico carried out in the year 2012 by the Ministry of Rural Development (*Secretaría de Desarrollo Rural*, SADER) and the Food and Agriculture Organization of the United Nations (FAO) (SADER and FAO, 2014), REUs can be classified into six strata: (S1) Subsistence family-based without link to the market, (S2) Subsistence family-based linked to the market, (S3) In transition, (S4) Entrepreneurial with fragile profitability, (S5) Pushing entrepreneurial, and (S6) Dynamic entrepreneurial. For the state of Querétaro, it was reported that, 46.6% of the REUs belong to S1, 35.1% to S2, 5.8% to S3, 6.9% to S4, 4.9% to S5, and 0.7% to S6 (FAO and SAGARPA, 2013).

Strata segmentation in the REUs in Querétaro could be related, primarily, to the small-scale farmers not having the managerial and productive capacities and abilities for entrepreneurial management. This is associated with the limited access to knowledge adoption, finding with this organizations that do not generate utilities and which, in contrast, show low productive levels and high production costs. This low positioning in the market is generated because they do not comply with the demanding characteristics of quality and a certain degree of differentiation, which has provoked disinterest and abandonment of primary activities and has derived into high rates of migration of the workforce and apathy from young people in rural zones.

Knowledge management provides the opportunity of transcending in the REUs, with the interest of having the ability to generate and adopt new knowledge, share it among members of the sector, and materialize it into technological innovations, goods, services and systems. Therefore, this would also allow being more productive and efficient to obtain competitive advantage through continuous innovation (Carson, 2018; Alavi and Leidner, 2002; Nonaka and Takeuchi, 1999). In addition, it would allow developing the knowledge, abilities and appropriate attitudes in the agricultural producers for agribusiness, making it easier to attain better results in the agro-industrial area, as well as improving the generational shift and economic dynamics (Toillier *et al.*, 2020; Ikuemonisan *et al.*, 2022).

Presently, the agro-entrepreneurial sector is found in a context of globalization, of high technological innovation and growing demand, so a greater emphasis is required on each task of its management, in addition to being in a continuous process of adaptation and permanence in time, in order to respond to the expectations and political, economic and social changes (Arteaga-Coello *et al.*, 2016). In this sense, Spielman and Birner (2008) suggested a series of points for the creation and implementation of an innovation system for agriculture, highlighting that agricultural education should be directed toward the

development of human capital, which will be reflected in the increase of yields, the generation of added value, the capacity for innovation, and the interest for entrepreneurship, among other processes. For its part, the Mexican Agrifood Innovation System has the objective of creating policies, executing projects, managing innovation, transferring knowledge and technology for the agrifood sector to incorporate science, technology and innovation within its activities as a motor for productivity, competitiveness and sustainability (Deschamps-Solorzano and Escamilla-Caamal, 2010). It should be highlighted that the promotion of agricultural innovation normally requires the support of the State, as has happened in diverse countries of the world as a way of encouraging producers to investigate, experiment and then implement cutting edge practices with the aim of improving their productivity, decreasing their agro-environmental impact, and facing market challenges (Wesseler *et al.*, 2017; Akkaya *et al.*, 2021).

Taking into consideration that public and private institutions that work on agricultural development in Mexico conduct an important role in knowledge and technology generation, they will be able to respond to the needs and quandaries identified based on the applied research. These should be linked in the regions with specialists, researchers and extension workers with the aim of contributing to the economic and social welfare of this economic sector. Because of this, the study suggests the objective of establishing a thematic proposal for knowledge management of small-scale agricultural producers (peasants) and the strengthening of rural economic units in the state of Querétaro, in order to make more dynamic the social fabric and improve the quality of life of the rural population.

MATERIALS AND METHODS

Part of the documental analysis carried out was the identification of research themes, with a bibliometric analysis of the scientific production on peasant knowledge in Mexico published in "mainstream" journals (Salager-Zeyer 2015) during the 1991-2023 period; for this purpose, a search was done of documental information in the Science Citation Index Expanded SCIE and Social Sciences Citation Index (SSCI) databases through the search expression:

$$TS = \left(\left(Farmer * \ OR \ peasant * \right) \ AND \ Knowledge \right)$$

The resulting bibliographic records were refined by the types of documents: scientific article, review article, and anticipated access, and then by country, selecting the articles published by authors with institutions located in Mexico.

A total of 271 bibliographic records were obtained, which were reviewed to select those that treated the subject effectively, and with that, the final database was made up by 181 documents, distributed into 172 research articles, nine review articles, and one of anticipated access, which was also classified as scientific article. The resulting records were exported to a file in text format compatible with the VosViewer software (van Eck and Waltman (2010), with the aim of performing the mapping of keywords of the authors and keywords assigned by the Science Web (Keyword Plus) of documents recovered through the joint-words analysis, thus identifying clusters of the research themes, as well

as identifying the research trends. The thematic research maps were carried out through the option of co-occurrence analysis (Tijssen and Van Raan 1994), selecting at least three repetitions of keywords or phrases (normalized and translated into Spanish) contained in the bibliographic records. To normalize the clusters, the LingLog option was selected, instead of the association one that appears by assignment in VosViewer.

For the second phase, the next step was the observational analysis according to the experience/knowledge focused on suggesting and limiting the study problem, taking into account the causes that provoke the economic and social deterioration of small-scale agricultural producers (peasants) in the state of Querétaro. Then, based on the diagnosis conducted and the experience/knowledge obtained in the field, the reach and perspective of the study was assessed. Finally, stemming from bringing together the information, a thematic proposal was designed to train small-scale farmers (peasants) and strengthen the rural economic units in the state of Querétaro.

RESULTS AND DISCUSSION

Research themes about peasant knowledge in Mexico

In the density map of keywords, six clusters of keywords are identified, which represent the research themes about peasant knowledge in Mexico (Figure 1). Cluster 1 (red) groups the research on traditional peasant, ethnobotanical, ecological knowledge, about ecologic restoration, agroforestry systems, forests and rainforests, ecological reserves, protected areas, wild flora, medicinal plants, and the Maya; examples of these are the studies by: Suárez *et al.* (2012), Beltrán-Rodríguez *et al.* (2014), Orantes-García *et al.* (2018), Parraguez-Vergara *et al.* (2018), Falkowski *et al.* (2019), Flores-Silva *et al.* (2021), and Heinze *et al.* (2022). Cluster 2 (green) groups the themes of ecosystem services, biodiversity conservation, sustainability, environment, agrosilvipasture systems, socioecological systems, agricultural landscapes, intensive agriculture, food sovereignty, coffee and Chiapas; in this cluster, the studies that stand out are: Valencia *et al.* (2015), Barton *et al.* (2016), García-Barrios *et al.* (2017), Castillo *et al.* (2021), Rendon-Sandoval *et al.* (2021), and Contreras-Medina *et al.* (2022). Cluster 3 (dark blue) deals with themes of local and indigenous knowledge, perception of farmers, and traditional agriculture, among which some included are soils, crops, irrigation, foods, health, pests and diseases, and safety in pesticide handling; some studies that represent this group are: Reséndiz-Paz *et al.* (2013), Bautista *et al.* (2019), Torres-Guerrero *et al.* (2019), Sánchez-Gervasio *et al.* (2021), and Trejo *et al.* (2022). Cluster 4 (yellow) groups the themes of climate change, and their adaptation to it, vulnerability, agroecology, small-scale farmers, family gardens, rainfed agriculture, rotating agriculture, sheep, tropical agriculture, local varieties, the *milpa*, and Maya knowledge. Some examples of studies on this are: Benz *et al.* (2007), Jiménez-Ferrer *et al.* (2007), Aguilar-Stoen *et al.* (2009), Charcas S. *et al.* (2010), Castellanos *et al.* (2013), Bermeo *et al.* (2014), Camacho-Villa *et al.* (2021), and Martínez-Herrera *et al.* (2021). Cluster 5 (purple) groups the themes of technology adoption, innovations, rural development, conservation agriculture, peasant agriculture, dual-purpose livestock, and Michoacán. As examples of studies in these themes, there are: Flores López *et al.* (2020), Contreras-Medina *et al.* (2020), Lastiri-Hernández *et al.* (2021), Subercaseaux *et al.* (2021), Villarroel-Molina *et al.* (2022), and Barragán-Ocaña

and del-Valle-Rivera (2016). Cluster 6 (light blue) groups peasant knowledge about genetic resources, particularly corn, food security, and the participation of peasants in agricultural research projects; among the articles that deal with these themes, there are: Zavala *et al.* (2005), Benz *et al.* (2007), Rodríguez *et al.* (2007), Bermeo *et al.* (2014), Berget *et al.* (2015), and Hernández-Ramos *et al.* (2020).

Research trends

The mapping techniques in science, using the co-occurrence analysis, allow visualizing the research trends, from the point of view that the most current themes are the trend. The word networks shown in Figure 2 show the most recent peasant knowledge themes, identified in yellow, such as technology adoption, conservation agriculture, intensive agriculture, ecologic intensification, women's participation, alternative control of diseases and pests, irrigation implementation, adaptation to climate change, ecology, and food sovereignty, among others.

Taking into account the results obtained from the maps of research themes on peasant knowledge in Mexico (Figure 1) and research trends (Figure 2), the need is identified to specifically analyze the impact of the technical-productive, managerial, and entrepreneurial management of small-scale agricultural producers (peasants) in the state of Querétaro.

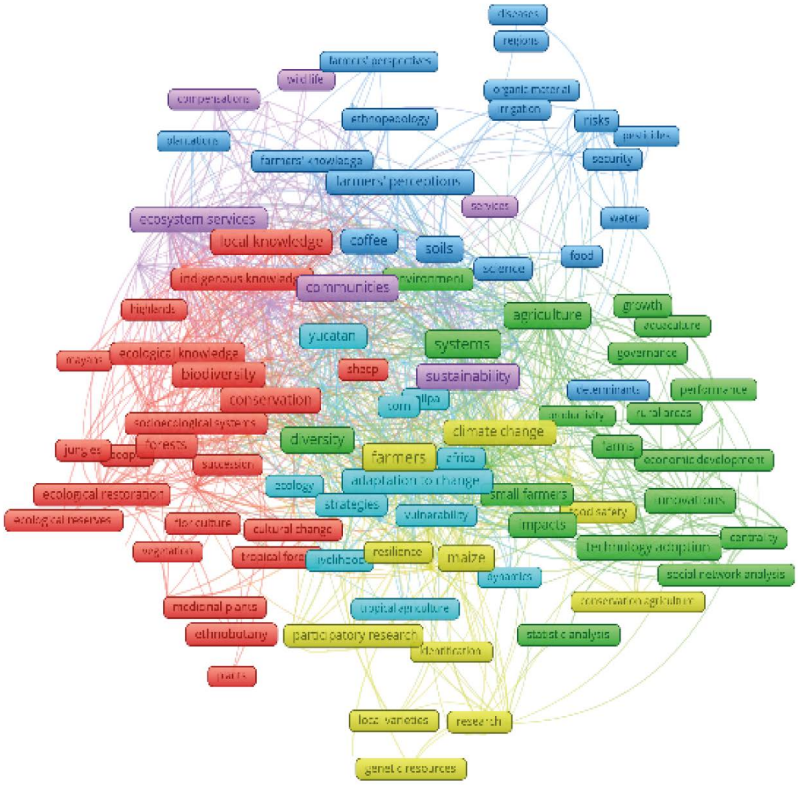

Figure 1. Research themes on peasant knowledge in Mexico in mainstream journals (1991-2023).
Source: Prepared by authors.

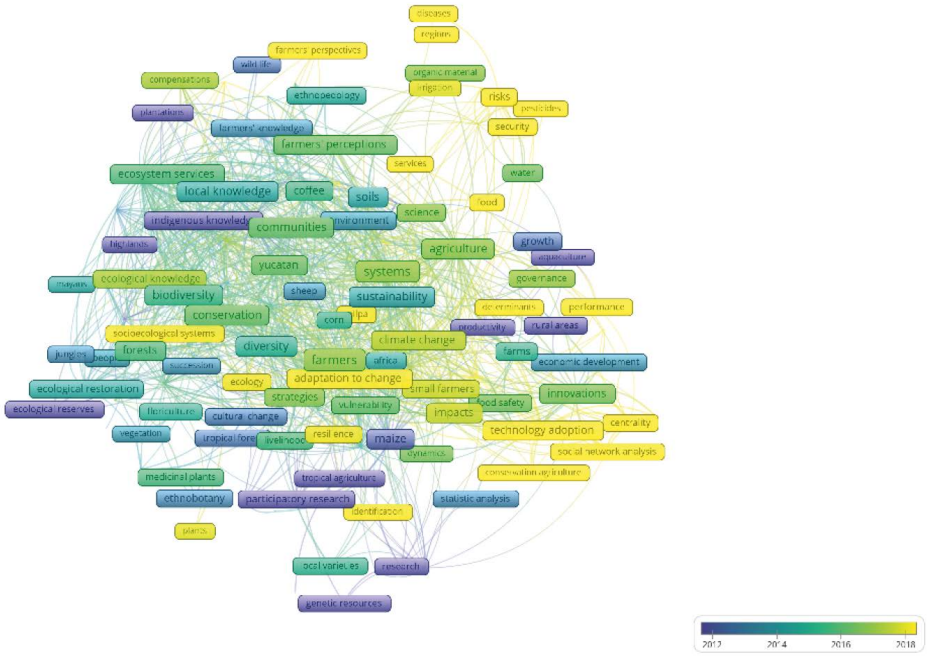

Figure 2. Map of research trends on peasant knowledge in Mexico in mainstream journals (1991-2023). Source: Prepared by the authors.

Current situation of the technical-productive, managerial and entrepreneurial management of small-scale agricultural producers (peasants) in the state of Querétaro

Presently, the country is immersed in economic uncertainty, resulting from the pandemic, political and macroeconomic changes, among others, having as a result unemployment, economic backwardness, impoverishing of the rural population, etc. This makes it even more important to mobilize and activate strategies for initiatives by the public and private sectors for the strengthening of rural economic units (REUs), which could allow generating employment in their communities and seeking the rootedness of the rural population.

Next, a series of problems identified in the field are listed (Table 1), through the different projects carried out with small-scale agricultural producers (peasants) in the state of Querétaro and which match the problems presented in the National Agriculture and Livestock Production Survey (INEGI and SADER, 2019), with the aim of addressing the causes and generating productive, economic, social results, among others, to forge sustainable entrepreneurial growth and consolidation.

Thematic proposal for continuous training of small-scale agricultural producers (peasants)

Table 1 presents the main problems identified in agricultural production of the rural economic units. According to each problem identified, it is necessary to establish the knowledge management that allows addressing, resolving or minimizing these problems. In general, training will be directed toward the objective of developing capacities, abilities,

Table 1. Problems identified in the rural economic units.

Thematic	Specific problems	General problems
Technical-productive	✓ Deficiency in good agricultural practices	✓ Low educational level ✓ Low income ✓ Low investment capacity for continuous training ✓ Lack of diagnostics that take into account specific needs in terms of knowledge, culture, etc. ✓ Demotivation due to lack of positive results ✓ Poverty and low quality of life ✓ Fear of failure ✓ Conformity with the results obtained ✓ Weaknesses in the methodological approach to knowledge and technology transfer by the extension sector ✓ Resistance to change ✓ Insufficient infrastructure and resources ✓ Generational change with no interest in the rural sector ✓ Migration to domestic and international urban areas ✓ Lack of market knowledge ✓ Low level of profits ✓ Marginalization and social inequality ✓ Among others
	✓ Low use of technological innovations	
	✓ Lack of capacity for transformation and generation of added value	
Management	✓ Lack of strategic management	
	✓ Lack of entrepreneurial vision	
	✓ Low market integration	
	✓ Lack of interest in business development	
	✓ Lack of leadership and direction	
Entrepreneurship	✓ Low level of associativity in agricultural production regions	

and competences in technical-productive, managerial, and entrepreneurial themes in agricultural producers.

Learning-teaching should be conducted according to the specific needs identified by region, productive chain, socioeconomic characteristics, and level of investment, among other aspects, through courses and workshops; also, through the establishment of demonstrative platforms and to explain good agricultural practices in an applied manner. Likewise, attendance to agricultural exhibitions and fairs should be encouraged, for farmers to be able to interact and exchange knowledge and experiences about agricultural production in their plots. Next, each theme will be addressed from the different perspectives of knowledge management.

Technical-productive

It is important to prioritize for the implementation of good technical-productive management to allow the strengthening of REUs. This management has been connected with the prior use of good agricultural practices by the producer, which greatly influences the success of their implementation. Garrido-Rubiano *et al.* (2017) report that producers with a better use of good agricultural practices present a greater interest for acquiring technical knowledge. Likewise, the Food and Agriculture Organization of the United Nations (FAO), suggests the need to incorporate innovations in agricultural production to increase productivity and profitability, in order to allow improving the quality of life of the rural population (FAO, 2014). From this the importance of proposing themes that allow managing the technical-productive knowledge of small-scale agricultural producers (Table 2).

Table 2. Technical-productive themes.

Good agricultural practices	✓ Adoption of technological packages for agronomic management, nutrition, harvesting, postharvest handling, and packaging.
	✓ Good agricultural practices and good management practices
	✓ Establishment of the agricultural plot
	✓ Definition of the size of the agricultural parcel
	✓ Procurement of supplies
	✓ Soil preparation and application of cultural tillage
	✓ Establishment of the agricultural crop
	✓ Cultural practices for crop maintenance
	✓ Estimated crop yield per planted area
	✓ Organic agriculture
	✓ Pest/disease management and prevention
	✓ Use of residues and harvest surpluses
Technological innovations	✓ Efficient use of agricultural irrigation and water-saving techniques
	✓ Use of renewable energies
	✓ Use of rainwater harvesting and recirculation systems
	✓ Use of highly productive vegetative material
	✓ Using big data for decision-making in agriculture
	✓ Use of technologies for the sustainable management of the rural economic unit.
Value added	✓ Alternatives for the generation of added value
	✓ Importance of physical, chemical, nutritional, and microbiological quality.
	✓ Quality specifications (size, color, texture, appearance, odor)
	✓ Safety in the production, storage, and distribution chain
	✓ Cooling in the storage and distribution chain
	✓ Agro-ecological products
	✓ Strategies for packaging, packing and wrapping
	✓ Labeling, branding, and corporate image
	✓ Certifications and regulations

Source: Prepared by the authors.

Development of managerial capacities that potentiate the economy of agricultural producers

The training strategy proposal in agribusiness themes can help in the management of rural economic units, through the development of the managerial knowledge, capacities and abilities of farmers, in order to tend toward the development of a fair, profitable farmland and which result in economic benefits of the rural zone. Avendaño-Ruiz *et al.* (2017), in a study on technological innovations in the vegetable sector in northwestern Mexico, make evident the importance in productive units of connecting good agricultural practices, integrated management of pests, and adoption of international standards of safety, innocuousness and food quality with administrative, marketing and commercial elements, to gain access to specialized markets such as that of exports. For their part, Mendoza-Velázquez and Pastrana-López (2021) highlight the importance of knowledge in themes

of financing, agriculture and livestock insurance and contingency funds that could cover the potential economic losses of agricultural production in presence of price fluctuation, climatological problems, among other contingencies; also, generating willingness in important themes such as investment in the improvement of lands, modernization and establishment of infrastructure, which if it is not taken into account leads to a high risk for agricultural production. Considering the aforementioned, this study suggests taking into account the following managerial themes in the knowledge management process that would allow growth in the REUs (Table 3).

Table 3. Managerial themes.

Strategic management	✓ Planning, organization, direction and control
	✓ Project management: Suppliers, risks, uncertainty
	✓ Organizational development and human resources
	✓ Business vision
	✓ Strategic planning
	✓ Development of administrative systems
	✓ Organization: Legal figures for regularization
	✓ Management of financial operations
	✓ Accounting management (budget, investment, cost and profit)
	✓ Management of the tax regime for the primary sector
	✓ Digital media management for business positioning
Agribusiness market management	✓ Contract farming and crop insurance
	✓ Market trends
	✓ Market studies for new products and by-products
	✓ Identification of value and market networks
	✓ Marketing channels
	✓ Web positioning (social networks, official website)
	✓ Marketing schemes (producer - final consumer)
	✓ Market: Opportunities, sales, production, type of product, prices, etc.
	✓ Pricing
	✓ Consumer segmentation and profiling
	✓ Product differentiation
Agribusiness	✓ Corporate Social Responsibility
	✓ Current status of local, regional, national and international production
	✓ Dynamics in recent years (volume, area sown, economic value, etc.)
	✓ Import and export statistics (quantity and economic value)
	✓ Identification of the main key players in the value chain
	✓ Integration into the production chain
	✓ Generation of products from the transformation of raw materials
	✓ Classification by standards, certifications
	✓ Access to national and international markets through digital marketplaces

Source: Prepared by authors.

Training theme for training of leading agricultural producers with entrepreneurial vision

In the study proposed by the Economic Commission for Latin America and the Caribbean (ECLAC), the Food and Agriculture Organization of the United Nations (FAO) and the Inter-American Institute for Cooperation on Agriculture (IICA) (CEPAL, FAO and IICA, 2021), there was agreement in the importance of taking into account entrepreneurship and cooperativism as agents of change, in order to ease social rootedness, resource sustainability, as well as agriculture and livestock production and trade, territory connectivity, and the necessary infrastructure to improve the efficiency of productive and commercial processes, which will strengthen the social economy. Meanwhile, Jurado Paz (2022) manifested that there is a disparity on training in entrepreneurial education themes in rural environments, where they rarely receive training in themes of solidary economy, cooperativism, inclusive businesses, sustainable rural development, which could contribute to the sustainable economic, social and cultural growth of the territories. According to the information gathered, it will be of great importance to incorporate entrepreneurship in the education of small-scale agricultural producers, in order to generate through knowledge management a change in mentality, create a business profile, and implement the entrepreneurial culture to make agricultural production attractive (Table 4).

Impacts to be obtained from training of small-scale agricultural producers and strengthening of rural economic units

The implementation strategies of technical-productive, managerial and entrepreneurial capacities in agricultural producers could favor knowledge management, thus generating economic, social and environmental impacts (Figure 3).

Next, the possible economic, social and environmental impacts are presented, which could provide knowledge management to small-scale agricultural producers through a thematic proposal for the strengthening of rural economic units.

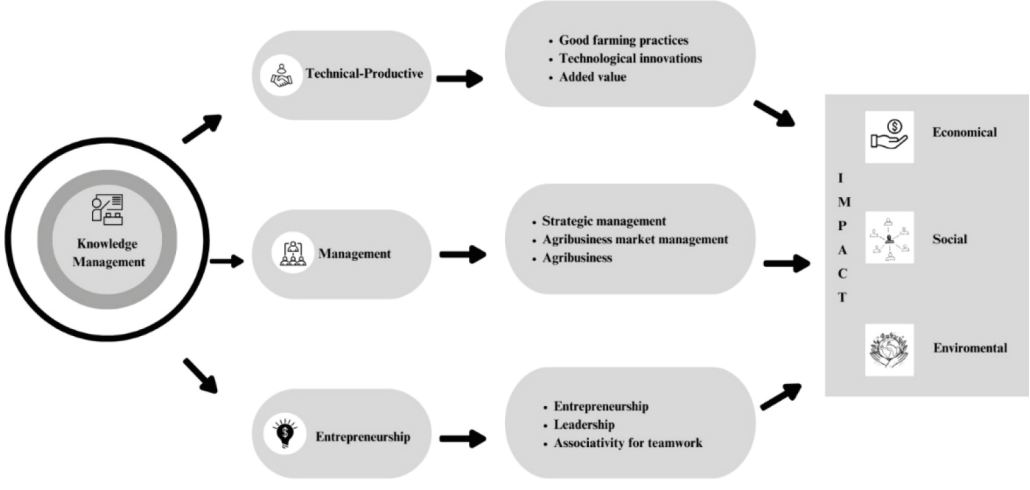

Figure 3. Plan for knowledge management of small-scale agricultural producers (peasants).
Source: Prepared by authors.

Table 4. Entrepreneurial themes.

Entrepreneurship	✓ Agro-entrepreneurship and formulation of productive projects
	✓ Investment mechanisms and access to public and private financing
	✓ Strategic networks for business generation
	✓ Entrepreneurial culture
	✓ Characteristics and profile of the entrepreneur
	✓ Change management
	✓ Entrepreneurial ecosystem
	✓ Failure vs Success
Leadership	✓ Address
	✓ Assertive communication
	✓ Negotiation
	✓ Business Vision
	✓ Collaboration
	✓ Teamwork
	✓ Resilience
	✓ Continuous improvement
Partnership for teamwork	✓ Network development for teamwork
	✓ Actors and roles in a strategic network
	✓ Building trust and creating a sense of belonging
	✓ Organization and operation of a strategic network
	✓ Motivation, responsibility, and mutual commitment
	✓ Establishment of common objectives and decision-making for community well-being.
	✓ Creation of a sense of belonging

Source: Prepared by the authors.

CONCLUSIONS

There is a great opportunity through knowledge management to elevate the capacities, knowledge and abilities of small-scale agricultural producers (peasants) in the state of Querétaro in technical-productive, managerial and entrepreneurial themes, which will generate economic, social and environmental impacts in benefit of this rural sector. Likewise, the articulation of the agricultural sector should be encouraged, in its different levels and links, with educational institutions (universities, technological institutes, centers for agricultural and livestock technological education, among others), research centers, and institutions related to the sector in the region. Strategies for transference of knowledge and technology could be established with these, to address the basic needs of training and to foster the creation of strategic projects and the generation of added value, which could transform rural economic units into productive and competitive units, to allow generating better living conditions, more sources of employment, and an adequate regional economic development.

Table 5. Economic, social and environmental impacts that the project's implementation could offer.

Economic	Social	Environmental
✓ Promote the strengthening of small agricultural producers in the state of Querétaro. ✓ It will contribute to rural development. ✓ Organize producers into formal groups that can have negotiating capacity. ✓ It will increase GDP participation through the dynamics of the economic circuits related to the agricultural sector in the state of Querétaro. ✓ It will promote associativity for more efficient commercialization. ✓ It will provide agricultural producers with tools that will enable them to create strategic alliances and formally organize and/or strengthen themselves as productive associations to market their products competitively. ✓ Strengthen rural economic units to reduce costs and gain competitiveness. ✓ You will have access to information on prices, technological alternatives, services, and credits to producers.	✓ Promote the creation of new sources of employment within the area of influence, improving the social and economic environment of the region where the productive projects are established. ✓ It will allow the integration of new trained producers who will be influenced by the results of this project, diversifying their productive offer. ✓ It will encourage regional and national production of food products for self-consumption and will help the food sovereignty of the population of Querétaro and Mexico. ✓ Promote the associativity of agricultural producers by developing negotiation, administrative, and liaison skills with different actors (public, private, and civil society sectors). ✓ Provide cooperation for social and community development in the state of Querétaro. ✓ It will favor the creation of productive projects that help improve the quality of life of its population and the growth of rural communities. ✓ It will encourage the rural population's interest in entrepreneurship, reducing the migration phenomenon. ✓ It will offer socioeconomic importance due to the number of jobs it will generate and benefit producers, suppliers, transporters, agricultural and industrial laborers, and consumers, which is why the business consolidation of this economic sector is of great importance. ✓ It will strengthen self-employment in the regions where agricultural production plots and agroindustries are located, thanks to the strengthening of rural economic units. ✓ It will contribute to improving the quality of life of producers, employees, and workers through access to well-paid jobs with good conditions. ✓ Increase the level of education through the training of agricultural producers.	✓ Use natural resources in a sustainable manner in agricultural crops with rational use of water, soil, and environment to minimize the damage caused by the misuse of natural resources. ✓ Preserve ecosystems by employing measures to reduce the impacts generated by productive activities. ✓ It will achieve the sustainable development of the Mexican Bajío Region by promoting training and environmental transformation processes that lead to the sustained and sustainable improvement of the rural environment. ✓ It will use new agronomic technologies for production optimization. ✓ Perform maintenance and remediation for the sustainable use of soils.

Source: Prepared by the authors.

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