Article

Effects of climate change: an analysis in the Wayuu territory in the north of La Guajira, Colombia

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Abstract

Climate change is a phenomenon that causes intense environmental changes that modify the natural conditions in the territories, which affects the Wayuu indigenous people in the Alta Guajira region in the municipality of Uribia, where prolonged droughts put the ethnic group at risk, added to the institutional non-observance and the absence of adaptive measures according to the ways of life of the Wayuu people. It was sought to interpret the effects of climate change in the Wayuu territory, through a participatory process of environmental education in the community of Guerrero in northern Colombia, articulating the ancestral knowledge of the uses and customs regarding water with measures of adaptation to climate change for the exploitation and sustainable use of water resources. The study was carried out from May 2019 to May 2020, it followed the ethnographic method, semi-structured interviews were applied and spaces for the exchange of knowledge were developed through meetings with the community. The problems around water and the identification of risk scenarios to climate change were diagnosed, adaptation measures to climate change according to the cultural context were proposed, with the participation of the Wayuu in their forms and times.

Keywords: adaptation, climate change, territory, Wayuu.

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Introduction

Climate change is a process of changing atmospheric conditions resulting from human activities (direct and indirect), the Organización de las Naciones Unidas (1992) it poses a challenge for Indigenous communities, who are mostly affected by the effects of the climate in regions such as Latin America (Yana, 2008). In the extreme north of Colombia, the Wayuu ethnic group, from their own forms, explains these changes and the effects on cultural practices and manifestations. These particular characteristics of the territory are the ones that, in the social context, generate relationships or perceptions about the environment in which they live (Ulloa and Prieto, 2013).

The territory of the peninsula of La Guajira has been occupied ancestrally by the Wayuu ethnic group, although they have survived the semidesert conditions, at present, the production of food in the driest months is limited by the lack of water, which compromises the food security of the ethnic group and exacerbates the scourge of malnutrition in children. This is reaffirmed by the Comprehensive Climate Change Plan of the department of La Guajira (PICC Guajira, for its acronym in Spanish), Corpoguajira and Asocaribe (2018). This situation is of great concern and is reaffirmed by the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM, 2015), as they project an increase in temperature of 0.9 °C for the period between 2011 and 2040 and a decrease in rainfall of 14.5% in the same years, in this scenario, the temperature would increase by 2.3 °C throughout the territory until 2100 and there would be a decrease in rainfall of 20.02%.

To achieve effective processes of adaptation to these climate changes, environmental education is used as a transversal instrument, for Flores (2013), environmental education is possible when organized actors structure activities that improve the environment. For her part, Sauvé (2013) emphasizes that the ethnographic current can inquire about the solution of the environmental problem from a cultural context.

Because of this, each culture has different ways of knowing, interpreting, perceiving, representing, acting and reacting to atmospheric weather and climatic phenomena and changes, which are linked to particular cultural conceptions, located in specific places (Ulloa, 2014). For the Wayuu, all these forms are linked in the deep relationship they have established with the territory and nature. For the Wayuu, the territory is the body of *Mma* (mother earth), a sacred space where their ancestors rest (cemeteries) and origin of the clans and its correspondence with the rain (*Juya*) (Junta Mayor Autónoma de Palabreros, 2013; Mesa Técnica Departamental de Etnoeducación Wayuu-MTEW, 2009).

So, they have learned to live with nature to the point that they do not consider it something apart from their society but rather part of it (Escobar, 2000). Based on this, the effects of climate change were interpreted to propose adaptation measures that seek to value these relationships with the territory and nature for participatory construction in Indigenous communities.

In the local Wayuu context, ethno-educational models that consider uses and customs have been established as an important tool to address the issues of education and learning in the ethnic group, based on their own knowledge and integrative strategies to facilitate the educational process in the

Wayuu people. The *Anaa akua'Ipa* project (Mtdew, 2009) is an example of this, likewise, other ethno-educational projects have incorporated ancestral knowledge for adaptation and awareness of climate change using the Wayuu ecological calendar, a strategy developed in a public institution of the department of La Guajira with high school students (Guerra, 2019).

In this paper, the relationships of the Wayuu with their environment were interpreted, identifying their current problems regarding water. From this perspective, it was investigated how they conceive the phenomenon of climate change in their territory and the degree of risk due to climate change that the Wayuu community has, seeking to build adaptation measures to climate change from the reading of the territory and the sociocultural environment, recognizing the influence of the West, as well as the Wayuu uses and customs.

Materials and methods

The research has a qualitative approach, for Hernández *et al*. (2010), this approach has elements that allow exploring phenomena in depth, the results are extracted from the data, and it is conducted in natural environments, they also indicate that it is a recurrent process and that it analyzes multiple subjective realities and has as benefits the amplitude of the meanings, the interpretative richness and it contextualizes the phenomenon. It was developed under the current of environmental education of the ethnographic type since it adjusts to the cultural context and takes elements of the resolutive current as it intends to respond to the incidence of an environmental problem. Qualitative techniques such as participant observation, in-depth interviews and documentary review were used to collect information. The study area is located north of the department of La Guajira in the municipality of Uribia, in the Wayuu community of Guerrero.

Environmental education workshops were held, which were focused on training and information on issues of climate change and in these workshops, spaces for cultural exchange were opened, which were developed in accordance with the own ways of intervening with the Wayuu ethnic group, giving rise to the two visions regarding the topics that were addressed in each workshop. This allowed carrying out a construction of dialogue of knowledge and reaching a consensus between the two visions, where the indigenous worldview was respected and learned, but which was also complemented through the Western form, and consensual knowledge was built.

The themes addressed in the workshops were taken from the AbC Community-based Adaptation Guide (MADS, 2013). Three moments of the study were considered, as shown in Figure 1. For the determination of the risk due to climate change in the community of Guerrero, aspects about the territory and water resources were selected according to the illustrative guide on the analysis of territorial vulnerability to climate change (CAR, 2018) adapted to the context of the community, for this reason, the matrices were made with the following aspects: water and water resources, productive sectors (livestock farming and agriculture), disasters (increase in temperature and decrease in precipitation and increase in precipitation) and culture. Climate change risk (Ccr) contains values that are determined by the product of the threat and the vulnerability.

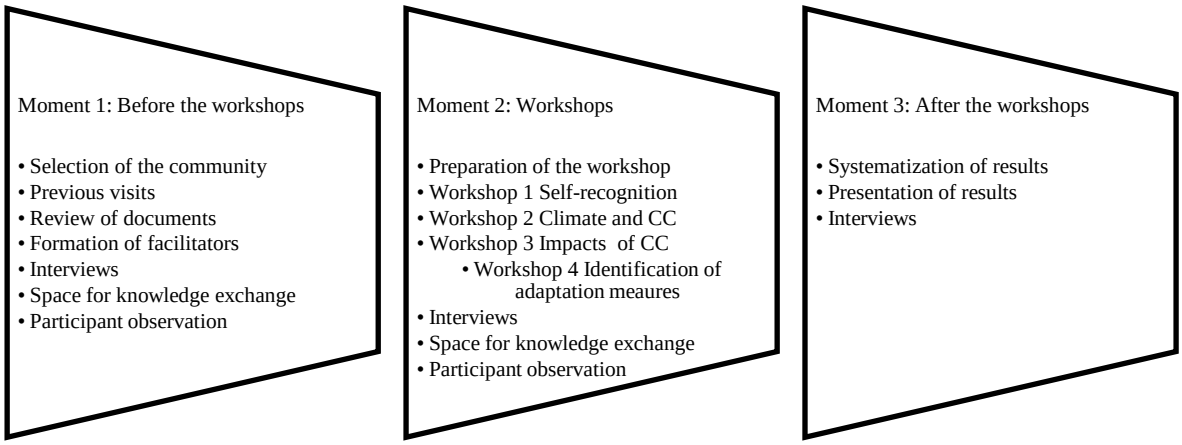

Figure 1. Moments of execution of the study are shown with the subitems that each of them presents. Adjusted ABC guide. Source: Adjusted AbC adaptation guide (MADS, 2013).

Results and discussion

Diagnosis of the sociocultural dimension of water in the Wayuu community of Guerrero

In the sociocultural dimension, it was found that the Wayuu Indigenous people use water in their different daily activities, which mark great importance within the culture, water is used in the following rituals, which are described below.

Bleaching or confinement

One of the most important rituals is the bleaching or confinement of the *Majayut* (miss), this symbolizes the passage from girl to woman, in the process the *Majayut* cannot be seen and only her mother or aunts can visit her, during this time they teach her to weave and other trades, they subject her to cleaning rituals where water is used to make plant drinks. Among these plants, Ortiz (2014) mentions that the *Jawapi*, *Kaswo'u* and *Palisse* serve for the cleansing of the body, which is why the woman receives several baths during the day and night. Benedicta Uriana affirms that this practice has been modified. 'Previously, the confinement took up to two or three years, but now the maximum it takes is a month, and sometimes not even that, the custom has been lost' (interview-September, 2020).

Wakes

As expressed by the inhabitants of the community of Guerrero, the first and second wakes is a space for the reunion of the relatives of the deceased, who in their sadness gather to celebrate and honor the passage to *Jepirra* (place where the deceased go in Cabo de la Vela), this implies obtaining food (male and female goats), *chirrinche* (traditional drink) and water for the preparation of foods such as corn *chicha* (fermented beverage) and other activities, wakes last several days within the Wayuu community.

Burial

Rituals are performed before the burial, where water with salt is used in the washing of the body of the deceased, 'the deceased sits in a chair and some of us, some woman in their family bathes them, sometimes as the deceased is very heavy, we need the help of a man', expresses Benedicta Uriana (interview-September, 2020). This is confirmed by Sara Ruiz Jusayú: 'sometimes men in the community are also responsible for preparing the deceased when they die naturally, it can be their nephew or a son' (interview-September, 2020).

This statement differs from published texts on the burial ritual, where it is identified that only women can participate in the practice of a burial. The person who prepares the deceased must have certain care during a period of 40 days, affirms Henry Cambar Palmar: 'we cannot have sexual relationships or eat anything roasted or roasted goat or roasted arepa, nothing, because we must take care of ourselves so that the deceased does not have any ties with us' (interview-September, 2020).

Call to the rain (*Juyá*)

Another of the rituals that the community of Guerrero identifies and performs in times of difficult drought is the call to rain, the ritual consists of performing the *yonna* (typical dance) and playing the drum to implore *Juyá* (rain) its prompt arrival.

House building

About this, Benedicta Uriana said: here in the community, we make the houses from mud, clay and sometimes we use straw for greater consistency in the mixture, the house is very important for us because here we protect ourselves, and we have our children and we do practically everything here (September, 2020).

Water and the Wayuu woman

The Wayuu woman plays a fundamental role around water within the society, she is in charge of carrying out most of the activities that involve the use of the resource, from the cooking of foods, collection at the source of supply, transport in *pimpinas* (clay containers) and storage in the house. Women in the community of Guerrero recognize their main role within society and their contribution to the community in which they live; however, in the community, the role of collecting water does not belong only to women 'here in the community, we all collect and look for water, from myself to children, adults, anyone can go to the *jagüey* (artificial well), the stream or the pool' (Luis Emiro Palmar-September, 2020). This statement differs from what is said about the Wayuu in that it is pointed out that the collection of water is only done by women and children.

Hygiene practices

It was identified that, in the kitchen, each person has their container from where they drink water, in the rituals of preparation of the deceased, and the use of soap and detergent for the cleaning of kitchen utensils, clothes and containers for collection, transport and storage of water was noticed.

This reflects changes in practices as narrated by Benedicta Uriana, 'previously, the old tell that they also used the heart of the cardon to clean the utensils and we even used it as a shampoo for the body and hair' (interview-September, 2020).

Climate change risk and adaptive capacity in the community of Guerrero

For the Wayuu, knowledge is transmitted to the new generations from the collective memory, which is why the construction of the memories of the climate and the natural manifestations regarding water was made from the Wayuu cosmology in the community of Guerrero. The construction of the climate memory of the community of Guerrero in the period of one year, May 2019-May 2020, allowed identifying and interpreting the interactions of the community with the climate (Table 1).

Table 1. Climate memory matrix, community of Guerrero. March 2020.

Event	Months	Impact	Direct consequence	Direct consequence on the community
Drought	Dec. Jan. Feb. Jun. Jul. Aug.	Rainfall decreases	The *jagüey* dries up	There is no water for domestic use
Drought	Dec. Jan. Feb. Jun. Jul. Aug.	Rainfall decreases	The *jagüey* dries up	There is no water for animals
Drought	Dec. Jan. Feb. Jun. Jul. Aug.	It does not rain	Pastures dry up / do not grow	There is no food for animals
Drought	Dec. Jan. Feb. Jun. Jul. Aug.	It does not rain	No produce is grown (occasionally)	There is no food
Heavy rain	Sep. Oct. Nov.	Roads are damaged	Roads are damaged	Travel to urban centers (Uribia/Maicao) is difficult
Rain	Sep. Oct. Nov.	The stream fills up	The stream fills up	The community can collect water
Rain	Sep. Oct. Nov.	Pastures and crops grow	There is food for the community and animals	There is food for the community and animals
Rain	Sep. Oct. Nov.	The *jagüey* fills up	Water is available	Availability of water for domestic use

Workshop of climate memories (2020).

In La Guajira, there are two seasons, rainy and dry, hence the events that the Wayuu relate are only related to them. In times of drought, the best option of supply is through tank trucks and the use of the community pool, the community recognizes that ancestral practices such as the use of *casimbas* (dams in riverbeds) has been lost over time, they recognize that, previously, crops such as beans, corn and wheat could be sown, but currently it is a practice that has been lost; however, they identify that when the rains are long some inhabitants sow in the community. On the other hand, in the rainy season, the great value of the rain on the territory is identified, it is associated with abundance, since the *jagüey* fills up, the stream flows again, the pastures for the animals grow and they can count on water availability for the development of all their activities.

Natural and ancestral manifestations of the climate associated with water in the community of Guerrero

Indigenous peoples relate to the climate through conceptions, ritual practices and symbolisms associated with specific meteorological phenomena (Ulloa, 2014). This workshop allowed understanding the culture-nature relationship, Table 2, which allows establishing the influence that these non-human actors exert on their way of life and how, from their ancestral beliefs, they constitute the society in which they live. Although from the perception of the climate of the community, the climate has changed and therefore they express phrases such as 'it does not rain like it used to', 'that was before when it was possible to sow', 'now, it rains very rarely', the explanation from the worldview was based on 'it is a punishment from God because there is a lot of evil in the world'. But there were also contributions from the youngest in search of that explanation in which it was mentioned 'it is the fault of climate change'. When approaching the reason for this response, it was clarified that this knowledge is the product of the information they have received and of the cultural exchange with the West by being in urban centers and having access to the media (Table 2).

Table 2. Natural manifestations matrix, community of Guerrero. March 2020.

Natural manifestations associated with water		
Manifestations	Behavior	Meaning
Southern lapwing	Song	It is going to rain
Rainbow	It appears in the sky	The rain stopped
Dragonflies	They appear/they are seen	It is going to rain/they are emissaries of Juyá
Lizard	They emit sounds	It announces that it is going to rain
North wind	The wind is cold	It indicates that the rain is coming
Birds in the sky	They fly from the sea (Gulf of Venezuela) to land	It is going to rain
Black clouds	They are seen in the direction of the sea (Gulf of Venezuela)	It is going to rain
Black clouds	They are seen in the hills of kitchens	It does not rain in the community
Ants	They riot on the ground and trees	It indicates that it is going to rain
Wind	The speed of the wind stops or decreases	It is going to rain
Wind	Winds with very strong speed	They indicate the beginning of the drought
First days of the year	Occurrence of small rains (dew)	Behavior of the year around the rain
Palouserray bird (fork-tailed flycatcher)	It is seen when rain approaches	It indicates that it is going to rain
Waspirray bird	It is seen when rain approaches	It indicates that it is going to rain
Jutpa ́bird	It sings to call the rain	They ask the sky for water
Ruddy ground dove (*Wawatchi*)	Songs and flutters	They ask the sky for water

Workshop of natural manifestations of climate (2020).

The knowledge of the nature-society-environment relationship in the Wayuu community allowed having a clear conception of the relationship of the community with the actors of the climate and how they influence society, and as Vargas (2015) puts it, the process of environmental education starts from this recognition from their worldview. In the study, the development of these workshops sought to raise awareness of a global problem such as the CC and as Alvear-Narváez (2013) points out, to understand the role of environmental education in facing the problem.

Climate change risk in the community of Guerrero

From its worldview, the Wayuu ethnic group seeks to explain the occurrence of climatic phenomena that occur in its territory, and these are based on the construction of the interaction with these phenomena through the years (Paz, 2016).

Table 3 shows the results for the risk of climate change in the community of Guerrero. For the aspect of water and water resources, there is a very high risk (10) and it is linked to the absence of permanent water sources for the supply in the community. For the productive sector (livestock farming and agriculture), there is a (15) very high and (9) high risk, respectively, and these are related to the lack of sustainability actions in the breeding of livestock in terms of feed, which is very dependent on pastures and the need for water for its growth, and the limited agriculture that is carried out in the community.

Table 3. Matrix of assessment of the risk of climate change on aspects of the territory around water.

Aspects about the territory	Cct	Ccv adjusted value	Ccr	Magnitude of CC impacts
Water and water resources	2	5	10	Very high
Productive sector (livestock farming)	3	5	15	Very high
Productive sector (agriculture)	3	3	9	High
Disasters (increase in temperature and decrease in precipitation)	3	5	15	Very high
Disasters (increase in precipitation)	1	3	3	Low
Culture	2	5	10	Very high

The risk for the aspect of disasters (increase in temperature and decrease in precipitation, and increase in precipitation) is (15) very high and 3 (low), the first conditioned to the lack of actions aimed at risk management in the territory and the null implementation of government policies in the community and the second is also due to the causes already mentioned but it is favored by the morphology of the terrain.

Climate change adaptation measures according to the cultural context

Knowing the risk of climate change allows identifying what aspects to work on to propose adaptation measures that seek to reduce vulnerability in the community. Therefore, they were built considering the results obtained from the risk matrix, but also considering the uses and customs of the Wayuu.

Adaptation measures proposed by the community from the uses and customs

Once the workshop on adaptation measures was developed, the community was trained in the subject and they proposed some measures that they considered necessary for adaptation to climate change in their community, for this the vulnerability on the aspects of the territory was considered. These results are shown in Table 4.

Table 4. Matrix of adaptation measures proposed by the community.

Aspect about the territory	Proposed measure	Expected impact	Actors to be involved
Water and water resources Culture	Construction of an underground well. Repair of the existing windmill. Conduction system to each house.	Permanent availability of water	Community Private company Government institutions
Productive sector (livestock farming)	Buy water by tank truck or get it from a well		
Productive sector (agriculture)	Bring water from the stream or a well		
Disasters (increase in precipitation)	Repair of the tracks when it rains a lot	Improvement of the mobility	Government institutions

Through the workshop technique as a space for the exchange of knowledge, the Wayuu participants were asked about two aspects: the ways to face drought and how to resume ancestral practices to reduce thirst and hunger, finding the following.

How can drought be better dealt with?

José Saúl Palmar said: 'the best thing that can be done because the rain is no longer like before is to make wells (underground wells to extract water), we can get water from there, those wells are durable, other communities have them and it has been useful for them' (interview-September, 2020). The economic needs prevent the community from maintaining the windmills, this is expressed by Henry Palmar: 'here in the community, there is also a (wind) mill, but it is damaged, when it worked it gave us water for the animals' (interview-September, 2020). And as a sample of the permeability of the West, Karen Cambar affirms 'what we want is that the water reaches our homes, not to have to go so far to look for it' (interview-September, 2020). The elders of the community have expressed how the Wayuu found a space for relationships in the long walks to look for water.

How would it be possible for them to be able to cultivate again and for the animals not to suffer from thirst and food in times of severe drought?

Henry Palmar said: the only way for us to cultivate again is that the rain is like before, because now it hardly rains and it is not good, that (the lack of rain) does not allow sowing anything because everything dies, if we could have water all year round or bring it from a well or stream, we could cultivate (interview-September, 2020). For Leiner Salas: The goats, sometimes we take them to the

jagüey or to the pool, but sometimes there is no water there, and we must go out to look for water further up, I think the only way is to buy water in a tank truck or else our animals will die of thirst (interview-September, 2020).

The case study with the Wayuu community of Guerrero demonstrates the success of social participation in building solutions together. This coincides with what was stated by García (2015) on educational strategies with communities as a starting point for mitigation and adaptation to CC and by Lalladares and Rivadeneira (2014) on the importance of environmental education of Indigenous peoples to act against the problem of CC.

Synthesis of adaptation measures

The measures proposed in a technical way were presented to the community and put into consideration for their knowledge and approval, the collection of these adaptation measures from the uses and customs was complemented with the proposals from the technical side, taking the experiences in Peru (Chirapaq, 2011). However, it was evident that the vision of the Wayuu is fragmented and closely linked to the ideas of the West. For this reason, what Ulloa (2014) stated about the cultural orientations for the actions that are visible in the territory and the changes of the climate regains value. Including educational processes as pointed out by Duque Quintero *et al*. (2014), by stating that environmental education processes help to know the collective rights over natural resources.

In the community of Guerrero, these rights are exercised over land tenure and the demand for water solutions is seen in purely Western solutions. In this regard, Cornejo and Duran (2018) infer that the modernization of indigenous peoples must be taken into account as part of their history and that they should not be deprived of modernity and left immersed only in the confines of nature, which is why the Wayuu indigenous people recognize the new conceptions of the environment in which they live, this vision of the Wayuu can be supported by the presence of projects of this type (underground wells, windmills, among others) in the territory, which have been developed and that, in some cases, have managed to bring water to some communities in the department of La Guajira.

These measures are focused on reducing vulnerability and increasing the adaptive capacity of the community of Guerrero, for this, it is necessary the involvement of the institutions: municipal, departmental entities, private companies and the community for the implementation of these measures; where it is possible to provide contemporary solutions respecting their uses and customs, as mentioned by Cornejo and Duran (2018).

Conclusions

This process of environmental education based on the culture-nature relationship allowed knowing, from the Wayuu worldview, the ancestral relationship that they have had with the environment, it helps to understand the symbolisms, practices and rituals around water and the importance of this allowed understanding that climatic phenomena and their associated deities are not alien to the Wayuu society and act as regulators of their behavior in society by being part of it. The spaces of

cultural exchange within the environmental education workshops made it possible to understand, discuss and provide feedback on both the Wayuu vision and the vision of the West in the search for effective solutions of adaptation to the CC, in a space of intercultural dialogue.

The interviews allowed establishing how, from the local, the Wayuu perceive the phenomena around them and how they find similarities and/or differences with respect to activities developed by the Wayuu of other areas of the department of La Guajira and their ancestors, that the natural environment affects the cultural environment and that relations with the West have influenced the decision-making of the Wayuu; that is why the Wayuu do not propose adaptation mechanisms linked exclusively to ancestral uses and practices, which explains that they have been influenced by the ideas of the West, where they reaffirm the most technically appropriate solutions for the territorial context and climate changes.

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