



The Role of Ancestral Knowledge in the Development of Agriculture in the South-Central Microregion of Manabí, Ecuador



Alan Patrick Mera-Shiguango ^a, Christian José Castro-Delgado ^b, Milton Vega-Játiva ^c

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Corresponding Author ^a



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ancestral knowledge;
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Abstract

The present study was carried out in the south-central microregion of the province of Manabí in Ecuador, specifically in the cantons of Santa Ana, 24 de Mayo, and Olmedo. The objective of the research was to determine the role of ancestral knowledge in the development of agriculture in the area under study. This microregion is an eminently agricultural and livestock territory and a representative area of agriculture in the province of Manabí. The methodology was based on the application of surveys to older adult farmers over 50 years of age. The results show the current perceptions of the farmer regarding the importance of traditional knowledge and the current weakening in the generational transfer of this type of knowledge. Even though the results show the importance that the surveyed population gives to ancestral knowledge, however, this knowledge tends to disappear mainly due to the lack of interest of the new generations.

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^a Instituto Superior Tecnológico Paulo Emilio Macías, Portoviejo, Manabí, Ecuador

^b Instituto Superior Tecnológico Paulo Emilio Macías, Portoviejo, Manabí, Ecuador

^c Instituto Superior Tecnológico Paulo Emilio Macías, Portoviejo, Manabí, Ecuador

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1 Introduction

At the world level, farmers possess invaluable ancestral knowledge that has allowed them to develop a very fine sense to relate the appropriate species with their corresponding agricultural ecosystems (FAO, 2008). Traditional knowledge is strengthened by obtaining information from nature, through special systems of cognition and perception that select the most useful and adaptable information to be transmitted daily from generation to generation orally and empirically, which is remembered through individual and collective memory, and socially and community-validated. Therefore, traditional knowledge in agriculture includes culturally shared knowledge, activities that have been practiced and improved with experience for many generations in communities, until reaching current production processes (Sánchez-Olarte et al., 2015).

The knowledge of good ancestral practices and the use of natural indicators, allowed past generations to forecast the occurrence of rains, frosts, droughts, the presence of pests, and others. Realizing the base of such knowledge facilitates the adoption of technical and institutional innovations in local communities. However, much of the ancestral knowledge and use of natural indicators have been lost and others will soon be gone as well (Tolbert et al., 2002; Sadguna et al., 2017; Harrop, 2007). In this sense, many organizations and governments make efforts aimed at the revaluation of ancestral knowledge and the use of natural indicators with an agricultural focus, as a strategy for the generation of programs aimed at prevention, mitigation, and resilience to the impacts caused by the climate change (FAO, 2016). This knowledge has meant that, over time, peasants have accumulated a diversity of knowledge about the management of the environment and natural resources such as water, land, vegetation, wind, and temperature depending on the place where they live. , whether in grasslands, coasts, on the banks of rivers, or in high mountain areas, this has allowed them to subsist and adapt to the place they inhabit (Pérez et al., 2014).

In Latin America, and particularly in the Andean countries, family farming is based on cultural processes at the farm, locality, or territory level, preserving traditions and knowledge, not only regarding food production, but also respectful ecological practices. of nature. For this reason, the role of safeguarding nature that traditional peasant agriculture fulfills is widely recognized (Loyola, 2016). Ecuador is a plurinational and multi-ethnic state, home to fourteen indigenous nationalities. It is also a country that in recent decades has experienced profound social changes that have affected both local economies, threatened by the global market, and social relations. In this context, peasant populations and indigenous communities have been affected by specific conditions that have often hindered their role and autonomy in development processes. Faced with these difficulties and after years of struggle by these social movements, after which notable progress has been made in their legal status, a scenario of change is presented today that can allow their greater participation through the assessment and recovery of their knowledge. ancestral, whose potential is undeniable for sustainable development (Verdú Delgado, 2017).

As an example, one could cite the great development of the technologies that the native Andean inhabitant acquired in Latin America, in the management of plant cultivation, in the construction of irrigation systems and terraces, as well as in the corn and meat preservation techniques and knowledge of the various ecological levels; and, if to such techniques we add the practice used for centuries in the management of agriculture, we have as a result that the knowledge of agricultural techniques and their methods of application would achieve unusual progress, which was and continues to be appreciated and admired by the whole world. In this virtue, the fundamental role that the peasant has played in the development of agriculture is verified, based on the knowledge that has been transmitted orally from generation to generation and that subsists to the present in the form of knowledge about ecosystem functions, or on the conservation and use of seeds, or on the management of agricultural technologies such as, for example, soil preparation and planting (Rodríguez Ruiz, 2016).

Although, the processes of urbanization, industrialization, and implementation of the agrarian reform that occurred in Ecuador in the decade of the seventies of the last century, encouraged the production of crops oriented to agro-industry and the expansion of livestock, since the traditional knowledge of the The farmer plays a super important role at the time of harvesting (Yaguana Jimenez, 2015), Ancestral, traditional and

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popular knowledge plays an important role within the ecosystem of the social knowledge economy (ESC) and alternative knowledge management, since the very proposal and implementation of an alternative civilizing project such as Good Living (Sumak Kawsay), comes precisely from ancestral wisdom and historical practices of resistance to coloniality, modernity and the global capitalism that prevails today, cognitive capitalism is one of its most powerful forms of historical domination. In this sense, this knowledge has been discredited, delegitimized, and even usurped and placed in a lower hierarchy as the knowledge of "backward", "underdeveloped" or "primary" peoples, and in the best of cases they have been called "folklore". (Crespo et al., 2014).

However, although the organic code of the social economy of knowledge, creativity, and innovation (COESC) in force in Ecuador, regulates the procedures to be considered in all processes of knowledge recovery, promotion of interculturality, respect for nature and endemic ecosystems, for food sovereignty, of men together with all life, mother earth itself and the life it houses; There is still a lot of work to be done in terms of raising awareness among a majority of the inhabitants (Zambrano & Yarita, 2021). In Manabí, the reality is not different from that of the country, being a province specializing in agriculture, in relation to the rest of the country. The large size of the agricultural sector is a key issue for the development of the Manabí economy. In addition, this agricultural sector is one of the most diverse in the country, due to the size of the province, the climatic stability and the topography of its soils suitable for cultivation, it registers a high specialization in agricultural products, given that the economic activity in the Manabita families is based on agriculture, putting into practice the ancestral knowledge acquired during their lives, either by their own study or by the transmission of the family inheritance of knowledge from generation to generation (Quijije Cordova, 2019). Given the importance of ancestral knowledge in Ecuador and particularly in the province of Manabí, the study objective was to determine the role of ancestral knowledge in the development of agriculture in the south-central microregion of Manabí.

2 Materials and Methods

The research was carried out in the south-central microregion of Manabí, which includes the cantons of Santa Ana, 24 de Mayo, and Olmedo. In the 24 de Mayo canton, field information was recorded in the Bellavista, Noboa, and Sixto Durán Ballén parishes; in the canton of Santa Ana, the information was obtained in the parishes of Ayacucho, Honorato Vásquez, and La Unión; in the Olmedo canton, the data was obtained from the El Cedro, Sequel and Pajarito sites. This microregion is made up of eminently agricultural cantons, most of its population lives in rural territories and is mainly dedicated to agriculture and livestock. Figure 1 shows the map of the location.

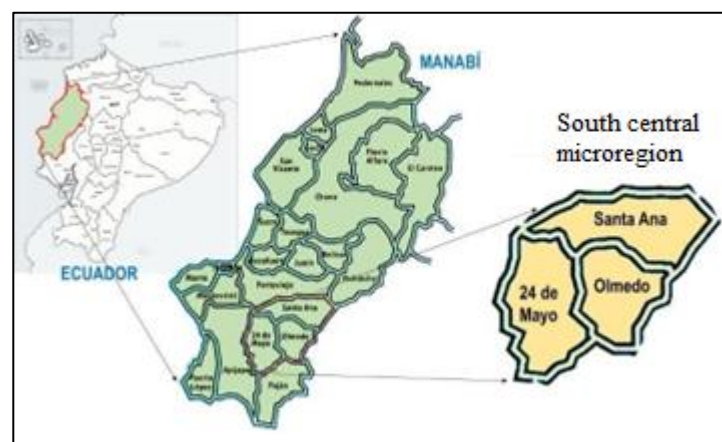


Figure 1. Location of the study
Source: GAD Manabí (2017)

Population and sample

The population of the cantons that make up the south-central microregion of Manabí corresponds to 86,075 inhabitants, which is detailed in table 1.

Table 1
Study population

May 24			Santa Ana			Olmedo *		
Bellavista (5,299)	Noboa (6,290)	Sixto Durán (3,840)	Ayacucho (6,569)	Honorato Vásquez (6,135)	La Unión (6,280)	El Cedro	Sequel	Pajarito
Subtotal 28,846			Subtotal 47,385			Subtotal 9,844		
inhabitants			inhabitants			inhabitants		

Note. There is no information by communities. The total population of the Olmedo canton was considered

To determine the sample size, formula (1) developed by pens, Larry and Spiegel, and Murray (2009) was considered, which yielded a sample of 204 farmers, also using intentional sampling to be able to apply the survey to farmers. who wished to collaborate with the collection of information.

$$n = \frac{Z_{\alpha}^2 * N * p * q}{i^2 (N-1) + Z_{\alpha}^2 * p * q} \quad (1)$$

Where:

n → sample size

N → population size = 86.075

Z → reliability coefficient represents the probability that the sampling error does not exceed the previously set value, determining the degree of reliability of the conclusions. It is the value corresponding to the Gaussian distribution, $Z_{\alpha} = 0.05 = 1.96$ and $Z_{\alpha} = 0.01 = 2.58$. In general, a reliability of 95% is used, so $Z = 1.96$.

p → expected prevalence of the parameter to be evaluated, if unknown ($p = 0.5$), which makes the sample size larger, $p = 70\% = 0.7$

q → $1 - p$ (if $p = 70\%$, $q = 30\% = 0.3$)

i → Error expected to be made, 5%, $i = 0.05$

Table 2
Details the distribution of the sample

May 24			Santa Ana			Olmedo*		
Bellavista (5,299)	Noboa (6,290)	Sixto Durán (3,840)	Ayacucho (6,569)	Honorato Vásquez (6,135)	La Unión (6,280)	El Cedro	Sequel	Pajarito
21			26			21		
68 farmers			68 farmers			68 farmers		

Record of field information

Based on the results of the diagnosis, the questions for the farmers were prepared. The surveys were directed mostly (80%) to farmers over 50 years of age and a small group (20%) were farmers between 30 and 50 years of age. To carry out each survey, a visit was made to the home or workplace of the farmer. The surveys consisted of 13 questions (8 closed and 5 open) and the receipt of responses lasted an average of 30 minutes. In total, 204 surveys were carried out in the three cantons. The questionnaire used to record information is included in annexes (Annex 1). It should be noted that before applying the 204 surveys, a test was carried out with five surveys per canton in order to determine if the questions were well formulated, if they were understandable and to measure the duration.

Although the questions were reviewed and improved so that they are easily understandable, it was necessary to give additional explanations because some of the surveyed farmers do not know how to read or write, in these cases, the survey lasted up to 45 minutes. The open questions were the following:

- 1) Mention the main knowledge about agriculture that you learned from your parents, grandparents, or other people.
- 2) What knowledge or experience does the university professional lack to obtain excellent harvests?
- 3) What would happen if the farmer's traditional knowledge was not taken into account in agriculture?
- 4) What topics would you like to learn about agriculture?
- 5) In which crops do you have more experience?

The closed questions can be seen in table 3.

Table 3
Closed questions of the questionnaire

No	Questions	Options
1	In relation to agriculture: Do you know what the farmer's traditional knowledge is?	Yes No
2	Between a university professional and a farmer, who knows more about agriculture?	Yes No
3	Do you know the difference between technical knowledge and traditional knowledge?	Yes No
4	How important is traditional knowledge for agriculture?	Very important Little important Not important
5	Do you think that traditional knowledge should be taught in universities?	Yes No
6	Is your traditional knowledge about agriculture sufficient for your crops to have an excellent harvest?	My parents and grandparents Testing some crops Observing what other people were doing I was taught at school I was taught by technicians from the Ministry of Agriculture I was taught by technicians from agrochemical companies Other (mention):
7	How did you learn about crop management?	Yes No
8	Do you currently teach your knowledge about agriculture to other people?	Yes No

The information obtained in the three cantons was recorded in Excel files and systematized using measures of central tendency such as the mean and mode. Statistical graphs and charts were made with the processed data.

3 Results and Discussions

The results of the questionnaire applied to the farmers imply the traditional knowledge of the farmer in the 3 cantons studied, thus in figure 2 it can be visualized in detail.

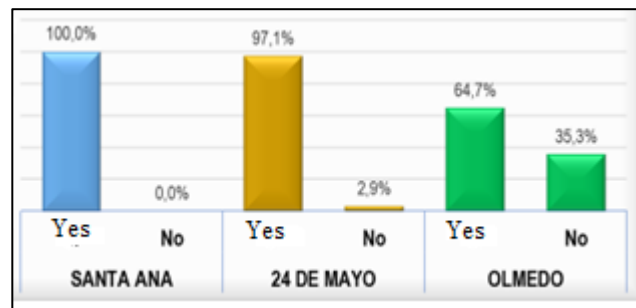


Figure 2. Traditional knowledge of the farmer

Not all farmers clearly understand the definition of traditional knowledge. The answer to question 1 was the same in Santa Ana and 24 de Mayo, where more than 97% of farmers can define this type of knowledge. In the Olmedo canton there is a greater lack of knowledge on this subject, with 35.3% of farmers who are unaware of this concept. It should be noted that the respondents expressed the concept of traditional or ancestral knowledge in different ways, but the main idea was the following: "Ancestral knowledge is a type of rustic and traditional knowledge about agriculture, which has been maintained over time in rural areas and that is transmitted by the family from one generation to another". Figure 3 shows the answers to the question about the knowledge of a professional and a farmer.

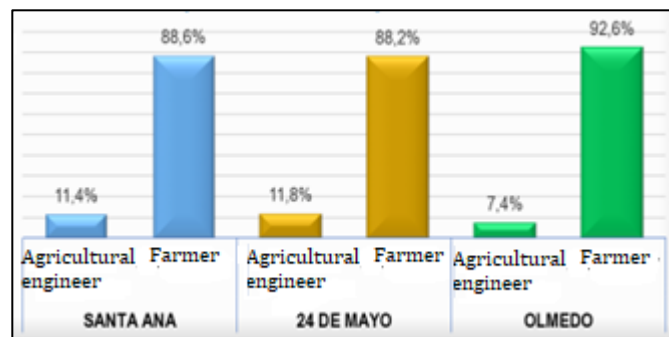


Figure 3. Knowledge of a farmer and a university professional

In the three cantons studied, the general perception of who knows more about agriculture is that the farmer knows more than the technician. In the dialogues held with the respondents, it is argued that the technician does not know much about the crops because he does not have enough contact with field activities. However, 11% of those surveyed consider that the technician knows more about agriculture. It is worth mentioning that, in the opinion of some farmers, the ideal would be the combination of both types of knowledge. Figure 4 shows the difference between ancestral and traditional knowledge.

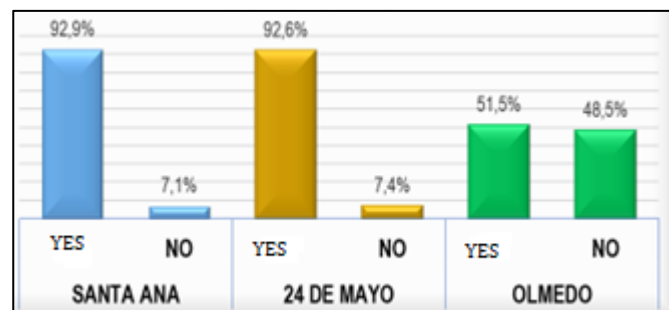


Figure 4. Difference between technical and traditional knowledge

As can be seen in figure 4, the response was the same in Santa Ana and 24 de Mayo, where more than 92% of those surveyed know the difference between technical and traditional knowledge. In the Olmedo canton, close to half of those surveyed (48.5%) do not know the difference between these two types of knowledge. Figure 5 shows the importance of ancestral knowledge for agriculture.

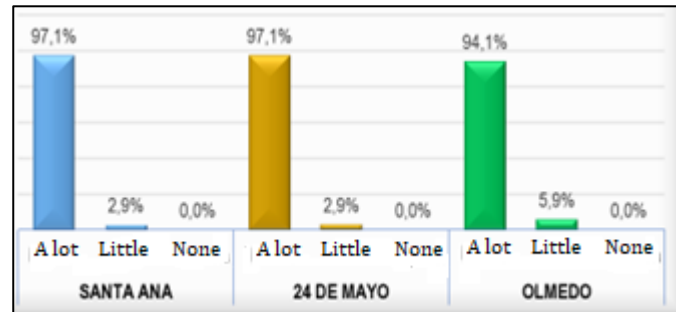


Figure 5. Importance of traditional knowledge for agriculture

As can be seen in figure 5, almost all the farmers of the three cantons under study consider that ancestral agriculture is very important. This result coincides with the response obtained in the diagnostic stage. Figure 6 details the results about whether traditional knowledge should be taught in universities.

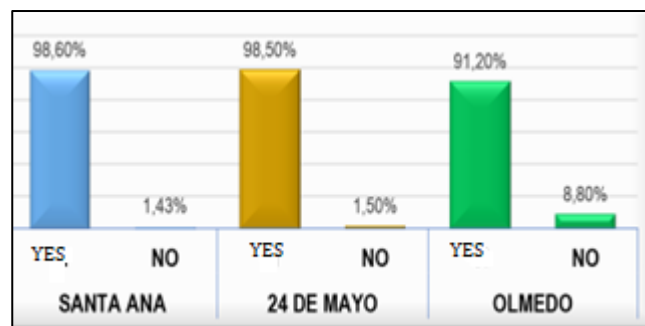


Figure 6. Traditional knowledge should be taught in universities

Regarding the main knowledge about agriculture that the farmer learned from his parents, grandparents or other people, he had: Carry out the management of the plantations according to the type of climate, how to recognize the fertile land, in which lunar phase it is better pruning, planting, harvesting, how to maintain crops to achieve better harvests, methods to fertilize plants, how long crops last and their main needs, times of the year in which certain agricultural tasks must be carried out, recognizing weeds and pests and the damage they can cause, how to maintain soil fertility to obtain good harvests, make homemade supplies with materials from the area, to fertilize plants and control pests, the stages of cultivation in which you need the most of water, personal values related to love of work, respect for nature, love for plants, responsibility, punctuality, preparation of soil manually, without the need for machinery, for a better development of the crops, perform pruning based on the phases of the moon to avoid infections and diseases, determine the planting distance based on the size and form of growth of the plant, the appropriate time to fertilize the crops, the appropriate time to prepare the land, before winter planting, recognize products and waste from the farm that can be used as fertilizer, cut the bamboo cane based on the lunar phases to avoid moth damage, curing or disinfecting the seeds before sowing, the light needs of each crop, such as corn that requires a lot of light or coffee that requires moderate shade, recognizing the best time of day year to sow, according to the characteristics and needs of each crop, build structures with materials from the area to facilitate the development of some plants, such as stakes, ramadas, scaffolding, twine, identify the best time for harvesting, recognize the different development stages of a crop and the opportune moment to carry out irrigation and fertilization, how to measure the land and calculate the amount necessary for planting.

Regarding the knowledge or experience that the university professional lacks to obtain excellent harvests, there were answers such as: Knowing the reality of the field and valuing the experience of the farmer, living in the field to gain more experience on agriculture, improving their technical knowledge learning ancestral practices, working alongside the farmer, valuing and taking advantage of his experience, combining his technical knowledge with the ancestral knowledge of the farmer, having more contact with the plants and the farmer, more experience with operational or rustic work, he lacks experience practice for crop management and know the context and reality of the rural sector, you must live in the countryside to acquire greater knowledge about the livelihoods, needs and experience of the farmer, you must have a professional vocation and love for the countryside, improve communication with the farmer, using clear and simple language with words of the local environment, for the exercise of his profession, he must develop personal values such as simplicity, humility, inclusive attitude, respect for cultures and traditions.

Regarding what would happen if in agriculture the traditional knowledge of the farmer is not taken into account, it was obtained that decades and centuries of knowledge accumulated in field work would be lost, in those places where there is no technical assistance, agriculture would fail, harvests would decrease and there would not be enough food in the markets, the farmer would lose interest in agriculture and seek other forms of livelihood, migration from the countryside to the city could increase, part of the tradition and culture would be lost, the farmer could lose interest in field activities, the processes of extension, validation and technology transfer would be affected, in which it is necessary to value the work and experience of the farmer, there would be a negative effect on the agricultural field and it would affect local commerce, farmers would be harmed because by not receiving technical assistance, the only knowledge they have is traditional, agriculture would rely solely on technical assistance and not all technicians have sufficient experience or practical knowledge.

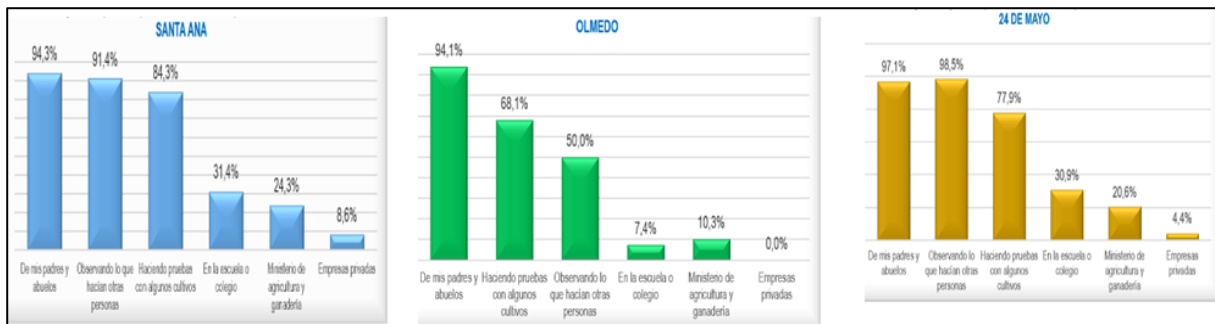


Figure 7. Way of learning crop management

As can be seen in figure 7, ancestral knowledge comes mainly from the family, particularly from parents and grandparents, in more than 94% of cases. However, many farmers learn based on tests they carry out in the field and by observing the experiences of their environment. Figure 8 shows the results on the sufficient knowledge that the farmer must obtain a good harvest.

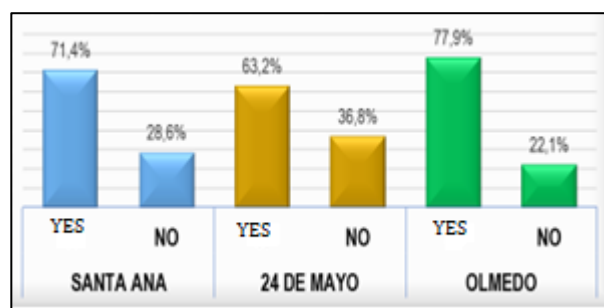


Figure 8. Sufficient traditional knowledge for a good harvest

Around 70% of those surveyed consider that their traditional knowledge and experience is sufficient to cultivate the land and obtain good harvests, while 30% believe that they are not enough and that they require technical support. Regarding the topics that farmers would like to learn in agricultural matters, there were: Methods for grafting different crops, methods for pruning different crops, new planting methods, how to manage a productive unit, how to apply modern techniques to cultivate, implement systems irrigation to avoid depending on the rainy season, management techniques for short-cycle and perennial crops, mechanisms to control pests and crop diseases, how to produce organic products to produce without chemicals, management and maintenance of agricultural machinery. Figure 9 shows the results about the teaching of traditional knowledge about agriculture to other people by farmers.

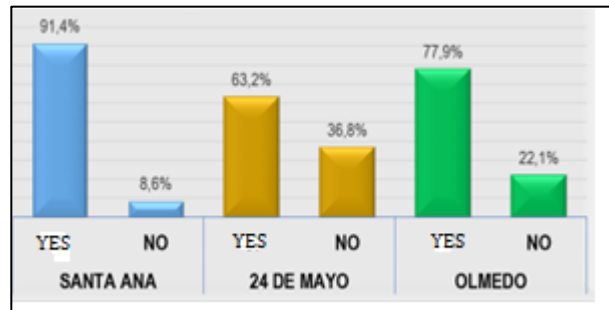


Figure 9. Teaching traditional knowledge in agriculture to others

In relation to figure 9, most respondents answered that they currently transmit their experiences to family, friends, and members of the community. However, they noted that young people currently no longer feel love for the countryside and are interested in going to the city. The results of this question are similar in 24 de Mayo and Olmedo, where around 70% continue with the intergenerational chain of transmission of knowledge, but it is evident, in 30%, that these experiences and knowledge are no longer transmitted. In the Santa Ana canton, the majority of respondents (91.4) report maintaining the transfer of traditional knowledge. In addition, regarding the types of crops in which the farmer has more experience, the responses included: Management of short-cycle crops, management of perennial crops, plantations with timber species, plantations with fruit species, management of plantain and banana crops, and crops of vegetables (Pulido & Bocco, 2003; Stinner et al., 1989; Gliessman et al., 1981).

Contrasting the results obtained with the appreciation of the farmers, they explained the main differences between both types of knowledge:

- a) Technical knowledge is learned in educational institutions and ancestral knowledge comes from the teachings of ancestors and from their own experiences. directly on the plantations.
- b) Technical knowledge allows the use of machinery and improved varieties, while the traditional one uses labor and uses the same varieties.
- c) Traditional knowledge preserves the same production and harvest methods, while technical knowledge seeks to innovate them.
- d) Traditional crop management uses rustic procedures based on the experiences of ancestors, while technical knowledge seeks to optimize management work based on scientific research.
- e) Technical knowledge is learned in educational institutions and ancestral knowledge comes from the teachings of ancestors and from their own experiences, directly in the plantations. .
- f) Traditional knowledge comes from the teachings of previous generations and is built every day in the field, learning based on trial and error and by observation.
- g) Technical knowledge changes and uses new methods and tools to make agriculture more efficient. Instead, traditional knowledge comes from accumulated experiences on agriculture, coming from the observation of aspects of nature and the ways of cultivating the land.
- h) Ancestral knowledge is empirical and technical knowledge is based on science.
- i) The difference between these two types of knowledge lies in the way we learn. The technician learns in the classroom and the farmer learns in the field.

The farmers further argued that, if man has been cultivating the land since before there were universities, no, it is necessary to apply the new technical knowledge. Yes, they are sufficient for crop management, but it is also necessary to know the techniques to control pests and diseases. If they are enough, but the harvests would not be very good, the help of the technician is needed. The farmer has many years of experience in the field. The assistance of a technician makes it possible to improve management techniques and harvests. The idea is to combine the experience of the farmer and the knowledge of the technician. The farmer's knowledge is enough to produce the land because he spends his entire life in the field in contact with the plants. The world has changed and now the support of a technician is necessary to improve crop management. The farmer has cultivated the land, but the support of institutions and the government is always advisable. Traditional knowledge is enough, but the technician can support certain specific issues such as production costs, marketing, and associativity. Technical knowledge responds to a capitalist system in which you have to have a lot of money to invest, with traditional knowledge elements from the same farm are used (Lieskovský et al., 2015; Dale & Polasky, 2007; Rigby et al., 2001).

The reasons that farmers have for maintaining that ancestral knowledge should be taught in universities involve: So that the new generations know the reality of the field and ancestral knowledge is valued; to combine theoretical knowledge with practice. Technicians must learn traditional knowledge so that they understand the dynamics of the field and contribute to solving problems. It would be a way of recognizing peasant traditions and culture.; By combining technical knowledge with the experience that the farmer has, better results can be achieved; agriculture requires combining theory with practice as a way to motivate young people. Currently, the new generations are not very interested in working in the fields; by teaching ancestral knowledge in educational centers, the value would be given to knowledge accumulated over a long time and it would be a way of recognizing the work and effort of the farmer; ancestral knowledge should be taught to new generations so that the roots of agriculture are not lost; By teaching ancestral knowledge in educational centers and the sacrificed work of the farmer, better conditions could be created at the level of public policies, to stimulate work in the field and ensure food for the population (Altieri, 1989; Ellis & Wang, 1997; Saravanadurai & Manimehalai, 2016).

The research carried out in the cantons of the south-central microregion of Manabí, in general, presents similar results in the three cantons, due to the fact that their vocation is eminently agricultural and livestock. This evidences the fundamental role that ancestral knowledge plays in the development of agricultural production in the south-central microregion of Manabí, where due to the lack of technical assistance and technology transfer programs, farmers have a high dependence on knowledge. traditional. It is also shown that technical knowledge, by itself, is not enough to promote the development of agricultural production, being necessary to know contextual aspects such as the problems of the rural sector, the priorities of the farmer and his family and other aspects related to local culture and tradition. The testimonies of the farmers reflect the need to give value to certain traditions, customs and knowledge that, little by little, are disappearing mainly because the new generations no longer feel the same love for the field.

The study makes clear the need to combine technical knowledge with the experience and ancestral knowledge of the farmer. The traditional knowledge that is transmitted from one generation to another is an accumulation of knowledge that comes from centuries of experiences lived in the field and as such, facilitates agricultural work and provide solutions to many problems that arise in agriculture. The results of the study confirm what Bull (2020); Deer (2020); Lekhi (2020), have said regarding the decreasing trend in the process of transferring traditional knowledge, which has been maintained for centuries, from one generation to another. This situation calls us to concentrate our efforts on actions that allow the revaluation of ancestral knowledge, traditions and local culture, fundamental elements in the development of agriculture.

4 Conclusion

The role of traditional knowledge is fundamental in agriculture in the south central microregion of Manabí, not only in relation to the management and production of crops, but it is a very important component of the culture and traditions of the rural sector, however, the farmer recognizes the need to update himself in the management of crops and plantations and demands advice on technified and innovative systems to achieve high yields. The development of modern agriculture depends to a large extent on the revaluation of traditional knowledge. The population in

general and the farmers themselves consider that there would be negative consequences for agriculture, not knowing the experiences and traditions of the farmer, since technical knowledge is weak if it is not complemented by the experience of the farmer. It is necessary that professionals know the context, conditions and needs of the rural area, in order to propose successful solutions to the agricultural problem. The application of certain ancestral practices in agricultural production is in harmony with nature, a good response of plants is achieved, and good harvests are achieved, however, although traditional knowledge is still transmitted to new generations, there is evidence of less interest of young people to get involved and participate in productive activities.

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Biography of Authors

	<p>Alan Patrick Mera-Shiguango Estudiante del Instituto Superior Tecnológico Paulo Emilio Macías, Portoviejo, Manabí, Ecuador <i>Email: alanmc-2000@outlook.com</i></p>
	<p>Christian José Castro-Delgado Estudiante del Instituto Superior Tecnológico Paulo Emilio Macías, Portoviejo, Manabí, Ecuador <i>Email: cc796226@gmail.com</i></p>
	<p>Milton Vega-Játiva Docente del Instituto Superior Tecnológico Paulo Emilio Macías, Portoviejo, Manabí, Ecuador <i>Email: itspem.mvega@gmail.com</i></p>