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Social Representations of Key Actors on Climate Change and Its Impact on Agricultural Production in Pergamino, Buenos Aires

Representaciones sociales de actores claves sobre el cambio climático y sus efectos en la producción agrícola en la localidad de pergamino, Buenos Aires

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ABSTRACT

Climate change is a global reality affecting populations worldwide. Developing comprehensive policies for risk management, adaptation, and mitigation is essential to address the challenges posed by an evolving climate. Argentina is particularly vulnerable to these challenges due to its reliance on agricultural and livestock production and its role as a major producer of raw materials. The country's dependence on these sectors makes it highly susceptible to the impacts of climate variability. This article examines the social representations of key stakeholders in Pergamino, Buenos Aires, regarding climate change and its effects on local agricultural production. It explores their perceptions, attitudes, and opinions about climate change and its implications, aiming to identify potential strategies for management, adaptation, and mitigation. The study involved 21 surveys with local stakeholders, addressing their views on climate change, local government performance in addressing the issue, agricultural yields, production dynamics, and related concerns. Understanding social representations within the community is critical for designing policies that effectively protect and manage the natural environment. Such policies must incorporate not only scientific and technical evidence but also the voices of citizens to ensure inclusivity and relevance.

Palabras clave:
cambio climático, representaciones sociales, adaptación y mitigación al cambio climático, alternativas productivas.

RESUMEN

El cambio climático es una realidad que aqueja a todos los habitantes, en todas partes del mundo. La generación de políticas de gestión del riesgo, de adaptación y de mitigación son fundamentales para hacer frente a los cambios que se avecinan en el futuro.
La República Argentina no está exenta de dichos cambios, y como país productor de materias primas con una gran dependencia del sector productivo agrícola/ganadero es muy susceptible a sufrir las consecuencias que se presentan a nivel climático.
El siguiente artículo está orientado a estudiar las representaciones sociales de actores claves de la localidad de Pergamino -Buenos Aires-, sobre el cambio climático y sus efectos en la producción agrícola de la zona, es decir, las visiones, percepciones y opiniones de ciertos

	miembros de la sociedad en relación al cambio climático y sus implicancias, con el fin de vislumbrar posibles formas de gestión y acciones de adaptación y mitigación. Para dicho fin, se realizaron 21 encuestas a actores locales y se les consultó sus opiniones en relación al cambio climático, la gestión del gobierno local en la temática, los rendimientos y la producción, entre otros. Conocer las representaciones sociales de los miembros de la sociedad, es fundamental para dar lugar a la creación de políticas de protección y de gestión del medio natural, atendiendo no solamente a los criterios científicos y técnicos, sino también incorporando las voces de los ciudadanos.

Introduction

Climate change, understood as those changes in climate that modify the atmospheric composition and are the result -either directly or indirectly- of human actions (United Nations Framework Convention on Climate Change [UNFCCC], 1992), has become one of the greatest problems afflicting humanity today.

While the Earth's surface climate has remained relatively constant for thousands of years, unprecedented changes have occurred in recent decades, especially since 1950 as a result of human actions. These changes include ocean warming, rising sea levels, decreasing volumes of snow and ice, loss of biodiversity, increase in extreme weather events, among others (Intergovernmental Panel on Climate Change [IPCC], (2014).

The Argentine Republic is not exempt from these changes and will have to face the complexity of the situation through mitigation and adaptation policies and actions.

Bearing in mind that Argentina is largely sustained by agricultural/livestock activity, climatic influences are aspects that may seriously affect the country's productive and economic reality.

In the Third National Communication, the Secretariat of Environment and Sustainable Development [SAyDS, for its acronym] (2015) projects a temperature increase of between 0.5 and 1°C in practically all areas of the country in the near future, with little variation in the level of precipitation. This would lead to increased water stress that would impact natural ecosystems as well as production. On the other hand, the Pampas region (the most important in terms of soybean and corn productivity) would be favored by the expected increase in temperature and rainfall during the summer period, which would favor these crops. However, such a situation could mean an intensification and expansion in the exploitation of such activities, bringing as a result a deterioration of soil and water quality, a loss of biodiversity, the potential increase in social conflicts over land tenure and in general an increase to climate vulnerability (SAyDs, 2015, and Esperbent, 2017).

This article focuses on understanding the dynamics between social representations or visions of climate change and its relationship with agricultural production in the town of Pergamino, Buenos Aires.

In the words of Navarro, social representations are understood as those "(...) forms of thoughts shared by a given social group or set, which allow understanding its social and physical reality, in order to intervene accordingly or simply perpetuate this same social reality" (Navarro, 2013, p. 105).

Given that the study area represents one of the most important production poles in the country, interference with the climate would seriously affect producers and production in general. Since the subject of the article focuses on a particular reality and is limited to a very specific spatial context, no research has been found so far that has addressed the same problem for the region under study. The aim is to open the scientific dialogue to future research and possible adaptation and mitigation solutions through improvements in production and land management that will help reduce risks and the vulnerability of producers.

The research presented here aims to identify the social representations of climate change of key actors in the town of Pergamino, for the evaluation of adaptation and mitigation alternatives in relation to the agricultural sector. In addition, it is also proposed to learn about the role of the government in relation to climate change in the area; to present the perceptions of local producers on the effects of climate change on yields and

local productivity; to evaluate how the effects of climate change have been perceived by citizens; as well as to analyze potential areas of action for improving risk management.

It also highlights the adaptation and mitigation strategies that are being implemented or that are planned for the future, in order to determine the productive alternatives for dealing with possible climatic interference. Thus, this work will contribute to the search for viable alternatives to adapt to a world that is changing at the climatological level with a production model that may be seriously affected, and help in the construction of projects that contemplate these visions of reality, laying the groundwork for the changes that are coming at the global level in relation to climate change.

Method

The contribution of information was carried out not only from theory but also from the interpretation of the data obtained through the actors themselves who live day by day with a situation that has not yet found a solution.

3.1. Research Design

The research proposed here is *non-experimental*, since the variables were not manipulated for the purposes of the study. The final purpose of this work was not to interfere with the concepts, variables and data obtained, but rather to observe them in order to understand them.

The spatio-temporal framework used in this study is *transversal*: the reality of the object of study was observed at a specific time -last quarter of 2021 to first half of 2022-.

In addition, it was proposed as an *exploratory* study because it deals with a subject that, although of great importance and of growing interest, has not been investigated in detail in the north of the province of Buenos Aires, so the aim was to generate a first approximation to the current situation in that area.

In turn, this is also a *descriptive* study, given that what was pursued was the description and observation of the opinions of the informants in relation to climate change in the area, what their views on the subject are, what degree of importance they consider to be given to the subject, among other aspects, so that their points of view were simply described.

3.2. Population and Sample

A *non-probabilistic sampling* was carried out: the aim is not to generalize the results, but rather to learn and interpret the opinions of the informants in this particular scenario.

The population taken as the object of study refers to members of the town of Pergamino who have some degree of participation in productive activities and/or knowledge of them. This decision was based on theoretical relevance. According to Meo and Navarro (2009), the latter refers to the fact that the cases selected are representative according to the theoretical or empirical criteria of the research itself.

In this case, 3 agronomists, 3 members of INTA (Instituto Nacional de Tecnología Agropecuaria), 3 members of AIANBA (Asociación de Ingenieros Agrónomos del Norte de Buenos Aires), 3 members of UNNOBA (Universidad Nacional del Noroeste de Buenos Aires), 3 producers in the area, 3 members of environmental organizations, 3 municipal officials were consulted and 21 surveys were carried out.

The informants were divided into three groups: municipal officials (Group 1); producers and specialists in the subject (Group 2); and members of environmental associations (Group 3). In this way it was possible to obtain the opinion on the subject from the point of view of the local government, from a more technical/productive point of view, and from a more social consideration.

3.3. Variables

Theoretical variable: 1- Climate change
Operational variables: - Comparative climate information. - Mitigation practices and actions - Adaptation practices and actions. -Alternative production.
Theoretical variable: 2- Social representations
Operational variables: - Opinion and degree of knowledge about climate change. - Perception of climate change as a problem. - Beliefs about climate change.

3.4. Measuring instruments and techniques

The survey technique was used, and a self-administered questionnaire was used as a data collection instrument.

This study is a mixed research, where a qualitative approach is presented with data collection elements that are more typical of quantitative research. For this reason, qualitative surveys were conducted. These, analyze the diversity of the members of a given population, unlike the statistical survey that seeks to analyze the frequency of the characteristics of the members of a population (Jansen, 2012).

The application of the surveys was carried out via e-mail, by sending a link to access the questionnaire in *Google Forms*. It was carried out between May and June 2022. Three questionnaires were created in response to the three groups mentioned above.

3.6. Statistical Analysis

As a result of the application of the questionnaires through the *Google Forms* tool, the same program automatically generates graphs (bar and pie charts), some of which were incorporated into the data analysis section to complement the results obtained. This section also mentions FASHION as a measure of central tendency. The latter allows us to identify which value is the most repeated in a particular question, revealing which values obtained the most mentions, which allows us to observe the points in common that the participants have in their vision of certain areas.

As symbolic constructs, social representations are continuously created and recreated by the dynamics of social interactions. Their flexible nature makes them prone to be modified according to the context in which they are immersed. In this way, it can be said that the theory of social representations does not provide explanations that can be generalized to other social groups, but it can serve as a support for the generation of new comparative or similar studies, giving rise to a possible dialogue for the generation of new studies.

Results

Section: General Knowledge About Climate Change.

All informants - groups 1, 2 and 3 - agree that they have knowledge about climate change, although in different proportions (some of them indicating that *they know a lot* about the subject, others that they *know*). The most relevant information media in all cases were the Internet, academic articles, lectures and social networks. Consequently, those consulted agree that climate change is the result of human actions reflected in changes in weather patterns, and that, although these changes occur naturally, they have accelerated recently due to anthropogenic actions, especially greenhouse gas emissions, especially carbon dioxide. In this sense, extreme climatic phenomena such as increases in rainfall, high temperatures, floods and droughts are occurring more frequently.

Section: Climate Change in Argentina.

All members of the first group (municipal officials) agree that climate change is a problem in our country, but that it is nevertheless given little/very little priority, while gender issues are the ones that the respondents consider to be the most important in recent times.

As for the sectors that have the greatest impact on climate change in Argentina, all those surveyed in this group agreed that transportation has the greatest impact due to CO_2emissions, followed by livestock farming, which generates methane gas, deforestation, which does not allow trees to absorb these harmful gases, and agriculture, which emits nitrous oxides due to the application of fertilizers. On the other hand, all also agreed that natural cycles would have no impact on climate change and that all inhabitants are affected by it.

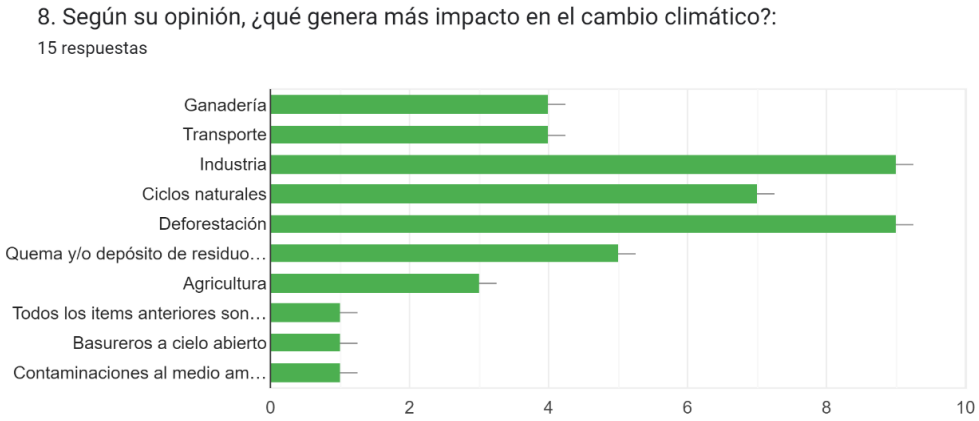
In relation to the respondents of the second group (technicians/specialists), there was a slight disparity in opinions, with 80% of those consulted considering that climate change does represent a problem in our country, while the remaining 20% believe that it is not.

As for the country's political, economic and social priorities, there were very different answers. Issues such as insecurity and the economy and inflation received very diverse responses, with the climate change issue being considered as one that is not given much importance (the largest number of responses refer to *very little* and *low priority*).

On the other hand, the central tendency measure MODA, in this case is made up of the values industry and deforestation, which obtained more mentions since they are presented as the sectors that generate more impact on the environment in our country, both with 9 mentions each, followed by natural cycles as responsible for climate change with a total of 7 mentions, as shown in Figure 1 below.

Figure 1

What generates generates more impact on climate change?



Note: Prepared by the authors based on the Google Forms tool (2022).

From the perspective of the vast majority of respondents in group 2 (86.7%), all inhabitants will be affected by climate change, and the impact it will have on low-income communities was also highlighted.

In the case of the third group (members of environmental associations), all agree on the fact that climate change is a problem that affects our country. However, while two of them considered that no priority is given to this issue, the remaining respondent considered that the issue is given considerable importance.

In relation to the sectors that generate the greatest impact on climate change, respondents mentioned livestock, transportation, industry and agriculture and deforestation as the activities that generate the most emissions, while waste burning and natural cycles were considered by only one of them. On the other hand, although two of the respondents considered that all inhabitants are affected by climate change, one of them pointed out that it is the poorest inhabitants and those living in coastal areas who would be most affected.

Section: The Role of the State in the Fight Against Climate Change

This particular section was consulted to the members of group 1. Respondents were asked if they considered that the municipal, provincial and national governments were carrying out actions to combat climate change. Although one of the members of group 1 considered that such actions were not being carried out, two of them pointed out that benefits and proposals to reduce the carbon footprint are being implemented at the provincial and municipal levels, as well as actions such as the replacement of public lighting with LED lights, waste separation and training, but that these are actions that alone and individually would not generate great changes. Regarding the role of the Municipality of Pergamino in the fight against climate change, two of the respondents considered that these actions are being carried out, while one of them does not know if this is happening. Among the actions taken by the municipality are the separation of waste, control in the application of phytosanitary products to reduce the number of applications and the amount of product applied, forestation of public spaces and home composting.

Finally, all agree on the importance of implementing measures to combat climate change as soon as possible, particularly the following aspects:

-Improved industrial waste management.

-Increased awareness of the problem among citizens.

-The development of a greenhouse gas inventory so that mitigation actions are more focused on the emission problem and require more immediate action.
-Tree planting as an important mitigation measure.
-Carbon footprint measurements and the granting of benefits for those who improve their carbon footprint.

Section: Effects of Climate Change on Production in the Region

The following section was incorporated in the questionnaire of group 2 since it was focused on technicians and agronomists in the area. In relation to the effects of climate change on production, 80% of those surveyed considered that changes in production are occurring due to this problem, while the remaining 20% indicated that agricultural production in the area is not being affected.

Within this last 20%, it was indicated that the drop in yields would not be a determining aspect for the moment given that the quality of the soil in the area is very good and the changes in weather patterns remain relatively stable, as well as because it is understood that these are cycles in the climate and that so far the area has been able to adapt to them, also highlighting that short-term actions cannot be carried out against the climate.

On the other hand, respondents who indicated that there have been changes in agricultural production due to climate change, mainly stated that regional production is affected mainly by extreme events such as temperature increases, floods and periods of drought; the increase in pests and diseases; and in terms of yields.

In relation to this last aspect, respondents were asked specifically whether crop yields have been affected by climate change in the last decade, to which 73.3% said yes, while the remaining 26.7% said that there had been no changes in this aspect. When consultedó when asked about the effects on yields, the response of extreme weather events once again stood out in terms of the number of mentions, being the most repeated throughout the survey. These aspects have a direct effect on the yields that affect crops, since they are lost either due to excess or lack of water.

Respondents were asked if they consider that productive alternatives can be carried out, where the central tendency measure MODA for this question indicates that the vast majority (80%) consider that productive alternatives do exist, among which the following stand out: conservationist practices, regenerative agriculture, greater importance to agroecological production, forestation, crop adaptation through genetic improvements, climate predictions, that lead to the management of planting dates, the incorporation of sustainable management actions that involve reducing the use of inputs and phytosanitary products, the use of green fertilizers, the combination with trees in livestock areas, and a greater supply of adapted machinery managed by the national and provincial governments.

Section: Effects of Climate Change on the Community.

The following section was incorporated only for the case of the third group. This decision was based on the fact that, being the same members of the association *Asamblea por la vida, la salud y el ambiente Pergamino*, it was considered that the participants could offer their opinion from a more socially-oriented point of view.

In this sense, all respondents agreed on the fact that climate change affects the local inhabitants, especially in terms of floods that affect both the inhabitants (through damages and material losses) and the farmers in the area who see their production lost, and must adjust their crops to the rainfall patterns. In order to address this situation, all

respondents agreed that agroecology and changes in the production model are essential to carry out such actions in the fight against climate change. The role of individual citizens was also highlighted, as well as the role of the State, which is present, committed and responsible for the cause.

Section: Climate Change in the Region - Pergamino

All members of group 1 agreed that they have noticed changes in the climate in the region in recent times, such as unusual temperatures at different times of the year, abnormal rainfall cycles, higher average temperatures, and less water availability in the soil.

These changes are viewed very negatively by all members of the group, particularly highlighting that they may contribute to the appearance of diseases, such as the increase in cases of dengue fever due to the presence of the *aedes aegypti* mosquito, which previously did not reach the area.

In terms of the elements that are most affected by climate change, livestock and agriculture stand out. Regarding the latter, they pointed out that it is affected by climate change, especially in crop cycles, generating stress on crops and even producing desertification in some areas.

When group 2 was asked if they had perceived changes in the climate of the region in the last decade, 86.6% said yes, while the remaining 13.3% said they had not perceived any changes. The former unanimously pointed out the presence of extreme weather events -especially in terms of increased temperatures, rainfall and droughts-. A response was highlighted that also mentions the presence of pests and diseases in the area's crops that did not exist before. The same percentages mentioned above were highlighted in terms of the perception of these changes, where most of those consulted consider that the changes in the climate of the area are perceived as negative, while the rest indicated that they would be positive.

Within the percentage of respondents who stated that these changes are perceived as negative, the presence of extreme events is repeatedly mentioned. Such unpredictability in the weather has an impact on agricultural production, which becomes more unstable and insecure. But there were also responses that included the social sphere. Such is the case of those who expressed opinions such as:

-Disruptions in the normal development of human activities.

-They affect agricultural productivity and people's well-being.

-We are moving away from equilibrium.

-Risk to life and lowers the human standard of living.

Agriculture, followed by flora and fauna, and then livestock are the elements that respondents said are most affected by these changes in climate.

With respect to group three, the responses of two of the respondents stand out, who mentioned having noticed changes in the region, especially - and coinciding with what was mentioned by the participants in groups 1 and 2 - in terms of changes in temperature and rainfall patterns, as well as in the occurrence of extreme phenomena, while the remaining respondent did not perceive too many changes in the area, given that the ten-year parameter is not sufficient to observe significant changes. However, all respondents in this group agreed that flora and fauna are the elements that will be most affected by the effects of climate change, with more disparate opinions in relation to agriculture and livestock, where in the first case, two of the respondents considered that agriculture would be very affected, while the remaining respondent indicated that it would be little affected, and in the case of livestock, the opposite was true: two of the

respondents indicated that it would be little affected, while one considered that it would be very affected by the effects of climate change.

Section: Climate Change Management

All members of group 1 indicated that they had heard about climate change mitigation and adaptation, although two of them do not know if such practices are being carried out by the Municipality of Pergamino, while the remaining respondent indicated that some are being carried out, although they did not specify which ones. For their part, all agree that the implementation of adaptation and mitigation strategies are important (one respondent) and very important (two respondents).

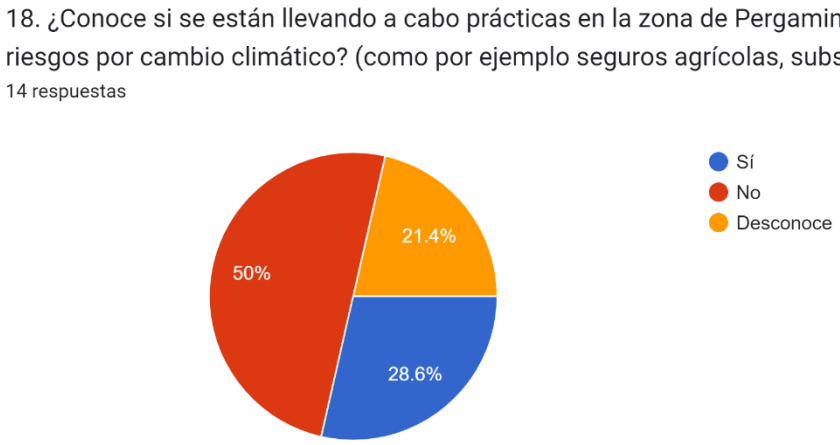
They unanimously emphasized that deforestation and forest control plans are very important, as well as agroecology, crop rotation, improvement of pastures and grazing systems, reliable weather forecasts to adjust crop dates and adaptation of germplasm banks to future climatic conditions.

In relation to group 2, the responses were more varied when asked if they had heard of climate change mitigation and adaptation, where 66.7% (10 respondents) mentioned having heard of it, 26.7% (4 respondents) said no, and the remaining 6.7% (1 respondent) said they did not know about it. However, regarding the existence of adaptation and mitigation strategies, all respondents expressed the importance of the role of such actions in the fight against climate change.

When respondents in the second group were asked if they knew whether risk management actions were being carried out in the area, the following responses were recorded, as shown below.

Figure 2

Risk management actions in the area



Note: Prepared by the authors based on the Google Forms tool (2022).

The MODA in the previous figure indicates that half of the respondents mentioned that risk management actions are not being carried out in the area, which could be seen as something negative, given that it is understood that from the political level this type of actions that are so necessary are not being carried out, especially in an area highly dependent on the agricultural sector such as the town of Pergamino. On the other hand,

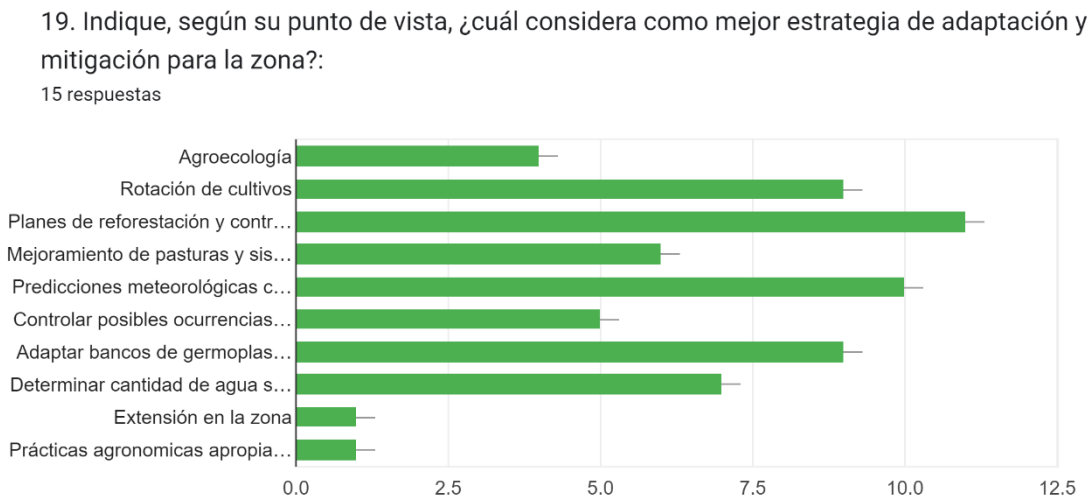
28.6% indicated that such actions are being carried out, while the rest of the respondents said they had no knowledge of the matter.

Agricultural insurance was the most frequently mentioned when asked which ones they knew about, as well as the existence of subsidies provided by the State to small agroecological producers.

When asked what they consider to be the best adaptation and mitigation strategies in the area, the following were highlighted, as shown in Figure 3.

Figure 3

Improved adaptation and mitigation strategies



Note: Prepared by the authors based on the Google Forms tool (2022).

As can be seen, reforestation and forest control plans obtained the most mentions (11 mentions), followed by reliable weather forecasts to adjust cropping dates (10 mentions), and crop rotation and adaptation of germplasm banks to future climatic conditions (9 mentions). For their part, some respondents added their own opinions, such as:

-Carbon sequestration strategies (soil and biomass) and reduction of GHG emissions (fertilization management, rice fields, livestock herds).

-Non-formal education with money from the municipality, the university and agricultural research entities, mediated by other educational institutions.

-Reduction of CO_2, methane and nitrous oxide in the atmosphere to limit global thermal increase.

-Carry out sustainability practices.

In the case of the third group, as in group 1, all respondents reported having heard about mitigation and adaptation practices, which they consider *important* (two cases) and *very important* (one case). However, despite the importance of this, one of the respondents did not know if such practices are being carried out in the locality, while the other two mentioned that no mitigation and adaptation actions are being carried out in the area.

Regarding the adaptation and mitigation strategies that respondents considered most appropriate, all members of group 3 agreed on agroecology and reforestation and

forest control plans, while crop rotation, improvement of pastures and pastoral systems and adaptation of germplasm banks to future climate conditions were mentioned.

The information gathered through the surveys suggests that the respondents are aware of climate change (to varying degrees, some more, others perhaps a little less) and the vast majority agree that the effects of climate change are being felt in the area, through extreme phenomena such as heavy rains or floods, droughts, increased temperatures, among others, which is affecting agricultural production. However, it is emphasized that there are mitigation and adaptation actions that should be carried out in the fight against climate change that should be given greater importance in order to defend local production.

Discussion

The results obtained from the surveys show that the respondents are aware of climate change, its repercussions on the environment and on production, the role that anthropic actions play in this problem and, in general, the perception that climate change will affect regional production.

The role of the government in environmental matters is fundamental since it is through this institution that tools such as regulations, decrees, laws, among others, can be created in the fight against climate change. Consequently, it was pointed out in the responses that the actions carried out by the municipality so far would not be sufficient to address this problem. These are actions that would not have a great impact, such as the change in public lighting, waste separation, public trees, among others, which, although they contribute in their own way to the issue, would not be enough to attack the root of the problem.

The way in which the subject matter is understood and approached is also of great importance. Taking up again what Celis et al. (2005) said, it would be interesting to look beyond the mere conception of the occurrence of isolated extreme phenomena that do not occur regularly, to understand that the recurrence of such phenomena is more common than is believed, and it is becoming more and more common for such phenomena that are believed to be "extreme" to occur. By recognizing the habitual nature of these problems, preventive rather than reactive policies are generated, so that management is more holistic and the aim is to attack the problem not only from the point of view of the effects but also by placing emphasis on the causes.

As pointed out by González Gaudiano (2012), it is very common to blame nature for consequences that in reality derive from erroneous and/or inefficient policies, but which in reality have a more social than natural character due to institutional disorder, lack of regulations and concrete actions, which increases social confusion and distrust on the part of citizens, causing a reduction in the urgency to act and to implement mitigation and adaptation actions.

This is a challenge that must be faced urgently, and for which governments must rise to the occasion through the generation of environmental management policies, preventive actions and adaptation and mitigation actions that require national and international cooperation to face this struggle in which all individuals, societies and nations must be part of the same team to confront the common enemy: climate change.

On the other hand, as indicated by Chávez-Caiza and Burbano-Rodríguez (2021), it is understood that climate change has become a latent threat to the productive sector. In the local reality, where production is focused on soybean monoculture, and where there

is a high dependence on the technological package required (use of phytosanitary products), the capacity to mitigate the effects of climate change is reduced.

Through some of the responses collected, it can be seen that the social representation of climate has been changing over time, and that there have been variations that did not exist as frequently in the past as they do today.

If the climate of the area is changing, it is understood that alternatives must be implemented, whether in production, management, mitigation and adaptation actions to face such changes. In terms of potential areas of action for improvement in risk management, several areas were highlighted that were repeated throughout the responses. Among these, reforestation and agroecology were the two most prominent potential areas of action.

It is also necessary to focus on the genetic improvement of crops in order to make them more resilient and thus better able to adapt and mitigate climate change.

In addition, it was noted that the deforestation of native areas to make way for agriculture and/or livestock (changes in land use) is one of the main problems in terms of climate change. In this way, a symbiotic situation is generated in which agriculture in the area is affected by climate variability, but at the same time, the production system itself exerts pressure on natural resources, emitting around 37% of GHGs at the national level (SAyDS, 2015).

The importance of the change in conventional production systems was also highlighted. Current forms of consumption are making the use of natural resources more intensive and are therefore generating pressure on the natural environment that cannot meet the requirements of a world that is home to more than 7 billion people.

Risk management requires long-term policies for the reduction of vulnerability conditions through mitigation, adaptation and prevention actions, as well as short term strategies to respond to disaster events such as floods, etc. This requires the involvement of state and non-state actors, social organizations and citizens to give rise to the emergence of new ideas and proposals for intervention on the subject. This idea of knowledge articulation is central to risk management, strengthening the link between the different actors based on the recognition of the problem, the place each one occupies in it and the capacity for intervention they can carry out (Bartolomé et al. 2005) (Bartolomé et al, 2005).

Pardo Buendía (2011) argues that the complexity of climate change requires a change in public and private policies from corrective and legislative ones to preventive, precautionary policies that combine regulatory, scientific-technological instruments and economic incentives, as well as more comprehensive policies that emphasize social participation in environmental management, incorporating the voices of citizens in the resolution of these problems.

In this way, the social representations that the members of society have in relation to climate change would be of great importance, because they would contribute to the knowledge of the perceptions of the actors, of how they understand the problem, what they believe are the best paths to follow in the face of this situation and what they consider to be the most appropriate forms of management in the face of a problem that grows every day and affects the population. Citizen participation is required in the fight against climate change, because it is through this social cohesion that society's constantly changing and modifying problems can be addressed.

Thus, the social dimension of climate change is considered necessary and complementary to the sciences that have been studying climate and its modifications in recent times. In this way, the knowledge provided by these sciences would be further

enriched if the information on how the population understands and interprets climate change and its implications on their lives were also incorporated into the policies for responding to these changes.

Adherence to mitigation and adaptation programs and actions to reduce the vulnerability of the population will also be determined as long as citizens recognize climate change as a real factor that affects their lives on a daily basis. For this reason, it is necessary to bring together the voices of concerned citizens, technologists, scientists, environmentalists, and members of society as a whole, when it comes to taking sides in risk management and natural resource management.

Climate change is the product of a society that is, at the same time, changing, advancing, but in its growth and in its path it is destroying and creating devastation in the natural environment, just as a climatic event creates devastation in the area it touches.

In short, climate change is a social fact since its causes are due to human action and it is precisely societies and their citizens who suffer its consequences through environmental change. But it is also a social fact because its solution depends on radical changes in society.

Conclusions

The following conclusions were drawn from the information gathered:

Climate change is a real issue to which science has devoted thousands of proven studies. It has been determined that changes in the climate are being seen in recent times, which are occurring rapidly and are a consequence of human actions.

There are effects on local production in the study area (for the vast majority of respondents) that can already be seen in the drop in yields due to extreme weather events, pests, and that are very likely to continue to be seen in the future.

The members consulted have clear ideas about the way forward, where changes in conventional production models for agroecological models, forestation, genetic improvement and the creation of laws are fundamental.

It can be said that the social representations or perceptions of the actors consulted on the problem are that there is a problem and that its consequences can be seen in day-to-day life, that these consequences can worsen but that there are ways and means to follow that can mitigate the effects of climate change in the area, which are those already mentioned.

In terms of risk management, governments must understand the dangers caused by climatic interference and begin to focus their actions not only in a reactive manner -once an incident has already occurred- but also, and above all, in a preventive manner. Long-term risk management requires joint actions by local and national governments and international alliances, with the participation of social actors, contributing their views and knowledge on the subject. In other words, a joint, holistic effort is required that reaches all areas.

Although this is an exploratory and descriptive study, which is intended as a first approach to the problems in the area, it should be noted that the voices of the people who participated are very important and knowing their opinions can be very useful in the creation and/or revision of policies, laws, decrees, which can lead to a more pleasant use of the natural resource.

For future research, it would be very useful to have a broader scope through the participation of more stakeholders in the study, providing more opinions and further enriching the subject matter. It would be very interesting to extend the concern of the

research to the school environment, and to consult teachers and students about their views in relation to climate change, in order to understand what is being taught today to the youngest, and how they understand the problem that is raised here.

References

Bartolomé, M., Kisilevsky, G. y Rodríguez, C. (2005). Gestión local del riesgo: Pergamino, una experiencia participativa hacia la gestión del riesgo Ambiental. VII Seminario Nacional de la Red de Centros Académicos para el Estudio de Gobiernos Locales. http://municipios.unq.edu.ar/modules/mislibros/archivos/bartolomkisilevkyrodriguez2005.pdf

Celis A., Caputo G., Bartolomé M., Kisilevsky G., Herzer H., y Rodríguez C. (2005). Primeros pasos hacia una política local que gestione el riesgo de inundación.https://www.ingentaconnect.com/content/iieal/meda/2005/00000062/F0020001/art00010

Chávez-Caiza, J. P., y Burbano-Rodríguez, R. T. (2021). Cambio climático y sistemas de producción agroecológico, orgánico y convencional en los cantones Cayambe y Pedro Moncayo. Letras Verdes - Revista Latinoamericana de Estudios Socioambientales (29), 149-166. https://revistas.flacsoandes.edu.ec/letrasverdes/article/view/4751/376.

Convención Marco de las Naciones Unidas sobre el Cambio Climático (CMNUCC). (1992) https://unfccc.int/resource/docs/convkp/convsp.pdf

Esperbent, C. (2017). El cambio del clima deja su huella en la agricultura. Revista de Investigaciones Agropecuarias (RIA). http://ria.inta.gob.ar/contenido/el-cambio-del-clima-deja-su-huella-en-la-agricultura

González Gaudiano, É. J. (2012). La representación social del cambio climático. Una revisión internacional. Revista Mexicana de Investigación Educativa, 17(55), 1035-1062. https://www.redalyc.org/articulo.oa?id=14024273003

Grupo Intergubernamental de Expertos sobre el Cambio Climático (IPCC). (2014). Cambio climático 2014. Informe de síntesis. Resumen para responsables de políticas. https://www.ipcc.ch/site/assets/uploads/2018/02/AR5_SYR_FINAL_SPM_es.pdf

Jansen, H. (2012). La lógica de la investigación por encuesta cualitativa y su posición en el campo de los métodos de investigación social. Paradigmas, 5(1), 39-72. https://dialnet.unirioja.es/servlet/articulo?codigo=4531575

Meo A., y Navarro A. (2009). La voz de los otros. El uso de la entrevista en la investigación social. Capítulo 5: La entrevista: el antes, el durante y el después. Oicom System. http://metodo3.sociales.uba.ar/wp-content/uploads/sites/169/2014/10/La-voz-de-los-otros.-Capu00EDtulo-5.pdf

Navarro, O. (2013). Representación social del medio ambiente y de la contaminación del aire: efecto de imbricación de dos objetos. Revista CES Psicología, 6(I), 104-121. http://www.scielo.org.co/scielo.php?pid=S2011-30802013000100007&script=sci_abstract&tlng=es

Pardo Buendía, M. (2007). El impacto social del Cambio Climático. Panorama Social, (5), 22-35. https://portal.uc3m.es/portal/page/portal/grupos_investigacion/sociologia_cambio_climatico/Sociology_of_Climate_Change_and_Sustainable_Development/El%20impacto%20social%20del%20Cambio%20Clim%E1tico.pdf

Secretaría de Ambiente y Desarrollo Sustentable de la Nación. (SAyDS). (2015). Tercera Comunicación Nacional de la República Argentina a la Convención Marco de las Naciones Unidas sobre el Cambio Climático.
https://unfccc.int/resource/docs/natc/argnc3s.pdf