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Participatory Analysis of the Vulnerability and Adaptation Strategies of Communities Faced with Climate Change in the Sahelian Zone of Burkina Faso: The Case of the Namissiguima Municipality in the Province of Yatenga (Northern Region)

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Abstract

Climate change is a concern of our time, both at global level and at community level, where its impacts vary according to context. According to the Intergovernmental Panel on Climate Change (IPCC), the causes of this change are anthropogenic and require urgent action on the part of humanity in terms of mitigation but also in terms of adaptation to strengthen the resilience of populations. The municipality of Namissiguima (13° 36' 00" north and 2° 13'01" west), in the province of Yatenga in Burkina Faso, is no exception. Located in the Sahelian agro-climatic zone of Burkina Faso and receiving less than 600mm of water per year, it has a population of almost 59,000, 51.7% of whom are women and 48.3% men, whose main occupations are farming and livestock rearing (94.6%). Through a participatory analysis using the "Trousse a outils planification et suivi-evaluation des capacites d'adaptation au changement climatique (TOP-SECAC)", this paper aims to analyze local communities' perceptions of climate variability and change and their perceived causes, to assess the impacts of climate variability and climate change on communities' livelihoods, and to discuss the adaptation strategies used by local people to mitigate these impacts.

Keywords

Participatory analysis, Climate change, vulnerability, adaptation, Namissiguima, TOP-SECAC

1. Introduction

Climate change remains one of the major challenges of the humanity (Lewis et al., 2016). The impacts on natural resources in general and the livelihoods of communities in particular, no longer need to be demonstrated (Caitlin et al., 2018). According to IPCC projections (IPCC, 2014), all regions of Africa are likely to experience severe environmental stress. Indeed, climate change will increase the area of degraded land in the Sahel region, reducing the area suitable for agriculture as well as wildlife species and their habitats. In recent years, the West African Sahel has been faced with enormous challenges relating to the security emergency, community conflicts, particularly over the exploitation of natural resources, and the migration and displacement of populations, all of which are exacerbated by global warming.

This situation of insecurity, with its attendant loss of human life and displacement of populations, combined with the adverse effects of climate change, with repeated flooding due to torrential rains, recurrent droughts, ongoing erosion of natural resources (water, soil and land, biodiversity), the appearance and/or worsening of various pathologies, including respiratory and water-borne diseases, falling agricultural yields, changes to transhumance routes, etc., continues to erode the livelihoods of Sahelian communities, who depend partly, but above all directly, on the exploitation of natural resources for their subsistence (AGRHYMET, 2010; Julie Mayans, 2020).

In addition, the Sahel is a mosaic of contrasting eco-climatic zones and ecosystems subject to high climate variability characterized by changes in rainfall patterns, extreme temperatures and recurrent droughts, with perceptible effects on farmland, grazing land and water availability (X. N. Gnoumou et al, 2017; CCRS, 2018). This pressure on subsistence resources such as water, farmland, grazing land, etc. in the face of a population predominantly made up of farmers and pastoralists continues to fuel rivalries and conflicts over the use of resources (HELLENDORFF, 2012; Adelphi, 2016; Caitlin E. Werrell and al, 2018).

Indeed, climate change is considered to be highly detrimental to community livelihoods, particularly in the agricultural sector (Dixon et al., 2001; A. Dinar, 2008). Because of their high degree of exposure and low adaptive capacity, sub-Saharan African countries are highly vulnerable to climate change (Niang et al., 2014). This situation is even worse for communities that depend almost exclusively on natural resources for their livelihoods. Thus, the majority of the population of Burkina Faso depends on climate-sensitive sectors of activity, including agriculture, the exploitation of forest resources, livestock farming, etc. (Marine LUGEN, 2019).

Climate conditions affect agricultural productivity, livelihoods, water availability, agricultural marketing systems and food prices (OMM, 2014). The imbalance in the climate system due to greenhouse gas emissions is resulting in higher temperatures, with the consequences of alternating droughts and floods, particularly in the Sahel countries, as illustrated by the floods of 1 September 2009 in Burkina Faso (Jean Marie DIPAMA, 2009).

In such a context, it is important to: (i) analyze local communities' perceptions of climate variability

and climate change; (ii) analyze the perceived causes of climate variability and climate change; (iii) assess the impacts of climate variability and climate change on communities' livelihoods; and (iv) discuss the adaptation strategies used by local populations to mitigate the impacts of various climate hazards, with a view to preparing the best responses to this climate emergency by using approaches that place communities at the heart of impacts assessments and solutions research.

2. Method

2.1 Study Area

Namissiguima is a rural commune in the Province of Yatenga, Northern Region of Burkina Faso, with coordinates 13° 36′00″ north and 2° 13′01″ west. The municipality is located in a Sahelian agro-climatic zone and receives less than 600mm of rainfall per year. It covers an area of 4,974.72 km2, with a population of 58,830 (10,378 households) made up of 30,417 women and 28,413 men (Burkina Faso RGPH, 2019).

The predominantly young population derives most of its income from agriculture, livestock farming and the exploitation of mining resources, mainly through gold panning. Consequently, to the security concern in Burkina Faso since 2015, the municipaly of Namissiguima has lost a significant proportion of its population, who have moved to the nearest, more stable communes, including Ouahigouya.

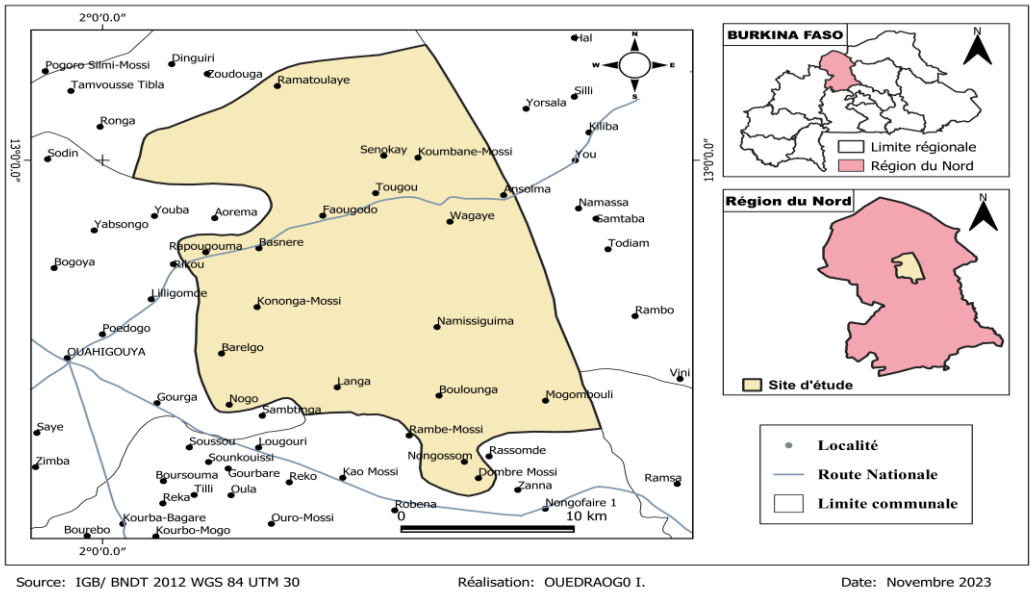

Figure 1. Location of the Commune of Namissiguima in Burkina Faso

2.2 Conceptual Framework

The conceptual framework for this research is based primarily on the sustainable livelihoods approach. Sustainable livelihoods comprise people, their capabilities and their resources, including food, income and assets (Chambers & Conway, 1992). As adaptation is particularly specific to territories and

communities (François Bernard, 2010), the choice of this framework is justified by the fact that it places “men and women at the centre of the analysis of problems related to climate change and associated adaptation strategies” (Somda. J and al, 2014). In addition, secondary data was collected through documentary research and primary data was collected in the field through interviews and focus group sessions.

2.3 Tools and Data Collecting

The primary data for this study were collected with Internal Displacement Persons (IDPs) from the Namissiguima in a camp for IDPs located in Ouahigouya between March and April 2023. Individual data were collected randomly from the IDPs of Namissiguima in Ouahigouya and from those who agreed to answer the interview questionnaires. This was followed by a focus group to gather information on the various hazards most prevalent in the locality, levels of exposure, population sensitivity and the strategies adopted by communities to cope with the hazards listed.

Indeed, a methodological approach based on field surveys with structured interviews and focus groups was deployed in order to assess the communities’ level of knowledge about climate change, their perception of the causes of the phenomenon and its impacts, and the strategies developed by the communities to mitigate the impacts and strengthen their resilience. The interview guides were digitized on kobocollect for direct interviews with the people surveyed. The tools in the Adaptation Capacity Planning and Monitoring Toolkit (TOP-SECAC) (Somda J and al. 2011) were used during the focus group sessions. These tools make it possible to analyze a community’s vulnerability and capacity to adapt to the effects of climate change, develop a vision, define the challenges of change, identify an action plan to strengthen the adaptive capacities of populations and institutions, and finally, identify partners who can contribute to the implementation of adaptation actions (Somda J and al, 2014).

In the context of this research, the TOP-SECAC tools were used only to analyze, with the communities themselves, their level of vulnerability and the adaptation strategies implemented by the populations to cope with the negative effects of climate change. These tools were Tool 1 for analyzing vulnerability and adaptive capacity to climate change (AVCA) and Tool 3 for participatory analysis of vulnerability factors linked to climate hazards (Somda J and al., 2011).

2.4 Data Processing and Analyzing

A data analysis plan was drawn up to define the tools and parameters to be analyzed. Data collected from the individual interviews were processed using appropriate statistical methods in Excel and SPSS, such as univariate and bivariate analyses.

The data collected during the focus group sessions was used to gather information on the various hazards, their location in the Namissiguima commune and the coping strategies adopted by the population to deal with them. Two tools from the Climate Change Adaptation Capacity Planning and Monitoring and Evaluation Toolkit (TOP-SECAC) were used for this exercise. These were: (i) Tool 1: Analysis of Vulnerability and Adaptive Capacity to Climate Change (AVCA). This makes it possible to map resources and climate hazards, identify the hazards that have the greatest impact on the most

important subsistence resources, analyze the most vulnerable social groups and identify the adaptation strategies currently used to combat the hazards identified. (ii) Tool 3: Participatory analysis of vulnerability to climate-related hazards identifies factors (exposure and sensitivity) that contribute to community vulnerability to the climate-related hazards they face in their area, establishes a baseline of the effects of climate-related hazards on communities and their resources, and determines the characteristics of the capacities of community members that are sensitive (Somda et al., 2011).

3. Result

3.1 Demographic and Socio-Economic Characteristics of the Population of Namissiguima

Namissiguima is a rural commune in the municipality of Ouahigouya, in the Province of Yatenga, Northern Region. According to the recent report of the «Recensement General de la Population (RGPH)», the commune had a resident population of 58,830 (10,378 households), 51.7% of whom were women (30,417) and 48.3% men (28,413), with a sex ratio of 93% (RGPH, 2019). However, these statistics remain compromised today in view of the context of insecurity, which has led to a mass exodus of the population, mainly in the municipality of Ouahigouya, 40km away, one of the municipalities hosting the most internally displaced persons (IDPs). According to a report dated 12 May 2023 by the Conseil National de Secours d'Urgence et de Rehabilitation cited in a national News (Note 1), there were more than two million internally displaced people (2,062,534 IDPs) in Burkina Faso on 31 March 2023, of whom 58.50% were children, 23.91% were women and 17.59% were men.

During the data collection period, IDPs living in Ouahigouya could continue to move between their commune of origin (Namissiguima) and their host commune (Ouahigouya), but the inaccessibility of the commune to third parties forced us to collect data from Namissiguima with IDPs living in Ouahigouya, with the support of representatives of the ministry responsible for national solidarity. Thus, seventy (70) IDPs agreed to to took part to the survey, 30% of whom were women and 70% men.

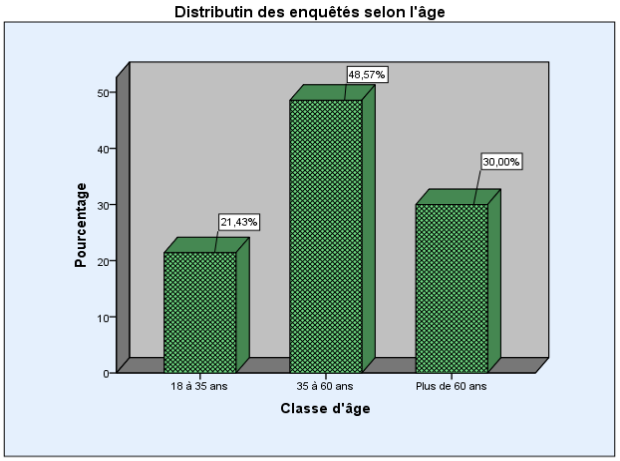

Figure 2. Distribution of People Surveyed by Age

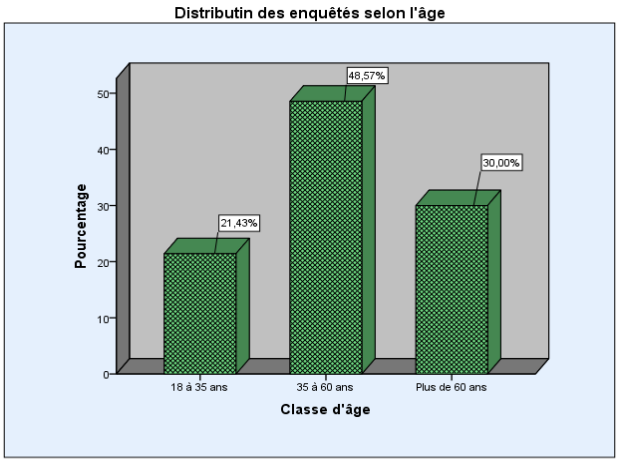

Figure 3. Distribution of Respondents by Level of Education

The results show that out of the sample of people surveyed, those aged between 35 and 60 accounted for 47.5%, followed by the over-60s (30%) and the 18-35s (21.43%). This could be explained by the security crisis, which has caused families to disperse and women, children and the elderly to be concentrated in reception sites. Another plausible explanation for this situation could be the mining boom in the locality and throughout the country, which has mobilized the youngest people to the artisanal gold mining sites.

In terms of level of education, over 50% of those surveyed had never attended school. For the rest of the population, there was an almost equal distribution between primary school (18.57%), secondary school (14.29%) and Koranic school (11.43%).

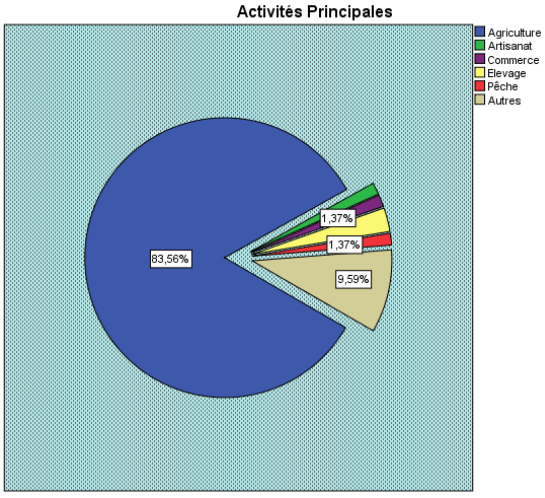

Figure 4. Main Activities of Respondents

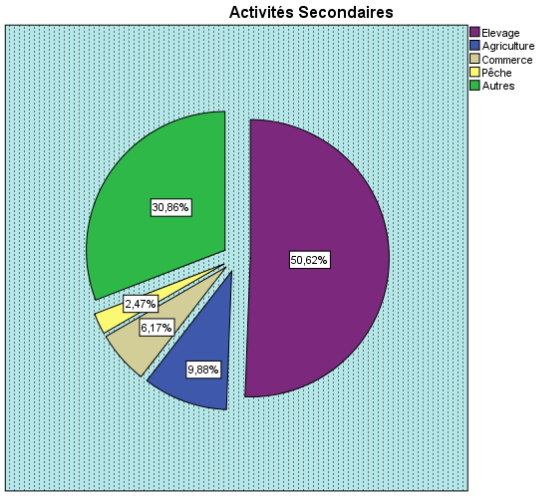

Figure 5. Secondary Activities of Respondents

Source: Survey data, (2023)

The main occupations of the working population are agriculture and livestock farming. This is consistent with national statistics, where more than 80% of the population lives in rural areas and their main activity is agro-sylvo-pastoral and fisheries production (RGPH, 2019). According to the survey data, 83.56% of people practice agriculture as their main activity, 9.59% livestock farming and 1.37% fishing. This represents 94.52% of the population of Namissiguima, who derive their main income and livelihood from natural resources, specifically agriculture, livestock farming and fishing. These results lead to the conclusion that the vast majority of households in Namissiguima depend on the exploitation of natural resources, mainly agriculture and livestock farming, for food security and subsistence (RGPH, 2019; Bekele Shiferaw, 2014; Kabore et al., 2019). If it has been shown that agricultural incomes are very sensitive to rainfall in Burkina Faso (Ouédraogo, 2012), this means that droughts and floods erode communities' adaptive capacities by leading to a drop in agricultural production, the destruction of crops, and so on. This increases the vulnerability of dependent communities to the adverse effects of climate change, as the rural sector is almost exclusively dependent on rainfall for production (PNA, 2015; X. N. Gnoumou, 2017; CDN 2021).

3.2 Impacts of Climate Change and Analysis of Perceived Causes

3.2.1 Impacts of Climate Change

All the people surveyed (100%) said that the climate had changed for the worse, making life difficult for the local population. According to the population, several indicators attest to this change, which can be summarized in Figure 7 below. The main hazards experienced are drought, flooding, strong winds, extreme heat, dust storms and extreme cold (PNA, 2015, CDN, 2021).

In terms of impacts, areas such as agriculture and livestock farming are the most affected. This is because almost the entire population engages in one or other activity, or almost always both (RGPH, 2019; Kabore et al., 2019). As agriculture is largely rainfed, the close link with livestock farming

means that producers are to some extent dependent on rainfall (X. N. Gnoumou et al, 2017).

Table 1. Knowledge of the Main Hazards Identified

	Total	Percentage	Level
Floods	37	53%	Moderate
Droughts	70	100%	Very good
Winds	28	40%	Low
Extreme heat	15	21%	Very low
Extreme cold	6	9%	Very low
Dust storm	11	16%	Very low

100% of the people surveyed have a very good knowledge of droughts ; 53% have an average level of knowledge of floods and 40% a low level of knowledge of violent winds. These data show that droughts are still the most worrying climatic hazard for the population of Namissiguima, and floods to a moderate degree. This is a recurring situation for the Sahelian agro-climatic zone, which receives less than 600 mm of water per year, with seasonal rainfall unevenly distributed over time and space, shifts in the start and end dates of the season, frequent pockets of drought, and high temperatures that impact on cereal production (millet, maize, sorghum) in Namissiguima, the main food crop produced by the population (PNA, 2015; X. N. Gnoumou, 2017; Lardia Ali Bougma et al, 2018; CDN, 2021).

According to communities, the consequences are loss of agricultural yields, loss of seeds at the start of the season due to uncertainty, drying up of crops in the songs during the season due to lack of rain or following an abrupt stop (Table 5).

Table 2. Perceived Impacts of Climate Change on Agriculture

Effects	Respondents	Percentage	Knowledge level
Lower yields and production	70	100%	Very good
Pest attacks	14	20%	Very low
Poor plant growth	7	10%	Very low
Destruction of crops by strong winds	16	23%	Very low
Drying out of crops due to lack of rain	33	47%	Low
Loss of seeds due to sudden cessation of rain at the start of the rainy season	39	56%	Moderate
Crop loss or drying out due to cessation of rain during the rainy season	34	49%	Low
Post-harvest loss due to excess water or an extension of the rainy season	1	1%	Very low

Conflicts with other producers or breeders	0	0%	Very low
Other	13	19%	Very low

Source: Survey data (2023).

3.2.2 Perceived Causes of Climate Change

For communities, the main causes of climate change remain human, in line with the conclusions of the IPCC (IPCC, 2014 ; IPCC, 2023). For them, climate change is mainly caused by wood cutting (99%), bush fires (59%), the divagation of animals (39%), the destruction of forests (29%) and other factors (34%), including demographic pressure, the loss of cultural and religious values, misbehaviour and lack of respect for nature, and the construction of buildings.

Table 3. Perceived Causes of Climate Change

Causes	**Respondents**	**Percentage**	**Knowledge level**
Wood cutting	69	99%	Very good
Destruction of forests	20	29%	Low
Divagation of animals	27	39%	Low
Bush fires	41	59%	Moderate
Use of pesticides in agriculture	12	17%	Very low
Traditional mining	3	4%	Very low
Pollution (vehicles, motorbikes, factories, burning etc.)	0	0%	Very low
Natural (God’s work)	3	4%	Very low

Source: Survey data (2023).

3.3 Participatory Analysis of Vulnerability to Climatic Hazards

This analysis was conducted in a participatory approach with *community* representatives through focus group sessions using TOP-SECAC tools, including the vulnerability matrix to climate hazards (Somda J, 2011). The vulnerability analysis focused essentially on the impact of climate change on the most important natural resources identified by the populations and the related activities (water, agricultural and livestock production, exploitation of non-timber and timber forest products, and mining) using a scoring system from 0 (lowest) to 5 (highest). The most important resources and the most severe hazards for local people were identified using primary and secondary data, in particular from the focus groups.

The main climatic hazards impacting these resources are drought, violent winds, extreme heat and flooding. However, these hazards have different impacts on the resources that are most important to communities.

Table 4. Vulnerability to Climatic Hazards

Hazards / Resources	Droughts	Violent winds	Heat wave	Floods	Total of resources
Water	4	0	3	0	**7**
Agriculture Production (millet, sorghum, maïze, cowpea, groundnut, sesame, rice etc.)	5	3	2	3	**13**
Livestock	4	2	3	3	**12**
Non-timber forest products (NTFPs)	3	4	1	0	**8**
Forest (woods)	2	2	1	0	**5**
Mineral Resources	0	0	0	0	**0**
Total of hazards	**18**	**11**	**10**	**6**	

Source: Focus group (2023) adapted from TOP-SECAC.

On a scale of influence from 0 to 5 (TOP-SECAC), drought is the most important climatic hazard with the greatest impact on community resources. It affects productivity and is the cause of the food insecurity experienced by some populations (X. N. Gnoumou, 2017). In term of importance, violent winds and heat waves have almost the same impact on livelihoods. Flooding was deemed to have less impact on community resources in Namissiguima than other hazards.

In terms of resources most affected by climatic hazards in the commune, it is mainly agricultural and livestock production that are suffering the most from the negative consequences of climate change. This is because the agro-sylvo-pastoral and fisheries sectors in the Sahel region and throughout the country are still dependent on rainfall. As access to water is essential for production (Jérôme Compaoré et al., 2023), the sector is directly affected in the event of drought. Because of the close link between agriculture and livestock, droughts that affect agricultural production will inevitably have a negative impact on livestock feed and, as a result, will reduce the adaptive capacity of local populations by reducing their income.

3.4 Analysis of Vulnerability Factors

The observed impacts of climate change in the Namissiguima commune vary according to the hazards (Table 5).

Table 5. Analysis of Vulnerability Factors Linked to Climate Hazards

Hazards	Oserved impacts	Exposure	Sensitivity
Droughts	• Decline in agricultural yields (household food insecurity) • Reduced income from livestock production • Animal deaths • Water shortage	100% of the community is exposed because all households are both farmers and livestock breeders. They have at least part of their fields in drought-prone areas.	80% of those exposed are sensitive because they have their fields in high-altitude areas and their crops are also sensitive to drought. Less than 10% of farming households use the lowlands. Less than 10% of households adopt good farming practices adapted to drought.
Violent winds	• Destruction of agricultural crops • Destruction of fruit • Destruction of dwellings and animal shelters • Uprooting of trees	100% of households are exposed because they are farmers, stockbreeders and exploit NTFPs.	70% of those exposed are vulnerable because their houses are built of banco and are not protected by wooded areas. Also, the low density of vegetation and high crops are more exposed (millet and maize).
Heat wave	• Water shortage • Electricity shortages • Diseases • Animal deaths • Low animal production	100% of the community is exposed to the effects of the heat	80% of exposed people are vulnerable to water shortages, load shedding and illness, especially vulnerable people (children, the elderly).
Floods	• Destruction of crops • Destruction of houses and buildings • Destruction of animal pens • Death of animals • Destruction of foodstuffs and documents • Destruction of traders' products	80% of the community is at risk, as they either live in houses made of banco or have their fields in flood-prone areas.	20% of exposed households are sensitive because they farm in low-lying areas and live near flood-prone areas. More than 80% of households live in high-altitude areas and also farm in elevated areas.

Source: Focus group (2023) adapted from TOP-SECAC.

The analysis of vulnerability factors shows that the level of vulnerability of the populations of Namissiguima is not homogeneous and varies according to the hazards, the types of resources exploited and their location in the area. While 100% of the population is exposed to drought, violents winds and extreme heat, only 80% is exposed to flooding. The level of sensitivity varies from 80% for drought and extreme heat to 70% for strong winds and 20% for floods. In order to strengthen people's adaptive capacities and resilience, this situation calls for specific solutions for communities, depending on the area and the hazard (PNA, 2015; François Bertrand, 2016).

4. Discussion

According to the survey, the Climate change is known by all respondants (100%), and for a large part of them, human activities are the main cause of this climate changing with various impacts on the livelihood and income. To adapt to the negative consequences of the various hazards, the people of Namissiguima adopt different coping strategies. The behaviour adopted varies according to the hazard and location (François Bertrand (2016). The table below shows the main measures taken by local people to cope with the main hazards they experience, namely drought, strong winds, extreme heat and flooding.

Table 6. Impacts Observed and People's Adaptation Srategies

Hazards	Impacts observed impacts	Adaptation strategies adopted by communities
Droughts	• Decline in agricultural yields (household food insecurity) • Reduced income from livestock production • Animal deaths • Water shortage	• NTFP exploitation • Trade of firewood • Exploitation of mining resources • Displacement of young people to favourable areas in search of work
Violent winds	• Destruction of agricultural crops • Destruction of fruit • Destruction of human habitat and animal shelters Uprooting of trees	• Cladding housing with improved cement and banco • Community mutual aid to build houses
Heat wave	• Water shortage • Electricity shortages • Diseases • Animal deaths • Low animal production	• Sleeping under the stars at night • Take shelter in shady areas • Travel early • Start activities early • Wash several times a day

Floods	• Destruction of crops • Destruction of houses and buildings • Destruction of animal pens • Death of animals • Destruction of foodstuffs and documents • Destruction of traders' products	• Temporary living in schools classroom • Cladding housing with improved cement and banco • Community mutual aid to build houses • Refraining from or limiting the production of certain crops in low-lying areas

Source: Focus group (2023) adapted from TOP-SECAC.

Globally, solutions adopted are mainly reactive strategies, and are still largely ad hoc. Although preventive solutions are less common, the people interviewed also mentioned certain preventive solutions such as limiting cereal production, including maize, rice and millet in lowland areas.

4.1 Adapting to Drought

Droughts are one of the main climatic hazards that have an impact on people's income (Bekele et al., 2014) and the main hazards that have a negative impact on the lives of communities in the Sahelian zone of Burkina Faso, particularly in Namissiguima. With 80% of the arable land at high altitude and crops sensitive to drought, droughts pose a problem for food security by leading to poor plant development, particularly for the main crops grown in the locality, namely millet, maize and sorghum (X. N. Gnoumou et al., 2017). The consequences are poor harvests, food shortages for households, lack of fodder, early drying up of water reservoirs, etc.

This vulnerability is compounded by the fact that communities depend almost exclusively on these resources for their livelihoods. According to Esikuri (2005) quoted by Bekele et al. (2014); 60% of sub-Saharan African countries are vulnerable to frequent and severe droughts due to the dependence of agriculture on rainfall. Burkina Faso and the commune of Namissiguima are no exception, as the agricultural production system remains almost entirely rainfed. To deal with this, the people of Namissiguima have adopted the exploitation of Non-Timber Forest Products (NTFPs), wood cutting and the firewood trade, the exploitation of mining resources (mainly gold mining), and the movement of young people to favourable areas in search of work.

Nowaday, the situation is increasingly complex due to insecurity, which makes mobility difficult and prevents access to various areas that were once favourable. Presure on forest resources is also making NTFP exploitation less productive as resources dwindle. For communities, new methods exist, including off-season crops through, among other things, the mobilisation of water resources (market gardening from boreholes), income-generating activities through trade, livestock micro-projects, etc., and the adoption of cultivation methods adapted to drought and climatic conditions. However, while the technologies and tools exist (improved seeds, Zaï, half-moons, stone cordons, production of organic manure, reforestation, agricultural production in low-lying areas, etc.), the implementation of these

technologies and tools is still a long way off. Indeed, the implementation of these adaptation options faces various obstacles linked to insufficient water control (Jérôme Compaoré and al, 2023), the departure of young people to gold mining sites and insecurity, the necessary financial resources, the high altitude of production areas (fields) and a deep water table.

4.2 Adaptation to Violent Winds

Violent winds are the second cause of vulnerability of Namissiguima people. The entire population is exposed to violent winds, which destroy agricultural crops, the fruit of plants, especially forest plants (NTFPs), homes and animal shelters, and uproot trees (Kabore, 2019). To deal with these problems, households mainly opt for community self-help and changing roof coverings to more sustainable materials. Other solutions exist, according to the results of discussions with local people. These mainly involve building solid houses using quality materials, reforestation and protecting crops with hedgerows. The implementation of these additional options is coming up against obstacles such as the lack of a young, active workforce, with young people leaving for the gold-mining sites, and the poverty of the population.

4.3 Adaptation to Heat

According to the hazard vulnerability matrix, extreme heat is the third most common cause of vulnerability for the population of Namissiguima, with a weighting of 10 points, compared with drought (18 points) and strong winds (11 points).

According to the Agence National de la Meteorologie (ANAM) data, peak heat periods in Burkina Faso occur between March and April. The impacts are varied and can be summed up as major water shortages, load shedding, disease, low animal production and the death of animals. To cope in the short term, people sleep under the stars at night or take shelter in shady areas. Other tricks include carrying out their activities and travelling early in the day. Finally, while toilets can be used to cool off several times a day, particularly for children and the elderly, they are still difficult to use because of the water problems that also arise at the same time.

In the medium and long term, reforestation activities, particularly in public places and homes, and the adoption of building systems with airy houses such as the « Voûte Nubienne » could be alternatives (Bruno Jarno, 2015).

4.4 Adaptation to Flooding

Compared to droughts, flooding is to a lesser extent the hazard that has the least impact on the livelihoods of the people of Namissiguima. It is nonetheless important, as the damage caused can range from the destruction of crops, houses and buildings, animal pens, loss of human life and the death of animals, to the destruction of foodstuffs and documents (in particular civil status documents) as well as traders' products (Jean Marie DIPAMA, 2009; PNA, 2015). To deal with the situation, the local population temporarily moved disaster-stricken households into schools classroom more resistant, covered their houses with cement and improved banco to prevent them from falling down, helped each other rebuild damaged houses and built houses in the higher parts of the commune. However, these

efforts are sometimes thwarted by a number of obstacles, such as insufficient premises to accommodate a large number of households, particularly in schools, and insufficient manpower for community work due to the exodus of young people to gold mining sites.

5. Conclusion

Climate change remains a concern for Burkina Faso in general and for the population of Namissiguima in particular. With more than 80% of the population dependent on agriculture and livestock farming for their livelihoods, any variation in climatic parameters has a direct impact on production yields and, consequently, on people's adaptive capacities. Nowadays, the causes of this change are well known to local people. Faced with this situation, although people are increasingly adopting production methods adapted to the climate (changes in crops, the practice of Zai, etc.), but their actions remain insufficient and largely reactive. The use of preventive methods, such as the use of climate information to anticipate impacts, remains very limited. The situation is even more complex actually, given the security situation in whole the country and in the sahel part of Burkina Faso in particular. In fact, natural resources remain one of the primary sources of supply for internally displaced populations, particularly timber and non-timber forest products for their subsistence. This is creating a dilemma in terms of the appropriate action to be taken to preserve these resources in several communes, and the humanitarian emergency in such circumstances.

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Note

Note 1. https://reliefweb.int/report/burkina-faso/burkina-faso-mise-jour-de-la-situation-mai-2023