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IMPROVEMENT OF SKILLS IN FOOD SAFETY AND DEVELOPMENT OF SOCIAL CAPITAL IN SMALL FARMERS

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ABSTRACT

Food production derived from family farming is a fundamental theme nowadays. This is not just because it supplies a large part of the global and national population, but also because it is based on subject associated to poverty eradication and development. Because of this, the objective in this study is to evaluate the implementation of strategies for outreach and transference to improve the skills in food safety and to strengthen the social capital of vegetable and fruit small farmers (SFs). The study covered a universe of 126 SFs belonging to 12 rural communes of the region of Libertador Bernardo O'Higgins, Chile, associated to two main programs from the National Agriculture and Livestock Development Institute (*Instituto de Desarrollo Agropecuario*, INDAP): the Local Development Program (PRODESAL) and the Technical Assistance Program (SAT). The intervention was five months long, where two outreach seminars and three working sessions were conducted, limited to small farmers identified as "representatives or leaders". A survey was applied during the seminars, at the beginning and the end of the intervention, which sought to measure the social capital of all participants. This information was complemented in working sessions with the farmers who were "representatives or leaders". The participants presented a high level of trust regarding their peers (SFs) and the public institutions (73.8% of a total of 42 SFs), and a lower level of trust towards large-scale agricultural producers of the region (35.7%). In terms of the willingness to generate outreach between SFs, it is observed that there is interest and it is evaluated positively. However, when delving into their discourses, technical collaboration is not understood as a synonym of associativity.

Keywords: methodologies, outreach, associativity, good agricultural practices, transference.

INTRODUCTION

The concern over food production has become relevant in recent years, and various socioeconomic factors such as poverty eradication and development are part of the main agenda of international and national organizations. At the same time, diseases transmitted by food represent today another significant global concern (Hoffmann and Jones, 2021). Most of the risky foods are produced in developing countries, where the ability to apply regulations is scarce or irregular (Hoffman and Jones, 2021).

In Chile, the region of O'Higgins stands out in vegetable and fruit production at the national level given its soil-climate conditions and location, occupying the second place. In addition, it has approximately 10,600 ha devoted to vegetable crops, corresponding to 15.16% of the country's surface destined to this segment (Namdar-Irani *et al.*, 2009). However, according to the Report of Notifications of Food Alerts from the Chilean Agency for Food Safety and Quality (*Agencia Chilena para la Inocuidad y Calidad Alimentaria*, available since 2013), various discoveries of chemical and microbiological contamination

have been made, and insufficient management has been seen in matters of technology transfer, especially that directed towards small-scale agricultural production. In fact, the knowledge available about the use, action mode, and degradation of agrichemicals in vegetable and fruit products is generally limited to large-scale companies and the safety at the level of small farmers is not fully known, many of which influence importantly in the supply of the local market. This situation is accentuated since in the region there are only three research centers connected to universities, with limited approach to these subjects.

At the international level there is evidence that suggests that a developed social capital is required in order to attain growth and evolution of a territory; that is, the "effective capacity [which] mobilizes the associative resources that lie in the different social networks to which members of a group have access" (Atria, 2003).

The notion of social capital has its origin in the 1970s, with formulations mainly of economic nature. At the end of the 1980s and during the 1990s, the concept occupied a relevant position within the field of social sciences. The three main references from the field of sociology are Pierre Bourdieu, James Coleman and Robert Putnam. Then, the concept extended to debates around development, generating impact on the theories of innovation (Rodríguez-Modroño, 2012). The rootedness of these resources or associative assets facilitates the implementation of public policies, through validation of all the actors that participate in the development of the territory.

Having said that, according to the Regional Development Strategy (*Estrategia de Desarrollo Regional*, EDR 2011-2020, Gobierno Regional del Libertador General Bernardo O´Higgins; División de Planificación y Ordenamiento Territorial, 2011), social capital associated to the organizations is not associated or coordinated in its different spheres of participation, and it is limited to local or communal actions. Some exceptions can be seen in organizations under sectorial wings such as the National Service of Women and Gender Equity (*Servicio Nacional de la Mujer y la Equidad de Género*, SERNAMEG) or the Rural Drinking Water Committees (*Comités de Agua Potable Rural*, APR) where dynamics have been generated that go beyond the commune.

"In the region, it is a problem that social capital is generally disperse in local and communal levels, without a strong regional identification that commits them in the development of the territorial unit of the region, with the possibility of losing or not taking advantage of the resource behind them in its full potentiality" (EDR 2011-2020, 2011).

When it comes to the programs associated to the development of skills in agriculture, there is the Agriculture and Livestock Development Institute (*Instituto de Desarrollo Agropecuario*, INDAP) which is a decentralized public agency emanating from the Ministry of Agriculture. It was created in 1963 through the Organic Law 18,910. Its mission is to "promote the economic, social and technological development of small farmers and peasants, from now on its beneficiaries, with the aim of contributing to elevating their entrepreneurial, organizational and commercial capacity, their integration to the rural development process and at the same time optimizing the use of productive resources" (Diario Oficial de la República de Chile, 1990). Currently, there are around 15 programs operating with promotion instruments directed to small farmers at the national scale.

According to the institution's Public Account (Ministerio de Agricultura/Instituto de Desarrollo Agropecuario, 2021), there are 11,233 users in the region of O'Higgins of whom 4,164 are women and 7,069 men. Of this total, most of the beneficiaries are beneficiaries of the Local Development Program (PRODESAL) and the Technical Assistance Service (SAT). The first is directed towards the expansion of capacities to sustain or improve the productive activities of small farmers, peasants and their families for self-supply. The program delivers economic incentives destined to co-financing technical counseling, investments and working capital in the spheres of forest-agriculture-livestock production and related activities, as well as the articulation with other public and private agencies to address problems of socioeconomic nature that impact the quality of life of families (Ministerio de Agricultura/Instituto de Desarrollo Agropecuario, 2015). It is generally executed through the municipalities. The Technical Assistance Service (SAT), in turn, is directed towards consolidating or diversifying the business of the small farmer.

The region concentrates a relevant percentage of agriculture and livestock production in the country, with the potential of being recognized for producing and processing agriculture and livestock products of excellent quality, although at the level of small and medium-scale producers, there are not always the skills required to ensure food safety of their products. Given the aforementioned, the hypothesis suggested was: improving the skills in food safety based on activities of outreach and transference generates changes at the level of willingness of participants to participate in collaboration networks, whether between peers or with other actors of their environment, such as organizations, institutions, programs and/or universities; meaning that it eases the rootedness of resources or associative assets by expanding the opportunities of small farmers (SFs) of the region. Therefore, the objective of this study was to implement strategies of outreach and transference to improve the skills in food safety and to strengthen the social capital of vegetable and fruit SFs of the region of O'Higgins.

MATERIALS AND METHODS

The project was directed towards 126 small farmers, mainly vegetable and fruit producers corresponding to Strategic Development Units (SDU) 3, 5 and 7 (Figure 1), defined in the Regional Development Strategy 2011-2020 (EDR 2011-2020), associated to the Agriculture and Livestock Development Institute (*Instituto de Desarrollo Agropecuario*, INDAP), agency with the greatest presence in Region 6. Mainly the Local Development Program (PRODESAL) and the Technical Assistance Program (SAT). The communes benefited were: Las Cabras, San Vicente, Pichidegua and Peumo (SDU3), Coinco, Malloa, Quinta de Tilcoco, Rengo and Requínoa (SDU6), and San Fernando, Placilla and Chimbarongo (SDU7).

Although each of these units is immersed in zones with different realities (sociodemographic, economic-productive, population, social, connectivity, identity characteristics, of political territorial division, among others), they have in common the production of vegetables and fruits as sources of income.

The research approached two axes: food safety, where activities of technical transference were carried out based on conversations and working sessions with SFs which served to

The colored points correspond to the communes where the study was conducted.
Figure 1. Map of the region of O'Higgins.

identify the main gaps and problems of the territories; and, in second place, social capital, where it was sought to determine possible changes in the level reached by the SFs after the intervention. A questionnaire was designed for that purpose, which recorded the changes. However, the expectations were modest. Durable changes in the practices and in the level of associativity could be the particular object of other intervention programs. Additionally, focal groups were included along with the three working sessions, with small farmers who are "representatives or leaders", with the objective of complementing the information gathered at the quantitative level.

The operationalization of the concept of social capital was constructed on the basis of the bibliographic review on the theme, particularly studies interested in measuring social capital. Three studies were selected to limit the dimensions. The first corresponds to a comparison between questions of a survey, the Survey of Quality of Life in Work (*Encuesta de Calidad de Vida en el Trabajo*, ECVT), conducted by the Ministry of Labor and Social Issues, together with the National Statistics Institute from Spain, and dimensions of the definition by the OECD (2001). The common themes were trust, commitment, informal networks, participation, communication and influence (Requena, 2004). The second corresponds to a study that was done for the Integrated Program of Governability and Decentralization in the Coquimbo Region, "Más Región". The dimensions considered were: groups and networks, trust and social cohesion, collective action and cooperation,

information and empowerment, and political action (Serrano, Alarcón and Tassara, 2006). The third reference chosen presents a methodology to measure social capital in children and adolescents from public schools in the municipality of Sucre, in Caracas. It proposes an index of social capital that has three dimensions: interpersonal trust, participation in associations of civic commitment, and tolerance (Patiño and Varnagy, 2012). Based on this, four dimensions were defined:

- Trust: it refers to the level of trust declared towards actors connected with agricultural production.
- Outreach: willingness and non-formalized practices of collaboration and cooperation between actors from the agricultural productive sector.
- Associativity: willingness and formalized practices of collaboration and cooperation between actors of the agricultural productive sector.
- Knowledge networks and management: it refers to knowledge, participation or use of service networks and programs.

Each dimension has sub-dimensions, which were objectified through indicators (Table 1). The study was developed in three stages and for each of them the contacts and calls to action were carried out through technical advisers from PRODESAL (INDAP) and were reinforced through confirmation telephone calls for the second and third workshop.
Stage 1 "First Seminar": It consisted in the implementation of a participatory seminar that had two objectives. The first was to gather information on food safety from working sessions. The second was to determine the level of social capital of the project's small

Table 1. Sub-dimensions and indicators of social capital.

Dimensión	Subdimensión	Indicador
Confianza	Instituciones	Confianza en las instituciones
	Asociaciones	Confianza en asociaciones productivas o gremios
	Pares (otros pequeños productores agrícolas)	Confianza en sus pares (otros productores similares)
	Grandes productores agrícolas	Confianza en grandes productores agrícolas de la región
	Compradores o distribuidores de productos agrícolas	Confianza en compradores o distribuidores de productores agrícolas
Vinculación	Opinión y disposición	Opinión sobre la resolución de problemas a través de la colaboración.
		Interés por vincularse próximamente con pares.
	Práctica	Frecuencia de prácticas de vinculación con pares en los últimos 5 meses.
Asociatividad	Disposición a la asociación	Opinión sobre la resolución de problemas a través de la asociatividad.
		Interés por asociarse próximamente.
	Práctica	Participa en asociaciones productivas.
Redes y gestión del conocimiento	Uso de servicios o programas	Uso de servicios o programas
	Participación en otras organizaciones	Participación en otras organizaciones

farmers (SFs), through the application of a quantitative instrument. In addition, the "representative or leader" SFs were identified, which were part of the "working team with direct beneficiaries" that accompanied the construction of the roadmap on food safety.

Stage 2 "Working Team": Outreach activities or working sessions were carried out with "representatives or leaders", particularly three meetings per SDU to build a roadmap regarding food safety. With this study, the information gathered in Stage 1 was validated. To complement and deepen the diagnosis and raise possible solutions, three focal groups with the "representatives or leaders" were applied.

Stage 3 "Second Seminar": The closing seminar was conducted, where the roadmap and proposal of solutions developed by the "representatives or leaders" were presented, which were validated with all those who attended the activity. In parallel, the survey was applied for the second time and the design of outreach and dissemination strategies began.

RESULTS AND DISCUSSION

The implementation of this study allowed reaching important results that can potentiate the research and the intervention in mixed strategies. The methodological design that integrates technological transference and participatory encounter activities between SFs, advisers and academics, can strengthen social capital since it allows closing the gaps between the actors and the territory. When the results are analyzed, it is possible to recognize aspects that may support new intervention strategies.

The application of the survey was carried out in two moments. In measurement 1, the sample considered as valid the answers given by 126 SFs. In measurement 2, the sample considered a total of 42 SFs who participated in Stage 1 and Stage 3. Additionally, 38 SFs remembered having responded to the first application of the survey. Considering the general objective of this study, 42 people constituted the unit of analysis on which possible changes were evaluated at the end of their participation in the study.

In relation to the dimensions of social capital, the answers did not reflect significant changes between the two measurements. According to the first dimension, "Trust in", from a universe of 126 surveys that were answered in the first measurement, 84.8% indicated "High trust" in institutions that support agricultural production; and from a universe of 42 valid responses in the second measurement, approval remained at 73.8%. Concerning "Trust in peers" the percentage of responses is similar: 79.2% answered having "High trust" in their peers in the first application and 76.2% maintained this trend in the second. The same was observed in relation to "Trust in productive associations or unions": in the first measurement 39.2% said they had "Regular trust" and in the second application 33.2% sustained this opinion. However, around "Trust in large farmers of the region", the results go in the opposite direction, that is, there is lower trust in the second application of the survey; in the first survey 43.2% indicated having "High trust" and 33.6% "Regular trust", while in the second survey, a higher proportion is seen, where 31% of the SFs indicated having "High trust" and 38.1% "Regular trust".

When it comes to "Outreach" significant changes were also not found in the responses of small farmers. Concerning the "Opinion about problem resolution through the

collaboration and interest over connecting soon with peers", a high approval of the affirmation was observed (above 90%) in the first survey applied. Likewise, in the second survey, most maintained their opinion (above 80%). In the same line, the responses in both measurements reflected a high interest in collaborating whether between small producers or in producers' associations (above 80%). When complementing this information with focal groups, the "representatives or leaders" suggested that there are various difficulties to achieve collaboration and communication between peers, among which they mentioned the following: lack of time, lack of information about how to be associated, unequal information, lack of commitment, conflict of interests, and skill associated to understanding or technical knowledge that they explicitly do not wish to share. Despite this, there is willingness to collaborate between peers, as indicated by SFs in focal groups.

In relation to "Associativity" more than half of the responses in the first measurement indicate that the SFs participate in informal groups of producers, as well as in meetings of neighbors or local organizations and solidary and/or religious organizations. To a lesser degree, they participate in productive associations (41.6%). Most do not participate in political organizations (95.2%). In the second measurement, the percentage of participation in neighbors' meetings or local organizations and solidary and/or religious organizations is maintained. To a lesser extent, they participate in productive associations (41.6%) and groups of non-formalized producers (42.9%). Of them, 92.9% do not participate in political organizations. Given the deepening with focal groups, it is perceived that there is a positive valuation about participating in organizations or the generation of collaboration and support networks.

Regarding the last dimension "Knowledge networks and management", the trend was maintained: most of the SFs in the first and second application of the survey indicated that they want to know more alternatives to sell their products, and to understand more about those who buy from their intermediary (both above 90% of approval in this affirmation). In addition, in the "participation in support services and/or programs for production", both measurements evidenced that more than 90% of the SFs consulted are beneficiaries of PRODESAL, and to a lesser extent they are users of SAT. Regarding the other services consulted, the results show that there is knowledge about the institutions and their support programs.

Based on these results, it is possible to state that no significant changes were observed in the measurement of social capital of SFs before and after their participation in the study. This allows to conclude that among the small producers who are beneficiaries of PRODESAL in the region of O'Higgins there is a high level of trust regarding the local productive ecosystem, which is expressed in the trust placed on peers (SFs) and in public institutions such as INDAP. However, there is less trust in large farmers. Secondly, a high disposition and interest in seeking connection between peers is seen in both measurements. Even so, technical collaboration is not understood as a synonym of associativity. In the focal groups it was observed that there is confusion between participating in "programs" and being "associated". At the same time, when delving into the activities with "representatives or

leaders", the opinions and experiences gathered around the actual interest and willingness in becoming organized or collaborating were diverse; in some cases a high level of mistrust is perceived between producers which would negatively affect the willingness to connect and associate.

Concerning the networks and management of knowledge, most of the producers invited to the project are beneficiaries of PRODESAL, which is why it is not possible to determine a correlation in this regard. Despite this, stemming from the two measurements of social capital it is possible to state from the deepening with "representatives or leaders" that there is a lack of dissemination, information and knowledge about "other" support programs for small-scale farming. This is in agreement with the diagnosis made by the Regional Government (EDR 2011-2020, Gobierno Regional del Libertador General Bernardo O´Higgins. División de Planificación y Ordenamiento Territorial, 2011).

The high interest of SFs to understand new ways of commercializing their products stands out, as well as the willingness to be contacted by the program via telephone or through the PRODESAL program advisers. This suggests great challenges that could be taken and integrated into the design, dissemination and implementation of programs directed towards SFs.

According to Landry *et al*. (2022), social capital contains structural aspects which correspond to business, information or research networks, participation assets and relational assets. These aspects should be strengthened on the basis of reciprocal trust between actors. The participation in networks such as those indicated before allows gaining access to tacit knowledge –which is knowledge that is created and shared through person-to-person interaction, by sharing conversations, stories and experiences. In this sense, the participatory activities of innovation, such as those suggested in this study, constitute a wise decision to continue reflecting and improving. However, the acquisition of knowledge and skills in actors and social agents requires a lasting incorporation to achieve participation, trust and associativity.

Based on the Theory of Networks, the values shared in cohesive networks improve the capacities of actors and reduce their vulnerability (Ramírez, 2015). The openness that is perceived as "weak connections", characteristic of the diversity of "new" knowledge available in a territory, constitutes a potential for innovation (Ramírez, 2015). This has a direct relation with the territorial system and the knowledge which comes from outside the territories to the local conditions. In this sense, the main observation of this study regarding the absence of changes or the permanence of the characteristics of the capital is that in order to generate changes in social capital, it is necessary to strengthen the trust between different actors who act in the same territory, as well as to intensify the general ecosystem of innovation and production where they are inserted. All of this requires systematic and joint efforts between public, private and community actors, as well as actions that are long-lasting in time. In this sense, this study was set out as an ambitious challenge, of short duration (5 months), where the beneficiaries met a maximum of 4 times and which was designed as an exploratory instance to identify gaps and challenges in food safety to be developed in the next working stages.

On the other hand, the absence of changes in the measurement of social capital invites to a reflection from the methodology implemented. The adoption of a mixed research design, based on a survey and focal groups before and after the program's execution, can be considered to be a wise decision regarding the traced objectives. However, by privileging the anonymity of the participants, the survey did not allow monitoring each individual and their responses among the applications. For this reason, the interpretation of changes between measurement 1 and measurement 2 is complex, because the variations can be a reflection of the loss of subjects surveyed in the sample for the second measurement. In this point, the application of focal groups allowed probing changes in the measurement of social capital from a qualitative point of view.

Another point of reflection has to do with the difficulty of verifying causality relationships in the social sphere. Regardless of the measurement device that is used, it is not possible to ensure that the change in a social practice or discourse is the product solely of a single stimulus or intervention, as would be the case for participation in this study. Human behavior is complex and multi-causal: it is influenced both by external and concrete experiences, as well as by subjective, cognitive and personal reflections, which can be followed and measured with much difficulty.

In Chile, an unfavorable diagnosis linked to the development of innovation in the main productive sectors persists. Despite the various efforts for joint planning from the public, private and academic-researcher sectors, this diagnosis has the following common traits:

- Lack of connection between the activities of research and training carried out in regions (supply), both in relation to their themes and to their capacity for response, and the needs of their current and emergent productive sectors (demand).
- The need to promote articulated work from smaller companies in matters of innovation, as a way to assume together the costs involved in this type of activities and, in addition, that they generate networks of technological cooperation.
- Universities or Regional Centers that are scarcely prepared for the effective transference of knowledge or technology, from the point of view of their institutional architecture, human capacities, among other aspects.
- Low level and knowledge, from businesses in the regions, on the current and potential scientific-technological offer.
- Low level of investment and absorption of initiatives of R+D+I in the businesses.
- There are not enough public instruments to support the establishment of long-term relationships between research and training agencies and the productive sectors.

This same idea is reiterated by a study about SFs in the Metropolitan Region. Boza *et al*. (2015) point out that most of the survey respondents did not participate in groups of technical-productive nature (84.6%) or in associations that support commercialization (89.7%), with membership in groups of citizen participation being the most frequent. The low level of associativity is worrying, if it is assumed as an indicator of social capital. On the one hand, this group would have fewer probabilities of better obtainment and

dissemination of information, as well as of cooperation for problem solution. The study also states that associativity can ease the reduction of certain productive and marketing costs through the acquisition and joint use of equipment. Likewise, the association between producers could produce a higher power of negotiation globally in face of occasional intermediaries present in the distribution channels of their merchandise.

In this framework, the incorporation of the notion of social capital in outreach programs between the public, private and academic sectors constitutes an alternative to favor their impact and to strengthen the social fabric present in each productive system.

CONCLUSIONS

As a conclusion, and thinking about future measurements of social capital in small farmers, it is convenient to retain the importance of the following learnings:

- According to the literature reviewed, higher intensity, periodicity and diversity of participating actors in interventions destined to strengthening the social capital could lead to a greater impact in their strengthening and development.
- Combining and complementing different techniques for gathering and producing information to adjust the interpretation of occasional changes in the measurement of social capital.
- Having strategies to ensure the highest stability possible of participants in the samples of different measurements destined to the evaluation of an intervention program.

Having said that, joint planning from the public, private and academic sectors, continues to be the great challenge in order to advance in transference methodologies, allowing the inclusion of social capital as a basis to generate competitiveness, development and sustainability in the actors and the territories.

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