

PERCEPTIONS OF CLIMATE CHANGE AND ECOLOGICAL COMMITMENTS OF LOCAL COMMUNITIES IN THE MBINGA-SUD GROUPING IN KALEHE, D. R. CONGO

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Abstract

The objective of this study was to explore the perceptions of climate change and ecological commitments of local communities in the Mbinga-Sud group, in the Buhavu chiefdom in the Kalehe territory in South Kivu, to emerge from the responsibilities of the power's communities, local communities, and individual inhabitants in the face of climate change and the need to act in an environmentally efficient manner. This exploratory study was conducted from 50 respondents who experienced the flood of 2008, 2010, and 2014 in five villages (Bushushu, Chishenyi, Luzira, Nyambasha, and Nyamukubi) of Mbunga-Sud territory. The interview guide was used to collect the data to determine their perceptions of the nature of climate change and their propensities to act or not act ecologically. The majority of respondents (80%) expressed that climate change was a severe problem and to human activities contributing to climate change. The respondents (85%) showed that the intense heat and cold waves, strong winds, heavy rains, thunderstorms and floods, landslides were more frequent and more severe for the weather than in the last decade. The results also showed that the causes of these disasters were human activities' nature and the natural predisposition of the area itself with the constraints that remained brakes for ecological transition. Respondents were not aware and had little social influence on this subject. Therefore, this study shows a growing responsibility of public authorities in climate change and in need to act t intervene when there is still time. Thus, young people's education as a trigger for ecological commitment must be the hub to change things in the future.

Keywords: Climate change, Perceptions, Ecological commitments, Local community, Kalehe.

INTRODUCTION

The notion of climate change is defined "as being changes attributed directly or indirectly to human activity altering the composition of the global atmosphere and which are in addition to the natural variability of the climate observed during comparable periods" (IPCC, 2007). Moreover, climate change and its consequences are now recognized as one of the most significant challenges on the planet (IPCC, 2007; Ali et al., 2011; Bruno, 2012; Cheng et al., 2014). Climate change and its impacts are now a primary concern of researchers, decision-makers at various levels, and local populations who are constantly affected by this phenomenon. Climate change is a new phenomenon, which is added to those of climate

variability, which, in turn, results from the natural evolution of the climate. Thus, climate variability denoted variations in the environment at all temporal and spatial scales other than those of particular meteorological phenomena attributed directly and indirectly to human activity (modify the composition of the global atmosphere, and]the natural variability) and observed during comparable periods (Shi et al. al, 2015).

The 2007 IPCC report ensured that the warming of the climate system is unequivocal. We already noted, across the globe, a rise in the average temperature of the atmosphere and ocean, widespread melting of snow and ice, and the rising global intermediate level of the sea. Several risks were directly linked to climatic conditions: storms, droughts, forest fires, floods, or heat waves. This 2007 IPCC report notably predicted a change in wind regimes, precipitation, and specific aspects of extreme phenomena. Climate change is a constraint experienced in the present and in the plural among local communities in the territory of Kalehe. At present, because this phenomenon, often linked to a distant horizon, is already having effects felt in specific communities as an abnormality order. In the plural, the concept of climate change encompasses a rural person in Kalehe cannot be reduced and is not mainly the classic trend increase in temperatures. Seasonal shifts, pockets of more prolonged droughts, more intense floods, more uncertain rainfall, landslides: these are the climate changes that local communities are experiencing daily in more than one country at the moment (UNDP / Comrec, 2009).

In the territory of Kalehe, the main effects resulting from climate change and climate variability are increases in violent precipitation, causing an increased risk of flooding, mudslides, or landslides. More frequent; decrease in rainfall, which may accentuate the effects of soil movements, particularly the phenomenon of shrinkage-swelling of clay soils; rising lake levels can lead to coastal flooding and increased erosion from storms rising water levels. Due to its geographical location and its very rugged terrain, particularly in its western part, the Mbinga -South grouping is very exposed to natural disasters. The UNDP /Comrec (2009) indicate that factors that perversion the climate resulted from human activities such as deforestation, anarchic constructions, population movements, etc. Over the past two decades, to cause disasters of various kinds, primarily floods, erosions, landslides, earthquakes, landslides.

Disasters linked to meteorological conditions were recorded repeatedly for more than two decades; the torrential rains regularly causing the overflowing of rivers, floods, torrents, and erosion and landslides that take away houses, destroy crops and infrastructure, etc. Villages built in the lowlands and on the coast are the most generally affected. The very advanced deforestation in and around urban areas, and the construction of dwellings on non-viable sites (on steep slopes, in river beds in lowlands, etc.), particularly following intense demographic pressure, are expected. The basis of the increase in populations' vulnerability in the face of this hazard (UNDP / Comrec, 2009).

Rains with hailstorms are frequently recorded and cause enormous damage to crops and, often also, to homes. Damage caused by strong winds is more frequent in some regions of this grouping. They are assessed mainly in terms of roofs of houses, and other public infrastructure washed away. Large-scale deforestation contributes enormously to disasters. Mass movements (landslides, erosion, mudflows, landslides, etc.) favored by abundant precipitation and the mountainous and rugged terrain are often the basis of significant

damage the villages built at the foot of hills and in the lowlands. -beds and coastline. The latest case in 2014 was the torrential rains that fell on the Mbinga territory, resulting in the death and disappearance of several people in villages affected by landslides and floods, including Bushushu, Chishenyi, Luzira, Nyambasha, and Nyamukubi (Méhaule, 2014).

Climatic disturbances have real impacts on local communities who live only on their fields' products in this grouping. When the climatic parameters are not controlled, it isn't easy to orient the different crops according to the different growing periods. Local communities are sometimes unable to cope with this situation of climate variability. The drought of 1984 generated a famine in Bushi and Buhavu in Kalehe (UNDP / Comrec, 2009). Over the past 20 years, rainfall deficits resulting in drought have forced local communities in certain villages to temporarily desert the area and go so far as to seek refuge in other neighboring localities.

To face the risks linked to climate change, and more generally to global changes, it is essential to work at different scales (international, national, and local) (Dewulf, Meijerink, Runhaar 2015). Adaptive responses that combine top-down and bottom-up approaches could be developed. This approach would make it possible to put forward proposals that would take better account of the local community's needs and stimulate changes in behavior and action at all levels of working life. The predisposition of populations to implement mitigation and adaptation strategies and support and encourage the authorities to do the same was linked more to perceived threats than actual risks (O'Connell -Rodwell *et al.*, 2000).

Capstick and Pidgeon () indicated that individuals draw conclusions about abstract phenomena based on their observed and lived experiences. Research has shown that climate change awareness and community engagement was often driven by country-specific factors such as national prosperity, media coverage of the issue, political action by political elites, sources of information, and governments. Individual factors such as beliefs, knowledge, and cultural views also play an essential role (Shi, Visschers, and Siegrist, 2015). All of these aspects contribute to public and personal's perception of risk. They can increase the willingness of communities to reduce climate change risks and adapt to new conditions or outright make ecological commitments appropriate to the situation.

Finding information on these elements of ecological commitment is all the more necessary in a group from Mbinga south to Kalehe, as local communities' perception of climate change remains evident. Such a study was based on fundamental questions such as populations' behavior, strategies of engagement, or abandonment during crises? The assessments of local people of their vulnerable situation caused by climate change? The ecological solutions envisaged dealing with this phenomenon?

RESEARCH METHODOLOGY

This study used an exploratory study from May to June 2020 on the perceptions of climate change and ecological commitments of the local communities of the Mbinga-Sud group, located in the chiefdom of Buhavu in the territory of Kalehe, province of South Kivu in the Democratic Republic of Congo. This grouping presents a very rugged mountainous relief. It also includes a large coastal and island part on Lake Kivu. Its climate is temperate, with vegetation mainly characterized by forests, savannas, etc. The Mbinga -South group has poor

soils that have been exploited for several years without appropriate cultivation techniques. These soils require agricultural amendment. This situation was aggravated by increased deforestation, which exposes these soils to water erosion and landslides of all kinds. These soils also display a stony- sandy character with a rubble dominance and various large exposed stones.

Collecting and Analyzing Data

Non-probability sampling was deemed intentional and aimed to reflect the sectoral diversity and structure of communities (Bushushu, Chishenyi, Luzira, Nyambasha, and Nyamukubi) affected by natural disasters which have devastated more 'once the Mbunga-Sud territory. Several variables like length of residence and experiences of floods of 2008, 2010, and 2014 were a survivor of one of these floods.

Thus, we conducted interviews with 50 people who had experienced the same floods in five villages in the Mbunga-Sud territory. Fifteen of these people surveyed were between 45 and 54 years old; fifteen other people were between 55 and 65 years old, and 20 people were over 65. Forty of the fifty participants lived in high-risk neighborhoods. They, therefore, presented similar socio-economic and cultural characteristics. Even if the workforce seems small, it is, on the one hand, difficult to find people affected on several occasions agreeing to go back on a traumatic experience to which they were exposed for some and others, themselves survivors. The interview guide that we put in place led participants to discuss their experiences, their perceptions of the nature of climate change, and their propensities to act or not act ecologically.

As part of this study, we have chosen to adopt the interview to analyze the meaning that the actors give to their practices to the events they may have been active witnesses. It made it possible to highlight the value systems and benchmarks from which these actors orient and determine themselves. This interview had the specificity of relating the ideas to the experience of the respondents. Therefore, it made it possible to seek answers to the respondents' perceptions, allowing them to appeal to their point of view, their experience, their logic, and their rationality.

SPSS software was used to support the processing of quantitative and qualitative data. This study focused on the art gaps between the ecological values advanced by most local communities and their behavioral inaction. The scientific literature puts forward different explanations, individual (mechanisms of moral disengagement, difficulty in changing habits, etc.) and contextual (lack of time, abstraction of climate change, importance of economic factors) (Cheng SC et al., 2014). Given the reality of the scientific literature, has started from the premise such as the art people affected in full force by a natural disaster more than once (as of flood s repetitive causing enormous material damage and loss of life) could further modify their way of life and become more environmentally friendly. In this study, we have made it our duty to minimize the theoretical and methodological dimensions to explore further the experiences and behaviors of local communities and their possible implications in searching for an appropriate ecological response.

RESULTS & DISCUSSIONS

Perceptions of climate change

The majority (80%) of respondents in the Bushushu and Chisheny villages expressed that climate change was a severe problem caused by human activities. They indicated that they had felt tremendous changes in their villages due to climate change. The most noticeable changes in all the towns were that the temperatures became warmer (67%), the dry seasons became longer (65%), the sunny months were longer and more generous than before (62%). There were no significant differences in the perceived changes in each village concerning the start of the rainy season (57%), the precipitation had become very low (54%), the rivers had become very weak (54%), dry up quickly when they take their source in the hills (52%). The study results resonate similarly to other studies conducted in other countries, which have shown that the majority of the population thinks that climate change is real. So the question is not so much in making the people aware of climate change but rather in finding the means to fight against these changes or adapt in the future (Bader et al., 2011; Gerber, 2012).

In the localities of Luzira, Nyambasha, and Nyamukubi, the local communities interviewed perceived climate change through several indicators, among which we mention, scorching nights, hot days, long periods of sun, the scarcity of rain. A long dry season than in the past, warmer years, the vegetation dries up due to long periods of the sun (78%) and pastoral production, which has become very poor (82%). Similar results have been reported by Mathieu et al. (2010) on farmers' perception of climate change in Burkina Faso. Among the farmers' indicators on climate change perception, there was also an extension of the hot season, a late start and an early end of the rainy season, and an uneven distribution of precipitation in space and time.

The respondents' impression that extreme weather events (intense heat or cold waves, strong winds, heavy rains, thunderstorms and floods, landslides) are more frequent and more severe today than in the last decade was (85%). In a study carried out in Burkina Faso, in Filingué, a constant increase in solid and sandy winds was observed by 52% of those questioned. Strong winds (storms, cyclones, tornadoes, and thunderstorms) are among the key indicators of climate change, found under other skies by other researchers (Cheng et al., 2014).

Causes of perceptions of natural risks and climate change

Table 1. Perceptions of natural risks are changing climate s and their causes.

Themes	Sub-themes	O ¹	F ²
Perceptions of natural hazards	Increase in violence and suddenness of natural disasters	310	40
	Increased frequency of natural disasters	200	35
	Risk region	165	35
	Belief in this relationship	55	35

Perceptions of the relationship between natural disasters and climate change	Belief in climate change	205	45
	Beliefs in the regular historical cycle of natural disasters	115	35
Perceptions of the causes	Extreme deforestation	930	45
	Over-exploitation of nature (Collective unconsciousness towards nature)	430	50
	Human activities (Digging minerals, building on inappropriate areas, cultivating anywhere),	185	40
	Consumption	105	35

This table shows how we have noted that the perception of risk is present in our sample, particularly vis-à-vis our group Mbinga South. Although participants argue the cyclical and historical aspect of natural disasters, they seem to be accelerating in frequency and violence in their eyes as evidenced by the following statistics: Torrential rains fell on the Mbinga-Sud grouping north of Kalehe, resulting in the death of 5 people and the disappearance of 134 people. Villages were affected by landslides and floods such as Bushushu, Chishenyi, Luzira, Nyambasha, and Nyamukubi. More than 700 houses were destroyed, three micro-plants to supply electricity wasted, two schools, a health center, bridges, and a church that housed several people were all washed away). Five hundred twenty-five families have been identified as affected, with 2,000 children and pregnant women. Hundreds of fields have also been destroyed in this region, where agriculture is one of the primary sources of income (Méhaule, 2014).

Kalehe was one of the areas where the risk of natural disasters remained the highest. Besides, Kalehe remained the territory with the most significant residual number of displaced persons (233,394 of the 618,326 displaced) due to natural disasters (Méhaule, 2014). For all of the Province of South Kivu regions at risk, Kalehe was still on the front lines in 2010. Out of more than 40,000 people affected by natural disasters and 16,000 displaced people, the territory of Kalehe came second after Fizi's, and Uvira came close to Kalehe (Méhaule, 2014).

The causes of these disasters are the nature of human activities and the area's natural predisposition itself. The general overexploitation of nature, which was ignored for economic reasons, marks an absolute unconsciousness, even madness, in the minds of the people questioned. The interview extracts are very explicit on this subject: they build everywhere without calculating, even in inappropriate places deemed dangerous; Humans invade everything. They dig ores from everywhere and manage to clog even river lilies, becoming whole rivers without hindrance. They want too much money; " Local communities cultivate everywhere without even resting the land. All the hills are bare because of their overexploitation. All trees were felled to produce embers and finish. All vegetation is almost no on the hills because of their solicitation ever. The people spend all their time trying to

consume natural resources. They do not necessarily deplete their savings because there is none but their daily income.

Those of other studies corroborate the results of this research. Dugué (2012) incriminated human activities to be part of climate change disasters. He stressed that human activities had contributed significantly to the increase in the concentration of greenhouse gases so that the planet's ecological balance has been altered. Today, this upheaval is reflected in the amplification of climatic dynamics and an increase in frequency and intensity of extraordinary climatic events: cyclones, droughts, heavy rainfall, heatwaves. Such changes have taken place in the distant past, but today they have never been so rapid as they are seen in many parts of developed and emerging countries. According to the Food and Agriculture Organization of the United Nations cited by Cheikh et al. (2012), human action on vegetation results in two significant behaviors: deforestation and pollution of the atmosphere. It is not the winds and the rains responsible for the accelerated erosion, nor some inherent defects in the soil. It is humans who are responsible. Humans exercise their actions out of ignorance or out of necessity, often favoring the adverse phenomena they should combat. The destruction of forests and pastures due to excessive exploitation, the clearing of land on too steep slopes, inappropriate cultivation techniques, the disappearance of organic matter from the fields by the exploitation of crop residues are examples of this.

Normally, it is increasingly recognized that local communities must be forced to adapt to climate change and the effects of natural disasters. Adaptation requires considerable differences in how they perceive and do things, such as land use adjustment, more efficient use of water, or agricultural transitions (Dewulf, Meijerink, and Runhaar 2015). It is important to note that climate change perceptions vary spatially depending on settlement forms and cultural and ideological factors (Howe *et al.*, 2015). Understanding the public perception of climate change and the ecological adaptation strategies is crucial for implementing appropriate and effective actions (Shi, Visschers, and Siegrist, 2015). All the communities' efforts in the localities of Bushushu, Chishenyi, Luzira, Nyambasha, and Nyamukubi in the Mbinga-Sud grouping are perceptible in their discourse about their difficulties in acting ecologically, as detailed in table 2 below. Below.

Difficulties of acting in an ecological way

Table 2. Propensity to act (or not) in an ecological way

Themes	Sub-themes	O ³	F ⁴
Perceptions of the brakes	Powerlessness and political inertia	1200	50
	Economic issues	980	50
	Individual helplessness (fatalism, diffusion of responsibility, feeling of injustice, etc.)	730	50
	General stakes in life (wanting to live despite themselves, " we must find something for our survival, egoism, distractions...)	265	45

Perceptions of triggers	Education / transmission	340	45
	The collective commitment of the village	195	35
	Health	170	40
	Individual consciousness	125	30
Effect of flooding on the propensity to act	No effect	145	50

The results shown in this table show us how much constraints (political and economical in particular) are obstacles to ecological transition. These pincers seem so strong in the speech of the people questioned that they become fatalistic and powerless. Some maintenance extracts are again very illustrative about it: This is the trap of their current system governance: here are many things that the parasites but they remain dependent despite them; One has the impression that their policies have lost their minds and are becoming oblivious; They want to live beyond their means, hence the support of the governance system, which favors anti-values also to make a living because the change will not come from them alone ". In a study carried out in the Gediz Delta, 33% of participants declared that they had not changed ecological terms to climate change against 17% in the Rhône delta and 9% in the Axios delta. The participants in this study in the three deltas expressed that they expected more from the public authorities on the management and the implementation of policies to adapt to the changes (Lisa et al., 2020; Adloff et al., 2015).

Regarding the perception of triggers, the participants in this study highlighted fascinating motivations in terms of ecological commitment: " education, collective and individual awareness (social influence is mighty on this subject).) and health. Understanding remains a capital element in our study. However, even if dynamics exist locally, adaptation to future changes seems to be a significant issue that must concern local populations and decision-makers and managers of the territory (Lwasa, Sh. 2015). It emerged clearly in this study. The current adjustments in the Mediterranean deltas are not enough compared to the prospects of scenarios changing climate and ecology. To do so will require a more substantial commitment to all levels for the future of Mediterranean deltas.

CONCLUSION

All the results of this study show the growing responsibility of public authorities in climate change and act. Actions should no longer be simple modifications on the fringes of the current dynamics of human society but, on the contrary, a complete reversal of our way of life. It is partly the responsibility of young people, and it is also generally the responsibility of their province or even their country. There is a need to move from a national education, which trains future consumers in a reflective, humanist, integrated, and participatory education, which awakens young people to their nature and nature. The ecological transition will have to rely only on springs individuals who find it very difficult to relax from a predatory political, economic and social class.

Acknowledgments

We would like to thank all the Mbanga-Sud grouping inhabitants, specifically the victims of the various floods that brought mourning to more than one locality of this group, for their willingness to participate in this study. Above all, for allowing us to discuss their own experiences, their perceptions of the nature of climate change, and their propensities to act or not act ecologically. We are aware that it was not easy for the 50 people to agree to discuss the traumatic events they experienced and which must have torn from them either loved ones or material goods, which they find here all our gratitude.

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