Social Representations Of Diseases Linked To Climate Change In The Population Of A Slum District: A Case Study From Haiti

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Abstract

Faced with the threats posed by climate change to global public health in the 21st century, the island of Haiti has a duty to inform the population and disseminate knowledge on the health consequences of the phenomenon. The effects of climate change are imminent for the country. In terms of health, the consequences will particularly accentuate the prevalence of endemic diseases, water-borne and infectious pathologies, malnutrition and undernourishment. Also, information on this issue must be widely disseminated through environmental and health education in order to raise awareness in the population and encourage them to modify their daily lifestyles through mitigation and adaptation. Previous work on strategies for popularizing scientific knowledge has shown that culture and poverty constitute obstacles to changes in behavior favoring mitigation and adaptation to climate change. The study of the Social Representations of the populations or social groups concerned makes it possible to discarded them.. From this point of view, this article questions and analyzes the social representations of vector pathologies including Malaria, Dengue, Chikungunya and Zika among the residents of Jalousie, one of the vulnerable neighborhoods of the Metropolitan Region of Port-au-Prince (MRPP - Haiti). This work highlights the link established by the population of Jalousie between climate change and the transmission of the vector-borne diseases mentioned. It does this by considering elements of Haitian popular knowledge likely to build understanding that combines the prevention and symptomatology of these pathologies with knowledge of public hygiene and supernatural phenomena. The survey carried out on a representative sample of 121 residents of the Jalousie district, a slum area of MRPP, shows that vector-borne diseases are assimilated with epidemics and their transmission due to changes in the seasons (temperature change: hot weather, rainy weather in Haiti).

Keywords: Social Representations, Climate Change, Vector-Borne Diseases, Slums, Haiti

Introduction

Since the start of the industrial revolution around 1750, human activities have caused an unprecedented increase in the concentrations of greenhouse gases (GHGs) in the atmosphere (IPCC, 2001; IPCC, 2007). These emissions generate environmental hazards which have, among other things, serious consequences on the social determinants of the health of living beings. This is what the IPCC (2014) confirmed in its report concluding that "human influence is clearly established regarding the warming of the atmosphere, the oceans, rising sea levels, certain changes in the water cycle and regarding the occurrence of extreme weather events. It should be noted that the consequences of past and current GHG emissions will inevitably be felt until 2050, even if all GHG emissions cease now." In terms of health, the negative effects of climate change on the human population are estimated in excess of 250,000 potential deaths per year between 2030 and 2050 at the global level (Hales et al, 2014). These effects linked to heat waves result in mortality in people over 65, mortalities associated with coastal flooding, diarrheal diseases in children under 15, malaria, dengue and malnutrition (Hales et al, 2014; Bard, 2017).

In the least developed countries, corollary factors including those linked to socioeconomic vulnerability will worsen the rate of mortality and morbidity due to infectious pathologies (McMichael et al, 2003). The Republic of Haiti, a fragile area suffering from vulnerability to climate change, like all the other territories constituting the insular geography of the Caribbean, is also likely to see an increase in the prevalence of endemic infectious diseases, including those with vector transmission. Between 2014 and 2016, Haiti experienced episodes of chikungunya and zika epidemics while malaria remains persistent with a high probability of increasing its prevalence (IHE, 2018). The country is slow to demonstrate its capacity to adapt and mitigate climate change. Its population, uninformed is trying to adapt independently but without great results. (Singh et. Cohen, 2014).

In such circumstances, in line with public health approach taken, priority is given to health education through environmental education to encourage habits favorable to the adoption of behaviors conducive to mitigation and adaptation to the effects of climate change on populations. The process involved in changing behaviors may turn out to be more or less long depending on the interests of the person or the target population, especially since climate change generates anxiety in populations as it affects the socioeconomic situation of their daily lives (Pruneau et al., 2008). Thus, we agree with the idea of studying the social representations of populations, judged by Jodelet (1984) as ultimately providing understanding of collective thought, essential to any program intended to popularize science in the social and educational domains (McDaniels et al., 1996).

In this perspective, this study questions and analyzes the social representations of the residents of a vulnerable neighborhood by considering elements of Haitian popular knowledge in order to ascertain their understanding of the prevention and symptoms of malaria, dengue, chikungunya and zika with regard to climate change.

Socio-sanitary characteristics of the slums of the Metropolitan Zone of Port-au-Prince

The process of creating slums in Haiti brings to mind the concept of metropolization in the context of poverty in the countries of the Global South (Darbouze et al., 2018). It manifests itself as a form of accentuated socio-spatial differentiation and generalized informality. It comprises informal and disorganized urban development, escaping state control due to a centralizing national policy (Verret et al., 2017). This absence of the state favors the proliferation of substitute actors including local associations and international NGOs which provide the few basic social services that exist. At the same time, there is a strong trend towards the provision of informal services. Consequently, the services have to be paid for at a high price and their quality leaves much to be desired, especially for the supply of water (Bras et al., 2017) with the subsequent risk to the health of the population.

Due to the lack of a good sanitation system, garbage litters the streets and alleys between houses. Rain presents a good opportunity for disposing household waste and other pollutants, favoring the development of diseases and the proliferation of mosquitoes, vectors of transmissible diseases including those of interest to our study (Bras, 2010).

Until recently, Port-au-Prince, the capital of Haiti, had positioned itself as an attractive area for populations living in the regions for socio-economic reasons stemming from the centralized national policy of the State (Milian and Konshina, 2017). Indeed, its growth has occurred through aggregation since the 1930s (Milian and Konshina, 2017). Its population increased from 9,949,322 inhabitants in 2000 to 11,123,176 in 2018 (World Perspectives, 2020). 17% of this population is concentrated in marginalized areas and precarious neighborhoods (Olivier (2018)

At the same time, Milian and Konshina (2017) reported other processes that would lead to a redistribution of the population of the metropolitan area. They referred to the fact that "the hydro-climatic disasters (cyclones of 2004 and 2008), the earthquake of 2010 as well as the political unrest of the period 2002-2004 led some inhabitants of Port-au-Prince to leave the region. city-center to settle in the "periphery". Although this occurred on a small scale, it reveals a new surge in urbanization on all fronts. From this point of view, the latest events endangering security (lawlessness, kidnapping)

leading the populations of certain slums to take refuge in other peripheral areas should also be considered.

In terms of health, the results taken as national averages are mixed. Pilkington (2017) mentioned a few cases but the results are not indicative of the overall quality of care (Table 1).

Table 1. Health service provision in the metropolitan area of Port-au-Prince (MAPP) - (Pilkington, 2017)

	MAPP	Haiti
Infant mortality	81/1000	59/1000
Malnourished children	1.8/100	0.9/100
Physical violence against women	29.2/100	28.2/00
Women giving birth in a hospital setting	60/100	38.1/100

These data indicate that the concentration of most health care infrastructure does not reflect the availability of services in the metropolitan area of Port-au-Prince (30% of hospitals and 12% of health centers). The figures show this very clearly because according to data from 2014 (Pilkington, 2017), 52% of health facilities in Haiti provide a set of basic health services while only 35% of health facilities do so in the metropolitan area.

Methodology
Brief presentation of the study area

This article analyzes the social representations of vector-borne diseases in a context of climate change in the population of the Jalousie district, a slum area in the metropolitan region of the capital of Haiti. Figures 1 and 2 show the orthophotoplane and the administrative boundaries of Jalousie. This site was chosen because it presents the five (5) related phenomena characterizing the habitat of the slums of Haiti: "(i) an accentuated urban sprawl, (ii) an accelerated process of slum development on the periphery, (iii) the rapid densification and degradation of central neighborhoods, (iv) significant vulnerability to environmental risks, and (v) a significant quantitative and qualitative housing deficit caused by, among other things, unprecedented demographic pressure" (Lizarralde et al. , 2018).

From the 1980s, the area was subject to successive waves of people fleeing Port-au-Prince due to political unrest but also due to arrivals of internal migration, characterized by the massive influx of people from rural areas to the outskirts of Port-au-Prince (Corvington, 2007). From there began a series of anarchic constructions on deedless occupied land and on state property. Demographic data for Jalousie are almost nonexistent. However, some authors report that in less than 15 years, the population has increased from 22,000 to 50,000 inhabitants (estimated in 2015 by Gilles et al., 2015).

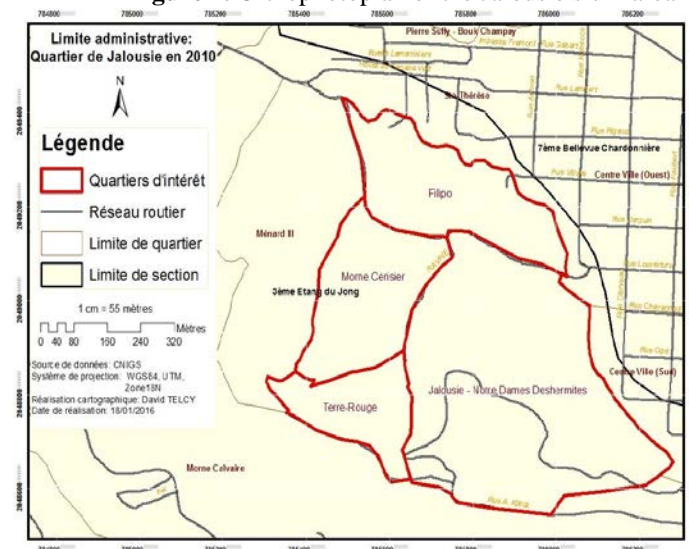**Figure 1.** Orthophotoplan of the Jalousie slum area

Figure 2. Administrative boundaries of the Jalousie slum area

The habitats of Jalousie correspond to the characteristics of those of the metropolitan area of Port-au-Prince. Indeed, the neighborhood is home to a community in distress, struggling with a lack of sanitation and an adequate drinking water supply system. Makeshift houses mingle with large concrete structures of dubious safety, accessible only by narrow stairs, erected on the side of Morne l'Hôpital on steep slopes or in ravines serving as canals for runoff water. The area is highly exposed to environmental risks due to poor plant cover, causing humans, cattle and houses to wash away mud. In addition, a secondary fault crosses part of the slum; there is a hazard and very strong ground movement (Global Development 2018).
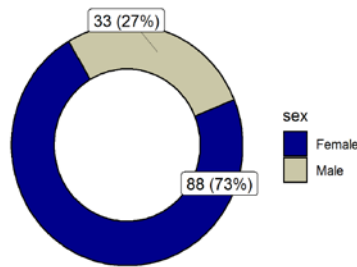
The population survey

The qualitative, exploratory and descriptive type study analysed two phenomena: the Social representations of people residing in the neighbourhood and vector-borne diseases requiring notification and/or surveillance (MSPP, 2013) including malaria, chikungunya, zika and the dengue. The survey scrupulously responded to the scientific criteria of Moscovici's representation methods (1954) by relying on the association approach of Abric (2001) and the evocation approach of Vergès (2001). The questionnaire, assembled according to these two approaches, comprises five (5) parts: i) Socio-demographic characteristics; ii) General knowledge of climate change; iii): Perceptions of diseases linked to climate change; iii) Community actions for adaptation to climate change; iv) Personal actions to protect the environment and prevent vector-borne diseases. The composition of the representational field of the latter was studied according to the age, gender and academic level of the respondents. Bi-variate crosses were made in order to identify for scientific exploration any evolutionary trend of the object of representations relative to the independent variables. However, our analyses were not performed to test their independence because they did not function on the basis of research hypotheses. In fact, their strength of association has not been measured.

The sample was chosen randomly according to a weighting per block, corresponding to the geographical distribution adopted by one of the health facilities of the area. For each block, the households were listed by interviewers according to the method of steps from 1 to 5 and on the basis of the inclusion criteria: (i) being from 25 to 65 years old; ii) being the head of the family; iii) of living in the neighbourhood for at least the last twelve (12) months preceding the survey; iv) of having a member of the household with a fever syndrome during the last 12 twelve (12) months, including that of the survey. In total, 122 people were interviewed. One was discarded for failing to meet one of the inclusion criteria.
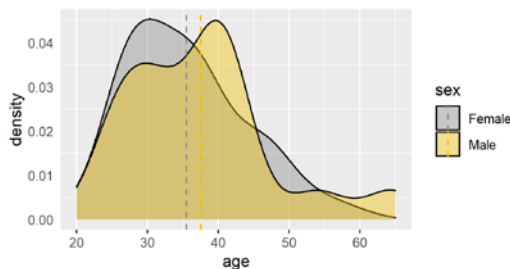
Results and discussion
Socio-demographic profile of respondents

The study was carried out on a sample of 121 adults aged 25 to 65 (average age: 36.5 years), 73% of whom were women (Figure 3 and Figure 4).

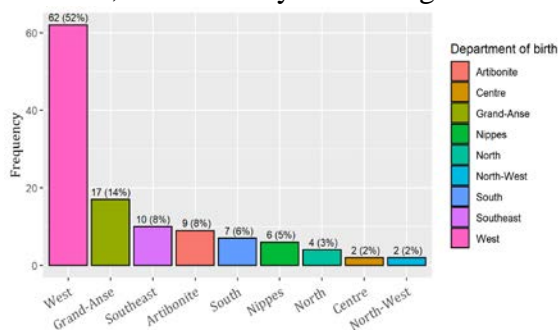Source: Survey data / Dec. 14-17, 2020

Figure 3. Distribution of the sample by gender

Source: Survey data / Dec. 14-17, 2020

Figure 4. Density graph of the age of respondents by gender

The study population is multi-regional (9/10 departments represented) with 52% originating from the Ouest department (Figure 5) and 63% from the metropolitan area of Port-au-Prince. These are people who have settled in Jalousie for more than 5 years (90%). In fact, 80% of them have lived there for 6 to 25 years (80%) while 36% immigrated there in search of a better life and to improve their living conditions. Others (28%), taken there by their parents during childhood, chose to stay in the neighbourhood even as adults.

Source: Survey data / Dec. 14-17, 2020

Figure 5. Distribution of the sample according to the departments of origin

Before residing in Jalousie, 64% of the population practiced agriculture and fishing. However, having emigrated to the western metropolitan area, they turned to informal trade (60%). 94%, including
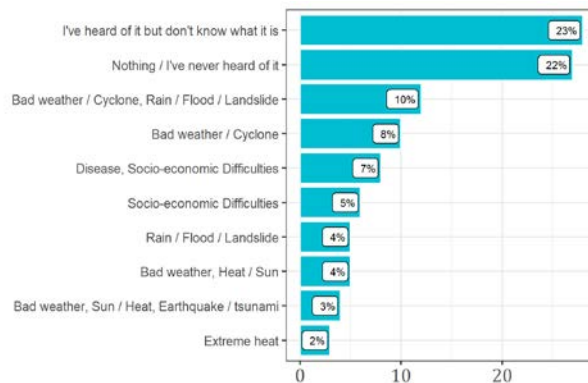
entrepreneurs (6%) and workers (12%), reported engaging in an income-generating activity to support the survival of households with more than 4 members according to the household density graph [Average height = 4.752066 (people)]. Note that 52% of the population lives in a free union (cohabitation).

In terms of education, the population is mixed. 86% attended school, 40% have reached secondary school, 20% and 17% have reached the 3rd and 2nd basic cycle respectively versus 9% in the 1st cycle of basic education. 3% went to college.

General knowledge of cchange

More than half of the population (52%) claim to have heard of climate change, on the other hand 36% are totally unaware of the concept. Note that 12% refrained from responding.

However, using the association method advocated by Abric (2001), respondents were asked to spontaneously choose three of the six responses that best described climate change. 44% said nothing because the concept is totally unknown to them (22%) or because they have heard of it but do not know what it refers to (22%). In 10% of the responses, climate change is assimilated with "bad weather / cyclone, floods, landslides". 8% of the responses were specific to "bad weather / cyclone" approaching the harmful effects of climate change. For the rest, the responses are jumbled, associating climate change with preexisting situations likely to cause disease (epidemics) as well as economic difficulties, etc. (Figure 6).

Source: Survey data / Dec. 14-17, 2020

Figure 6. Definition of climate change by respondents

In another question, we sought to identify the extent to which the population is aware of changes taking place in the ecosystem without reference to climate change. The five largest observations attest to the multiplication of cases of influenza and fever (23%), temperature rises (19%); the drop in local

agricultural production (15%); drought of rivers, irrigation canals and water sources (14%); the proliferation of mosquitoes (10%) (Figure 7).
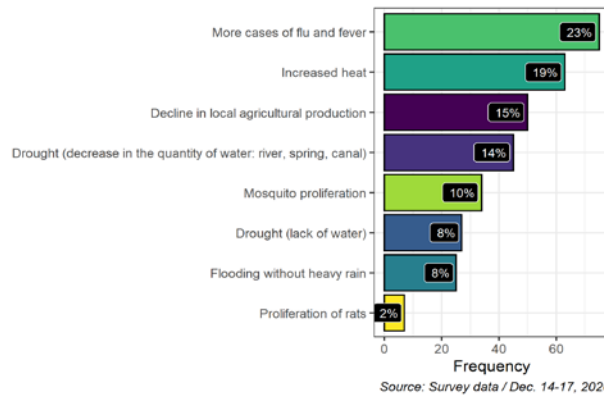

Figure 7. Effects of climate change observed by respondent**s**

To have more elements of representation of diseases linked to climate change, we also sought to understand to what extent respondents felt concerned by environmental problems without alluding to climate change. This was in the eventuality of circumventing the possible biases due to ignorance of the concept by respondents on the one hand, and to assess what their greatest concern relates to, considering the postulate of Seidel (1998) according to which poverty reinforces barriers to the development of climate change mitigation and adaptation behaviors.

On a scale of 1 to 3, applicants rated the highest score (3) as the situation of greatest concern to them. Environmental problems were not among the 3 situations chosen by the sample. Political unrest / insecurity worries came first (42%) followed by fetishism (36%) then health problems including cancer, HIV and COVID19 (33%), poverty / economic problems attributing unemployment, lack of money, undernourishment, etc. (32.38%). Environmental issues came fifth (Figure 8) in the top 5 items of the ranking (31.96≈32%).
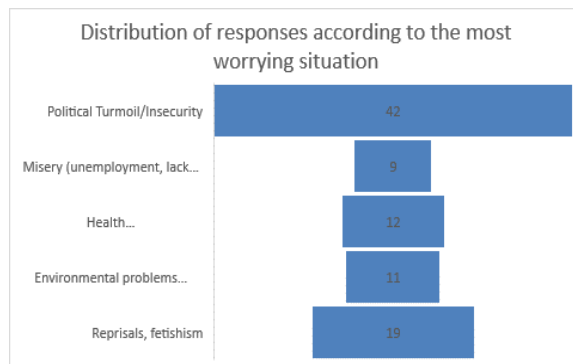

Figure 8. Situation considered the most worrying by the respondents.
Social representations of vector-borne diseases in a context of climate change

The survey sought to find out whether the respondents were directly or indirectly affected (him or a member of the household) by any of the vector pathologies selected. This makes it possible to understand that the respondents have already been confronted with the situation for which we were evaluating their social representations. They were asked to mention the frequency of the febrile pathologies to which they have been affected during the last 5 years. According to the data collected, cases of fever lasting more than three days (82%) were the most frequent. This was followed by influenza (77%), Zika (52%), malaria (39%) and chikungunya (37%) and dengue fever (30%) (Figure 9).
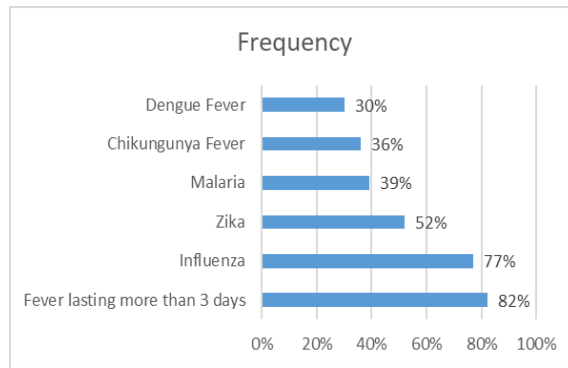

Figure 9. Frequency of cases of vector-borne pathologies and other fevers among respondents over the past 5 years

Before evaluating the social representations of vector-borne diseases, the investigators shared information on climate change with emphasis on its effects on human health from an informative flyer developed for this purpose. To assess the social representations of vector-borne disease transmission, association (Abric, 2001) and evocation (Vergès, 2001) methods were pooled in the survey questionnaire. Respondents had to associate the transmission of each of the pathologies with climate change or with one of the elements of Haitian popular knowledge (God, Fetishism, Undernourishment) often reported in cases of illnesses in general and in cases of febrile syndromes in particular. They also had the choice of bringing up others.

The results revealed that 17% of the respondents did not make any association with vector-borne diseases. In 17% of cases, these were simply epidemics, while for 61% of responses, these epidemics came from various sources: i) pre-existing diseases in space (18%); ii) bad weather (10%), among others (Figure 10).
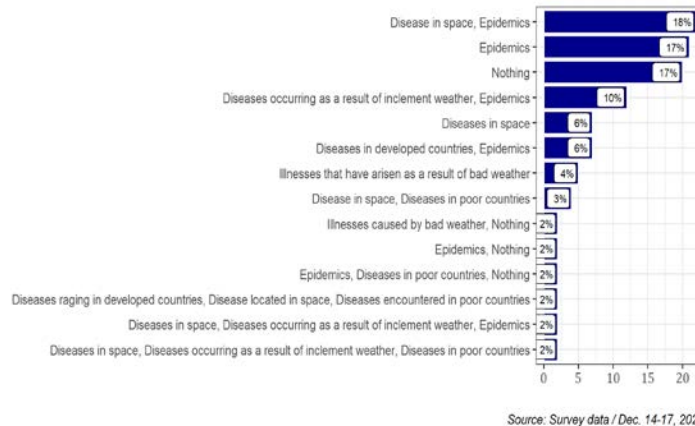
Source: Survey data / Dec. 14-17, 2020

Figure 10. Perception of Diseases linked to climate change among respondents

Bivariate analyses with age and then with academic level show no interdependence with the representation that respondents have of the transmission of diseases linked to climate change. On the other hand, crossing with the gender of the respondents shows a tendency of correlation although we did not find it relevant to confirm this interdependence from the test, that is to say women made up a higher proportion of respondents who made no association with diseases linked to climate change (19% women vs. 9% men) (Figure 11).
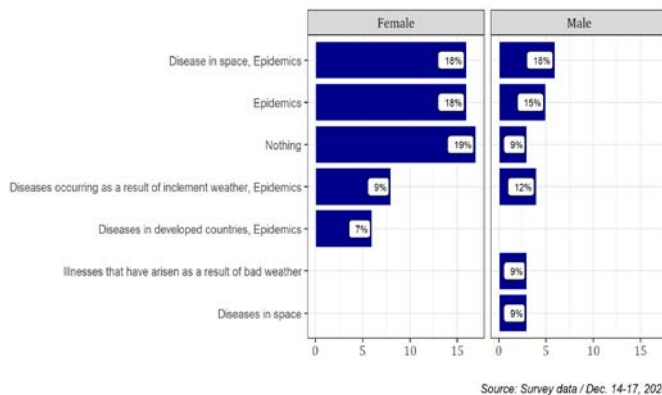

Source: Survey data / Dec. 14-17, 2020

Figure 11. Perception of respondents of diseases linked to climate change (according to gender)

Community actions for adaptation to climate change

The study assessed the position of the population on the need for the country and their neighborhood to adopt behaviors favorable to adaptation and mitigation of climate change through community and personal actions. This should make it possible to assess their level of awareness of the issue of climate change. 64% of them believed that community actions are necessary in Haiti for adaptation to climate change. Of this proportion, 47% spoke with

conviction (yes, necessarily) versus 19% who were less convinced (yes, maybe). For the remaining 19%, no action is necessary.

However, when the question was more specific and directly related to their neighborhood of residence, 78% said that the population of Jalousie have an obligation to take actions to reduce or protect themselves from the harmful effects of climate change while 60% of this population think the neighborhood is less exposed than the rest of the country. To prevent vector-borne diseases, they had to choose the three actions they considered most plausible in the direction of what they were prepared to take. According to the responses: i) 23% chose not to throw rubbish in the streets; ii) 22% to avoid keeping standing water; iii) 21% to keep the neighborhood clean; 18% to ask to move from Jalousie to live in a cleaner neighborhood and, v) 8% to consume a balanced diet (better eating).

Conclusion

The aim of the study was not to search for the SRs of climate change. However, it does tell us about a fundamental building block for a science dissemination program on climate change: the concept is unfamiliar to the study population, who have a misconception of it. For lack of information and understanding on climate change, they associate it with natural temperature variations due to seasonal changes [climate refers to temperature which implies climate change = temperature change (hot weather, rainy weather in Haiti)].

In this case, the construction of the central core of social representations of climate change and the transmission of vector-borne pathologies focuses on empirical knowledge having as its object (symbolic elements) bad weather, epidemics and what the respondents call preexisting diseases in the air (Abric, 2001; Lo Monaco and Lheureux 2007). This association refers to popular beliefs in the abundant Haitian oral literature that combine epidemics of fever, flu and rainy periods that bring all kinds of diseases from space (the air). Indeed, in Haiti, epidemics, unusual natural disasters (the earthquake of January 12 for example) are explained in this sense: it is due to something in "the air" (that is to say, uncontrollable), mysterious, etc.). Within this population, therefore, there is a form of knowledge of vector-borne diseases that is socially developed and shared, with a practical aim that contributes (Hidalgo, 2012; Jodelet, 1989) to the choices they have made to adopt behaviors relating to environmental hygiene to protect against such diseases: do not throw rubbish in the streets; avoid keeping stagnant water; keep the neighborhood clean. This knowledge, an important element in the conditionality of the existence of RS, could take shape in the assiduous education campaigns carried out within the framework of vector control in Haiti; particularly regarding malaria in accordance with

the objective of the Ministry of Public Health through its strategic plan to reduce local transmission to 0/100 by 2020 (MSPP, 2013). The respondents do not make any association of vector pathologies with God fetishism, or climate change. However, can it be said that education programs for the prevention of malaria have succeeded in influencing popular beliefs in the construction of SRs for this vector-borne pathology? A study of the SRs of vector-borne diseases like malaria, without taking into account climate change, could reveal the weight of cultural elements (popular knowledge).

Furthermore, the existence of SR requires "recurring practices" that assume a level of experience in relation to the object in question (knowledge and duration of experience in relation to the object) (Depeau, 2006). In the case of our sample, experience with vector-borne diseases consists of a recurrence of the latter or of fevers and flu during and after rainy periods on the one hand, and practices against the proliferation of mosquitoes and protection against their bites (ref. distribution of mosquito nets as part of malaria programs (OPS, 2017). These prevention practices condition and reinforce the common belief of the respondents on the measures deemed more easily adoptable to protect themselves from vector-borne diseases. It is clear that this collective social consciousness that constitutes SR does not yet exist around the concept of climate change and vector-borne diseases in the study population; it therefore leads to erroneous beliefs which, among other things, can constitute a considerable barrier to education when attempts are made to get it to adopt adaptive and attenuating behaviors (Pruneau et al. 2006; Maiteny, 2002).

The study did not go so far as to identify the organization and the relationship of social representations of vector-borne diseases with objects such as the situation considered to be the most worrying (Figure 7) and the pathologies of possibly vector or viral sources experienced by respondents (Figure 6). Such analyses would provide better understanding of the structure and organization of the social representations of respondents regarding vector-borne diseases. These data collected during our investigation will be made available for use by interested researchers and / or may be the subject of another article from us. In the meantime, this in no way detracts from the scientificity and relevance of the study, the first in Haiti on the social representations of vector-borne diseases in a context of climate change. It promotes the sociocognitive salience of climate change as an abstract and generic concept, thus initiating the construction of social representations relating to it, if only among the respondents. In addition, it paves the way for several SAR studies that could greatly contribute to the policies and strategies of education programs and the dissemination of scientific knowledge from a global health perspective. These studies caould take the form of: i) a study of social representations of malaria to assess the place of cultural elements; ii) a

study of the SR (opinion) of religious leaders of all faiths in connection with the choice of churches as a channel for disseminating messages relating to environmental education during religious services and events, a choice made by 16% of the respondents.

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