Revista Iberoamericana de las Ciencias Sociales y Humanísticas

RICSH

ISSN: 2395 - 7972

https://doi.org/10.23913/ricsh.v10i20.252

Artículos Científicos

Percepciones campesinas sobre los cambios climáticos en Huamuchapa, Guerrero

Peasant perceptions about climate change in Huamuchapa, Guerrero

Percepções dos camponeses sobre as mudanças climáticas em Huamuchapa, Guerrero

Josefina Munguia-Aldama
Universidad Autónoma de Guerrero, México
josefinamunguia@hotmail.com
https://orcid.org/0000-0003-0527-2884

Eleuterio Campos-Hernández
Universidad Autónoma de Guerrero, México
ecamposh@hotmail.com
https://orcid.org/0000-0002-4117-0271

Rosalba Díaz-Vásquez
Universidad Autónoma de Guerrero, México
rosaldiaz@yahoo.com.mx
https://orcid.org/0000-0001-5304-1840

Mario Martínez-Rescalvo
Universidad Autónoma de Guerrero, México
rescalvo@yahoo.com
https://orcid.org/0000-0002-5842-0740

Roxana Reyes-Ríos
Universidad Autónoma de Guerrero, México
roxx_r@hotmail.com
https://orcid.org/0000-0003-4376-4687

ISSN: 2395 - 7972

Resumen

En el presente trabajo se analiza la perspectiva que tienen campesinos de la comunidad de Huamuchapa, municipio de Tecoanapa, Guerrero, México, sobre los cambios del clima (su origen e implicaciones), así como la percepción de indicadores bioclimáticos a nivel local. Mediante una metodología mixta, se realizó un análisis estadístico descriptivo. La información fue recabada mediante observación directa, entrevistas semiestructuradas, recorridos en parcelas y una encuesta sociodemográfica y de producción campesina aplicada a 30 % de las familias de la localidad. Se encontró que estos campesinos tenían un conocimiento incipiente del cambio climático en términos conceptuales, lo que no impide que perciban claramente que el clima ha venido cambiando. Sus explicaciones sobre dicho fenómeno giran en torno a la naturalidad de este, desconocimiento, creencias y actividades antropogénicas. Los efectos del cambio climático son reconocidos en las modificaciones de la temperatura y la precipitación, variables que impactan directamente en el cultivo del maíz y en la falta de disponibilidad de agua para uso doméstico; además, los campesinos reconocen que los elementos que se han modificado son relevantes para la sobrevivencia de la comunidad, la familia y las próximas generaciones. En conclusión, los campesinos viven los cambios del clima, los identifican y los explican de acuerdo con sus experiencias y creencias. De hecho, tienen gran disposición para participar en acciones de adaptación y son conscientes de las consecuencias de sus actos al entorno que los rodea. Frente a las adversidades climáticas prueban y adoptan prácticas resolutivas para disponer de maíz.

Palabras clave: adaptación climática, cambios climáticos, percepción climática campesina.

Abstract

This research analyzes the peasant perspective about climate change by peasant from the community of Huamuchapa, municipality of Tecoanapa, in Guerrero, Mexico, its origin and implications, and the perception of bioclimatic indicators at the local level. We used a mixed methodology, a descriptive statistical analysis was carried out, the information derived from direct observation, semi-structured interviews, tours of plots and a socio-demographic and peasant production survey applied to 30% of the families in the locality. It was found that these peasants had an incipient knowledge of climate change in conceptual terms, which does

not prevent them from clearly perceiving that the climate has been changing and their explanations about it revolve around its naturalness, ignorance, their beliefs and activities anthropogenic. The effects of climate change are recognized in the changes in temperature and precipitation, which have a direct impact on the cultivation of maize, and the lack of availability of water for domestic use, in addition, farmers recognize and reflect that the elements that are they have modified are relevant for the survival of the community, the family and the next generations. In conclusion, peasants experience climate changes, identify and explain them according to their experiences and beliefs, are very willing to participate in adaptation actions, they are aware of the effects considered "damage" to the environment that surrounds them and contribution of their own acts to them. Faced with climatic adversities, they try and adopt decisive practices to dispose of maize.

Keywords: climate adaptation, climate change, perception peasant climate.

Resumo

Este artigo analisa a perspectiva que os camponeses da comunidade de Huamuchapa, município de Tecoanapa, Guerrero, México, têm sobre as mudanças climáticas (suas origens e implicações), bem como a percepção dos indicadores bioclimáticos em nível local. Utilizando uma metodologia mista, foi realizada uma análise estatística descritiva. As informações foram coletadas por meio de observação direta, entrevistas semiestruturadas, passeios em parcelas e levantamento sociodemográfico e da produção camponesa aplicado a 30% das famílias da localidade. Constatou-se que esses agricultores possuíam um conhecimento incipiente sobre as mudanças climáticas em termos conceituais, o que não os impede de perceber claramente que o clima está mudando. Suas explicações sobre esse fenômeno giram em torno de sua naturalidade, ignorância, crenças e atividades antropogênicas. Os efeitos das mudanças climáticas são reconhecidos nas mudanças de temperatura e precipitação, variáveis que impactam diretamente no cultivo do milho e na falta de disponibilidade de água para uso doméstico; Além disso, os camponeses reconhecem que os elementos modificados são relevantes para a sobrevivência da comunidade, da família e das próximas gerações. Concluindo, os camponeses vivem as mudanças do clima, identificam-nas e explicam-nas de acordo com as suas experiências e crenças. Na verdade, eles estão muito dispostos a participar de ações de adaptação e estão cientes das

consequências de suas ações para o ambiente ao seu redor. Diante das adversidades climáticas, eles tentam adotar práticas decisivas para o descarte do milho.

Palavras-chave: adaptação ao clima, mudanças climáticas, percepção do clima camponês.

Fecha Recepción: Marzo 2020 **Fecha Aceptación:** Enero 2021

Introduction

Climate change is currently one of the most relevant global problems due to the environmental phenomena it generates, which impact biodiversity, ecosystems, productive processes, infrastructure and health (Vélez-Torres, Santos-Ocampo, De la Tejera-Hernández and Monterroso-Rivas, 2016). In fact, the World Health Organization (WHO) has indicated that the environment is responsible for a quarter of deaths on the planet, since it causes new diseases that have quadrupled in the last 50 years due to the disturbance of ecosystems (Edwards, García and Walkins, March 25, 2020).

In the specific case of Mexico, its geographical, climatic, orographic and hydrological characteristics contribute to making it one of the most vulnerable areas in the world due to climate change (González, Silva, Ávila, Moncayo-Estrada, Cruz and Ceja, 2017). For example, hurricanes Ingrid and Manuel in Guerrero caused disasters in the Costa Grande and Costa Chica regions with costs of several million dollars (Detta, 2014).

Experts have sufficiently shown that the climate is changing at an unprecedented rate due to anthropogenic activities. Such statements are based on the analysis of indicators[1] globally, which foresee the increase in temperature, changes in precipitation patterns, among others. To which are added those of a qualitative type, in the sense of what is expressed by the European Environment Agency (EEA, 2006).

While it is true that efforts by governments to mitigate and adapt to climate change have been increasing, there is still much to do. In this sense, for Latin American countries, the Economic Commission for Latin America and the Caribbean (ECLAC) maintains that mitigation and adaptation[2] They are inseparable because continuing with greenhouse gas

[1] Un indicador es, comúnmente, la síntesis de un conjunto de datos cuantitativos que sirven para representar un fenómeno complejo, al mismo tiempo en términos cualitativos es "un indicio o señal con un grado razonable de certidumbre" (AEMA, 2006, p. 7), que proporciona evidencias de un evento o un comportamiento.

[2] Se entiende por mitigación a las acciones para reducir la emisión de gases y compuestos de efecto invernadero a la atmósfera. En cambio, la adaptación se refiere a las "iniciativas y medidas encaminadas a reducir la

emissions at the current rate will not only continue to increase the temperature, but will have other effects. Thus, adaptation implies designing measures that respond to the nature of the change, taking into account the conditions of different populations to expand the possibility of improving the quality of life in rural areas (Bárcena, Samaniego, Peres and Alatorre, 2020).

However, perceiving climate change as a threat can vary between populations. The perception of risks depends on knowledge, attitudes, beliefs, judgments and feelings crossed by daily experience, as well as on the willingness to act based on one's own valuation of life, health and assets (Urbina, 2015). Population perceptions are based on descriptive traits, characteristics, or indicators that are not necessarily measurable and that sufficiently detail them.

Approaching these understandings is useful because the climate and its manifestations are the result of how each individual perceives, interprets and appropriates the events; therefore, the concepts of climate are cultural, spatial and historical human constructions (Mariño, 2011; Soares, García and Manzano, 2018) many times shared. This means that each culture has its own conceptions and explanations about the climate.

For example, among the indigenous and peasant populations of Mexico there was a deep knowledge of the climate that allowed them to predict it through the method known as cabañuelas, which is specifically applied in agriculture. In certain groups, specific knowledge about the climate is perceived and predicted from experience through bioclimatic indicators (Ulloa, 2011).

At present, not only the conceptualizations are still necessary to know, but also the actions carried out by the peasants to face the climatic effects, as they become adaptive measures adapted to their needs, on very particular occasions, which are being reconsidered by scientific positions. . This requires understanding adaptation as the actions that citizens take to reduce the weight of adverse effects (Salazar-Ceballos, Freyle, Tamara and Álvarez-Miño, 2016) and as a set of measures that are implemented from below. The consideration is that if what people do works, it is valid to be heard and shared, because —as Bárcena et al. (2020) - "inaction also has costs" (p. 19).

vulnerabilidad de los sistemas naturales y humanos ante los efectos reales o esperados de un cambio climático" (Instituto Nacional de Ecología y Cambio Climático [INECC], 2018, párr.1).

ISSN: 2395 - 7972

Research in the last decade on the different levels of knowledge and perception of climate change around the world has also increased, although the challenge remains to lower the spatial scale (Ferrero, Hernández and Zafra, 2014). Studies on knowledge, practices and beliefs contribute to filling information gaps for the design of public policies, in which the referents of national, regional and local groups must converge (Corona, 2018) towards the search for comprehensive solutions when relevant or towards the definition of particular strategies according to the real conditions. In other words, having information from local studies provides certain advantages, since it is politically easier to propose, implement and assess actions when there is a global agreement (Estrada, 2017).

The research of González et al. Is focused in this direction. (2017), who address the perception or knowledge that the Purépecha indigenous population of the municipality of Chilchota in Michoacán has about climate change. Research results show that the surveyed population recognizes negative changes of climate change in health, economic activities and well-being in the medium and long term.

On the other hand, the study in the community of Ahuihuiyuco in the state of Guerrero reflects how farmers, based on their observations on the relationship between climate and corn cultivation, face contingencies by modifying their actions and converting them into adaptive strategies to mitigate agricultural risk. (Munguia-Aldama, Sánchez-Plata, Vizcarra-Bordi and Rivas-Guevara, 2015).

Several studies have verified that changes in precipitation and increase in temperature are the most recognized indicators, although their presence is assumed from different time periods, some, by the way, very recent (Barrasa, 2017; Ferrero et al., 2014; González et al., 2017; Novión and Estrada, 2011; Pinilla, Rueda, Pinzón and Sánchez, 2012; Vélez-Torres et al., 2016). Special mention should be made of the water and air situation, since ordinary people evaluate them as being of greater risk (Urbina, 2015).

There are other investigations that analyze the perception in urban inhabitants, whose results show that although people conceive climate change as a risk to life, they see it relatively distant from themselves; That is, they believe that its effects have already begun, but in other countries or places, because it is not directly connected with their work, their interpersonal relationships or their material possessions (Martínez, 2015; Novión and Estrada, 2011; Urbina, 2015).

Based on these references, the purpose of this study was to analyze the perspective that peasants from the Huamuchapa community have on climate changes, origin, implications, as well as the perception of bioclimatic indicators at the local level.

Materials and methods

The research was carried out in the town of Huamuchapa, municipality of Tecoanapa, in the Costa Chica region of the state of Guerrero, Mexico. This locality is located between the following coordinates: longitude 99º 19 ’03’ ’, latitude 16º 56’ 39 ’’ and at an altitude of 720 meters above sea level.

The scope is descriptive because it "interprets what is" (Tamayo and Tamayo, 2002), details situations and events. The problem is approached using in a complementary way quantitative and qualitative approach procedures, since its integrative nature is considered methodological pluralism (Ametrano, Vestfrid, Bonaparte, Adaro and Huarte, 2017). A two-stage model was used (Hernández, Fernández, & Baptista, 2002): quantitative in the first and qualitative in the second, although the latter is predominant.

Access to the community was achieved through an agreement with the commissioner after a presentation to the open population on solid waste. Notification of our presence was left to his person.

The quantitative strategy was the survey and it was called the socioeconomic and corn production survey, applied to a sample of 30% of heads of families existing in the locality (168 in total).

Due to heterogeneity in the concentration of the dwellings per block or survey area, and due to the inequality in their size, the blocks of the survey were randomly chosen based on their numbering on the map. In them, using a sweeping technique, those who were in their homes during the tour were surveyed. The information was provided voluntarily by the head of the family, once the purpose of the survey had been made explicit and after a guarantee of confidentiality.

The collection instrument was a standardized questionnaire with 8 sections and 149 variables. The second section collected information on the characteristics of the respondent. The specific section on climate change addressed here included 22 items related to bioclimatic indicators such as changes in temperature, changes in precipitation, extreme events, changes in vegetation and risks for the community, which were investigated using an

assessment scale ordinal assigning a number from lower to higher intensity. The data reflect the perception of the head of the family.

Prior to the application, a pilot test was carried out in another location to validate the quality of the instrument. The final version was applied by students of the degrees in Regional Development, Sociology and Experimental Biology of the Autonomous University of Guerrero. Although the data were processed in the SPSS program, version 22, they are only presented using descriptive statistics because it is a first approach from this vision to said reality.

In the qualitative strategy, the semi-structured interview (Flick, 2007) with key informants and direct observation in plots and houses were used. The interview recovers the voice of the participants (what they know, think and believe in their own words) (Taylor and Bogdan, 2013). These were carried out with seven peasant heads of families who grow corn, all men, because it is unusual for women to take over these tasks. They were chosen by means of a snowball (Cea, 2001) with the support of technological instruments in places such as their house, the plot or the covered field of the town. The central issue of the talks was the cultivation of corn, while its possible damages related to climate changes were only part of the diversity of what was expressed. The conversations lasted from one to two hours continuously or in two sessions.

Key informant participation was also voluntary. Once the intentions of the study were explained to them, the confidentiality and exclusively academic use of their information was guaranteed. In fact, although we cite them in the results, it is not possible to identify them due to the commonality of their surnames among the inhabitants.

Direct observation was carried out without the support of a structured guide, through visits to plots at the time of sowing, dispersal of fertilizer and harvest, as well as in houses during harvesting, shelling and storage of agricultural products. During the tours, a university student was accompanied to reduce the possibility of obstruction by the self-defense group.

The audios and field notes were transcribed into Word. The qualitative information was ordered and classified using codes and thematic categories. From these, significant words, phrases or paragraphs were extracted that were later articulated in an interpretive construction with the quantitative.

Results

We present the findings in two parts: the first exposes the conceptions of climate change and the second the perception of bioclimatic indicators, their effects or consequences in recent years and future perspectives. However, before going into detail, we describe some of the characteristics of the chief and his families. The headship is predominantly male, although 29% corresponds to women, single mothers, widows or abandoned by their partner. In addition, 94% of those surveyed are Catholic and the average schooling is six years (that is, with completed primary school and 21% without schooling). They live in small houses, 45% of which have a single room where a family of five coexists. There were cases with large groups of nine members made up of grandparents, in-laws, uncles, parents, children, and grandchildren.

The essential food is corn: 96% grow it, and they consume an average of four liters per week just for tortillas. The liter has been a conventional measure among the inhabitants of the entity for various products. Some interviewees reported consumption of up to 10 liters of corn weekly, independent of that used for pozole, tamales and other foods.

A relevant issue in relation to the issue of climate change is the use of firewood for cooking by all the families (100%) of Huamuchapa, which is reflected in the cutting down of trees in the area to satisfy this demand.

The concept of climate change, its origin and implications

Although some farmers have heard about climate change, they still do not have a conceptual elaboration with its own content and meaning (in this study we could not recover it), probably because for them it is a subject of very recent discussion and of specific connotation. Even so, the reference to the weather has been a constant in their lives, in different senses and for a long time. In fact, it is common to hear that weather and weather are used interchangeably as synonyms in expressions such as “the weather is changing a lot” or “now the weather is not like before” (Barrera, personal communication, December 10, 2018). Likewise, they tend to give various connotations to the word time: "dry time", "hot time", "rainy time", "dry time", "cold time" (García, personal communication, July 20, 2019).

Climate changes are assumed to be true by 86% of the surveyed inhabitants, which is more clearly identified by men than by women. In this sense, 60% of men accept the existence of noticeable changes in the climate in their locality, a percentage that is reduced to just under half (26%) in the case of women.

The opposite is the case with those who affirm that there are no changes in the climate: here the highest percentage is for men (11%) and only 3% for women. The following opinion summarizes this perception of climate stability: "The climate is as always, as long as I remember it is like that" (Roque, comunicación personal, 10 de agosto 2019).

On the other hand, the most common reasons to justify climate change can be grouped into five categories: for 33% of people the origin is found in the felling of trees by the region's own inhabitants and 26% attributed it to pollution already burning garbage. Likewise, beliefs occupy the third place with 16%: among these, religious women register 5.5% with expressions such as the following: "It is a punishment from God for human misbehavior" (especially of children) or because "it is approaching the end of the world ":" Children mistreat or beat parents "or anywhere" they pick you up, torture, murder or steal, not before "(Ayodoro, personal communication, October 31, 2018). Likewise, 10.5% maintain that "the sun is hotter because it is descending." The declaration of ignorance is also relevant, although it represents 13%. These two types of thoughts (beliefs and ignorance) reach 29%, which reflects the lack of clarity of what happens both in the community and globally.

On the other hand, 10% affirm that climate changes are natural ("that's the way it has always been"), and a small portion (2%) specifically mention that it is due to global warming.

The data, in short, show that the explanations of 60% of the farmers are strictly linked to anthropogenic activities: logging, pollution, burning of garbage and global warming.

We know that the figures used to refer to climate change have been collected over long periods of time (at least 30 years); However, in these societies the perceptions of climatic variations are more recent (mainly for about five years, since only some have had this perception for 10, 15 or 30 years).

When inquiring about what these changes represent in their lives (with valuations ranging from little to considerable), 96% assume that the greatest damages will come for future generations; however, 93% estimate that there are already negative effects on the community, and when it comes to those closest to them (such as family) it reaches 97%. The consequences declared as the most felt are the lack of water, the decrease in harvests and the

presence of pests. In fact, the relationship between climate changes and the presence of new diseases in humans is striking (opinion of 16% of those interviewed).

Recognition of bioclimatic indicators at the local level

The recognition of the peasants of Huamuchapa about the different thermal sensations, as well as their considerations on the losses that the climate changes cause in the crops in each agricultural cycle, are perceived through bioclimatic indicators, constantly referred to between a before and an after. In this sense, 56% feel that the temperature has increased strongly, 38% conceive slight increases and 6% affirm that it is the same according to the time of year.

An unusual event in the past is hot days in winter, such as December, which is perceived as very frequent (30%), occasionally (54%) and non-existent (16%). In addition, 66% affirm that there is a gradual increase in cold days. The cold comes in a "kind of fog that burns the plants and damages the hibiscus flower" (Barrera, personal communication, December 10, 2018). To avoid loss they cut the flower early (tender). This is one of the reasons why planting has decreased.

Regarding precipitation, 41% estimate a drastic reduction in the period, while for 55% it is moderate. In other words, 96% of the inhabitants refer to a decrease in the number of rainy days during the storm that begins in July. This movement of the "sowing time" together with the reduction forces to use other seeds, that is to say, the improved ones of short cycle in substitution of the own ones (denominated by the farmers of native or creole maize). However, improved or hybrid corn is used for sale, not for family consumption because it does not have the characteristics of smell, taste and malleability of the dough that native corn has.

Other modifications in the characteristics of the storm are evident: firstly, there is the lower volume of rainwater observed by 95% of those interviewed, with variations between moderate (56%) and relevant (39%). Likewise, there is a decrease in torrential rain (71%) and an increase in rainfall associated with strong winds and hail (69%): "Before it rained more at night and after noon ... It was a slow rain and for several hours that it penetrated the earth… The river had water all year round… there were swamps "(García, personal communication, July 20, 2019). Now there is less water and "as it does not rain much the land warms up", the river dries up, the swamps disappeared, the "rain lasts until October and

November, but the jamaica flower rots", with the consequent loss or decrease of harvest according to damage. Or very heavy rain falls, “a blow of water that runs off”, it is lost, it is not absorbed into the ground, it is just “a pasón” (Barrera, personal communication, December 10, 2018) that causes damage instead of benefits due to drought or because it is erosive. In addition, "due to the scarcity of water in the river, there are no longer irrigated crops" (García, personal communication, July 20, 2019), which depend solely on the seasonal cycle for corn production.

Drought is the manifestation of the change that most damages the corn crop. Drought is understood as the lack of rainwater for 15 days during the storm. Depending on the days of absence of rain, the baby corn or corn does not develop properly or, ultimately, the harvest is sinister. 68% of the inhabitants consider that they suffer from frequent drought, while 30% maintain that it is relative. Some even claim that for about 15 years there has been “a good year and a bad year” (Meneses, personal communication, July 20, 2019), that is, the conditions are no longer suitable for traditional agriculture and self-consumption.

For its part, the strong winds that settle [3] the corn plant are becoming more frequent for 26%; on the other hand, 66% estimate regularity in its occurrence. If the lodging areas are large or depending on the stage of development in which the corn plant is, the losses are important. It is said, for example, that if lodging occurs, "the strip before jilotear there will be no corn, it gets scared, the corn does not come out, it no longer works" (Victoriano, personal communication, October 31, 2018). These farmers have found that improved corn, in addition to having a shorter cycle, has greater resistance to drought and lodging, so it is a good option for production.

In the cultivation cycle there are four clearly differentiated stages: sowing, harvesting, storage and rest of the soil. Changes in climatic conditions have effects on each of them and direct consequences on the food production of this population.

One aspect observed during the visits is the abandonment of the use of the troje. The barn in this place is not a structure, but a form of storage of the cob with its leaf as a protective cover. The ears are placed in rows in some space inside the house, and lime is scattered to control the presence of pests. This disuse - the farmers suggest - is due to the fact that today

[3] Acame es cuando fuertes vientos voltean hasta el suelo las plantas de maíz; puede solo caer o arrancarse desde la raíz, con la consecuente pérdida del fruto. El viento “las tumba”, dicen los pobladores.

the damage caused by weevils and other insects is increasing. Thus, this practice is being displaced by the storage of corn in grain in metallic or plasticized tanks to which aluminum phosphide is added as an insecticide, known as "the pastilla". The disuse of other agricultural practices such as fallow was also observed; however, it was not possible to determine if this is related to climatic aspects or not.

Other signs recognized by the peasants are the decrease of the common or native vegetation by 49%; in fact, 26% distinguish new plants on their land that are strange to them. "Before there was wild anise, now you can't see it anymore" (García, personal communication, July 20, 2019). The most felt indicator among the inhabitants is the limited availability of water for domestic use; this is assumed as a forceful affectation for 50% and regularly for 46%. In other words, 96% recognize it as a problem.

Few predictive indicators of the climate remain alive or have not been sufficiently investigated in this region. In this regard, it was found that "when the environment is foggy, it is a sign of drought and the presence of pests" during the storm. By misty they refer to days with the presence of dense fog (Chino, personal communication, October 31, 2018).

It is worth highlighting the recognition as improper of their own decisions and activities; This is how one informant puts it, referring to corn production:

> It is no longer cultivated as before, because now it did not give us work, we did not liquidate, not anything, so, nothing else was planted and it was no more cleaned, and right now it is cultivated well for the same reason that, well, now it is You have to pay, you have to add liquid to the mountain and the pests (Barrera, comunicación personal, 10 de diciembre de 2018).

From their self-assessment, they recognize the negative of their actions: “People deviated a lot with the use of liquids” (Victoriano, personal communication, October 31, 2018). They even use the term liquidiar, understood as dispersing agrochemicals to dry out the grass or the "bush" (as they call the weeds in the fields, killers and pest insects), but at the same time they are polluting and destructive of pollinating insects. However, as there are no other options available, not using them implies considerable losses: "A one hectare crop with plague is completely destroyed in two or three days, that is why people are devastated" (Victoriano, personal communication, October 31 2018), “it is no longer the same as before”, “life is no longer the same as before” (Ayodoro, personal communication, January 12, 2019). Thus, agrochemicals have managed to position themselves as a strategic resource even for

these populations. This, added to deforestation that affects precipitation and intensifies heat, are elements that together become a problem with a complex solution.

Discussion

In Huamuchapa two issues are relevant: its conceptualizations, management and implications of time (closely linked to the cultivation of corn) and the perception of climatic indicators (some little documented).

In this society, climate change, as such, is not yet named or endowed with its own content. In fact, perhaps it is not required because even in the scientific communities of the world there is no single position.

However, for the peasants there is time. Time is a central, complex and long-standing, polysemic category. Furthermore, it is polymorphic or polyvalent, and denotes uniform, linear and measurable periods and magnitudes in numerical units, but also qualitatively different, irreversible and unrepeatable cycles, conditions, temporalities and states, such as environmental, atmospheric and productive ones, with a before and a after. One of these forms of time is the weather, which sometimes has the same meaning and at other times it maintains an indissoluble link. The "dry season" and the "rainy season" are two constituent conditions of an individual and at the same time collective annual seasonal calendar, because they determine a specific organization of social life; They adjust and develop specific activities related to the agricultural cycle of corn. Even the decisions to leave and return as agricultural laborers coincide with these times.

The climate is assumed to be changing, with movement and a life of its own; suddenly it seems that nothing can be done against the "natural or divine" order, "a good year and a bad year"; however, their doing is constant: they confront it, anticipate it, devise, plan, act. In an act of commitment to himself, to his families and to his beliefs.

Regarding the perception of indicators, some of our findings coincide with other local studies, although it is worth noting that there are few publications on vegetation. For example, it is known that plants need optimal conditions to thrive and that associated environmental changes can contribute to the disappearance or appearance of species in certain areas. In this sense, almost half of these farmers, due to their extensive knowledge of the vegetation in their environment, report the loss of plants, and three out of ten report the presence of plants never seen before.

It is possible that the rains associated with strong winds and the reduction of the period will cause a decrease in the population of wild plants and the appearance of new species in the fields. These elements as a whole are indications to carry out specialized studies that lead to determine the most suitable type of vegetation, of commercial, nutritional or other utility for the area, or to determine the convenient geographical areas for the maintenance of the species of current community interest. (like corn), since it is a vital resource and its adaptation process has been long. It is pertinent to experiment which native corn is more resistant to these changing circumstances.

The recognition that the climate is changing is evident. It is no longer known how the storm will come. It is hotter and changes in the rain pattern delay its onset, which affects traditional cultivation practices. These perceptions are consistent with several authors (Barrasa; 2017, Soares et al., 2018; Vélez-Torres et al., 2016). However, in our case, although these are peasant perceptions, it is possible to identify levels of detail and effects that could be compared with data from meteorological stations for a more complete interpretation.

Authors such as Soares et al. (2018) emphasize that regardless of the construction of the concept of climate change, at the local level the impact of variations in rainy periods and increased heat is observed, interpreted and felt (Vélez-Torres et al., 2016). In this case, 8 out of 10 peasants consider that climate changes have been more notable in the last 5 years, although there are those who acknowledge that this has occurred for 10 years and up to 30 years ago. This discrepancy in temporality may be due to the age of the informants and their socioeconomic conditions related to the multiple activities they perform.

On the other hand, perhaps the lack of farmland or having a source of water supply for domestic consumption near the home are the reasons why 14% considered that there is no such modification of the climate. Certainly, there are people who see climate changes as a natural event, while to others, even knowing that they are events that cause damage, they seem distant because they are not directly related to their activities or assets, as they explain it. studies on urban perception of climate change (Martínez, 2001; Novión y Estrada, 2011; Urbina, 2004).

For the peasants of Huamuchapa these changes are of utmost importance for the survival of the community, the family and the next generations, which is why it is a vulnerable population. In this sense, a study among peasants in Santander refers to consequences in ecosystems and in future generations, although they can be solved through

collective action (Pinilla et al., 2012). Traditional practices that did not generate environmental impact have almost been lost (eg storage in troje, an activity that was transmitted generationally). The aluminum phosphide to preserve grains has serious consequences on the health and even on the lives of people, if it is not used properly.

In surveys carried out in countries such as the United States, Malta and Canada, it was found that people associate climate change with high temperatures and with health effects (Leiserowitz, Akerlof, De Bono, Vincenti and Calleja, cited by Salazar-Ceballos et al. ., 2016).

In the case of the peasants of Huamuchapa, they explain that these changes are mainly due to the felling of trees, the burning of garbage, pollution, among others, which is similar to that reported by González et al. (2017), although it is worth noting that in the present investigation divine explanations were also found to justify said environmental phenomenon.

Conclusions

Although words such as time and climate are usually used with the same meaning, in Huamuchapa, municipality of Tecoanapa, Guerrero, farmers have a very clear idea of what is happening with the climate and its effects on agricultural production and conditions. environmental issues of your community. In this sense, they consider that the most relevant events have to do with the increase in temperature (94%), changes in precipitation (96%) and the lack of availability of water for domestic use (96%), all which generates uncertainty in the inhabitants. In fact, during the storm they have observed a reduction in the amount of rainwater, a decrease in the days of the period, an increase in torrential rains, the presence of strong winds and droughts, as well as changes in vegetation.

This situation, according to the perception of more than half of these peasants, has anthropogenic origin mainly due to deforestation and pollution, and to a lesser extent to global warming of the planet.

The impact of this translates into a drastic decrease in crops and, in particular, corn almost every two years, hence the risk of these families increases, since this product is strategic for food. For this reason, and to mitigate the effects of changes in precipitation, drought and lodging caused by the wind, they are replacing native maize with hybrids, which, although not beneficial for the conservation of native maize biodiversity, constitutes the only way to guarantee survival.

ISSN: 2395 - 7972

On the other hand, it was also possible to show that the valuation they give to climatic events depends on whether or not they have direct consequences on their lives. For this reason, for some the climatic changes do not represent any problem, so they do not modify their actions; on the other hand, the farmers who are dedicated to the cultivation of corn and other products deeply regret what is happening.

Likewise, as climate changes are occurring rapidly and adaptive processes are slower, it takes time (a complete agricultural cycle) to test and others to secure a result. Thus, the recognition that "time has changed a lot" implies longing for a past with no return of which one is fully aware. In this regard, some recognize that their own actions affect nature and that if this reality is not reversed today, it will be more drastic for future generations.

This type of approach at the local level identified the losses associated with the climate of cultural impact (such as the troje) and of climatic predictors (such as the cabañuelas), as well as the recognition of changes in the vegetation that alter the biological diversity. Likewise, it showed that the most significant element at risk is corn (in particular the native one), a human product that cannot exist without the intervention of men or women, which is why it synthesizes the environment, culture and biological diversity. .

On the other hand, the study demonstrated relevance in the identification of climate changes and resilience in these farmers, who undertake actions with their own resources to face climatic eventualities. It is the need to have food that leads to constant action, although at the same time it shows contradictions, since this procedure involves the use of procedures and products that solve a food problem immediately, but also contributes to its infeasibility. long term.

We cannot conclude without mentioning some potentialities and limitations for this type of work. Undoubtedly, the research possibilities are wide, which can be focused on proposing sustainable energies to reduce logging and pollution. Likewise, inquire about women's knowledge about climate changes, which can range from how they name them to the actions they take to face them. Likewise, deepen the knowledge of adaptive strategies, carry out intervention studies to develop practices and behaviors that are friendly to the environment, as well as find varieties of corn that are more adaptable to these changing conditions, but that preserve their biocultural wealth, which has been generated. through centuries of human labor.

This type of study can be carried out not only in this region, but in any other of the state, since catastrophic climatic events are constant in Guerrero. If a true dialogue of knowledge is achieved between farmers, scientists and authorities, the responses can be really positive.

Finally, in terms of limitations, we can mention the lack of resources for field work and the choice of relevant contacts for community openness. The most relevant thing during the survey was not knowing on the first day that the community had opening and closing times for access established by the self-defense group. Ignorance of community dynamics can be an important limitation. However, none of these aspects was impossible to solve, and it was compensated by the accessibility and trust of the participants.

References

Agencia Europea de Medio Ambiente [AEMA]. (2006). *Conjunto básico de indicadores de la AEMA*, Guía. Ministerio de Medio Ambiente. Recuperado de https://www.miteco.gob.es/es/calidad-yevaluacionambiental/publicaciones/ConjuntoBasicoIndicadores_tcm30-185692.pdf

Ametrano, L., Vestfrid P., Bonaparte, A., Adaro, R., Huarte, F. (2017). Técnicas de Investigación Social. Universidad Nacional de la Plata. Facultad de Periodismo y Comunicación Social, pág. 143.

Bárcena, A., Samaniego, J. L., Peres, W. y Alatorre, J.E. (2020). *La emergencia del cambio climático en América Latina y el Caribe: ¿seguimos esperando la catástrofe o pasamos a la acción?* Comisión Económica para América Latina y el Caribe (Cepal), n.° 160. Santiago, Chile.

Barrasa, S. (2017). Percepción del cambio climático en comunidades campesinas de la Reserva de la Biósfera La Encrucijada, Chiapas, México. *Cuadernos Geográficos de la Universidad de Granada, 56*(3), 44-65.

Cea, D. M. A. (2001). Metodología Cuantitativa. Estrategias y técnicas de investigación social. Editorial Síntesis. España, pág. 415.

Corona, M. A. (2018). El conocimiento, la percepción y disponibilidad para afrontar el cambio climático en una población emergente, los migrantes de retorno. *Estudios Sociales*, *28*(52), 1-17. Recuperado de https://www.ciad.mx/estudiosociales/index.php/es/article/view/578/360

Detta, E. (2014). *Las tres verdades del cambio climático que ya deberías conocer.* Banco Interamericano de Desarrollo [BID]. Recuperado de https://blogs.iadb.org/sostenibilidad/es/cosas3saberdeberia/

Edwards, G., García, A. y Walkins, G. (25 de marzo de 2020) *¿Cuál es el vínculo entre covid-19 y las emergencias ecológicas y climáticas?* Banco Interamericano de Desarrollo [BID]. Recuperado de https://blogs.iadb.org/sostenibilidad/es/cual-es-el-vinculo-entre-covid-19-y-las-emergencias-ecologicas-y-climaticas/

Estrada, P. F. (2017). El calentamiento local en ciudades, mayor al calentamiento global. *Boletín UNAM-DGCS-391*. Recuperado de http://www.dgcs.unam.mx/boletin/bdboletin/2017_391.html

Ferrero, E. L., Hernández, Y. T. y Zafra, C. F. (2014). Percepción latinoamericana de cambio climático: metodologías, herramientas y estrategias de adaptación en comunidades locales. Una revisión. *U.D.C.A Actualidad & Divulgación Científica*, *17*(1), 73-85.

Flick, U. (2007). En Introducción a la Investigación Cualitativa, Ediciones Morata S. L. Madrid, pág. 313.

González, S. Ll., Silva, J. T., Ávila, L. A., Moncayo-Estrada, R., Cruz, G. y Ceja, L. F. (2017). El fenómeno de cambio climático en la percepción de la comunidad indígena purépecha del municipio de Chilchota, Michoacán, México. *Revista Internacional de Contaminación Ambiental*, *33*(4), 641-653. Doi: 10.20937/RICA.2017.33.04.08

Hernández, S. R., Fernández, C. C., y Baptista, L. P (2003). Metodología de la Investigación. Mc Graw Hill. México, pág. 705.

Mariño, N. (2011). Reflexiones sobre la perspectiva cultural en las políticas de cambio climático en Colombia: un acercamiento al análisis cultural y espacial de las políticas públicas. En Ulloa, A. (ed.), *Perspectivas culturales del clima* (pp. 495-527). Bogotá, Colombia: Universidad Nacional de Colombia, ILSA.

Martínez, C. A. (2015). *Percepción pública del cambio climático en México* (tesis de maestría). Universidad Iberoamericana, México. Recuperado de http://ri.ibero.mx/handle/ibero/698

Munguía-Aldama, J., Sánchez-Plata, F., Vizcarra-Bordi, I. y Rivas-Guevara, M. (2015). Estrategias para la producción de maíz frente a los impactos del cambio climático. *Revista de Ciencias Sociales, 21*(4), 538-547.

Novión, A. C. y Estrada, G.C. (2011). Percepción de los efectos vivenciales del cambio climático en una muestra de habitantes urbanos australes. *Magallania, 39*(1), 93-102.

Pinilla, M. C., Rueda, A., Pinzón, A. y Sánchez, J. (2012). Percepciones sobre los fenómenos de variabilidad climática y cambio climático entre campesinos del centro de Santander, Colombia. *Ambiente y Desarrollo, 16* (31), 25-37.

Salazar-Ceballos, A., Freyle, N., Tamara, G. y Álvarez-Miño, L. (2016). Percepción sobre riesgo al cambio climático como una amenaza para la salud humana, Taranga, Santa Marta, 2014. *Luna Azul*, (43), 102-127. Doi: 10.17151/luaz.2016.43.6

Soares, D., García, A. y Manzano, L. R. (2018). Cambio climático. Percepciones sobre manifestaciones, causas e impactos en el Distrito de Temporal Tecnificado Margaritas-Comitán, Chiapas. *Ciencia Ergo Sum*, *25*(1). Recuperado de http://www.redalyc.org/articulo.oa?id=10453975001

Tamayo y Tamayo, M. (2002). El proceso de la investigación científica. Limusa. México, pág. 440.

Taylor, S.J. y Bogdan, R (2013). En Introducción a los métodos cualitativos de investigación. Paidós. España, pág. 343.

Urbina, J. (2015). La percepción social del cambio climático en el ámbito urbano. En Ortiz Espejel, B. y Velazco Samperio, C. (coords.), *La percepción social del cambio climático. Estudios y orientaciones para la educación ambiental en México* (pp. 22-36). Universidad Iberoamericana de Puebla. Recuperado de http://repositorio.iberopuebla.mx

Ulloa, A. (2011). Construcciones culturales sobre el clima. En Ulloa, A. (ed.), *Perspectivas culturales del clima* (pp. 33-53). Bogotá, Colombia: Universidad Nacional de Colombia, ILSA.

Vélez-Torres, A., Santos-Ocampo, A., De la Tejera-Hernández, B. G. y Monterroso-Rivas, I. A. (2016). Percepción del cambio climático en los agricultores periurbanos y rurales del municipio de León, Guanajuato. *Geografía Agrícola*, (57), 7-18. Doi: 10.5154/r.rga.2016.57.008

Rol de Contribución	Autor (es)
Conceptualización	Josefina Munguia-Aldama (Grado de contribución principal) Eleuterio Campos-Hernández (Grado de contribución principal) Rosalba Díaz-Vásquez (Grado de contribución igual) Mario Martínez-Rescalvo (Grado de contribución igual) Roxana Reyes-Ríos (Grado de contribución igual)
Metodología	Josefina Munguia-Aldama (Grado de contribución principal) Eleuterio Campos-Hernández (Grado de contribución principal) Rosalba Díaz-Vásquez (Grado de contribución igual) Mario Martínez-Rescalvo (Grado de contribución igual) Roxana Reyes-Ríos (Grado de contribución igual)
Validación	Josefina Munguia-Aldama (Grado de contribución principal) Eleuterio Campos-Hernández (Grado de contribución principal) Rosalba Díaz-Vásquez (Grado de contribución igual) Mario Martínez-Rescalvo (Grado de contribución igual) Roxana Reyes-Ríos (Grado de contribución igual)
Análisis Formal	Josefina Munguia-Aldama (Grado de contribución principal) Eleuterio Campos-Hernández (Grado de contribución principal) Rosalba Díaz-Vásquez (Grado de contribución igual) Mario Martínez-Rescalvo (Grado de contribución igual) Roxana Reyes-Ríos (Grado de contribución igual)
Investigación	Josefina Munguia-Aldama (Grado de contribución principal) Eleuterio Campos-Hernández (Grado de contribución principal) Rosalba Díaz-Vásquez (Grado de contribución igual) Mario Martínez-Rescalvo (Grado de contribución igual) Roxana Reyes-Ríos (Grado de contribución igual)
Curación de datos	Josefina Munguia-Aldama (Grado de contribución principal) Eleuterio Campos-Hernández (Grado de contribución principal) Rosalba Díaz-Vásquez (Grado de contribución igual)

	Mario Martínez-Rescalvo (Grado de contribución igual) Roxana Reyes-Ríos (Grado de contribución igual)
Escritura - Preparación del borrador original	Josefina Munguia-Aldama (Grado de contribución principal) Eleuterio Campos-Hernández (Grado de contribución principal) Rosalba Díaz-Vásquez (Grado de contribución igual) Mario Martínez-Rescalvo (Grado de contribución igual) Roxana Reyes-Ríos (Grado de contribución igual)
Escritura - Revisión y edición	Josefina Munguia-Aldama (Grado de contribución principal) Eleuterio Campos-Hernández (Grado de contribución principal) Rosalba Díaz-Vásquez (Grado de contribución igual) Mario Martínez-Rescalvo (Grado de contribución igual) Roxana Reyes-Ríos (Grado de contribución igual)