

THE PERCEPTION OF CLIMATE CHANGE IN SENEGAL COASTAL AREAS



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The cognitive dimension of climate change is a subject that is rarely analysed. However, communities' endogenous adaptation strategies are heavily dependent on their perception of the risks linked to climate change. An analysis of individuals' representations and perceptions of climate change makes it possible to improve the ability to adapt of territories confronted by it.

In this analysis, the relations of interdependence between perception, knowledge and adaptation strategies show how communities living in the coastal area of Senegal interpret climate change, in particular in the fields of agriculture, water resources and coastal areas.

Considering these representations favours the co-construction and acceptability of the adaptation strategies.

It enables state and non state actors to better understand the communities' needs as regards public climate policies, whereas the media can identify levers they can use to devise effective public information campaigns on the climate, in order to reduce the vulnerability of communities that face climate hazards.

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ACRONYMS AND ABBREVIATIONS

CBOs: Community based organisations

CLPA: Local Artisanal Fisheries Council

COP: Conference of Parties

CSO: Civil society organisation

DEEC: Department of Environment and Classified Establishments

FAO: Food and Agriculture Organisation of the United Nations

GHG: Greenhouse gases

NGO: Non governmental organisation

OXFAM: Oxford Committee for Famine Relief

PAS-PNA: Support Project for Science based National Adaptation Planning

RAPEN: Network of Associations for the Protection of the Environment and Nature

SCA: Sports and Cultural Associations

SDGs: Sustainable Development Goals

SOCOCIM INDUSTRIES: Cement company

TFP: Technical and Financial Partners

UNFCCC: United Nations Framework Convention on Climate Change

WACA: West Africa Coastal Areas Management Program



EXECUTIVE SUMMARY

Senegal is exposed to various climate hazards, and its economy is very sensitive to climate change. Adaptation policies, even if they are voluntary, are not systematised. This is detrimental to strong and resilient socio-ecological systems. Even worse, the populations still struggle to recognise the phenomenon of climate change and the associated consequences, according to the different repertoires of cognition.

Considering this, in 2021 and 2022, Oxfam launched the African Activists for Climate Justice (AACJ) and Ford Climate Media Collaborative projects in Senegal, which aim to use communications to defend communities' rights and change narratives in favour of economic justice and awareness of climate change. This study of *The perception of climate change in Senegal* was therefore carried out to provide reference elements that will form a basis for advocacy for Oxfam, its partners and the communities.

In simple terms, the study aims to understand and compare the perception of climate change in coastal areas of Senegal, with an emphasis on biodiversity, the coastal area and water resources. Consequently, nine towns and villages on the coast of Senegal, i.e.: Saint-Louis, Lompoul, Dakar (Fann), Guéréo, Bargny, Palmarin, Kafountine, Diogué and Kabrousse were chosen for this survey.

After this study, the profiles of the respondents, from a socio-demographic and socio-professional point of view, are representative of the characteristics of Senegal as a whole. Knowledge of climate change within the communities is limited, unless it involves identifying the factual consequences and other impacts such as coastal erosion, heat waves, high winds, scarcity of fishery products, late arrival of rainfall, water supply problems etc.; this sometimes indicates confusion between climate change and deterioration of the environment, even if the qualitative survey made it possible to list the terms whereby the phenomenon is identified: "sopéeku alam bi" (deterioration of the environment), "sopéeku jaw ji (change in the climate), "sopéeku jamono ji (change in the environment) "Géej gi daffa aaye" (rough sea), "Look", "Aaye ", " Seer", " Kàajjé" and "Jàw ji daa tang (warming of the environment). Consequently, if 45.6% of respondents consider that climate change is of natural origin, that is because divine punishment is indicated as the main cause, without ignoring moreover the anthropogenic factor, in particular as regards industry, described as "excessive human action".

There is a real impact on biodiversity, in particular the poverty and salinisation of the soils. In the maritime domain, in Bargny the price of round sardinella, called locally "yaboye", which has increased from €15 to €68 or even €75 in less than five years, shows the extent of the increasing scarcity of the main resources the communities live on. The drying up of watercourses can be seen along the coast, in particular in Guéréo, even if the problem of groundwater recharge is partly linked to the demographic weight and tourist planning, which exceed the technical capacities of the boreholes. Climate change is therefore not always to blame.

In view of this situation, the coastal communities are doing their best to adapt. In their perception, tradition still plays a part, in the sense that the protective spirits still show concern. We note however that the process of passing on this perception to the younger generation is not effective. Furthermore, perception of the factual existence of climate change determines whether the respondents adapt or not. We note that those at school are more inclined to adapt than those who are not educated. Even though the usual adaptation measures such as raising the awareness of regulations and best practice for fishing, introducing suitable crop varieties, water management, banning the removal of sea sand, reforestation etc. are implemented, the scale of the problem is such that they are not enough. From this point of view, they require strong measures, in particular no longer granting fishing permits, installing breakwaters, environmental migration and the search for other occupations which represent significant alternatives.

In their perception, tradition still plays a part, in the sense that the protective spirits still show concern.

Finally, adaptation is experienced differently according to gender. Women are, in fact, doubly affected by their condition within the households, and their dependence on natural resources for processing and marketing activities for fishery products, or for harvesting, and marketing garden produce. However, they have a major role in adaptation, in particular in terms of commitment, mobilisation and awareness raising. Similarly, young people show a definite involvement in favour of awareness raising and reforestation measures. But it is men who are more likely to take part in the seminars, without really acting as a go between. However, the

decision makers do not sufficiently involve the populations in the adaptation policies; it is instead the intervention of NGOs that is praised.

The quantitative survey shows that almost 43.1% of respondents showed weak commitment or no personal commitment to reducing the effects of climate change on biodiversity, whereas 56.9% showed moderate commitment. It should be noted that the lack of access to climate information and environmental education are harmful trends for commitment. Media treatment is not favourable to environmental issues, hence the need to better understand the populations' perceptions, to structure and complete the adaptation policies more effectively from the standpoint of social acceptability, via a communication approach based on the media.

MAIN ELEMENTS OF THE PERCEPTION OF CLIMATE CHANGE IN SENEGAL

PERCEPTION OF THE CAUSES OF CLIMATE CHANGE

- **47% of respondents maintain that climate change is of natural origin, while 46% state that climate change is due to excessive human action.**
- **48% of respondents gain their knowledge from tradition, 31% from science and only 15% from religion.** This strongly suggests that the population has limited scientific knowledge and is therefore unaware of the real scientific causes of climate change. This ignorance of climate events by the majority of the population is due to a lack of education. "Divine will" appears significantly in the answers, in Saint-Louis, Lompoul, Kafountine and Palmarin, etc.
- **For example, 60% of respondents maintain that climate events are due to divine punishment.** Conversely, 29% do not believe in divine or mystical punishment.
- **Among the different factors perceived to be the cause of climate change, we note that a natural change in the climate was the most common answer, representing 62% of the sample.** Anthropogenic causes came next, representing 56%. Supernatural and divine causes represented less than 67% of the sample.

PERCEPTION OF THE CONSEQUENCES OF CLIMATE CHANGE

- **Among the consequences of climate change, the existence of droughts is suggested by 66% of respondents, compared with 47% who disagree with that possibility.** We note respectively salinisation, which represents 17% of the total sample, swells (22%), high winds (33%), drought (42%), high tides (44%), and to an even larger extent, floods (63%). Floods are the extreme event that is the most prominent in the accounts. This may be due to the exposure of the coasts to the ocean, in addition to the proximity of the maritime activities. It is also a consequence of the lack of planning, which results in people living in areas subject to a building ban.
- **In Lompoul, the disappearance of certain animal species such as jackals and apes has been reported.** This is largely linked to the deforestation that the area has suffered for many years, as well as the advance of the desert in places.
- **In the sample polled, 64% consider that the loss of biodiversity is due to climate change.** 68% of respondents reported the disappearance of several plant species.
- **71% of respondents noted the disappearance of species of fish from our coasts. Only 19% recorded the appearance of new species.** That being said, more species are disappearing

than are appearing. This phenomenon may be due to several factors, in particular overfishing off the coasts of Senegal, the type of fishing carried out by foreigners with the use of small mesh nets, global warming, the use of certain toxic products etc.

- **There are over 160 fish species off the coast of Senegal.** These include firstly the grouper or “Cóf” and the white grouper, which according to several respondents is an endangered species. It is mentioned 138 times as one of the most difficult species to find by fishermen and consumers.
- **Many species were plentiful off the coasts of Senegal. But now, because of their scarcity, the fishermen must sail in the waters off neighbouring countries, or resort to seasonal or even illegal migration as, according to some, it is no longer possible to make a living.** This has a considerable impact on women who work along the coasts, processing and marketing sea products.
- **Many respondents cite the example of the change in the price of fish as proof of its increasing scarcity:** in Lompoul, a kilo of “Yaboy” sardinellas used to cost two cents, and now costs €2; whereas in Bargny, a basketful increased from €15 to €68 and then €75 in less than five years.
- **The most recurrent problems suffered by the fishing areas are the destruction of the habitat (45%), coastline retreat (44%), coastal flooding (38.6%) and regression of the surface area of the mangrove swamp (28%).** Among the impacts, coastline retreat is noted more often in the areas of Dakar/Fann, Guéréo, Lompoul and Palmarin, whereas coastal flooding is more often reported in Bargny, Guéréo and Palmarin.
- **The advance of the sea, known as Waamé in Wolof, can be seen along the coasts.** The fishermen and fish wholesalers mention it increasingly often. They even mention the distance between the dry land and the sea, which can range from 1 km to 20 m today.

THE INFLUENCE OF PERCEPTION ON THE ADAPTATION STRATEGIES OF THE COMMUNITIES

- **43% of respondents consider that rites are decisive to obtain good resources.** 45% of respondents believe in the existence of a protective spirit and its influence on their survival. Rites are mainly practised by men (40%), followed by women (35%), whereas young people are in last place (2%).
- **The respondents use different techniques to adapt to impacts linked to water resources:** recovery of rainwater (50% of responses), raising the awareness of the population of the need to properly manage resources (50%), motivating women and young people to manage and plan water resources at the local level (30%), implementing systems for sustainable water use (28%) and using large scale water saving measures (13.20%).
- **To adapt or cope with impacts on the coastal area, the three most common proposals are a ban on removing sea sand (76% of responses), raising the awareness of regulations and best practice (fishing, activities in the coastal area etc.): 40%, and reforestation/planting (in particular of the mangrove swamp): 40%.**

- **To cope with the impacts on the agricultural sector, choosing heat tolerant varieties is the main adaptation measure cited, with a response rate of 41%.** This is combined with irrigation (31%) to reduce the dryness of the soil, the use of local boreholes (28%), and the setting up of retention basins (25%).
- **In Bargny, the fishermen usually go to Kafountine in the south, or to Tandié, a village in the Gambia, to get good catches.** If this strategy does not work, more and more often they choose to migrate illegally to Europe.
- **The use of certain types of fishing nets such as monofilament is prohibited.**
- **In the Palmarin area, measures to protect resources, such as a biological recovery period, are applied to the marine protected area (MPA).**
- **In Diogué, the Ghanaians, Gambians and Malians who met in front of the village have had to move to Elinking and Cap Skiring,** due to the advance of the sea, which is washing away their workplaces.
- **In Saint-Louis, many families are being rehoused in the suburbs of the town, in Khar Yallah, on the Gaston Berger University (GBU) road.**
- **On the whole, the communities do not have effective means to combat climate change, as adaptation requires so much money.** For that reason, in Kafountine and Guéréo, respondents provide the example of the breakwaters installed in Saly, calling for these measures to be applied all along the coast.
- **87% of the sample maintain that the government has a duty to have a fundamental role in climate matters.** Even if efforts are made by the state, the ability of policies and decisions to influence climate change adaptation do not have much impact in terms of raising awareness and recommendations for the communities.
- **Several times in the interviews, it emerged that women's power to mobilise on socio-community issues, as well as to promote and successfully carry out collective action, is firmly established.** But on the whole, they lack specific and thorough knowledge of the phenomenon of climate change, to carry out decisive awareness raising or advocacy actions.

PERCEPTION OF AWARENESS RAISING AND ENVIRONMENTAL EDUCATION

- **The interviews in Saint-Louis showed that men are better informed than women about the phenomenon of climate change,** except for certain women in strategic positions in CBOs.
- **Faced with this disaster, most of the young people in the sample, i.e. 36%, did not know what role to play.** For others (22%), their role as young people is limited to issues of awareness raising. Moreover, 8% of them consider that young people have no role to play in climate change adaptation.
- **43% of respondents show little or no personal commitment to reducing the impact of climate change on biodiversity.** 64% of the 500 respondents gave a negative reply to the



question about their involvement in planning climate change adaptation. These statistics are alarming considering the issues of sustainable development.

- **66% of respondents maintain that there is no satisfactory environmental education for young people.** Environmental education is of more benefit for young people at school, whereas uneducated young people do not have specific information on the phenomenon and its effects, even if they end up working in fishing or market gardening activities sensitive to climate change.
- **74% of respondents declare that they do not take part in awareness campaigns to combat climate change.** 76% of respondents gave a negative reply when asked if they carry out advocacy actions to combat climate change.
- **Only 5% of respondents work jointly with the media in connection with combating climate change, 84% of them do not.** Respondents listed the following obstacles to collaboration between the media and the population: inaccessibility of the media, lack of knowledge about the subject, lack of time, lack of interest etc. These limits act as a brake on good conduct in combating climate change.

74% of respondents declare that they do not take part in awareness campaigns to combat climate change.

PERCEPTION OF THE LINKS BETWEEN CLIMATE CHANGE AND POVERTY

- **Poverty is shown by the household's income. For example, for 49% of respondents, their income is less than their requirements.** Only 49% say that they meet their needs, whereas 2% are compelled to go without.

- **The impact of global warming endangers family farming. Consequently, the coastal communities polled identify a decline in soil fertility as the initial impact.** This naturally leads to a decline in yields, which is noted as the second impact of variations in rainfall. Most family farming is intended foremost to feed the family, and then, if possible, to sell part of the produce. Consequently, a fall in yields exposes families to a decline in income and food insecurity.
- **Whereas poverty, stigmatisation and discrimination are generally the three main problems of people living with disabilities, the effects of climate change aggravate these problems.** We note that nearly 40% do not know how to cope with these difficulties to meet their requirements. This shows society's ignorance of the situation of disabled persons.
- **The fundamental bases of the means of support, i.e. agriculture, water, fishery and forestry resources, have been suffering from various climate hazards for a few decades.** With poor control of climate risks, the combined effect of these hazards is often likely to overshadow the efforts made by states to achieve the double aim of ensuring the economic emergence and well being of the populations.

PERCEPTION OF THE LINKS BETWEEN CLIMATE JUSTICE AND ENVIRONMENTAL JUSTICE

- **Anthropogenic factors and the impact of industrial activities on the environment, in particular that of extractive industries, aggravate the effects of climate change such as drought.** "... in the end, the soil has been so badly harmed that even if you farm it, it will not produce anything. Some products have polluting ingredients which are not favourable for farming. Anything that is not good for a crop is of course bad for man".
- **Like climate change, both western and local industries cause countless environmental nuisances.** In Palmarin the surveys show fear of potential pollution of the sea due to the exploitation of oil in Sangomar, as in Saint-Louis with the exploitation of gas, Lompoul with the exploitation of zircon and in Bargny with the cement company (SOCOCIM Industries) as well as the effects on air quality of the coal fired power plant in Sendou.
- **Very often, the interviewees speak without distinction of environmental deterioration and the consequences of climate change.** Environmental awareness appears to be an issue of justice at every level, whether environmental, economic, social, gender or cognitive.

1. INTRODUCTION

Climate change continues to arouse increasing interest, not only due to its harmful effects on the environment and populations, but above all because it is not yet well understood by many people. However, it is essential to know about the phenomenon of climate change to develop a meaningful attitude to reduce its harmful effects, such as coastal erosion, extreme events, the rise in temperatures etc. Although specific knowledge is developed and supplied via sophisticated methods of data collection and analysis and projection of scenarios on climate change, the fact remains that in local cultures, the forms of long term social representations of the environment, from generation to generation, steer perceptions of it, which are already culturally acquired. At this level, the state of scientific knowledge is still unsatisfactory, all the more so because mitigation and adaptation demand social practices which make sense within a given local culture.



Moreover, that is why, despite the international agreements regarding climate negotiations, the implementation of adaptation strategies is not only a matter of fundraising and investments in the works and other measures to reduce greenhouse gas (GHG) emissions, but rather a question of social acceptability of the existence of the phenomenon, and as a result, of combating it to check its dangerous progress for all forms of life on Earth. According to this view, it is possible to have better knowledge of the perceptions of climate change in the different communities, according to their cognitive schemas, in order to develop effective communications to reduce poor adaptation. In simple terms, the views, narratives and images associated with a phenomenon are the logical frameworks of repertoires of actions that make it possible to guarantee the sustainability of the natural resources and the balance of the socio-ecological systems.

Senegal is located in the far west of Africa, with a coastline of 750 km in addition to several waterways located inland and lining almost all its borders, and is exposed to climate change. Having ratified and signed all international conventions and protocols on environmental governance, in particular from the multilateral environmental agreements of the Rio de Janeiro conference in 1992, Senegal treats the management of natural resources as one of its national priorities, in both its laws and regulations. However, to better understand the manifestations of climate change, it is necessary to analyse the perceptions, points of view and actions of the communities.

it is possible to have better knowledge of the perceptions of climate change in the different communities, according to their cognitive schemas, in order to develop effective communications to reduce poor adaptation.

In view of the above, Oxfam's "Ford Climate Media Collaborative" and "African Activists for Climate Justice" projects are justified in their action which involves firstly defining and comparing the perception of climate change in the coastal areas of Senegal, and secondly, devising activities

to reinforce the adaptation planning abilities of the local authorities. These actions create opportunities for raising awareness by the media to steer public debate on climate change, and in addition to guide better climate change adaptation.

It is not by chance that the coasts of Senegal were chosen for the study. This is justified by the evidence, in particular the fact that the coasts stretch for 750 km from north to south and concentrate over 70% of the Senegalese economy. Furthermore, they are too vulnerable to climate change. They also comprise a concentration of the population of Senegal, representing more than half of the total population. Moreover, there are continuous and steady flows of commuting and permanent migrants there. Considering all of these considerations, it is not accidentally that Saint-Louis, Lompoul, Dakar, Bargny, Guéréo, Palmarin, Kafountine, Diogo and Kabrousse, i.e. three sites per area, were chosen. Indeed, the fact of questioning the perceptions of millions of Senegalese, where cultural diversity reveals the intermingling of different communities, offers a guarantee of the representativeness and saturation of the sample which will be considered, and therefore extrapolated to the entire population. As a result, the advocacy actions will have greater impact if they reflect the issues perceived on the coasts.

This shows the purpose of the study, i.e. the aim of advocacy and reinforcement of the ability to achieve a positive change in practices and processes within the communities and by the various stakeholders. Indeed, despite the many efforts made in favour of sustainable development in general, the results are still disappointing. The Sustainable Development Goals (SDG) have been implemented to a level where the positive effects should be noticeable, particularly as the scenarios for warming by 2050 and 2100 remain alarming. However, it is necessary to understand the narrative and accounts of the local communities which directly observe the impact of climate change on biodiversity, their water resources and the other means of subsistence (agriculture, fishing, breeding, market gardening, gathering etc.) according to their patterns of social representation, to better understand the attitudes produced by perception of the phenomenon.

The aim of this study is to define and compare the perception of climate change in the coastal areas of Senegal and to reveal the opportunities for awareness raising by the media to steer public debate on climate change, as well as to encourage better climate change adaptation. This involves studying three important elements of climate change: understanding of perceptions, communication on the phenomenon, and the acceptability of the adaptation strategies. Critical knowledge of the representations that are associated with climate change is a decisive way of contributing to environmental education.

Numerous studies show the importance of the social representations of individuals, which enable territories to adapt more effectively to climate change. An analysis of individuals' social representations of climate change and of the associated risks makes it possible to improve the ability of territories and societies to adapt to this phenomenon. A better understanding of how social representations of climate change are shaped will improve citizens' awareness. In connection with the integrated management of territories, considering these representations

favours the co-construction and acceptability of the adaptation strategies. It is in this context that Oxfam Senegal launched the Ford Climate Media Collaborative project, the aim of which is to use communications to defend communities' rights and change the economic narratives in favour of economic justice and promote awareness of climate change.

The study of perception will make it possible to express more clearly the communities' needs as regards public climate policies, in order to influence public policies regarding the priorities that the climate action of the state and its departments must cover. Taking into account these representations favours the co-construction and acceptability of the adaptation strategies. In that way, the target audience, the media in their use of the results of the research, the public decision makers (government, state bodies, local authorities, backers), and civil society organisations (CSOs) in the field of the climate and the environment, will acquire scientific evidence to address the harmful effects of climate change in the local context of the cultures, geography and decisions of the public authorities.

Although it is true that Senegal, like many countries in the world, contributes to international efforts to deal with the climate threat, many questions remain regarding the inclusive nature of the national and local policies developed to cope with climate change, and as regards taking into account local knowledge and representations that men and women have of climate change.

2. CONCEPTUAL MODEL AND METHODOLOGICAL APPROACH OF THE STUDY



To better understand the objectives of the study, it is important to draw up a theoretical framework to guide the empirical study. Investigating the coasts of Senegal, which concentrate most of the socio-economic activities, resources and populations of the country, involves conducting a systemic analysis that simultaneously takes into account all of the sectors, such as marine and terrestrial biodiversity, the water resources and the coastal area. This is particularly relevant as it considers the complexity of the climatic phenomenon in the daily life of the communities and stakeholders. The methodological approach is therefore a consequence of the objectives of the study, involving a combined methodology to analyse a qualitative and quantitative approach. First, it appeared necessary to review the perception of climate change, in order to reveal the shortcomings in the knowledge of the subject.

2.1. STATE OF KNOWLEDGE OF THE PERCEPTION OF CLIMATE CHANGE

It is necessary to define the concepts of climate change and climate variability. Article 1 of the United Nations Framework Convention on Climate Change (UNFCCC) states that “Climate change” means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.” The UNFCCC therefore makes a distinction between “climate change” that can be attributed to human activities that alter the composition of the atmosphere, and “climate variability” due to natural causes (UN 1992). Climate change is a real threat and therefore constitutes one of the major challenges faced by humanity since the end of the 20th century. As a result, there are many answers influenced by the technological and social capital of the communities and the strength of the local and political institutions (Sall et al., 2011). This global phenomenon probably affects the ways of life of societies at various levels and in various forms. The effects of climate change vary and are experienced differently from one country to another, and from one society to another. Africa is responsible for barely 4% of global greenhouse gas emissions. However, it is particularly vulnerable to the effects of climate change. Moreover, orders in favour of the ecological and energy transition are imposed on it despite its limited responsibility for global pollution (Sarr, 2021). Several studies carried out in Senegal inform us of the consequences of climate change. They are the result of the vulnerability of Senegal’s ecosystems, requiring specific measures to adapt to the future climate outlook, in order to control the potential impacts, in particular in socio-economic terms.

- Agriculture

Sub-Saharan Africa is particularly exposed to climate hazards, as the rural populations depend on rain fed agriculture, which represents nearly 93% of the cultivated land (Sultan et al., 2015). Climate change has a negative impact on the infrastructure supporting agricultural production and will contribute to the increase in post harvest losses.



According to the study by Niang et al., (2022) of the perception of, and strategies for adapting to climate change by market gardeners and artisanal fishermen in the area of Niayes in Dakar, the local populations report a decrease in and irregular rainfall, a late start to the rainy season, rain stopping early and more frequent pockets of drought, as well as strong winds. The market gardeners and fishermen polled emphasise that with climate change, the rain has become less heavy and strong. It comes later (August instead of June) and ends early (October instead of November), and therefore there is less rain in a shorter period. Like the observations on rainfall, the vast majority of market gardeners and fishermen affirm that there has been a rise in the temperature accompanied by a longer period of heat in the last few decades. This is also unanimously reported by artisanal fishing actors. Moreover, the perceptions of most market gardeners and fishermen that there has been a rise in temperatures are confirmed by the scientific data. Regarding the negative impacts on socio-economic activities, the actors unanimously acknowledge a decline in yields and a decrease in income due to the erosion caused by the winds and the irregularity of the cold and hot periods. From the same angle, the earlier work of Diop et al. (2005), as well as the more recent work of Cissé and Diop (2022), Sarr (2020) and Mballo and Sy (2019) on agriculture support these results. However, they do not show elements from the representational schemas and cultural identities, making it possible to identify the changes that have occurred or are likely to occur.

- The coastal area

In connection with the Support Project for Science based National Adaptation Planning (PAS-PNA), vulnerability studies have been conducted in order to assess the vulnerability of the different business sectors including the coastal area for the Fatick region. The results have proved that the coast of the Saloum Delta is particularly sensitive to climate hazards and natural events such as coastal erosion and coastline retreat.

On another level, the analysis of perceptions in the study of the “socio-economic resilience of vulnerable communities in the Senegal River delta faced with climate change” conducted by Sambou et al. (2020) shows that the populations in the zone have quite a good knowledge of the risks linked to climate change. The main risks identified by the actors are the advance of the sea, the scarcity/disappearance of certain maritime species, and river flooding. These phenomena have impacts on the infrastructures and houses located on the coast and on the ecosystems. The measures that are given priority by residents to protect themselves and adapt to climate hazards mainly involve building wooden or concrete walls, building sandbanks and planting plants.

On the specific question of perceptions, the thesis of Diop (2014) on the risk of coastal flooding

in Saint-Louis is pioneering in that it studies, based on the concept of “social representations”, the preventive practices of fishing communities in the Langue de Barbarie (Guèt Ndar and Ndar Toute) faced with the risk of coastal flooding. For that researcher, the preventive practices are in fact part of the process and are the product of a psychological and social elaboration of reality. The issue here is not to determine the reality of the risk of coastal flooding, but to understand how the respondents from Guèt Ndar and Ndar Toute appropriate it. This relationship between representations and practices gives rise to contradictions between scientific expertise and community expertise. This means that the practices of the scientific community will differ from those stemming from the fishing communities of the Langue de Barbarie. The social representations of the risk are determined more by the socio-cultural characteristics of the fishing communities than by objective observation of the situation. As a result, the social representations include socio-cultural elements of the fishing communities of Langue de Barbarie. This led her to note the existence of differences between the perceived risk and the real risk, as well as the existence of cognitive polyphasia in the system of social representations. This means that different types of rationalities (scientific rationality and socio-cultural rationality) are involved in the construction of social representations within the fishing communities.

- Water resources

Several studies (Hubert et al., 1989; Dione, 1996; Nicholson et al., 2000; Paturel et al., 2003), of the effects of climate change on modifications in the hydrological regime of the Senegal River show a reduction in the flow at the different stations in the basin. A break was observed in about 1970. However, the hypothesis of the return of rainfall in the Sahel from the 2000s is increasingly accepted (Sène and Ozer 2002; Vischel et al. 2015). Nevertheless, the populations do not have easy access to water. The study by Diop et al. (2015), notes, in fact, that in general, the factors that change the hydrological functioning of the coastal catchment areas are a combination of both natural and anthropogenic elements. Indeed, human action in developing farming systems, hydro-agricultural improvements and irrigation systems have a significant role in the availability of resources. According to Faye et al. (2003), salinity is the major constraint for water resources, thereby threatening its quality. The surface resources of the river are characterised by increasing salinity upstream of the river mouth. The geomorphological environment has greatly favoured the intrusion of salt water in the river.



- Standpoint of social representations of climate change and perception of the phenomenon

The consequences of climate change lead to an increasing number of fears within the coastal communities affected by the advance of the sea. The loss of habitat and production space perturbs beliefs to such an extent that the phenomenon of climate change is seen as a divine will to entirely destroy the world. Several local concepts, sayings and proverbs are used by the rural communities to explain the changes observed. The farming world is, in fact, closely linked to its environment, and its dependence on the climate is the result of full knowledge of the change in climate parameters (FAO, 2007).

According to Farrington and Martin (1987), endogenous knowledge is not abstract, as scientific knowledge can be. It is concrete, strongly linked to intuition, to historical experiences, and directly perceptible and obvious. However, the numerous studies conducted in Senegal which have highlighted the perception of climate change by the local populations do not stress the aspects linked to culture and social representations. According to Fischer (1987: 118). "Representation is a perceptive and mental process for elaborating reality, which transforms social objects (people, context, situations) into symbolic categories (values, beliefs, ideologies) and gives them a cognitive status that makes it possible to understand aspects of ordinary life by refocusing our own behaviour within social interactions". Social representations are common knowledge, known as "common sense", elaborated and shared socially, steering behaviour and communication, contributing to the construction of a reality shared by a given social group, for practical purposes of organisation and control.

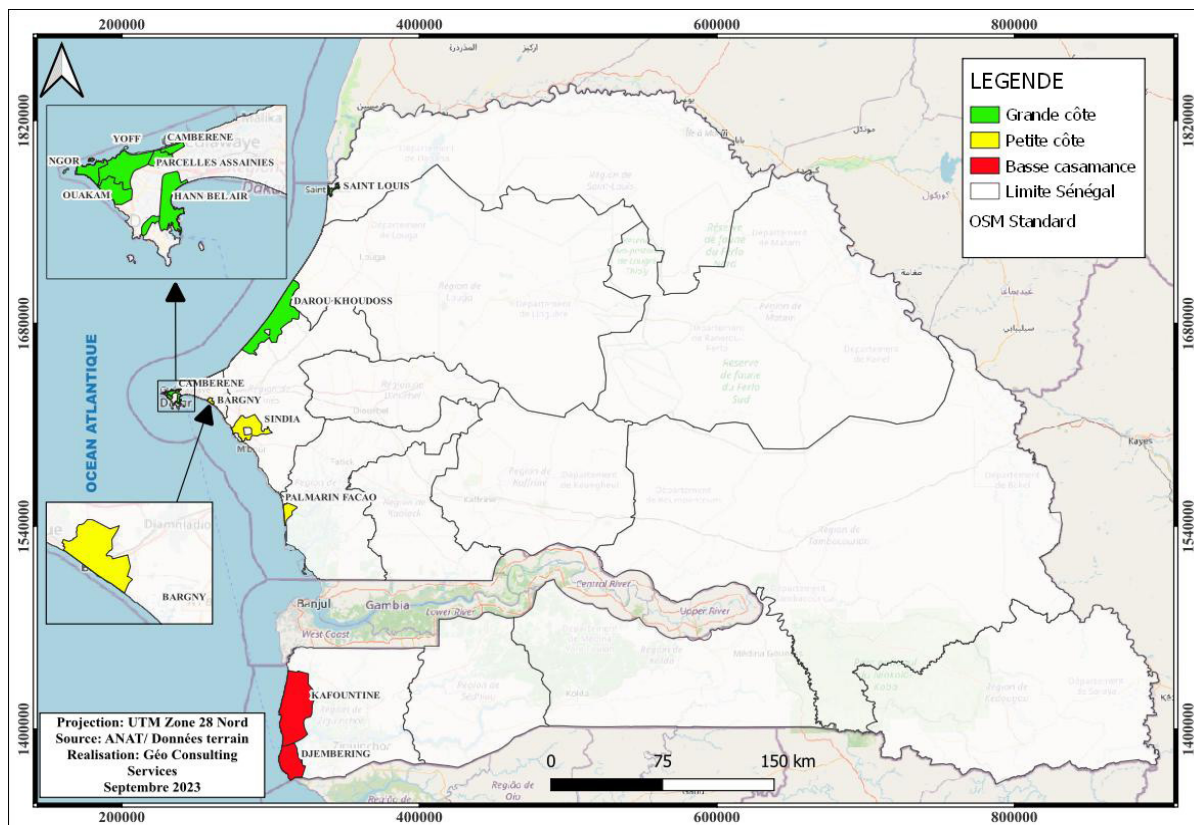
2.2. SYSTEMIC ANALYSIS OF PERCEPTIONS OF CLIMATE CHANGE IN THREE SECTORS: MARINE AND TERRESTRIAL BIODIVERSITY, WATER RESOURCES AND THE COASTAL AREA

The study concerns the perceptions of climate change in Senegal. It is therefore eminently sociological. The perceptions are analysed as social representations, which are the founding concept of sociology. In simple terms, we will show the interdependent relationships between the three concepts (perception, knowledge and adaptation strategies). The systemic analysis will be used to show how the communities interpret climate change, in particular in the fields of terrestrial and marine biodiversity, water resources and the coastal areas. Moreover, the systemic analysis provides a view that includes "the links between climate change, health, food safety, habitat, and all of the other social issues that affect populations" in order to contribute as effectively as possible to decision making.

The study is limited to the coasts of Senegal, according to three sectors: terrestrial and marine biodiversity (which includes agriculture and fishing in the broad sense and their subsectors), the coastal area and water resources, in order to assess perceptions of the phenomenon of climate change. Consequently, the sites are chosen due to their sensitivity and expressiveness regarding the impact of climate change, the multifaceted resources they concentrate and provide, as well as their spatial distribution within the sub-area, along the coast: Grande-Côte, Petite-Côte, south-west.

The choice is based on the experience of research on the themes, and on the field work and documentation from recent years. It also involves avoiding looking at sites that are already overloaded and no longer provide new information. Consequently, the survey sites chosen are Saint-Louis, Lompoul, Dakar/Fann, Bargny, Guéréo, Palmarin, Kafountine, Diogué and Kabrousse. The choice of these places made it possible to take into account the diversity of the situations from a geographical (north, centre, west and south; capital city, secondary towns, islands, village) socio-economic and cultural point of view, as well as according to the level of expression of climate change.

Figure 1 : Location of the study area



2.3. A TWO FOLD QUANTITATIVE AND QUALITATIVE METHODOLOGICAL APPROACH

To facilitate understanding of the perception of climate change on the coasts of Senegal, it is necessary to adopt a methodological approach that aims firstly to combine quantitative and qualitative data. In this report, simultaneous use of quantitative and qualitative research methods is a promising strategy to combine the information, in order to provide an analysis of the content that makes it possible to carry out a classification according to the understanding, impacts, attitudes, ability to adapt, communication and commitment, information and education etc. on the issue of climate change.

The main aim of this study is to understand the common perception of the populations. The research process will be mainly based on a co-construction process via an evaluative, iterative and participative approach in which the young people, adults and elderly people as well as the community based organisations (CBOs) are central to the research. Allowing these individuals' voices to be heard gives priority to an approach that sees them as able to provide their own accounts and to develop ideas about the consequences of climate change to which they are exposed.

Overall, the research approach will be based on the following methods:

- a review of the literature on the perceptions of climate change, centred in particular on the Sahel and Senegal, to assess the lessons and differences;

- a survey of households, based on an individual questionnaire, applied and suited to the target population;
- collection of the views, accounts and testimonies of individuals according to age, sex, level of education and activity, in particular via semi structured personal interviews and focus groups;
- observation of the physical environment and daily activities of the households by collecting photographs;
- indepth interviews with a few key informants (institutional and social actors) via non structured interviews, in order to confirm certain information or more clearly define the contributions.

2.3.1. Survey via a questionnaire

The sampling method used is the two stage stratified sampling method. The three different areas constitute the strata. The first stratum concerns the coast, the second concerns the departments of the sites studied. The sample of households was divided up in proportion to the population size of the areas concerned. To conduct the questionnaires, second stage units were observed using route sampling, choosing a sampling interval in order to properly cover the survey sites.

The basis for forming the sample is the national census of the population in 2013 and the regular forecasts, which cover all of the towns targeted with the number of households. The size of the sample is calculated using the Schwartz method ($n = (ea^2 \cdot p.Q) / i^2 \times 2$), taking into account a confidence interval of 95%, with a margin of error of $a=5\%$.

As a result, 500 households were polled, divided between the different strata, as shown in the table below. The weighting system then indicated the number of questionnaires to be completed. The following sample was applied for the 9 research sites, for a total of 500 questionnaires.

Table 1: Distribution of the sample according to the survey sites

Strata	Weighting	Site	Weighting	Sample
Grande strate (Stratum 1)	45	Saint-Louis	9,5	48
		Lompoul	9,5	48
		Dakar/Fann	26,0	130
Petite-côte (Stratum 2)	23	Bargny	13,0	65
		Guéréo	15,6	76
		Palmarin	10,0	50
Sud-ouest (Stratum 3)	22	Kafountine	9,0	23
		Diogue	9,0	23
		Kabrousse	7,4	37
TOTAL	90%	TOTAL	100%	500

The questionnaire was designed ambitiously, to ensure that it reflected the socio-demographic and occupational profile of the respondents, their knowledge and beliefs regarding changes in the environment, their perceptions of climate change, their adaptation strategies, communications, and the expectations and needs of the local communities as regards adaptation, in addition to possible indicators of the perception of climate change in the three sectors. The questionnaires were completed from 9 to 23 August, after some difficulties, in particular linked to access to the sites and the technical adaptation of the data collection software package.

2.3.2. Qualitative survey

The type of actor sampling was used for the qualitative survey. This makes it possible to monitor and give an account of the diversity of the personal interviews on the subject represented, i.e. climate change. Verbatim accounts were used for the phenomenon, in order to know exactly what the individuals think, and how and why they think it. However, sampling by type of actor is single case sampling. In the study, it was necessary to add a contrast/saturation sample, involving multiple case sampling. This has the advantage of making it possible to simultaneously identify a group of actors united by the same activity or the same area of intervention, but with different points of view, in spite of sharing common characteristics. This method of sociological intervention is particularly suitable for authorities and official organisations (CBOs, associations, organisations etc.). Consequently, the people included in the sample are included due to their status in the towns.

The personal interviews targeted young boys and girls aged between 15 and 24, male and female adults (including the elderly), women specifically and actors in community based organisations (CBOs). They concern the following subjects: understanding of the issue of climate change, ideas and images of climate change, impact of climate change, climate change adaptation, participation and involvement, communication and environmental education. For young people, the subjects "actions and commitment in favour of climate change adaptation" and "learning, communication and environmental education" were studied in particular, after asking them about their knowledge of the phenomenon. In the same way as for CBO actors, certain adjustments were made regarding their business sector and their commitment.

As regards the focus groups, the survey was mainly aimed at women and young people. For women, the central subject of discussion was the impact of climate change on their activities, stressing in particular their leadership as regards adaptation, whereas for young people, it was more a question of the role of young people in combating climate change, stressing the actions in favour of the environment and awareness raising.

The team comprised 9 interviewers in total, 4 women and 5 men, with one interviewer per site. They were easy to train, as they had a master's degree, experience in research, knowledge of the sites studied and of the issues tackled and in view of their professionalism. After the training of the interviewers which took place on 1 August, the surveys started depending on the site from 3 August and continued until 19 August 2023. Transcription of the interviews also took place in that period.

Table 2: Number of focus groups and personal interviews per site

Site studied	Personal interviews	Focus group	Total
Saint-Louis	4	2	6
Lompoul	3	3	6
Dakar	3	3	6
Bargny	3	2	5
Guéréo	4	2	6
Palmarin	7	2	9
Kafountine	4	2	6
Diogue	5	1	6
Kabrousse	3	1	4
TOTAL	37	18	55

In total, 55 interviews were carried out: 37 personal interviews and 18 focus groups (each comprising 4 to 6 people). Targeting took into account the gender, age, age group and business sector. Over a third of all of the respondents were women and girls, whereas about half of the respondents were young people. Verbatim accounts of the interviews will back up the analyses of the quantitative data, clarifying the meaning of the perception of climate change.

2.3.3. Processing and analysis of survey data

As regards the quantitative data, after collection, processing was carried out using SPSS, taking into account several levels. As a result, sequential sorting made it possible to show single variables such as the socio-demographic profile. On the other hand, combining two or more variables for bivariate or multi variate analysis, made it possible to show the relationship or influence of one indicator on another. For example, this involved revealing the level of commitment of communities to climate change adaptation according to the gender or age group, or the perception according to the sector, of the climate data and of the local or endogenous knowledge. Open ended questions in the qualitative survey were intended to enable content analysis.

Thematic content analysis was, in fact, carried out based on the qualitative data. Manual processing was preferred, to select the relevant verbatim accounts according to the subjects tackled. This made it possible to support the statistical data, to show the ideas more clearly.

2.3.4. Difficulties encountered and methods of resolution

The national political situation in August, with the arrest of a leading political opponent, disrupted the smooth running of the field surveys in accordance with the schedule and under optimum conditions. Road access and the tranquillity of the communities in the central and southern areas were particularly sensitive elements. Consequently, the blockade of Ziguinchor by demonstrators prevented students who had to go to Kafountine, Diogue and Kabrousse from making the journey. It was necessary to wait for the situation to gradually calm down.

A further difficulty was the unavailability of the populations, due to their daily occupations: if it was not due to their professional obligations, some complained about the number of surveys carried out in the past, whereas they had seen no improvement in their living conditions. On this point, it was only necessary to adapt to their schedule, and to be patient. In Lompoul, the population became wary as soon as we talked about a non governmental organisation (NGO). The current exploitation of zircon has created a climate of distrust towards anyone who is not from that area. But as soon as the interviewers took the trouble to clearly explain the reason and aim of their presence, things went well.

The weather conditions in the wintry period were not favourable to regular trips in the field, in particular to Diogué, which is an island. It was unsafe at sea, and it was necessary to adapt to the weather conditions, avoiding taking unnecessary risks during crossings by pirogue.

Another major problem was translating accurately from French into the local languages (Wolof, Fulah, Mandinka, Diola etc.) the themes (and sub-themes) of the interview guides to make them accessible to the respondents. Sometimes the concepts were not understood. Understanding was possible thanks to prior translation during the training of interviewers, and more or less satisfactory knowledge of the local languages. The basic problem in this regard was also that some respondents had no notion of the phenomenon. Nevertheless, this did not prevent them from having interesting discussions with them, when the interviewers took the time to properly explain the subject and to use the national languages as well as possible.

3. SOCIO- DEMOGRAPHIC PROFILE OF THE RESPONDENTS



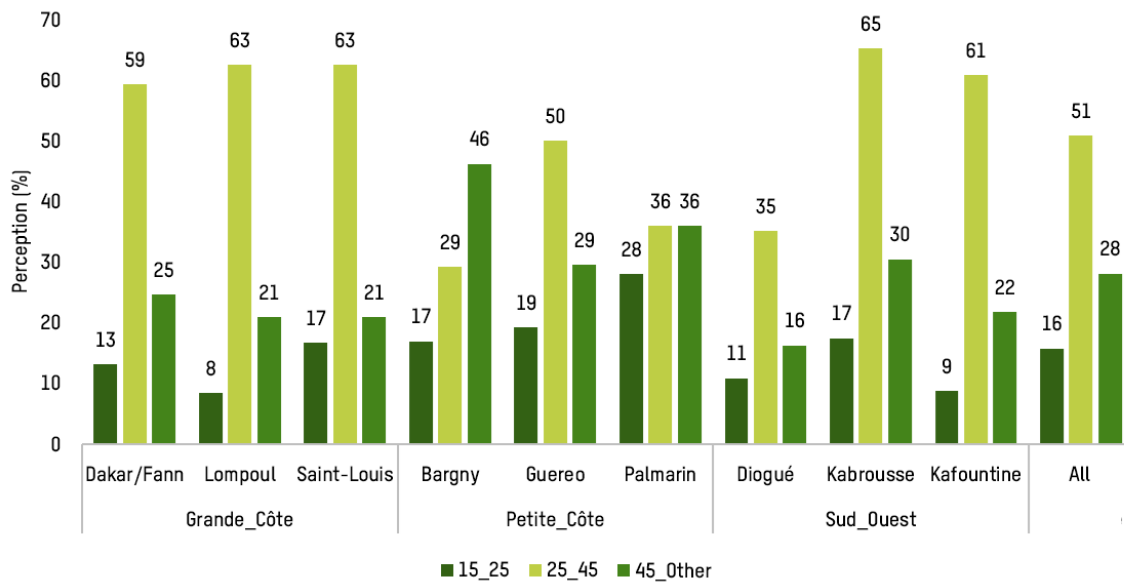
3.1. BREAKDOWN ACCORDING TO THE AGE, GENDER AND MARITAL STATUS OF THE HOUSEHOLDS

The quantitative survey of households shows a predominance of adults among the respondents. Out of 500 respondents, 375 were aged between 25 and 65, i.e. 75% of the sample. Of these 375 people, we note a large proportion of the population at the age of entry into working life, aged between 25 and 45 (a total of 257), representing more than half of the total target population of the survey. This category is usually seen as being young, according to the social realities. In addition, there is quite a large active population aged under 25. These were mainly students found in the different places, but also young fishermen met on the beaches. There was a total of 56 people, i.e. 11% of the sample. 45 people did not give their age.

The marital status of the respondents shows that married people represented the largest proportion at 63%. In second place were unmarried people at 33%, followed by widowers/widows at 2%. In the last place, divorcees represent 2% of the sample. This strongly suggests that the family has a fundamental role in social cohesion. Moreover, regarding the relationship between respondents and the head of the family, marriage appears in 21% of cases, and more frequently they are related, i.e. parent/child (26%), nephew/niece (8%) or brother/sister (3%). Within the household, the number of people taken charge of by the head of the household varies from 2 to 12, given that more than half of the sample did not want to answer that question.

Regarding gender, the quantitative survey shows that out of 500 respondents, men were by far the largest proportion at 350, i.e. 70% of the sample. Women were therefore in second place at 150 people, i.e. 30%. This number reveals the secondary place of women in the households, even if in actual fact they hold the reins. Moreover, the survey indicates that only 47% of respondents were the head of the family. In certain cases, this notion is more symbolic than real; it depends on who provides for the needs of the household.

Figure 2: Different age groups of the individuals interviewed

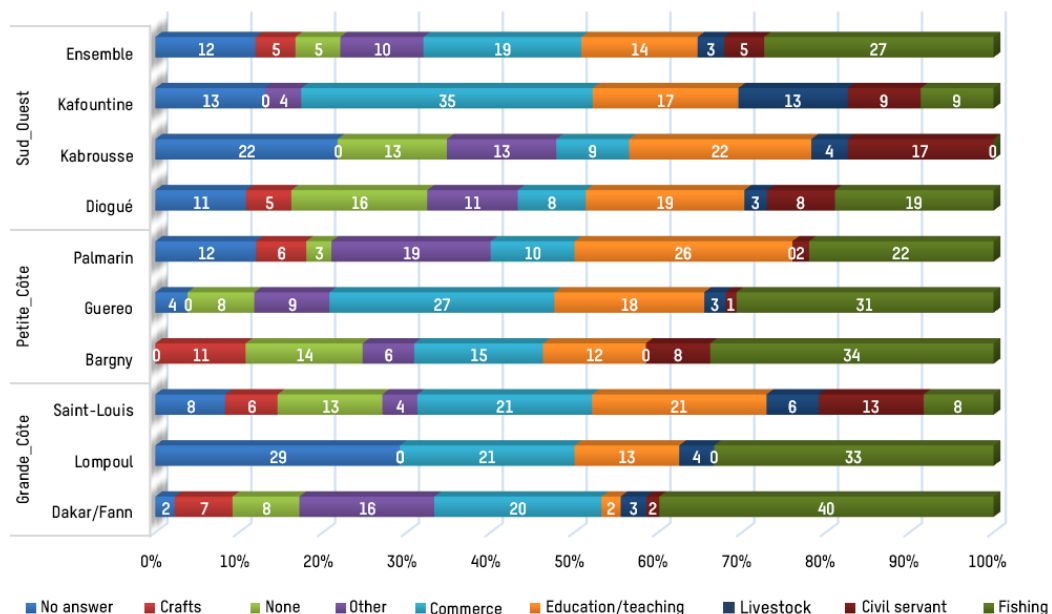


Source: OXFAM 2023 survey

3.2. BREAKDOWN BY PROFESSIONAL ACTIVITY

The following figure shows the different business sectors, but the main professional activity of the respondents is fishing at 28%.

Figure 3: Main professional activities of the respondents



Source: OXFAM 2023 survey

Like the main professional activities, most of the respondents have a single professional

activity, i.e. 60% of the sample. However, some people have secondary activities (38%). Indeed, multiple employment is not only common within the populations, but recourse to secondary activities also makes it possible to compensate for the precariousness of the main activities. The secondary activities carried out in the various places concerned by the study were first and foremost those linked to agriculture, breeding, trade, fishing, transport as well as market gardening. The latter are the leading activities in the places where the survey was conducted. The other activities, which are in the minority, cover diverse sectors such as digital technology, catering, plumbing, gardening and arboriculture, among others.

Several people state that their income is insufficient to cover their expenses. Although most of the time they try to survive with the help of their family, most heads of households manage by diversifying their activities, as well as with the help of loans from neighbours or shopkeepers while they wait for the situation to improve. 59 heads of families consider that households no longer show such solidarity with each other, as each family faces its own difficulties. The cost of living is one reason for the erosion of solidarity between households, in addition to the modernisation of societies, which tend to be more individualistic. However, it is recognised that there is solidarity within the households. For instance, 84% of respondents said they were in favour of mutual aid within the couple. Nevertheless, this aid is not always apparent. 13% declared the contrary. In this regard, it is women who carry out the most tasks; they take responsibility for providing for the needs of the household. In Kafountine, a woman admitted that she was too worried about taking care of her household to be interested in climate change.

4. SOCIAL REPRESENTATIONS OF CLIMATE CHANGE

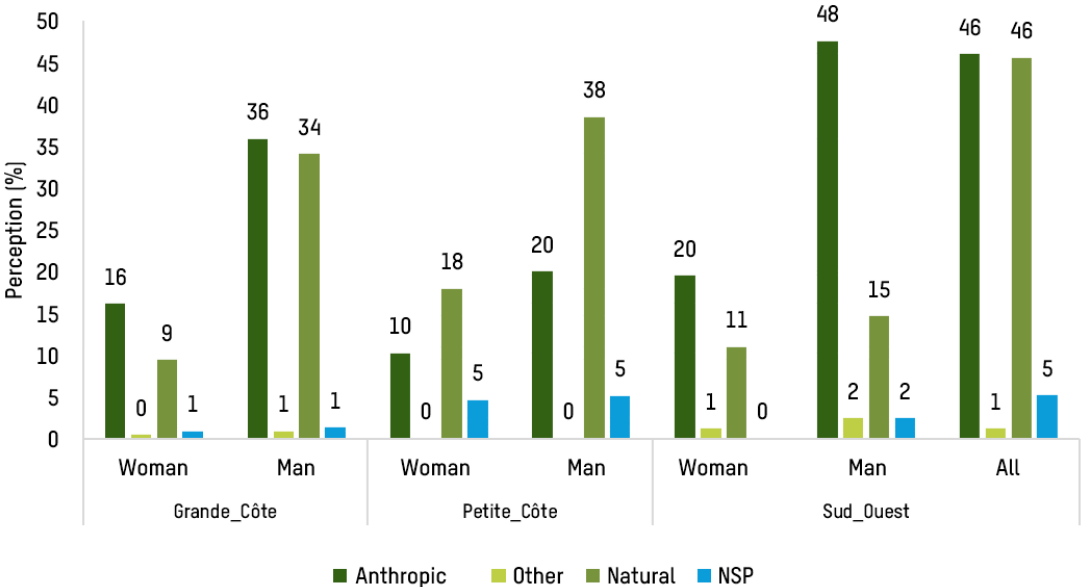


4.1. KNOWLEDGE AND BELIEFS ABOUT CLIMATE CHANGE

4.1.1. Awareness and images of the existence of climate change

These days, global warming is a major concern for all nation states in the world. The pace of climate change is increasingly worrying, and numerous efforts are made to understand firstly the causes of this change. For that reason, this study looks at the causes of climate change (figure 4). Indeed, 46% of the total population maintain that climate change is of natural origin. On the other hand, 46% think that climate change is the result of excessive human action. 5% of the population had no idea and 2% of the population did not answer the question. On the Grande Côte of Senegal and in the south west, people are more inclined to believe that climate change has an anthropogenic cause (Figure 4). On the Petite Côte, natural causes are preferred. This difference of approach by the populations may be linked to the scale of the consequences of climate change which are very pronounced on the Grande Côte and the south west coast, characterised by substantial anthropogenic activity.

Figure 4: Perception of the effects on nature of the causes of climate change

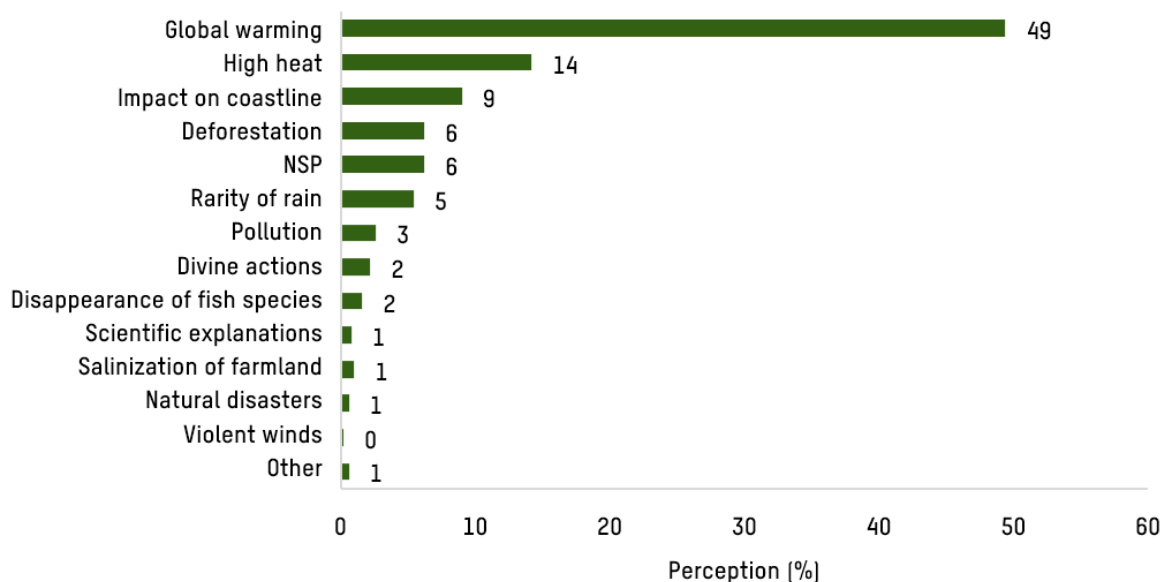


Source: OXFAM 2023 survey

The various signs of climate change, depending on the place and the respondents, are global warming accompanied by great heat, impacts on the coast, deforestation, scarcity of rainfall,

salinisation of the land and high winds. The bar chart below shows that 49% of respondents consider that global warming is the main sign of climate change. By global warming, some people mean heat.

Figure 5: Signs of climate change according to the respondents



Source: OXFAM 2023 survey

The perception may change from one place to another, but the assessment is almost unanimous for the different sites visited. The respondents observe the consequences of climate change. In the qualitative survey, with open ended questions without instructions, the answers appear less obvious. This account by a woman who did not have access to schooling, aged 30, a fishmonger, clarifies this:

« To tell you the truth, I was not aware before you asked me that question that all these phenomena that are currently taking place in the Langu de Barbarie represent climate change. In my opinion, I thought that they were all part of the divine will. I often heard people talking about it on the radio and sometimes on the television I saw short reports on the harmful effects. The main causes of climate change are, in my opinion: the harmful products of foreign industries discharged into the sea and those released into the atmosphere. The environment has changed too much today, and for me, this transformation is due to the excessive use of chemicals. In my opinion, human activities constitute a considerable proportion of the causes of climate change ».

It is here that the associated images and perceived or observed characteristics are more interesting. In fact; the causes of climate change are not known by numerous respondents, even in Dakar, especially if the person has not been educated. Furthermore, they do not always find people in their family circle who can explain climate change to them. However, they may meet at demonstrations when the harmful effects of climate change are visible in their immediate environment. In Ngor (Dakar) as well as in Bargny and Kafountine, we often hear

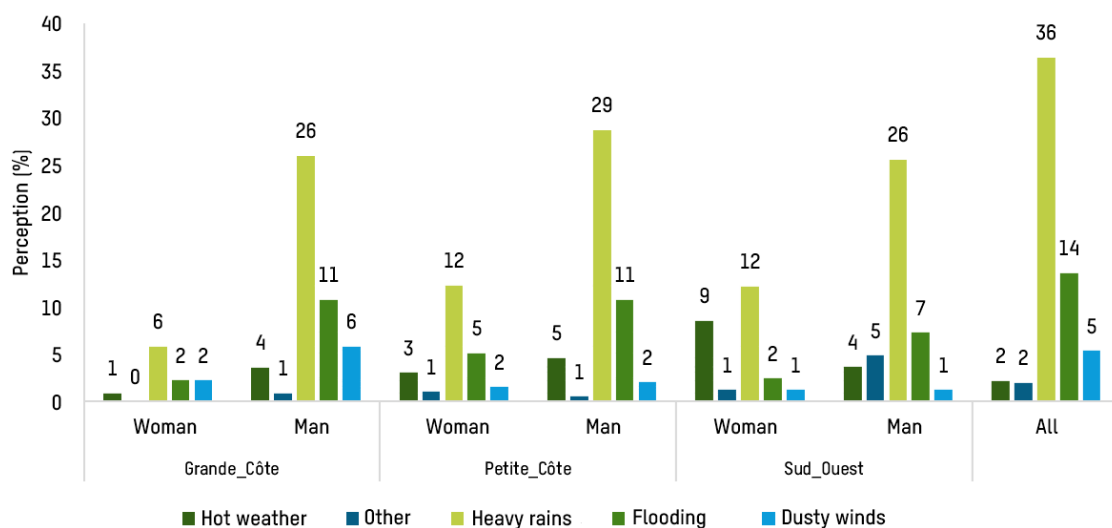
"sopéeku alam bi" or "sopéeku jaw ji" and "sopéeku jamono ji" directly linking climate change to the environment and the climate.

On the other hand, one focus group involving women made it possible to see that to assess the changes that have occurred, they observe what is being done, in particular the reforestation and creation of green areas instead of buildings, no more cars causing pollution, less heat, unlike the "mboyà" (harmattan) which is now more common etc. An uneducated young man aged 20 who is a fisherman in Saint-Louis told us the following: "I do not know the term climate change by its name in French. But I am well aware of its meaning in Wolof. For example, when the sea is too rough, we say: Géej gi daffa aaye, Look , Aaye, Seerr, Kàajié, Jàw ji daa tang". These words refer to the changes in the state of the living environment, the water and the atmosphere. His knowledge of climate change is directly linked to his business sector, which is fishing, when the sea is rough. An old man aged 70, who lives, in fact, in Guet Ndar (Saint-Louis), sheds light on the changes that have occurred and the sources of scientific knowledge that contrast with tradition and former cultural practices.

« ... Formerly, to go out to sea, we took carts and travelled almost 5 to 7 km. But now it is the waves that wake us up. The sources we have about climate change come from science which uses arguments such as ice loss, sea outfall, the rise in the level of freshwater rivers, the breach and industrial development. On the other hand, in the community mythology tried to enlighten us about climate change by presenting it as a curse and proof of the anger of the gods and the spirits of the sea. The sacrifices that were made in the past were guarantees and sources of protection for the populations against the excesses and horrors of the sea. Nowadays, these practices have been abandoned and are becoming obsolete, hence the upsurge in deaths and accidents caused by the advance of the seawater ».

Beliefs play a major role, in particular in places where the cultural density is more significant, such as in Kabrousse where we learn, from a teacher aged 35, that "Diola society is a traditional society. When some of the paddy fields are flooded by seawater, the populations believe that it is due to someone's totem. As a result, the person whose paddy fields have been flooded makes a sacrifice to the ancestors to block the action of the totem". The quantitative survey shows that several types of divine punishment are identified depending on the place. Populations that spurn mystical beliefs explained various situations showing divine punishment. These situations include floods (37%), heavy rainfall (38%), dust winds (12%) and great heat (8%). On the Grande Côte and the Petite Côte, floods and heavy rainfall are mentioned by the men, whereas in the south west, women speak of the heat which has an impact on water resources. In short, the signs of climate change are experienced differently according to the beliefs. Climate change can show itself dramatically, such as the risk of coastal flooding, without being linked to the supernatural. At a focus group in Diogué, one respondent said jokingly that "... During the period of high tide, everyone was panic stricken. Sometimes, some people tell you that you should sleep with a life jacket on, as you never know (laughter)..." Moreover, a young artist from the island has written a song on climate change to that effect.

Figure 6: Perception of the different types of punishment due to climate change according to the sites



Source: OXFAM 2023 survey

4.1.2. Source of knowledge on climate change, from tradition to science

37 % of respondents say that there are genuine differences in the levels of knowledge about climate change. 46% of respondents maintain that climate change has natural causes. On the other hand, 46% think that climate change is the result of excessive human action. 5% of the population had no idea and 2% of the population did not answer the question. At the same time, 48% of respondents gain their knowledge from tradition, 31% from science and only 15% from religion. This proves that the population has limited scientific knowledge and is therefore unaware of the real scientific causes of climate change. 60% of respondents maintain that climate events are due to divine punishment. Conversely, 29% do not believe in divine or mystical punishment. 10% of the same sample have no opinion on the matter. This ignorance of climate events by the majority of the population is due to a lack of education. "Divine will" appears significantly in the answers, in Saint-Louis, Lompoul, Kafountine and Palmarin, etc. That is what emerges from the comments cited below, made by a 79 year old woman, who is a shopkeeper in Guéréo:

« [...] What I think personally is the cause of climate change, it is the divine will because, you know, if you have not learned these things, you will not be able to understand them. But you will be able to understand that the weather has changed. Perhaps also due to our sins, the Almighty can decide to put us through this heat. But you, you do not see it that way, you have learned French, you believe that climate change is due to human activities. ... About the Koran, I can tell you many things, you know, the time will come when the Almighty will despise us so much that He will punish us, even if the punishment will not be severe. Because with what is happening, you can understand that it is because of our many sins that the darkness is overcoming the Earth, those who harm others, all that is part of it. You know, if people behaved normally, if they prayed to the Lord as they should, and no one did harm to their neighbour, in short, if humans behaved properly, the Almighty would not put us through certain things. But because of lies, corruption, gossiping, the Lord can punish us in different ways ».

In the qualitative survey, we have noticed that among persons with an advanced level of education, such as pupils (in Saint-Louis and Dakar), students (in Saint-Louis), teachers and council employees polled (in Kafountine, Kabrousse and Palmarin), the information on climate change is better understood, in particular in terms of the causes and consequences. The quantitative survey revealed that out of the 500 respondents, 121 (i.e. 24%) have received higher education. Others have only received primary education (22%) or secondary education (12%). In addition, some have carried out Koranic studies or attended training seminars (17%) or middle school (12%). There are also those who have not completed any level or have received virtually no education (8% and 2%). For example, in Kabrousse, a council official specialised in local development and monitoring/assessment, based his comments on the studies conducted, revealing that each year the sea is advancing by 5m, and that the 30 km coastline is being reduced at Diembéring from year to year. From this point of view, the scientific facts are known by some of the populations. Moreover, the links with the international context are often mentioned.

In Diogué, in the Bliss Casa islands, here is what an artist who lives there told us:

« ... With the Industrial Revolution, the world discovered the use of machines, which then greatly polluted the environment. Cars, industries, petrol driven machines... are products that came from the advances of the Industrial Revolution. And we know that these objects contribute actively to the pollution of the environment. These objects that we use and that have an important place in our lives are part of the things that are damaging the environment. What's more, our economic activities also have their share of the responsibility". We note that with the spread of ideas and the dissemination of information at the global level, it is possible that the populations will review their knowledge, taking into account the environment which they are learning to know better, to the point of developing a certain activism in favour of protecting nature. Finally, men and women do not have the same level of knowledge about climate change, even if there is no great difference. This is because on the whole it is men who have the opportunity to take part in seminars on the issue of climate change and who also have time to follow the daily information and discuss it in meeting places such as the "mbàar »». (public squares).

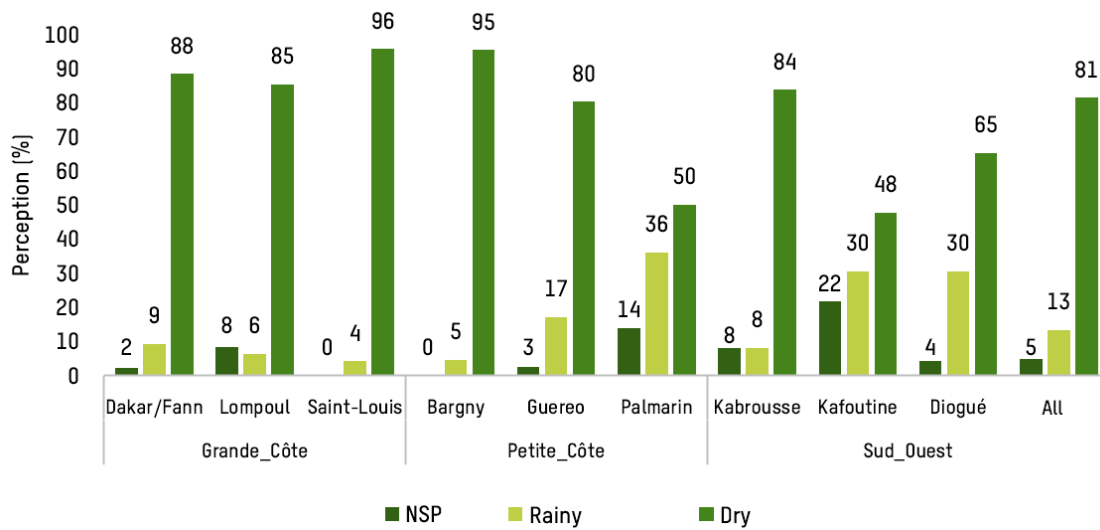
4.2. PERCEPTION OF CLIMATE CHANGE, CLIMATE INDICATORS AND SECTORS

4.2.1. Indicators and perception of the development of climate change

4.2.1.1. Climate change indicators linked to rainfall

The subtropical regime (Sudanese climate) is characterised by two seasons, a rainy season and a dry season. Consequently, according to the quantitative survey, 81% of respondents think that the rainy seasons are increasingly dry, compared with only 13 % who declare that they are quite wet. The winter season in most places arrives later and later compared with about ten years ago. This assessment of seasons becoming increasingly dry is acknowledged more on the Grande Côte whereas in some places on the Petite Côte such as Palmarin, 36 % of respondents think that they have become rainy. This perception of the rainy nature of the seasons is more significant in the southern areas, in particular in Kafountine and Diogué (30%).

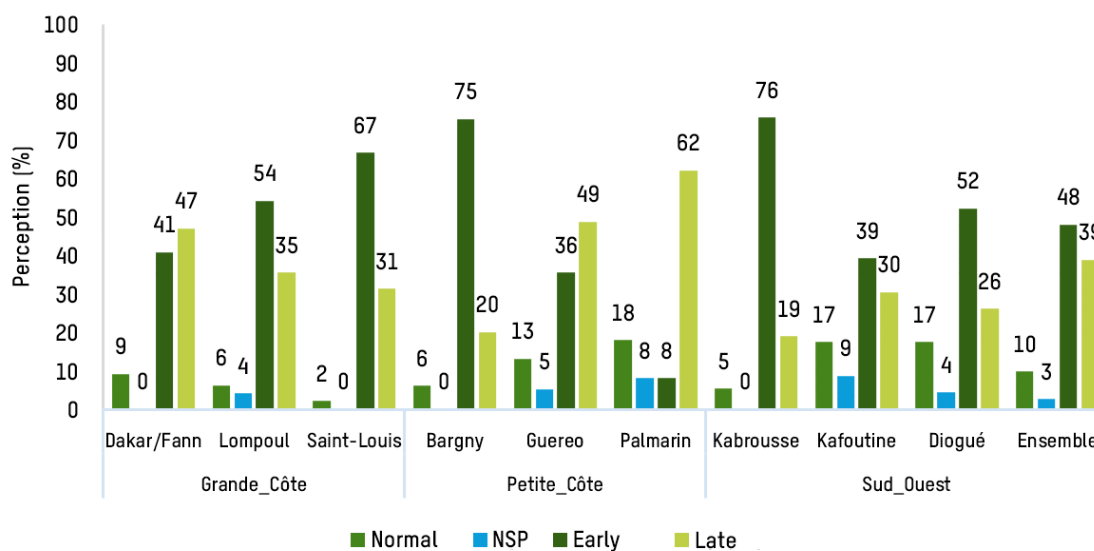
Figure 7: Perception of the state of the season



Source: OXFAM 2023 survey

The end of the season in the last ten years came early according to 240 respondents (out of 500), i.e. 48%, whereas for 194 (39%) it came late. 10% maintained that the end of the season remains normal. In Bargny, Kabrousse and Saint-Louis, the seasons ended early according to the perception of over 60% of respondents.

Figure 8: Perception of the end of the rainy season

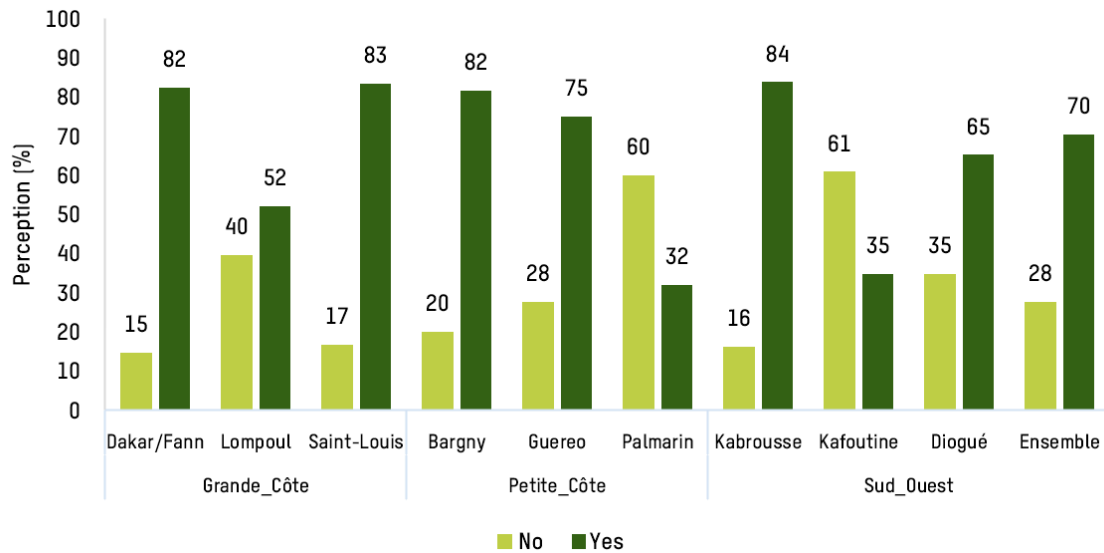


Source: OXFAM 2023 survey

There is an increasing number of droughts per season according to 70% of the respondents (out of 500), whereas 28% declare the opposite. In most of the places visited, except Kafoutine and Palmarin, over half of the respondents consider that rainy periods are more frequent. This

increase is perceived more in places on the Grande Côte and the Petite Côte, except in Palmarin where a reduction in rainy periods is mentioned by 60% of respondents. In the south, a reduction in rainy periods is also noted in Kafountine, according to 60% of respondents.

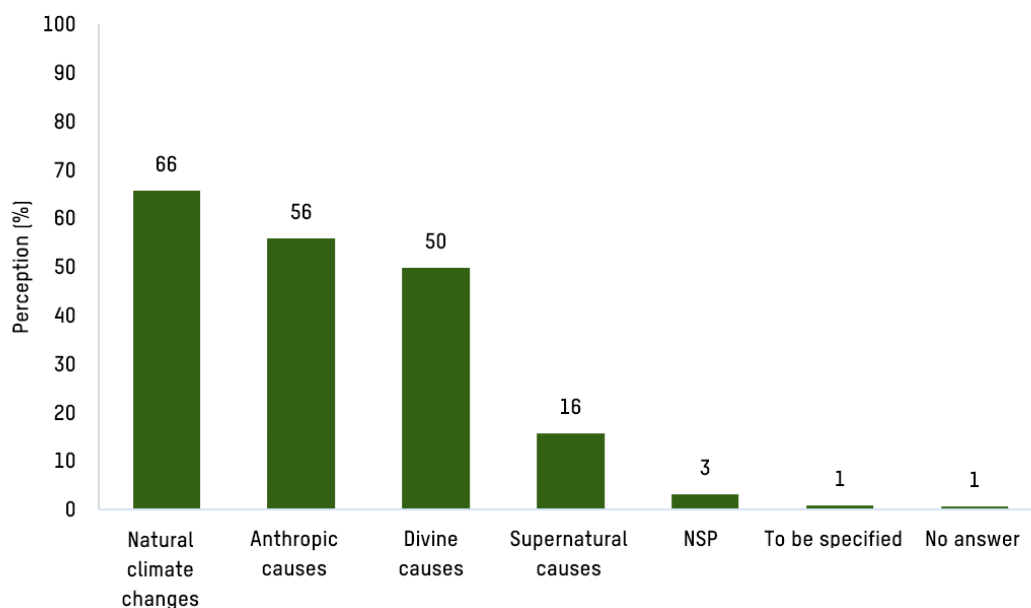
Figure 9: Level of perception of the frequency of rainy periods. Are rainfall breaks more frequent?



Source: OXFAM 2023 survey

According to 66% of respondents, this configuration of the seasons, with the increasingly late arrival and more marked variability of rainfall, is mainly due to natural changes in the climate. This argument is then followed by anthropogenic causes, with a considerable share of the responses nevertheless in favour of a variation due to climate change. In fact, the setting up of polluting industries and deforestation etc. constitute factors that have an impact on rainfall. Finally, 50% consider that the variation in rainfall is merely the act of God (divine causes and supernatural causes).

Figure 10: Level of perception of the main causes of the variation in rainfall



Source: OXFAM 2023 survey

4.2.1.2. Climate change indicators linked to temperature

According to 49% of respondents, a rise in temperatures exists in more or less all of the places visited. Moreover, they see this warming as the main sign of climate change. Heat waves are recorded each year, according to 9% of respondents. However, the respondents think that this rise in temperatures is due to the reduction in trees resulting from deforestation.

Heat is an indicator that is easy for the populations to detect, compared to the previous weather. Respondents regularly mention the “Mbóoya”: the harmattan. At a focus group comprising women, here are the responses that followed the mention of temperatures, a potential cause of illness, and which prevents the normal course of daily activities:

R1: *People are sick, they are sick all the time due to climate change.*

R2: *There is irritation too. People get worked up quickly and that increases the stress.*

R3: *Because of the heat, people have to put off some of their activities. It wastes a lot of time. At one point in the day, we have to stop our activities. It is not because we don't want to, but we can't take any more because of the great heat.*

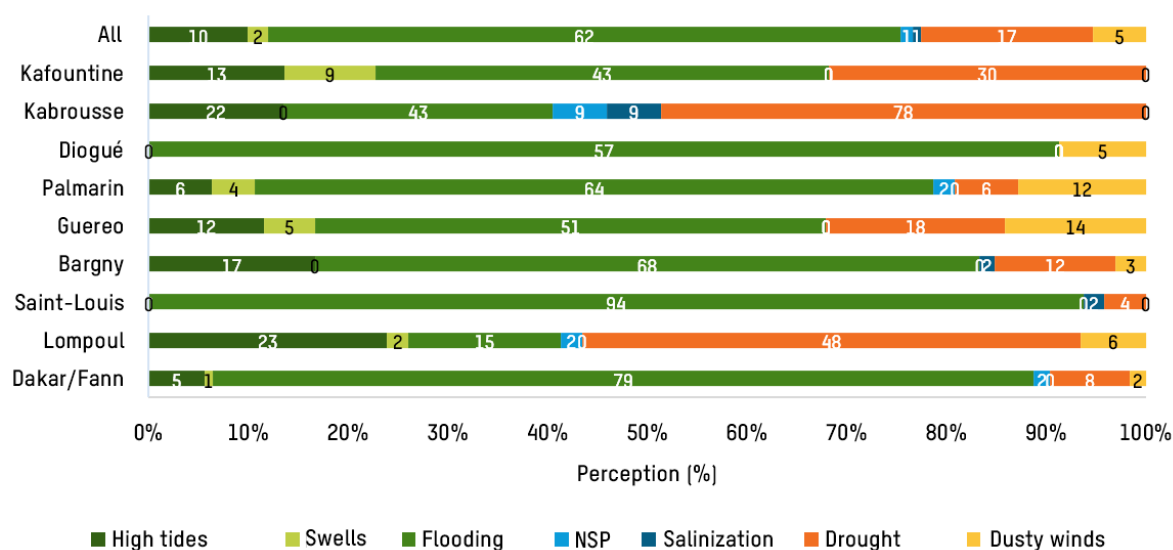
R4: *“Déngay mëb sa bopp” (you hold on to your head) to avoid falling ill”.*

4.2.1.3. Climate change indicators regarding extreme events and the consequences for human health

The signs of climate change are also noticeable in the coastal areas of Senegal, appearing

during the period of drought, the recurrent nature of which has become the norm. Among the consequences of climate change, the existence of droughts is suggested by 66% of respondents. 47% disagree with that possibility. Other extreme climate events are associated with the consequences and the damage caused by climate change, in particular floods and heat waves etc. Their existence is an actual and identifiable fact in the coastal areas. In this study, several extreme events were identified in the coastal areas.

Figure 11: Level of perception of extreme events

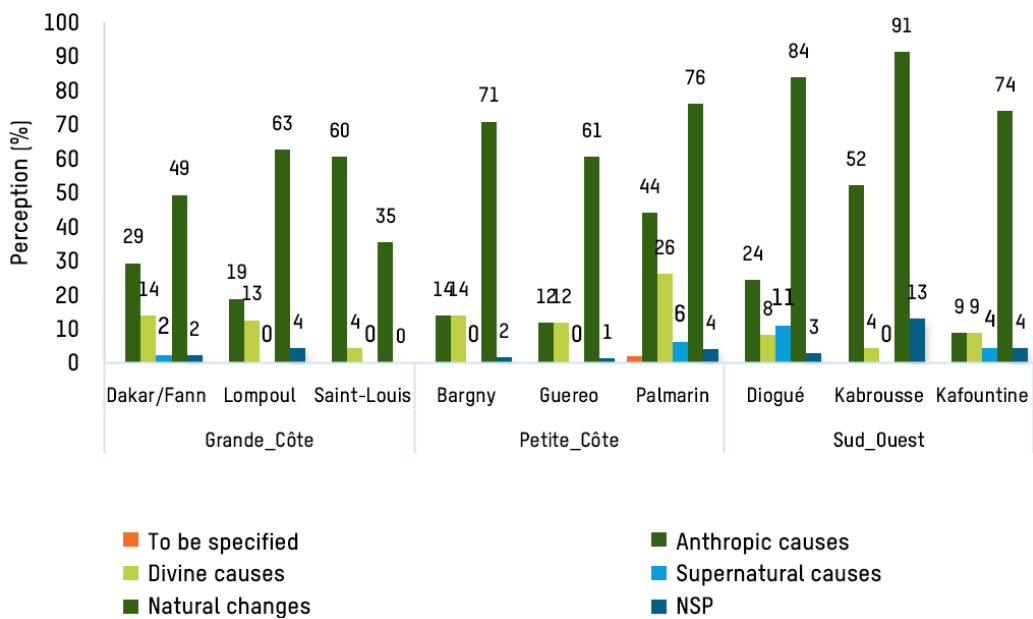


Source: OXFAM 2023 survey

We note salinisation, which represents 17% of the total sample, swells (22%), high winds (33%), drought (42%), high tides (44%), and to an even larger extent, floods (63%). Floods are the extreme event that is the most prominent in the accounts. This may be due to the exposure of the coasts to the ocean, in addition to the proximity of the maritime activities carried out by the populations. It is also a consequence of the lack of planning, which results in people living in areas subject to a building ban.

The different extreme climate events cited also have various natural or anthropogenic causes, the pressure of which on the environment results in nuisances on all sides.

Figure 12: Level of perception of the causes of extreme events

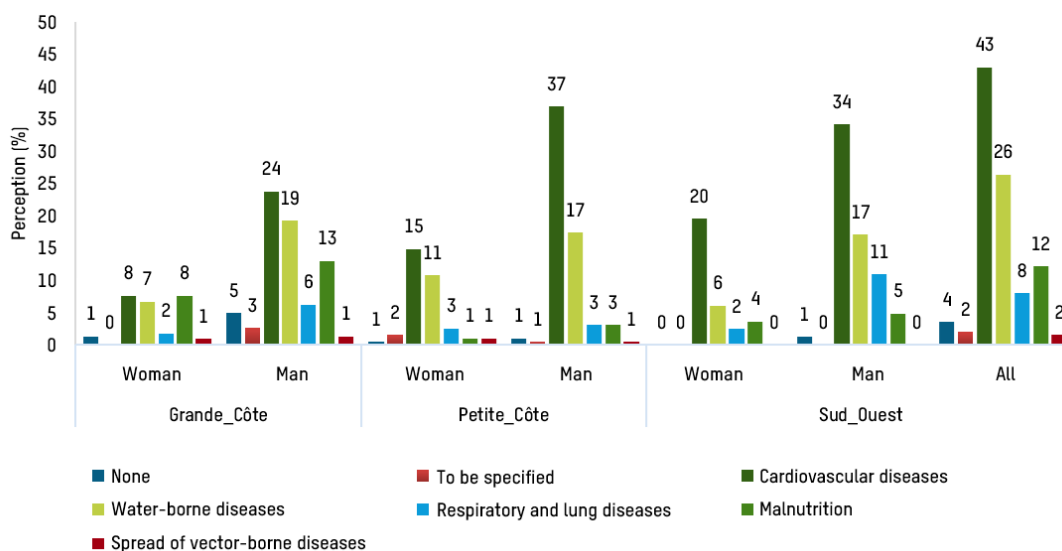


Source: OXFAM 2023 survey

A natural change in the climate was the most common response (62% of the sample: i.e. 312 out of 500 respondents). Anthropogenic causes came next, representing 56%. Supernatural and divine causes represented less than 67% of the sample. At a focus group comprising women in Kafountine, F. T. maintains: "... that in Kafountine we have high winds in February and that sometimes stops us from working as we should. And you know, we women if we don't work, we cannot sort out our little problems". For other respondents in the same place, high winds occur frequently and considerably disrupt activities.

Extreme climate events have numerous impacts on human health. The proliferation of illnesses is a salient fact suffered by the most exposed population. High temperatures also increase the ozone concentration, which may affect lung tissues and cause complications for asthmatics and people suffering from respiratory diseases. We can also mention the spread of vector borne cardiovascular and water borne diseases, malnutrition and respiratory and pulmonary diseases.

Figure 13: Level of perception of the impact of climate events on human health



Source: OXFAM 2023 survey

Figure 13 which shows the impact of extreme climate events on health, highlights the percentage distribution. The consequence of extreme events most often cited by men and women are cardiovascular diseases, followed by water borne diseases. Consequently, the peak in responses linked to water borne diseases is due to the study area, located on the coast of Senegal and marked by permanent exposure to water.

The various extreme climate events have distinctive impacts on marine and terrestrial biodiversity (including family farming and fishing), water resources, coastal areas and human health.

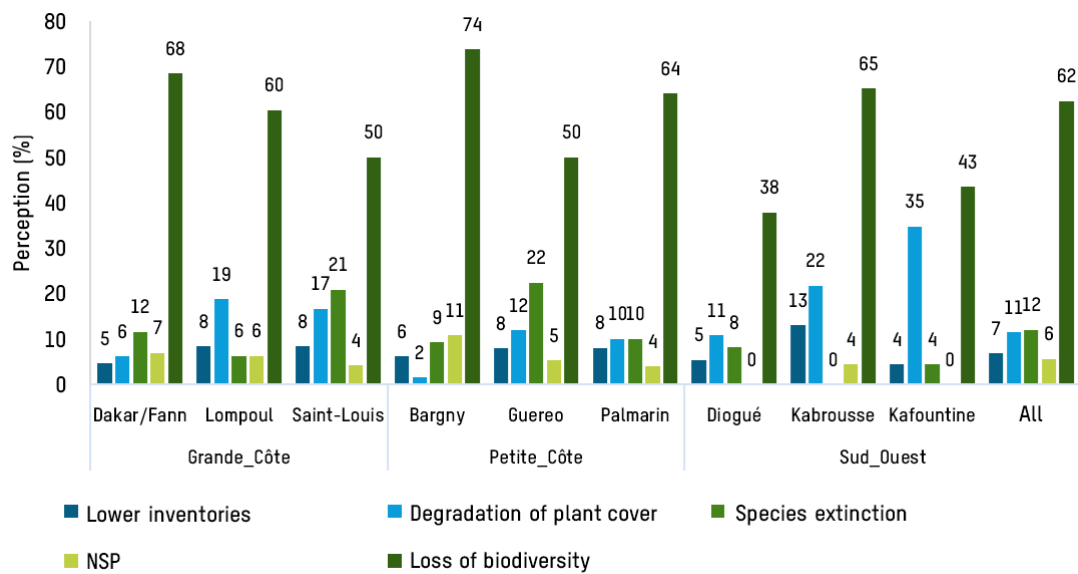
4.3. DETERMINATION OF THE PERCEPTION OF THE EFFECTS OF CLIMATE CHANGE ON THE DIFFERENT SECTORS

4.3.1. Impact on terrestrial and marine biodiversity

4.3.1.1. Marked impoverishment of the terrestrial biodiversity, having an impact on agriculture

In the sample, 64% consider that the loss of biodiversity is due to climate change. 55% cite the disappearance of species, 41% indicate the deterioration of the plant cover, and finally 37% are worried about the decrease in fertility of the soils. Also, regarding the distribution of rainfall, in most places loss of biodiversity is the impact the most often noted, as is shown in the figure below.

Figure 14: Level of perception of the impact of climate events on terrestrial biodiversity



Source: OXFAM 2023 survey

We note the disappearance of species (second most common response) with 238 responses out of the total sample. In first place, 312 respondents report the loss of biodiversity. Consequently, extreme climate events lead to the regression of plant cover, and the ecosystems of the coastal areas scarcely avoid this effect. **Furthermore, 68% of respondents reported the disappearance of several plant species.** For the same question, 16% maintained that they had not noticed the disappearance of plant species, and 14% had no information on plant species.

In Lompoul, the disappearance of certain animal species such as jackals and apes has been reported. This is largely linked to the deforestation that the area has suffered for many years, as well as the advance of the desert in places. Furthermore, the recent setting up of the zircon mining company MDL favours the exploitation of a large area of land, removing trees and vegetation. But in any case, *“... the soil has, in fact, been so badly harmed that even if you farm it, it will not produce anything. There are products that have polluting ingredients which are not favourable for farming. Anything that is not good for a crop is of course bad for man”*. Anthropogenic factors and the impact of industrial activities on the environment, in particular that of extractive industries, aggravate the effects of climate change such as drought. In areas where market gardening is carried out, such as along the Niayes area, it is essential to use manure due to the poverty of the soils. In Saint-Louis, an invasive grass variant for crops called “Sida” is noted by the community.

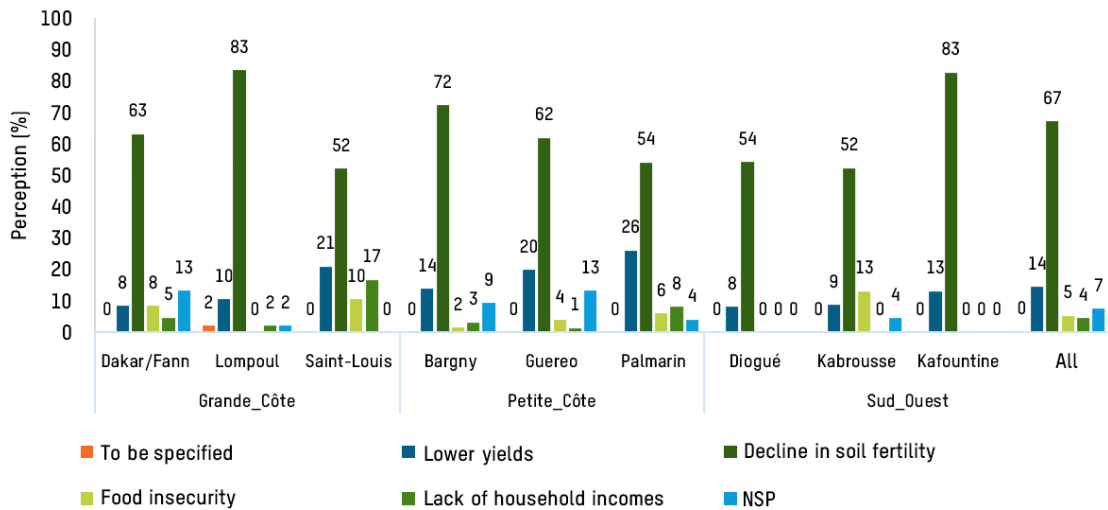
Photo: Invasive species in Saint-Louis, called "Sida"



Photo credit: Field survey

The impact of global warming endangers family farming. Consequently, the coastal communities polled are worried about the decline in soil fertility. This naturally leads to a decline in yields, which is noted as the second impact of variations in rainfall, as is shown in the figure below. Indeed, the main aim of most family farming is to feed the family, and then, if possible, to sell part of the harvest. Consequently, a fall in yields exposes families to a decline in income and food insecurity. It should be remembered that family farming is dependent on rain. But the rainfall is irregular, even if the quantity does not decrease.

Figure 15: Level of perception of the impact of climate events on rainfed agriculture



Source: OXFAM 2023 survey

Warming can also have a direct impact on crops, as their growth is closely linked to

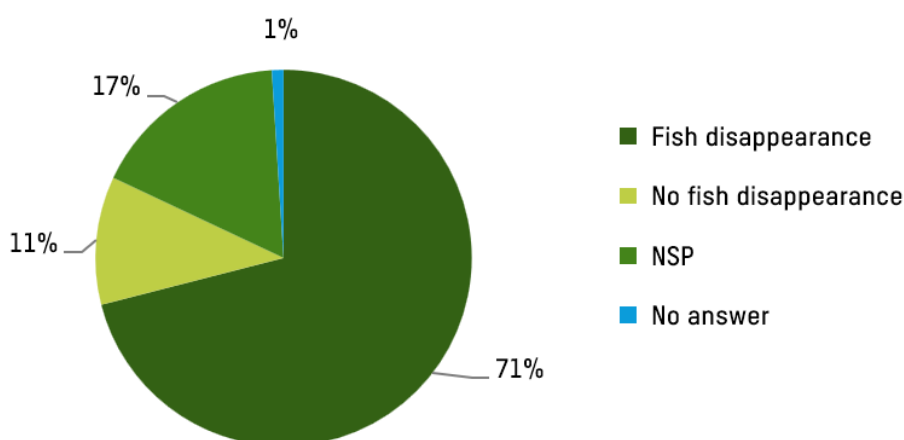
environmental factors. As a result, agriculture, a development sector, is threatened. It is facing new challenges: firstly, an increase in requirements for human and animal food following population growth, and secondly the new requirements of society which impose agricultural production that guarantees food safety.

Poverty is shown by the household's income. For example, for 49% of respondents, their income is less than their requirements. Only 49% say that they meet their needs, whereas 2% are compelled to go without. This situation may be due to the harshness of life, the explosion in prices of staple commodities, among other things, and also the direct impact of climate change on production activities, in particular fishing.

4.3.1.2. Regression in marine biodiversity, causing insecurity in the fishing sector

The rise in temperatures has an impact on marine biodiversity. The correlation between the two figures (16 and 17) below shows the decline of certain species of fish. Regarding the first figure (20), 71% of respondents reported the disappearance of fish species from our coasts. In the second figure (21), only 19% note the appearance of new species. That being said, more species are disappearing than are appearing. This phenomenon may be due to several factors, in particular overfishing off the coasts of Senegal, the type of fishing carried out by foreigners with the use of small mesh nets, global warming, the use of certain toxic products etc.

Figure 16: Level of perception of the impact of climate events on marine biodiversity

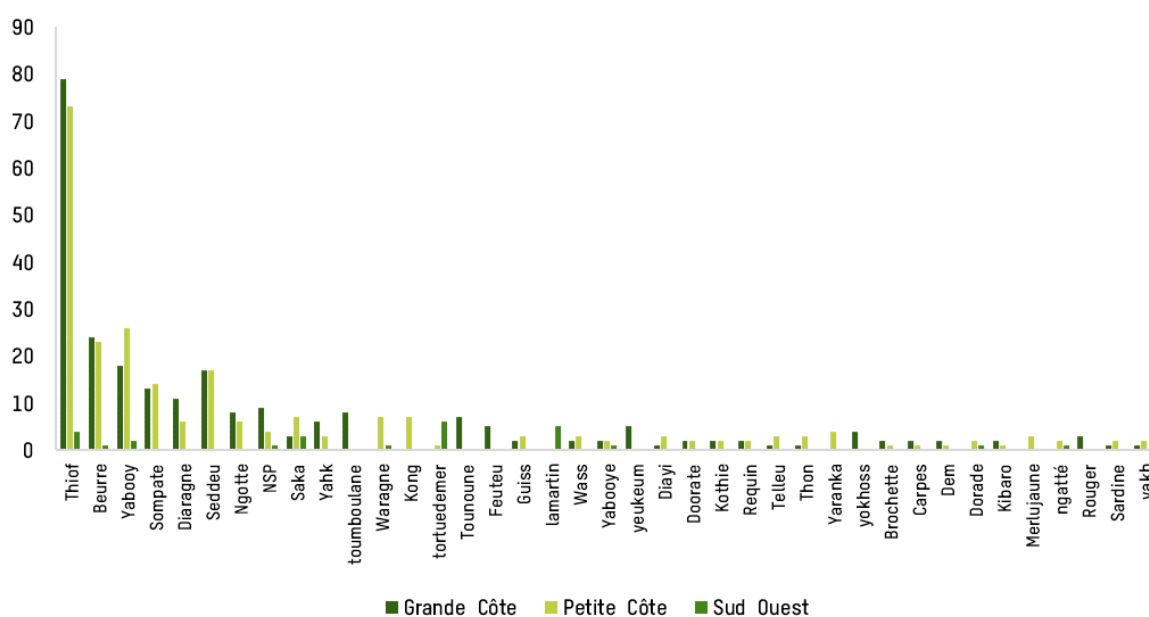


Source: OXFAM 2023 survey

The issue of the disappearance of fish made it possible to collect a vast number of responses which reveal over 160 species of fish identified off the coast of Senegal. These include firstly the grouper or "Cóf" and the white grouper, which according to several respondents is an endangered species. It is mentioned 138 times as one of the most difficult species to find for fishermen and consumers. Next comes the "Yaboy" or round sardinella. This fish, which was found all along the Atlantic coast, is becoming difficult to find, due to the presence of foreign boats that catch everything in their path, according to the fishermen we met. Next come the

threadfin or “*beurre*”, and the barracuda or “*Söd*” which are highly prized for processing as smoked fish, in particular by women, and for a dish with rice and fish called “*Ceebu jën* ». 27 responses mention these species. Sompat grunt or “*Sompat*”, formerly plentiful off the coasts of Senegal, is increasingly rare, at least according to 17 respondents. And to a lesser extent, we may mention red carp or “*yakh*”, “*djay*”, sea bream or “*warañ*”, tilapia or “*wass*”, tuna and so many other species of fish which were plentiful off the coasts of Senegal and which now, because of their scarcity, force fishermen to sail in the waters of neighbouring countries or resort to seasonal or even illegal migration since, according to some, it is no longer possible to make a living. This has a considerable impact on women who work along the coasts, processing and marketing sea products.

Figure 17: Different types of fish identified as having disappeared or that have become rare due to climate change



Source: OXFAM 2023 survey

Many respondents cite the example of the change in the price of fish as proof of its increasing scarcity: in Lompoul, a kilo of “*Yaboy*” sardinellas used to cost CFA F150, and now costs CFA F1500; whereas in Bargny, a basketful increased from CFA F1,000 to CFA F45,000 in less than five years. In Ngor (Dakar), a woman said that whereas that type of fish used to be given to the inhabitants and other passers by on the bank, you now have to pay for it. Moreover, it was said that it was a sign of poverty to eat those fish, which is no longer the case as other types of prized fish, such as “*Kóc*”, “*Cóf*”, and “*Jëreng*”, have become so scarce. Meals no longer taste the same. Worse still, men, who used to only go to sea to catch and bring back fish, have now become fishmongers, as fish is becoming scarce at sea, and in view of the costs for fuel and the crew, losses are building up.

The disappearance of many species following climatic upheavals is almost generally acknowledged. On the other hand, we note the appearance of new species, in particular in the

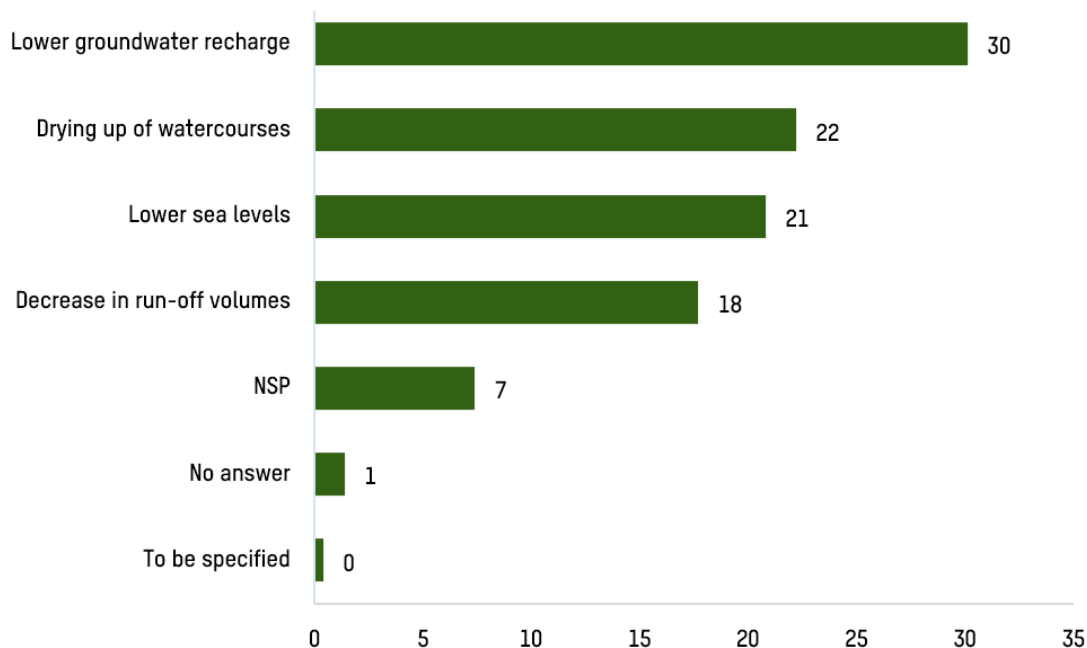
mangrove swamps, such as the “baal”, the “tum” and the “barakh” etc. Here, we prefer to speak of “climatic upheavals”, as the appearance or disappearance of fish species observed in an area may be linked more to disruption of the natural cycle than to the outright extinction of the species. That is what we learn, for example, from the comments of a fish wholesaler:

« *The main problem is the scarcity of fish. This is the result of climate change. Before, it could be explained by the fact that in mid November it was already cold. But that is no longer the case. With climate change, fish migration has been disrupted with the rise in temperatures. For example, there were fish that migrated in winter, looking for areas where the [water] temperature is less cold. If there is climate change, the fish will no longer migrate to that area. The further north you go, the colder it is. Now, with climate change, it is in March that it's cold. That is why we no longer have certain species when it is cold, or not the same quantity. Whereas before we worked for 6 months, now it's 2 months. In fact, fish reproduction takes place more in the north, near Mauritania. But with the swells, they will migrate to the south. In that period, they group together near the two Guineas (Conakry and Bissau). It's in about May and June that they will turn back towards the north. During their journey, they rest and reproduce and finally continue on their way. That is what explains the absence of certain species when it is cold* » N. C., fish wholesaler, aged 48, Ngor (Dakar).

4.3.2. Impact on water resources

Climate change has an adverse impact on water ecosystems as it leads to a decrease in groundwater replenishment, drying up of watercourses, a rise in the sea level and a fall in runoff volumes, according to most respondents on the coasts of Senegal, as is shown by the figure below.

Figure 18: Level of perception of the impact of climate events on water resources



Source: OXFAM 2023 survey

Overall, the graphical representation shows the drying up of 40% of watercourses and a decrease in groundwater replenishment of 42%. Despite the extent of the water resources on the coast, the river network, even if it is quite dense, does not solve the difficulties of the population in gaining access to water. At this stage, it is more a problem of planning the water supply than dealing with the impact of climate change. The damaging effects of climate change are occurring, however, with a trend towards the worsening of the shortage of water resources.

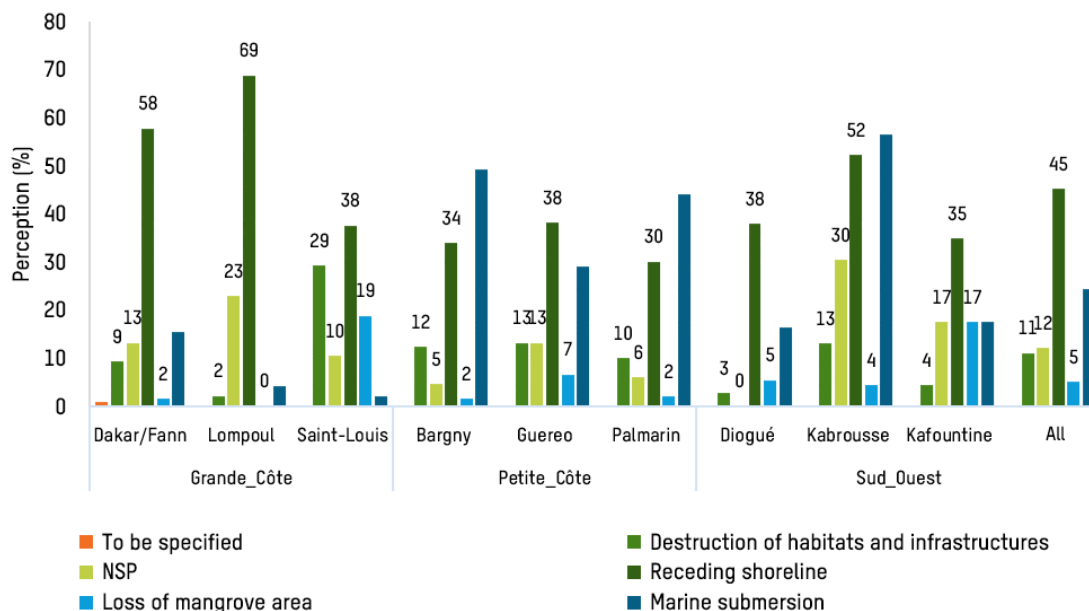
In Lompoul, a young student declares: "... we have noticed that the groundwater level is starting to fall. You know, here in Lompoul, if we did not have tap water, before we only had to dig 2 or 3 m to find water. But now, we have to dig a 15 or 16 m well for the water to gush out". The water resources are decreasing. However, the populations associate with climate change things that perhaps should not be associated with it. For example, the water supply is a crucial problem in Guéréo, and it turns out that the well which is still in operation was built in 1974, whereas since then, the village has become a tourist area, and the local population has increased. Depending on the rate of extraction, the groundwater may have difficulty filling up, but the fact remains that the root of the problem probably lies elsewhere.

4.3.3. Impact on the coastal area

The impact on the coastal areas is visible, as coastal erosion can be accentuated by human activity. Humans and their activities can have a significant impact on the functioning and dynamics of the coast. The figure below therefore highlights the problems that the coastal areas suffer, the most important being the destruction of habitats (45%), coastline retreat (44%), coastal flooding (39%) and regression of the surface areas of the mangrove swamp (28%). The advance of the sea has led to soil salinisation. Among the impacts, coastline retreat is

noted more often in the areas of Dakar/Fann, Guéréo, Lompoul and Palmarin, whereas coastal flooding is more often reported in Bargny, Guéréo and Palmarin.

Figure 19 : Level of perception of the impact of climate events on the coastal areas



Source: OXFAM 2023 survey

Coastal erosion due to the advance of the sea naturally accompanies coastline retreat. In Saint-Louis, coastline retreat is especially accentuated by the opening of the breach in 2003, with consequences for fishing and human safety that are still visible. In Palmarin, the disappearance of houses fuels a certain fear. An old man aged 73 still remembers the rupture of the Point of Sangomar in 1987 and extrapolates about the offshore exploitation of oil in the area as the cause of the increasing scarcity of fish. For her part, an old woman, divorced and supported by her children, has lost her house and is now forced to be a tenant. At the town hall, we were informed that households whose houses are washed away or threatened by the sea will be allocated a new plot. However, the populations do not want to leave the seaside where they have their daily activities, often until late at night. Living far away is a heavy blow for their activities.

Coastline retreat is a common feature along the coastal area. The village headman of Guéréo says that the inhabitants will soon be greatly threatened by the building of the port of Ndayane, which in his opinion will take the place of the water and will be a disaster. To solve the problem of erosion, "we must do what was done at the lagoon of Somone, i.e. remove silt from the lagoon so the water that comes can go there before it causes damage. You know, when there is a lot of water and there is a place where it can go, it will not cause damage. When we were young, we used to play in the lagoon, and you had to swim to cross it, but now you can easily walk across it because there is a lot of sand in the lagoon... Today, when I realise where the sea used to be, and where it is now, it is very different, I can say that the sea has advanced by more than 500m, and it is still continuing to advance". The same situation of the disappearance of houses is

observed on all the coasts of Senegal, from north to south. In Diogu , the Ghanaians, Gambians and Malians who met in front of the village were forced to move to Elinking and Cap Skiring, due to the advance of the sea, which is washing away their workplaces. In Saint-Louis, many families are rehoused in the suburbs of the town, in Khar Yallah, on the Gaston Berger University (GBU) road.

Photo: Destruction of habitats in Bargny



Photo credit: Field survey

The advance of the sea, known as Waam  in Wolof, is visible along the coasts. The fishermen and fish wholesalers mention it increasingly often. They sometimes mention the distance between the dry land and the sea, which has decreased from 1 km to 20 m today, as we were told by the president of the association "Ande japalanet  kurel gui" in Kafountine.

Photo: Women from Diogu  evoking the changes noticed regarding fish



Photo credit: Field survey

5. CONCEPTION AND DEFINITION OF ADAPTATION STRATEGIES TO DEAL WITH THE IMPACTS OF CLIMATE CHANGE IN THE COASTAL COMMUNITIES



5.1. MAGICO-RELIGIOUS PRACTICES FOR A HEALTHY LOCAL ENVIRONMENT

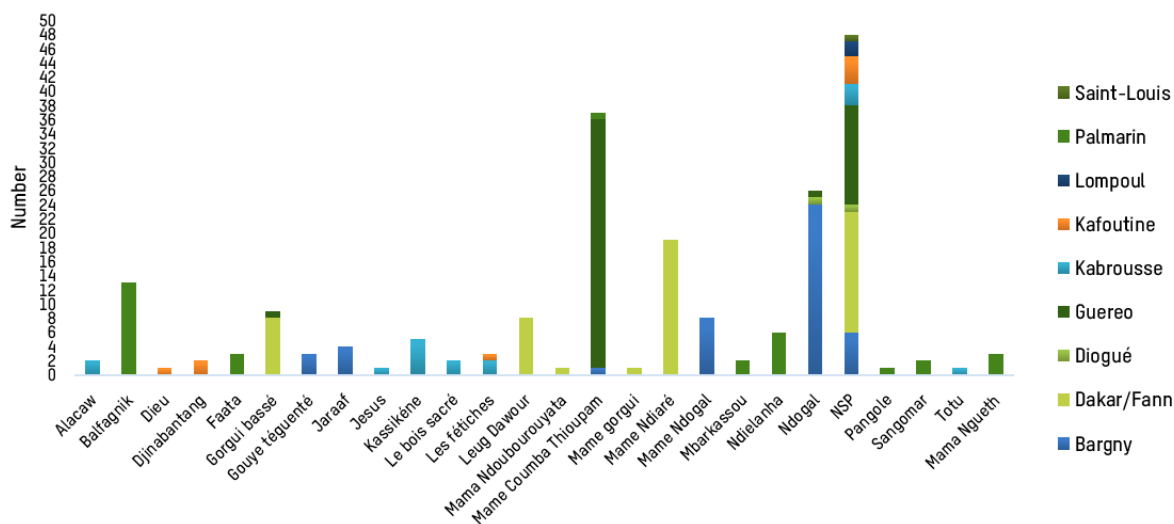
The populations resort to various practices to guard against the harmful effects of climate change. These practices are carried out to pray for the arrival of the rain or plenty of resources, and protection against disasters. In Saint-Louis, the terms *"Sarraxàl géej gi"*, *"turru géej gi"* and *"ndëpp"* refer to mystical practices that involve appeasing the spirit of the sea in order to counteract the effects of climate change. The survey shows that concrete practices such as reforestation exist alongside magico-religious practices such as the *"Bawnaan"* (prayer for rain), a Muslim prayer for plentiful and life giving rain. There are also the *"Ndëupp"* or *"Tùrr"* ceremonies, carried out in particular by the Lebu, present from Dakar to Guéréo, which for them are a source of protection and a way of increasing fishery resources.

43% of respondents consider rites to be decisive to obtaining good resources. On the other hand, 28% of them do not believe in their positive influence. The remaining 29% did not give their opinion on these practices. The rites are mainly practised by men (40%), followed by women (35%), with young people in last place at 2%.

In spite of the technological advances and the progress of science, belief in these practices shows that the traditional religions are still firmly rooted in the coastal areas. This can be observed both in rural areas and in urban areas. Belief in the existence of supernatural beings called "protective spirits" still persists in Bargny and Saint-Louis. 45% of respondents believe in the existence of a protective spirit and its influence on their survival. Conversely, 47% of persons polled deny the existence of a protective spirit. They do not believe either in its existence or its influence. The *"Balfagnik"* is often mentioned in the Palmarin area, where it is said to protect the populations and solve their problems. The same applies to the *"Pangool"* (spirits of ancestors) of *"Mama Ngueth"*, *"Faata"* and *"Sangomar"*, also appealed to by the populations in the event of disasters. In Guéréo, the spirit *"Mame Coumba Thioupam"* is mentioned, who is said to offer protection, as is *"Gorgui Bassé"*. In Dakar and in particular in Lebu areas (Yoff, Cambérène, Ouakam, etc.), *"Leuk Daour"* and *"Mame Ndiaré"* offer protection against rough seas,

provide prosperity, and protect the inhabitants when travelling by night. In Kabrousse, the spirit “Kassikéne” is seen as the god of rain; mention is also made of fetish priests and the “sacred grove” which the populations call on in case of need or of natural disaster.

Figure 20: The main protective spirits mentioned in the areas studied



Source: OXFAM 2023 survey

5.2. ENDOGENOUS CLIMATE CHANGE ADAPTATION STRATEGIES

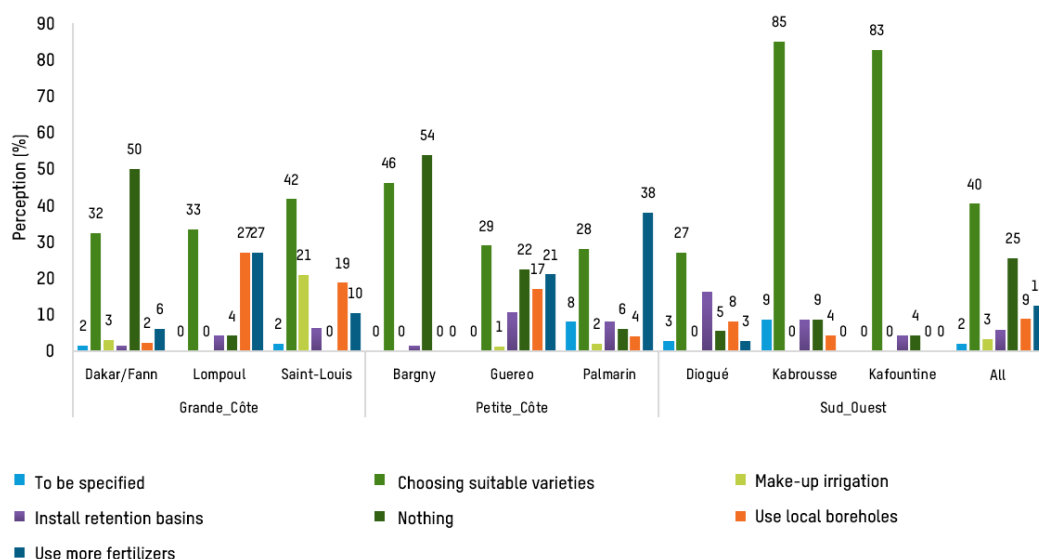
5.2.1. Measures taken in the field of fishing

In Bargny, the fishermen usually go to Kafountine in the south, or to Tandié, a village in the Gambia, to get good catches. If this strategy does not work, more and more often they choose to migrate illegally to Europe. On the Grande-Côte, organisations for monitoring fishing techniques and tools are set up by certain towns, often accompanied by the Local Artisanal Fisheries Council (CLPA). The use of certain types of fishing nets such as monofilament is prohibited. In the Palmarin area, measures to protect resources, such as a biological recovery period, are applied to the marine protected area (MPA) in Sangomar, which covers 87,437 hectares.

5.2.2. Measures taken in the field of agriculture

The impact of climate change affects all business sectors and above all agriculture, due to dependent factors such as the soil, rain, seed varieties, temperature etc. Several measures have been adopted by the communities to cope with them, in particular in the event of a decrease in rainfall.

Figure 21: Adaptation measures of farmers in the event of a decrease in rainfall

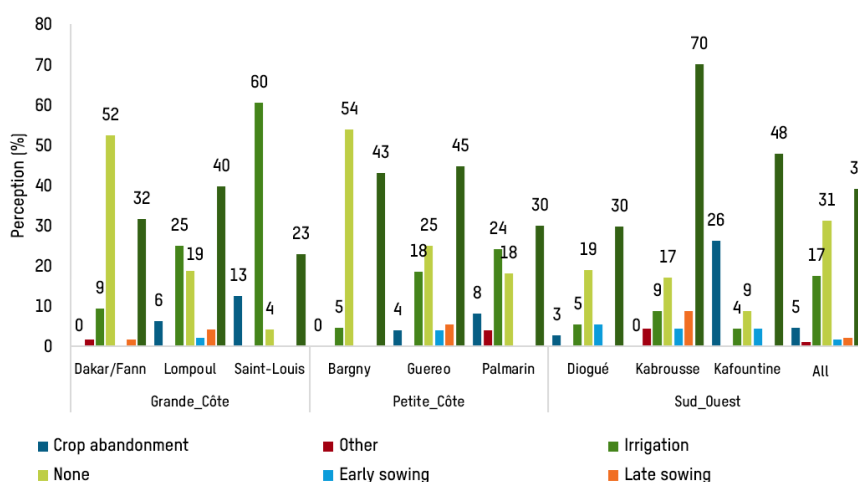


Source: OXFAM 2023 survey

This figure strongly suggests that the main measure adapted by the farming sector is the choice of varieties suited to the lack of water, for 41% of respondents. Nevertheless, 25% say that they do not do anything; a high number which shows the helplessness of the populations in finding solutions. Use of local boreholes represents 28%, and the setting up of retention basins 25% of the measures implemented by those polled. These different practices represent the adaptation strategies of both farmers and market gardeners faced with the decrease in rainfall.

In the event of a rise in temperatures, in addition, farmers use several techniques to perpetuate their business. They mainly opt for heat tolerant varieties (42%). A large proportion of them (31%) chooses to irrigate to reduce the dryness of the soil. That is the case for most market gardeners. The following table shows in detail the various measures taken, often several at the same time.

Figure 22: Level of perception of the adaptation measures in the event of a rise in the temperature

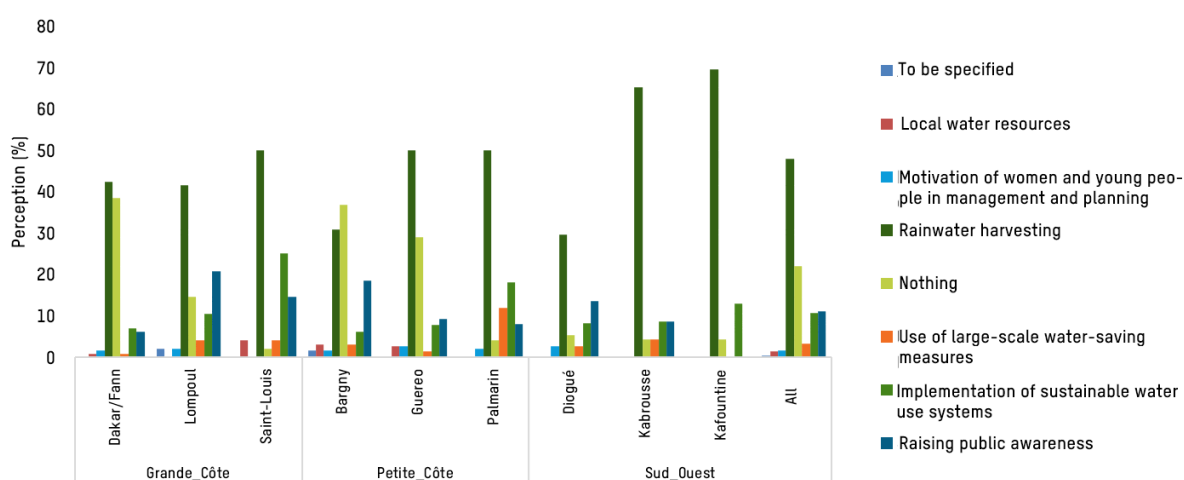


Source: OXFAM 2023 survey

5.2.3. Measures take for water resources

The respondents use different techniques to adapt to impacts linked to water resources: recovery of rainwater (50% of responses), raising the awareness of the population of the need to properly manage resources (50%), the involvement of women and young people in managing and planning water resources at the local level (30%), implementing systems for sustainable water use (28%) and using large scale water saving measures (13%). 22% of respondents answered “Nothing” to the question asked, 2% did not reply, and 1% did not specify their response. Doing nothing even though solutions exist is worrying as regards appropriation of the issues of the sustainability of resources.

Figure 23: Level of perception of the adaptation measures taken for water resources

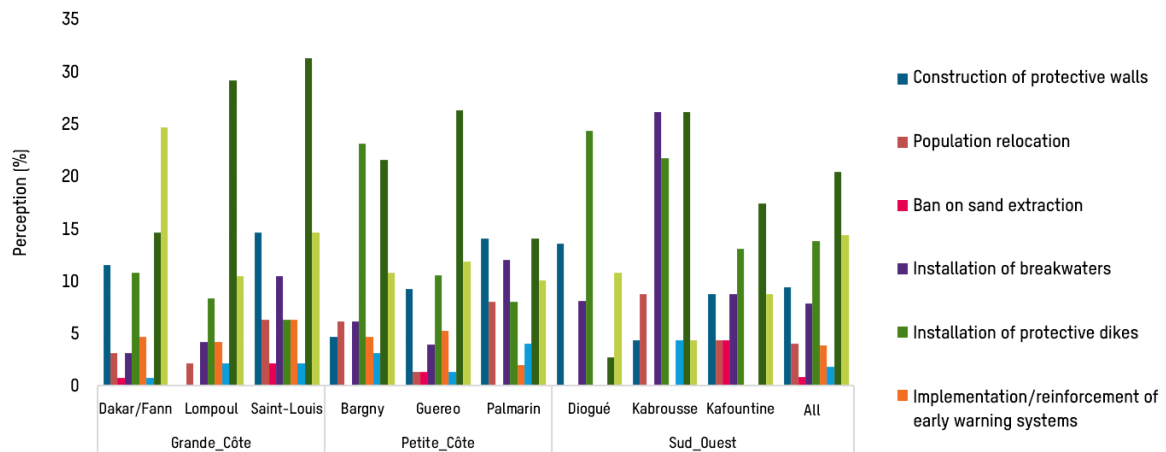


Source: OXFAM 2023 survey

5.2.4. Measures taken for the coastal area

The 500 respondents suggest different strategic measures to adapt to or cope with the impacts on the coastal area. The three most common proposals are a ban on removing sea sand (76% of responses), raising the awareness of regulations and best practice (fishing, activities in the coastal area etc.) for 40% of those polled, and reforestation/planting (in particular the mangrove swamp) as well for 40%. The chart below also shows other strategic measures that are less representative of those polled, a non response rate of 1%, other responses for which those polled do not provide details (1%), and 8% who answered that they do nothing.

Figure 24: Level of perception of the adaptation measures taken for the coastal area



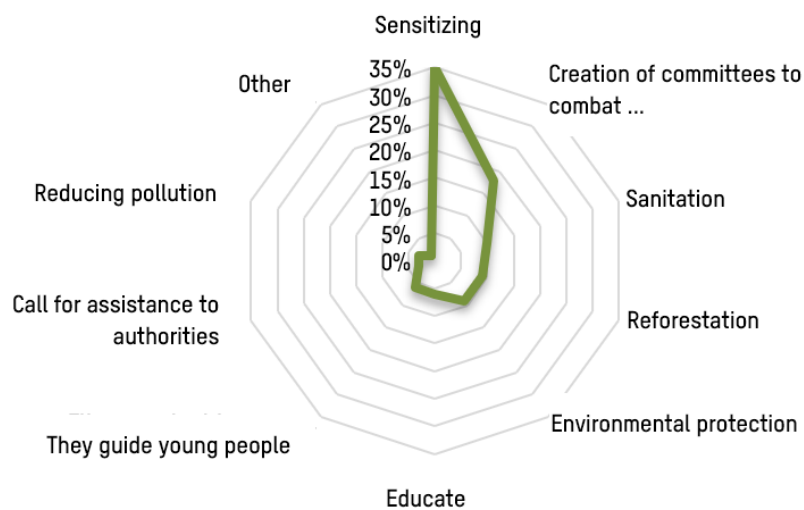
Source: OXFAM 2023 survey

5.3. GENDER RELATIONS IN THE ADAPTATION STRATEGIES

5.3.1. Impact and role of women in the adaptation strategies

Climate change adaptation comprises all of the strategies, initiatives and measures taken to reduce the vulnerability of natural systems. On the whole, women have an important role in this field, in particular by raising awareness, creating committees to combat this phenomenon, sanitation, reforestation etc. It involves holistic consideration of their environment.

Figure 25: Level of perception of the measures taken by women as regards adaptation strategies



Source: OXFAM 2023 survey

According to the interviews conducted in Saint-Louis, men are better informed than women about the phenomenon of climate change, except for certain women in strategic positions in community based organisations (CBOs). In Lompoul, adult men do not include either young people or women in decision making about the village as a whole. In Guéréo on the other hand, and thanks to awareness raising of women carried out by women during home visits, tree felling has stopped, and reforestation has started. That means that communication between women on raising awareness of climate change can function successfully, especially since they are used to discussing and debating together the problems that concern them in everyday life. It should be stated that the action of eco-guards was decisive to inform about the threats faced by the village if tree felling continued. They managed to bring together over 500 women, in collaboration with eight other villages (Popenguine, Thiafra, Soro, Khachat, Ndayane, Popenguine Sérère etc.), to reforest the lagoon.

The sub-theme regarding “women’s leadership in adaptation” at a focus group in Bargny resulted in the joint responses of four Lebu women. They are shown in the following box.

Box 1: Women's leadership in climate change adaptation

"In my opinion, it would be very respectful to involve us in the policies to conserve natural resources as it's something which concerns us all. Although some are aware, one thing is for sure, people like me who are unaware can do things that are not good for protecting these resources. Therefore, women must have access to a level of awareness so that they know that they are as much involved as men in the policies to conserve the natural resources. But also, our abilities must be reinforced, so we have a dynamic perspective that enables us to have a significant role. It would be very beneficial to give us women and girls the means that will enable us to overcome our lack of awareness, such as giving us lessons on the environment each Saturday evening, so we have the same level of awareness of this phenomenon.» F. N., aged 39, vegetable seller, education level: fourth year in primary school.

"It is imperative to organise awareness raising for women and reinforcement of their abilities by workshops so that they are more committed, but also so they can be aware that they are as much involved as men in the policies to conserve natural resources. This can be facilitated by the local authorities by providing them with the means to enable girls and women to have equal access to environmental education, which requires good organisation at the local level." K. D., aged 48, seafood processor, illiterate.

"What my friends have suggested is interesting (laughter). I think that for us to feel involved, our awareness must be raised. There should be monthly meetings to increase awareness but also to further reinforce women's abilities, thanks to Non Governmental Organisations (NGOs) to have a dynamic role that reveals what we can do. For that, adults like me should not think that it is too late to have an environmental education or be ashamed to go back to school to gain knowledge about this phenomenon. To combat this phenomenon, the authorities must give easy and accessible means to women and girls for equal access to environmental education." A. S., aged 44, vegetable seller, illiterate.

"In my opinion, involvement requires us to have a really personal commitment, even before it is political, to protect and conserve the natural resources; which requires us to be aware that these resources are a shared asset. Therefore, it is necessary to carry out awareness raising for women but also to reinforce their abilities by workshops or meetings to give them tools that enable them to be more active. In my opinion, it is necessary for the local actors or state authorities to equip us with the means to give women and girls equal access to education, and for that, it is crucial that you take into account the times when we are free as we are in our homes". A. G., aged 40, fish seller, education level: first year of secondary school.

5.3.2. The place of young people in the adaptation strategies

Young people are confronted with climate change either because they are in the business sectors of adults such as fishing, or because they are pupils and students informed of the issues and challenges of the environment by their education. However, most of the young

people included in the sample, i.e. 36%, do not know what role to play in the face of this curse. For others (22%), their role as young people is limited to issues of awareness raising. 8% of them consider that young people have no role to play in climate change adaptation.

On the other hand, for 7% of them, young people have a duty to manage the reforestation measures, for 5% they should carry out ecocitizen activities, and for 3%, they should be involved in the policies introduced.

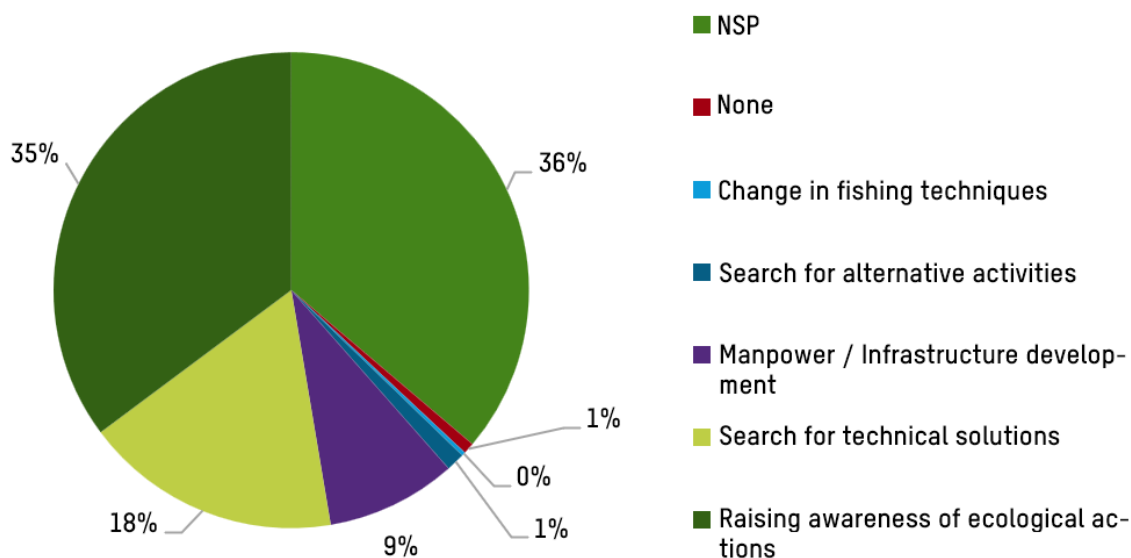
“The main obstacle for dealing with climate change and its impacts is awareness, especially by young people, and also we must obtain the necessary means to carry out the measures in order to combat these impacts” M. D., young person from Kabrousse. Most of the young people polled emphasise their strength and energy, to contribute to raising the awareness of the communities and to combat climate change. However, the young people express the need for training in this issue to be able to claim to carry out their role fully. Some young boys and girls say they took part in installing sandbags in front of the houses to combat the advance of seawater, which is flowing onto the concessions.

« We have knowledge about climate change and its impacts. We see it through global warming, the melting of glaciers, coastal erosion. There is also the decrease in rainfall and the most worrying is global warming because it causes the rise in the sea level and therefore the advance of the sea and erosion. As young people of the village of Kabrousse, we have taken part in reforestation or building traditional dykes, but in general, the young people in the village are not really interested in the environment or the issues of climate change. What they are interested in above all is to work in hotels and have a chance to live abroad, it is the young people who come back from university for the holidays who often make the others more aware of climate change. For example, they suggest reforestation. But as soon as they go away, when the universities open, no one is concerned about it and there is no follow-up of the areas that were reforested ». Focus group organised in Kabrousse with a young woman aged 21.

5.3.3. Role of men in the adaptation strategies

The diagram below shows the role of men in climate change adaptation in the different places polled. Even though lots of them do not know what to do, a large proportion count on “environmental action”, understood as the conservation and protection of the natural resources and biodiversity. Nevertheless, the measures are specific to the situation in the areas. For example, in places affected by the advance of the sea, and in particular in Diogu , Palmarin and Kabrousse, men see their role as building dykes to reduce the effects of the waves on the shore and the houses. Some are thinking of looking for other activities or changing their fishing techniques, while others are risking illegal migration.

Figure 26: Level of perception of the measures taken by men as regards adaptation strategies



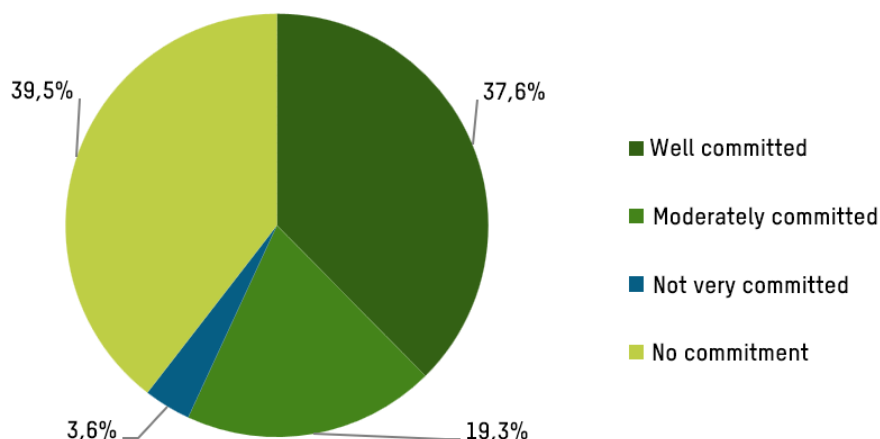
Source: OXFAM 2023 survey

Combating climate change is sometimes associated with laying sandbags to counter the advance of the sea; for that reason, physical strength is cited as a condition for that activity, from which women are therefore excluded. There is therefore a gendered view, depending on the nature of the adaptation measure. For example: "In Kafountine, it is only the men who carry out the measures to combat the effects of climate change because here we are used to saying that women cannot carry out concrete measures, for example to reduce the phenomenon of coastal erosion because they lack the physical strength to do so. And they do not try to do so because all they are interested in is the profitability of their economic activities and their tontines", M. D., man, aged 59.

5.3.4. Commitment of the coastal communities and involvement of the decision makers in adaptation planning

Climate change has serious consequences for biodiversity and helps to change the living conditions of species. It is urgent for everyone to reduce the effects of climate change. The results of the quantitative survey show however that 43% of respondents are not or are not very committed personally to reducing the effects of climate change on biodiversity, compared with 57% of people moderately or strongly committed. These statistics are alarming in view of the issues of sustainable development. But this comes from infallible knowledge of the harmful effects of climate change on socioecological systems.

Figure 27: Level of perception of the actors' degree of commitment



Source: OXFAM 2023 survey

The results concerning the involvement of the populations in climate change adaptation planning are also not satisfactory. 64% of 500 respondents replied “No” to the question about whether they are involved in planning ; only 24% replied “Yes”, while 9% did not reply and 3% said they did not know if they were involved or not.

In spite of this finding, the qualitative survey reveals a few interesting elements regarding the commitment of the coastal communities. One person told us in Guéréo: “... we have started to reforest the lagoon, in particular by planting filaos to stop coastal erosion. Recently, we have been reforesting near Somone”. On the island of Diogué the community radio stations often take part in organising the World Environment Day to increase awareness. Reforestation is a widespread trend there, as can be seen in the other places.

« What we do in Kabrousse... the population meets together. When I say the population, I mean the adults, the old people and the young people, to go to places where the sea is advancing and erect anti salt dykes in the traditional way. We build anti salt dykes to stop the advance of the sea and soil salinisation, as well as to recover a little land. It now enables us sometimes to carry out aquaculture or “kukineuk”... The women can go there to get fish ». T. D., aged 35, specialist in local development and monitoring/assessment, council official.

On the whole, the populations are not greatly involved in climate change adaptation planning. However, the adaptation strategies are implemented via initiatives introduced in connection with CBOs such as the Local Artisanal Fisheries Councils (CLPA) in west Dakar and in Guéréo. Mentioning sea pollution, a fish wholesaler aged 48 who is a member of the West Dakar CLPA, declares that the draining of wastewater without treatment by hotels is a well known problem on the coast. An action plan was introduced but according to him “there is no follow-up” because “the state has not played its role”. He also denounces the dumping of plastic bags into the sea, in spite of a law banning their use. The CLPA has however planned to organise the cleaning of the seabed by divers in November. This trend by community organisations can be seen in Sports and Cultural Associations (SCA). In Kafountine, according to I. S., “... to reduce the advance of

the sea, last year we brought together all the SCAs to take bags filled with sand and put them on the road, where the sea had started to destroy it, to hold it back. Even if it is not effective, it's better than nothing". The same applies to the reforestation and awareness campaigns carried out via the community radio station, and chats during the rainy season. In Palmarin, the interviewees declared that all of the households clubbed together to erect a protective dyke. They did not manage to do it, but the idea and the intention were there.

« We started by repairing the dykes that had been shattered by the sea in the high tides. We did everything possible, but unfortunately, we did not manage to hold back the power of the water. It is a problem of resources which prevented us from doing so, but the whole population joined forces several times, especially the young people, but without a positive result. You see, also at the edge of the sea, there are posts which have been driven in. They are branches of trees that we have driven in to stop the advance of the sea... It's a strategy that was recommended to us by a white man. It involves driving in posts while leaving a gap between them. Now we need to get leaves from trees and nets to tie the posts together up to a certain height. When the waves come, they deposit sand, which means that over time the water will recede because there is a lot of sand. You see, now the posts measure less than 1 m and when we drove them in, we left them about 2 m high. That shows the large amount of sand deposited by the waves ». Young man, marketing agent, in Diogué.

Photo: Flexible dyke solution in Diogué



Photo credit: Field survey

An incentive for commitment is visible in Bargny as regards dealing with environmental problems since the coal fired power plant was set up in 2008. Several associations were created to defend the interests of the populations, some achieving better results than others. The Network of Associations for the Protection of the Environment and Nature (RAPEN) was formed at that time, to oppose actions seen as harmful carried out by the cement company SOCOCIM INDUSTRIES, the

coal fired power plant and the port of Ndayane. The populations consider that these industries undermine the ecosystem of the town, which leads RAPEN to conduct awareness campaigns among the inhabitants, to lodge complaints against the coal fired power plant and call for the relocation of the plant. As a result of these campaigns, the plant was forced to change its method of operation to reduce marine pollution as much as possible; the operating circuit was modified. Thanks to partnerships with certain NGOs, RAPEN was able to conduct community audits to understand the real economic, health, environmental and social impacts of the coal fired power plant on the populations of Bargny. CBOs that acquire skills and are supported by NGOs can provide genuine sustainable environmental protection solutions that reduce the ecological footprint and the anthropogenic factor.

« The main obstacles the organisation meets are the lack of funding to combat climate change, the unawareness of certain members of the population of the causes of climate change, and behaviour that is harmful to nature. We have human, financial and material resources, but there are deficiencies. Even so, there is collaborative work to find common solutions with the authorities and partners like Natural Justice, which is a South African NGO that fights for justice for vulnerable communities by providing them with legal tools. There are other financial partners who help us to carry out our workshops. It can be said that the organisation has specific needs for support, such as financial support, but also its members need skills for to improve their ability to act and prepare for possible problems linked to climate change. » S. M., environmentalist, RAPEN.

5.3.5. Communities' assessments of the adaptation strategies put in place by the decision makers

The public authorities have a major role in combating climate change, even if civil society organisations (CSOs), community based organisations (CBOs) and the communities must join forces and get involved. However, the consequences of climate change are such that the populations rather expect the involvement of governments. Moreover, the results of the quantitative survey show that 87% of respondents think the government has a duty to have a fundamental role in climate issues.

The results of the survey must be studied and taken into account. In Saint-Louis, the West Africa Coastal Areas Management Program (WACA) was implemented by the Department of Environment and Classified Establishments (DEEC) and aims to restore and conserve marine biodiversity with trees like filaos that are very effective in combating climate change in general and the advance of the sea in particular. However, the ability of the politicians and their decisions to influence climate change adaptation does not have a real impact in terms of awareness raising and recommendations to the communities, as is shown by the results of the survey. The fact is that most projects only have an institutional scope and a limited community element. It appears that the participative and inclusive approach in the adoption, preparation, implementation and assessment phases of the policies and programmes does not cover all of the populations, resulting in poor appropriation by them. To that effect, a young student chanted "everything that's done for me but without me, is done against me", a refrain for populations who feel excluded from issues that concern them. It is necessary for the state

and its Technical and Financial Partners (TFP) to make great efforts to include and involve all of the local players in its approach and development strategy, unless its local actors act as intermediaries at the community level.

“You know, it is very difficult to make some people aware. It doesn’t matter what you say, they will not change their position. And you know, today’s generation has not experienced what happened in years gone by, and for that reason, they don’t believe anything you tell them. And you know, regarding climate change, the state can’t do anything because it does not have the means to make canals and protective dykes on the coasts and the sea will continue to advance”. Village headman of Guéréo.

During the interviews carried out in Kabrousse, the interviewer described her discussion with an agent who collaborates with an NGO and has worked on the project to build the Senegal-Bissau-Guinea dyke at the border, in Kabrousse. According to that agent, “the mouth used to be at least 7 km from the village of Kabrousse, but now it is about 3 km from the village. The creation of dykes is a priority in Kabrousse, or the sand dunes will be endangered.» In his opinion, “a few years from now the cultivable land, especially near Diembering, will disappear. To stop the advance of the sea, filaos are planted on the dunes, but this technique is not effective as the roots do not go deeply into the soil, and once the water manages to reach the dunes, they will fall down. The filaos must be planted in the hollows and not on the dunes, that will at least make it possible to slow down coastal erosion.”

5.3.6. Nature of the obstacles to implementing climate change adaptation

The bar chart below regarding the nature of the obstacles encountered when implementing climate change adaptation shows that most respondents did not want to answer the question. Out of the total number of respondents (500 people), 289, i.e. 58% did not give an opinion on the question. 53 people, i.e. 11% of those polled, replied that the obstacles were financial, 47 (9%) that they were institutional, and 45 (9%) that they were sociocultural. The obstacles seen as material, by 34 people (7%), or technical, by 28 people (6%), were cited far less often. On the Grande Côte of Senegal, the main obstacle to adaptation is perceived as institutional by men, whereas it is perceived as financial on the Petite Côte and in the south west (Figure 28). Among women, it is seen rather as sociocultural on the Petite Côte and the Grande Côte, but financial in the south west.

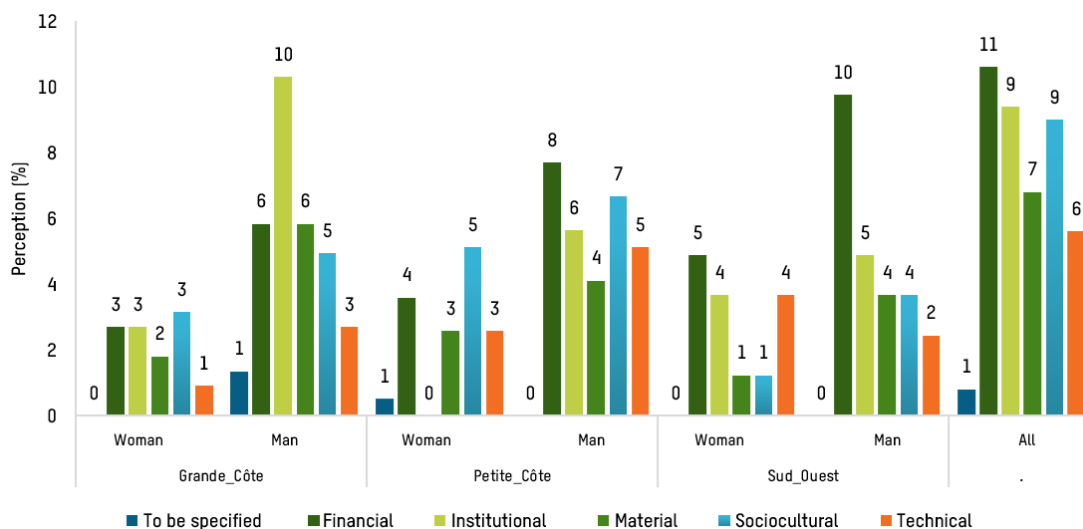
5.4. ACCESS TO CLIMATE INFORMATION

Living in the coastal area of Senegal and in general earning their living from fishing and agriculture, 59% of the 500 respondents replied “Yes” to the question on the need for climate information, 21% replied “No”, 8% replied that they do not know if they need to have climate information, and 2% did not answer the question. Over 40% of the men polled said they need climate information, compared with about 15% of women.

As to whether men, women and young people have the same need for climate information, 50% of respondents replied “Yes”, 14% replied “No”, 5% did not know and 31% of the sample did not answer the question. The needs for information therefore appear to be different on the whole,

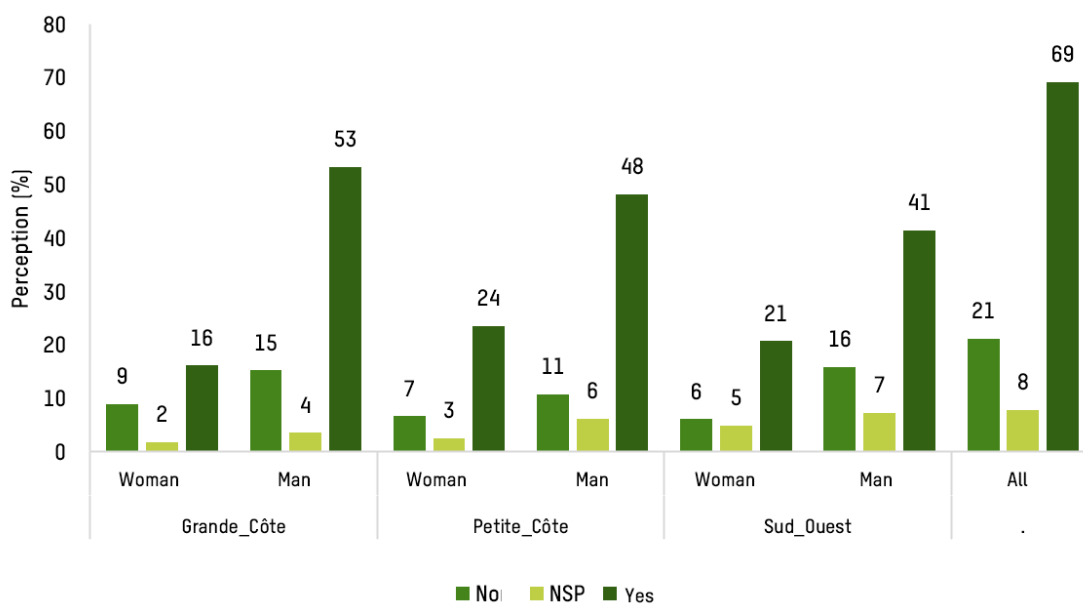
according to the gender, activity and relationship of the person to the environment and their awareness of environmental issues.

Figure 28: Level of perception of the nature of the obstacles to implementing adaptation



Source: OXFAM 2023 survey

Figure 29: Level of perception of needs for climate information



Source: OXFAM 2023 survey

The information on climate change is mainly disseminated by the media. 58% of respondents have access to this information via the media, 28% do not have access, 9% do not know and 4% did not want to answer the question. The qualitative survey shows that the populations are sceptical about the content broadcast by the television channels and radio stations, and access to reliable information on the climate is therefore complex.

It is also unevenly distributed according to gender and age group. Whereas in Bargny it is women who most frequently attend meetings or seminars to mention problems in Bargny and are therefore informed of the problems linked to climate change, that is not the case in Saint-Louis. In the area from Langué de Barbarie to Saint-Louis, the existence of “mbàar”, shelters where the men gather and talk all day long favour daily communication by men on essential, varied and topical issues. Women, on the other hand, only have weekly meetings in the “mbotay”, cultural associations of domestic and economic interest, to tackle these issues, and in general, climate change is not mentioned.

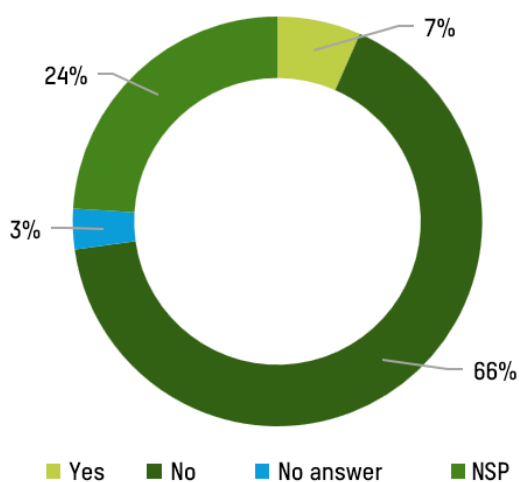
« *Local knowledge about changes that have occurred in time and space, is held and used ineptly as we are in last place when it comes to decisions, initiatives and proposals, unlike men who are in the forefront and who monopolise all of the knowledge and secrets... Our level of knowledge about the measures taken in the city against climate change is very limited due to a notion firmly rooted in our minds since the start of our socialisation, which holds that men are superior to women and must be at the centre of all important decision making. Women’s capacity for resilience from a physical point of view to deal with climate change compared with men is not comparable because they are more exposed to the hazards that can result from this curse, due to their gender and their social status. Similarly, as regards the conservation of natural resources, men are more involved than women due to their position and their level of knowledge on the subject.* » Woman aged 30, fish seller in Saint-Louis.

5.5. ACCESS TO ENVIRONMENTAL EDUCATION

66% of respondents affirm that on the whole there is no satisfactory environmental education for young people, 7% say that there is, 24% do not know whether there is satisfactory environmental education for young people, and 3% did not answer the question.

Figure 30 : Level of perception of access to environmental education

Is there satisfactory environmental education ?

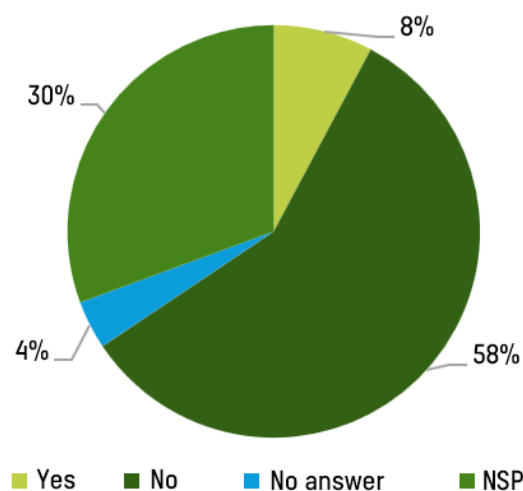


Source: OXFAM 2023 survey

The pie chart below shows that 4% of respondents say that women or girls have unequal access to environmental education compared with men, 58% of them answered "No", 8% do not know and 4% did not answer the question.

Figure 31 : Level of perception of access to environmental education by men and women

Do women and men have equal access to environmental education?



Source: OXFAM 2023 survey

Environmental education is of more benefit for young people at school, whereas young people who are not at school do not have specific information on the phenomenon and its effects, even if they take part in fishing or market gardening activities sensitive to climate change. At a focus group held in Saint-Louis with young boys and girls, the secondary school pupils and students declared, for example, that they know about the existence of climate change via geography and biology lessons received at school, as well as via documentary series on channels like National Geographic. Similarly, they are made aware during trips to protected marine areas or national parks, such as the one in Saint-Louis. According to that approach, access to environmental education is unequally distributed and varies according to the schooling and sensitivity of the different regions to climate events. For example, a student we met in Lompoul mentioned the heat waves, drought and fires that occurred in Spain, Greece, Canada and the United States in July and August 2023. On the other hand, in the same town, a woman who is a member of an Economic Interest Grouping (EIG) explains that she knows nothing about climate change but knows very well how small her "todj" is, (i.e. the place or table where smoked or dried fish are displayed), and the difficulties in obtaining seafood to process and market it.

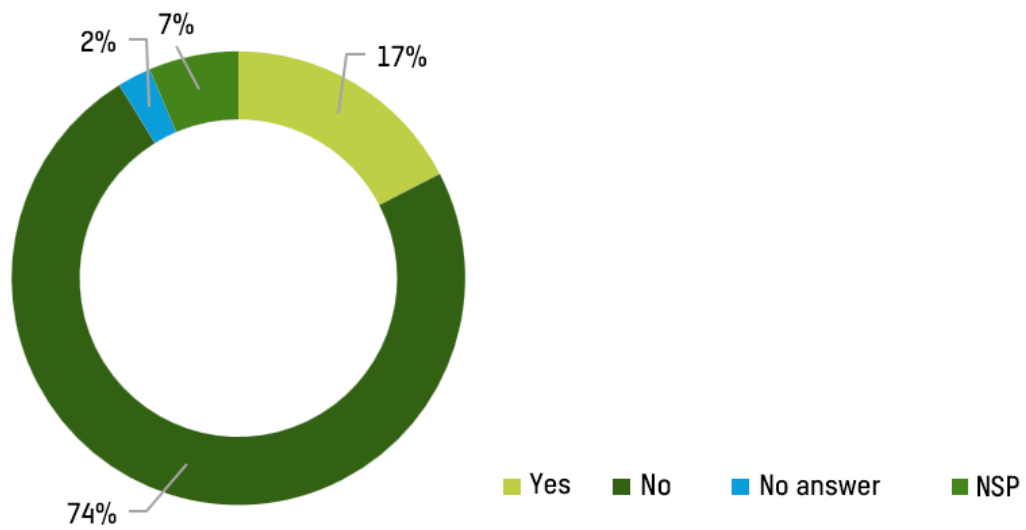
5.6. COMMUNICATION ABOUT CLIMATE CHANGE: AWARENESS RAISING, ADVOCACY, COLLABORATION

We note from the pie chart below that the coastal communities are not entirely involved in combating climate change. It should be stated that this depends on their knowledge, the information available on environmental issues, and the non involvement of decision makers

in these issues. 74% of respondents affirm therefore that they do not take part in awareness campaigns to combat climate change, only 17% declare that they take part in these campaigns, 7% do not know whether they take part or not, and 2% of them did not give their opinion on the question.

Figure 32 : Level of perception of the participation in awareness campaigns on climate change

Have you ever taken part in a CC awareness campaign?



Source: OXFAM 2023 survey

Like the previous diagram, 76% of respondents answered “No” to the question about whether they carry out advocacy actions to combat climate change, 14% replied “Yes”, 8% do not know and 2% did not give their opinion.

Table 3: Content and form of advocacy actions during awareness campaigns

	Grande-Côte		Petite-Côte		South-west
Dakar/ Fann	Adaptation action	Bargny	Cleaning of the sea	Diogué	Environmental protection
	Reforestation and cleaning				Advance of the sea and its consequences
	Clean the living environments		Training		Awareness and conservation panel
	Raising the awareness of climate change		Protection of the environment		Protection of the coast
	Set setal		Against the setting up of polluting industries (SOCOCIM, Sendou power plant, iron works)	Kabrousse	Conservation of the mangrove swamp
	Use of plastic		Cleaning of beaches		Climate change
Lompoul	Agriculture and stock breeding	Bargny	Raising awareness of waste treatment	Kabrousse	Combating the destruction of mangrove swamps
	Fishing		Reforestation		Raising awareness of the consequences
	Reforestation		Raising the awareness of women via EIGs		Raising awareness of the extraction of sea sand
	Protection of fish resources		Raising awareness to change behaviour	Kafountine	Reforestation of the mangrove swamp
	Cleaning		Combating damage		
	Health		Reforestation		
Saint-Louis	Reforestation	Guéreo	Increase the awareness of the populations of the effects of climate change	Kafountine	
	Combating damage to the soil		Set setal		
	Protection of the environment		On the environment and the measures that can be introduced		
	Awareness raising and prevention regarding the environment	Use of certain types of fishing nets			
	Fishing	Palmarin	Advance of the sea		
			Damage to the environment		
	Ban on cutting down trees				
		Zero plastic waste			

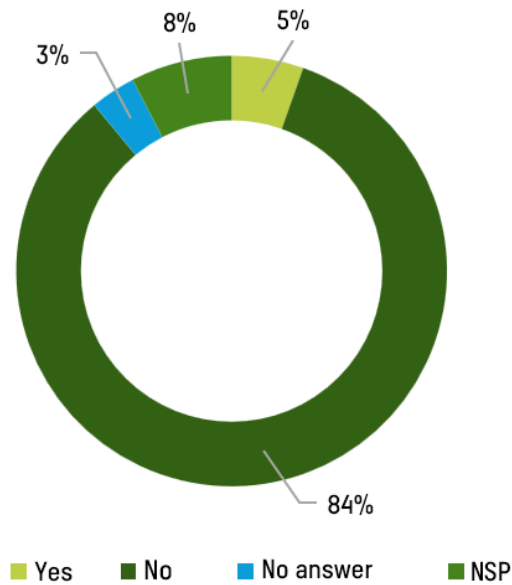
Source: OXFAM 2023 survey

Following their participation in seminars on climate change, having expanded their knowledge in that manner, certain actors became intermediaries for their community, to make them aware of the behaviour to be adopted faced with an upsurge in environmental risks. Their advocacy actions concern adopting preventive measures and warning against bad practices such as dumping waste in the sea etc. These actors also initiated reforestation and cleaning activities

which include all levels of society. 5% of respondents work jointly with the media in connection with combating climate change, 84% of them do not, 8% do not know and 3% chose not to answer the question.

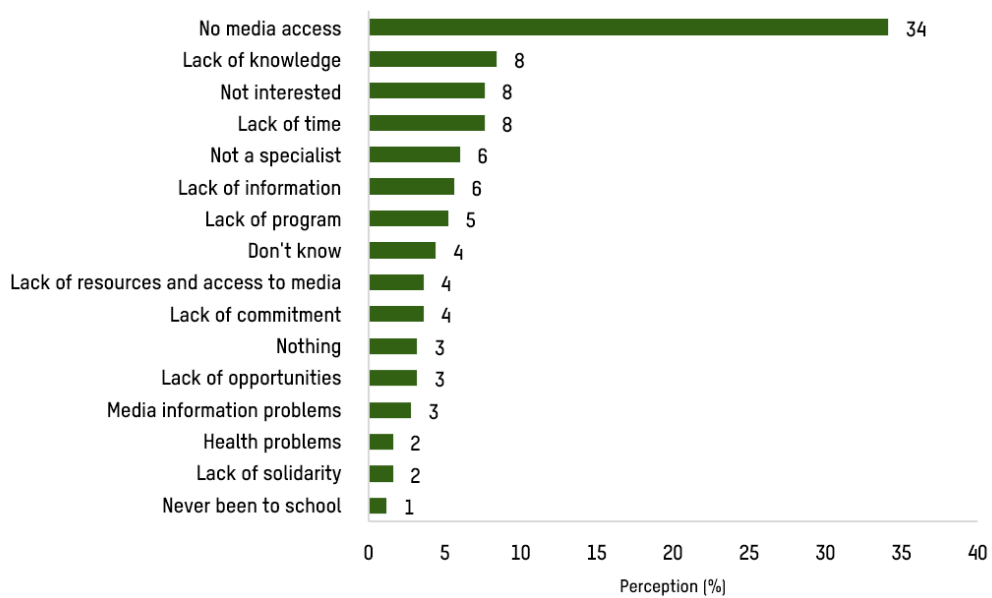
Figure 33: Level of perception of collaboration with the media

Do you work closely with the media in the fight against CC ?



Source: OXFAM 2023 survey

Figure 34: Level of perception of access to the media



Source: OXFAM 2023 survey

It is undeniable that the media can have an important role in combating climate change by broadcasting environmental issues. Respondents listed obstacles to collaboration between the media and the population (Figure 34): inaccessibility of the media, lack of knowledge of the subject, lack of time, lack of interest etc. These limits act as a brake on good management of combating climate change.

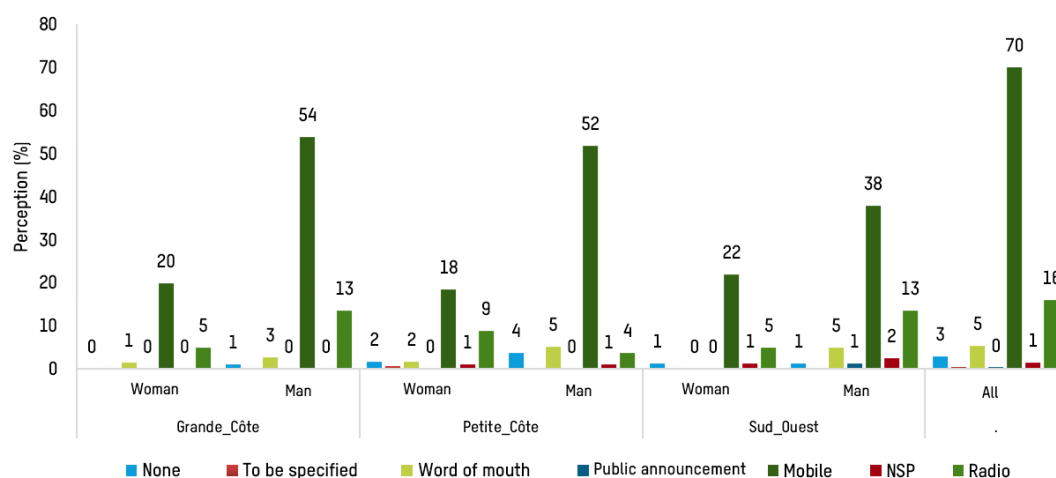
According to an interview in Ngor (Dakar) “the Senegalese media are not rigorous like the Asian channels”. The result is that there is a lack of specific content on climate change in the media. At a focus group in HLM Grand Yoff (Dakar), the young boys also complained about the political content of the media, which “only talk about people”. On this point, it is encouraging to note that an adolescent aged 15 who lives in Dakar dealt with the issue of the understanding and the dissemination of knowledge about climate change in Senegal, a concern that she shares with one of her teachers, as she explained to us:

« The television channels have a responsibility but the parents too because if you don't go to school, there are things that you will not know. Everyone talks about politics, but climate change, if you have not been a student, you will not know anything about it. Everyone knows what politics means, whereas climate change, unless you have been a student, you will not understand why it's hot if it isn't explained to you. The media also have a big responsibility because if they explained to people the causes of climate change, like they do with politics, the Senegalese would understand why it is hotter or colder and why it no longer rains much ».

Different communication channels are used to convey climate information (Figure 35). The four channels most used by the respondents are mobile phones at 73%, followed by the radio at 72%, word of mouth at 34% and public announcements at 7%. 21% of respondents did not answer the question. 15% do not use any communication channel, 8% do not know, and 8% use other communication channels without specifying which ones.

58% of the 500 respondents say there are no specific informative communication channels for men, women or young people, 16% say there are, 22% do not know if there are, and 3% chose not to give their opinion.

Figure 35: Level of perception of communication channels regarding climate change



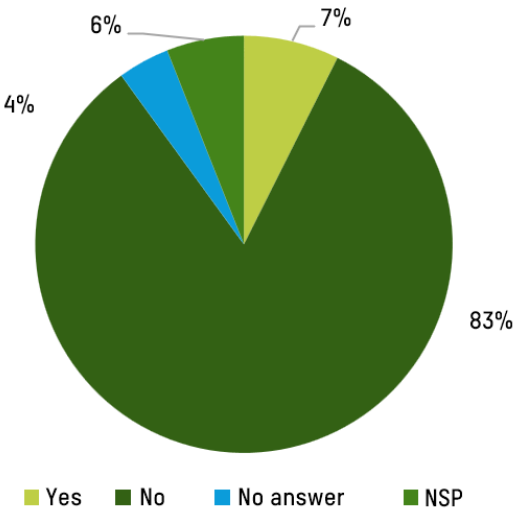
Source: OXFAM 2023 survey

5.7. KNOWLEDGE OF CLIMATE JUSTICE

The diagram below shows that 83% of respondents have no knowledge of the notion of “climate justice”. 7% have heard of the notion, 6% do not know, and 4% did not answer the question. There is the same finding in the qualitative survey: on the whole, the coastal communities have no knowledge of the notion of climate justice. Educated people also have quite a vague understanding of it and refer to the term “justice” to try to find an explanation.

Figure 36: Knowledge of climate justice

Do you have a basic knowledge of climate justice ?



Source: OXFAM 2023 survey

6. EXPECTATIONS OF THE COMMUNITIES AS REGARDS ADAPTATION AND RESILIENCE



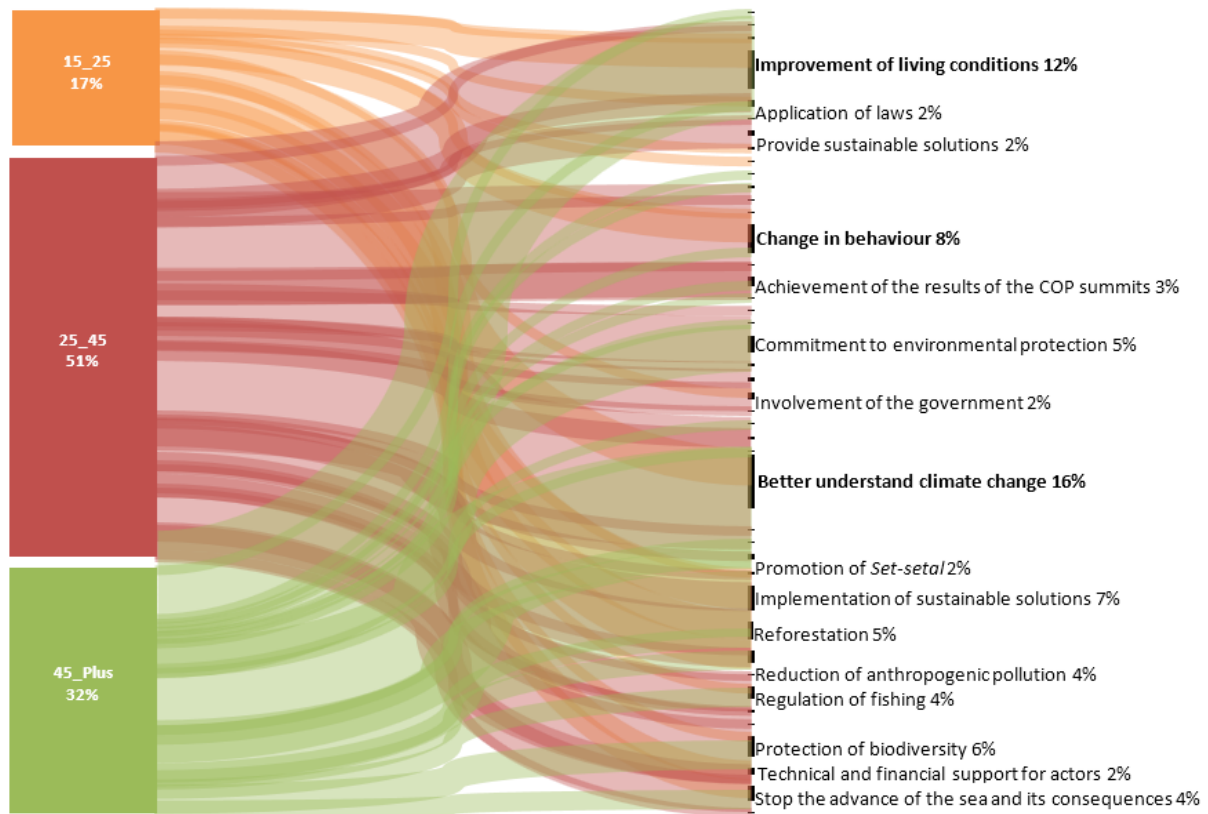
6.1. MAIN EXPECTATIONS OF THE COASTAL COMMUNITIES

The responses concerning the expectations of the communities were analysed according to the respondents' age group. The question was whether there is a better understanding of climate change among young people, adults or the elderly. This question is aimed at the understanding of climate change phenomena and their consequences for the different business sectors. Improving the living conditions of the populations and their living environment is an expectation for 12% of those polled, this aspect being more important for adults and the elderly who call for more technical and financial aid to improve their standard of living. For both adults and young people, a change of behaviour is an important expectation, in particular the reduction of the causes of climate change in their daily actions. Other expectations are also noted in the survey conducted, such as a commitment to environmental protection (5%), reforestation (5%) and protection of biodiversity.

Concerning expectations regarding other members of the communities, the most common responses are: raise young people's awareness of respect for the environment (48% of those polled), comply with the preventive measures established (7%), ensure environmental protection (7%) and stop wasting natural resources (6%). On these issues, a major role is expected by young people.

In the qualitative survey, those interviewed show clearly that the populations, civil society, development actors, local authorities, decentralised technical departments and NGOs "must unite to combat climate change via joint actions and thinking". And "adults and the elderly have a duty to raise their children's awareness and instil in them the issues linked to climate change through stories and/or myths".

Figure 37: The main expectations of the communities regarding climate change adaptation according to age group



Source: OXFAM 2023 survey

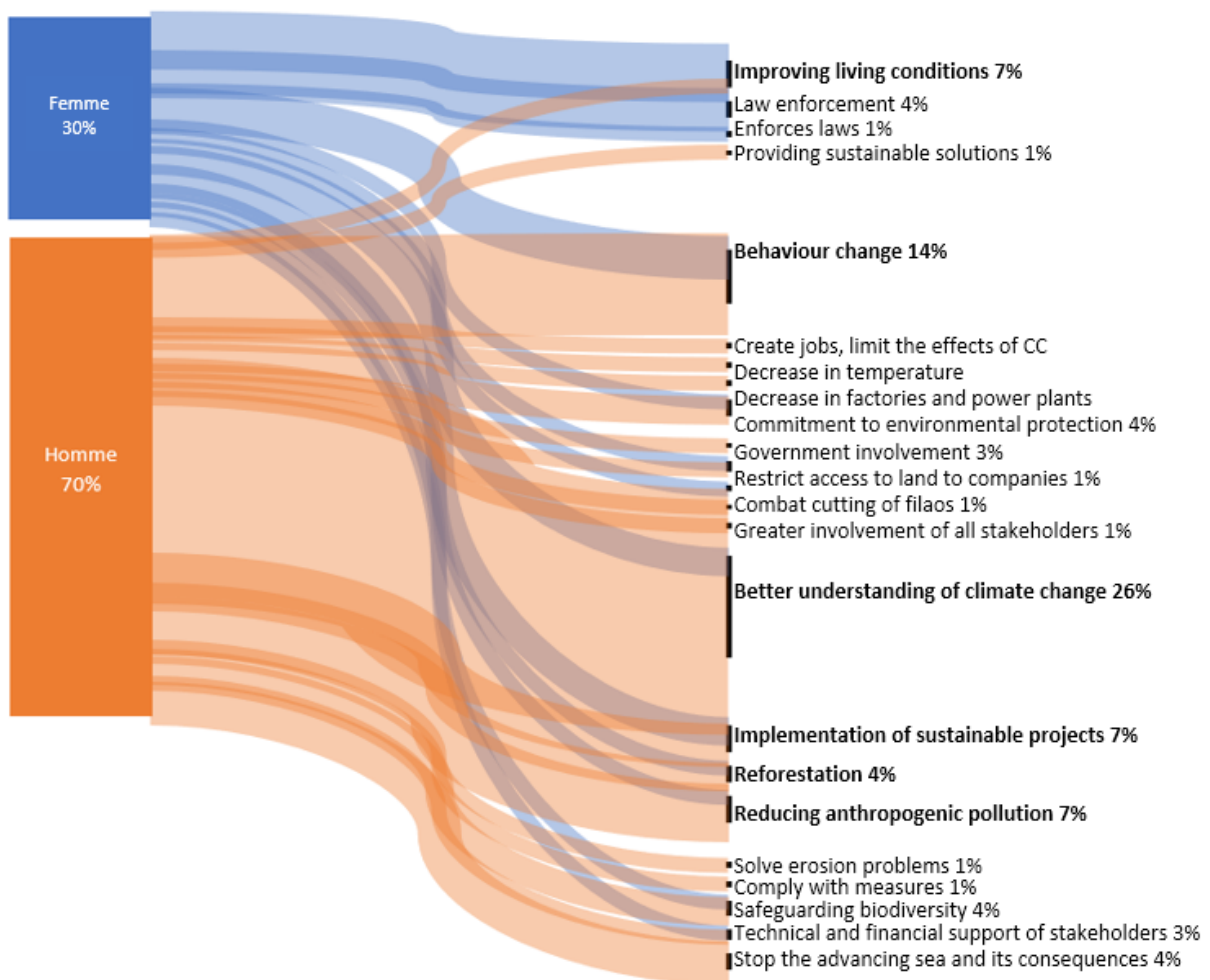
« In my opinion, the nature of the need for information on climate change is to identify its causes and consequences, as the practices of our women as well as of men can contribute to this phenomenon. And these needs are not the same, as our activities are different. To raise the awareness of the community, you can carry out awareness campaigns by channels such as the television, but that channel is not the same for women as they use WhatsApp and TikTok more than us.

I think that it is important to include the phenomenon of climate change in the curriculum so that it is understood. It is also important to find a suitable programme and one that takes adults into account, as not everyone goes to school. As a result, our commitment and involvement would be to watch out for any behaviour that may endanger nature, such as polluting, etc. Our role as adults is to raise young people's awareness of the consequences this phenomenon may have, get involved in cleanliness campaigns and avoid polluting as far as possible. The role of young people must be to appeal to a sense of responsibility to show that environmental protection is something which concerns everyone ». M. F., fishermen, aged 58, Ndiandia (Bargny).

The president of the association and *japalaneté* kurel gi in Kafountine, explained that: "regarding climate change, our association only needs the information that is required; if necessary, create

training sessions in our local languages so that we can master the phenomenon in order to continue to raise awareness properly. That’s all we need for the moment. If need be, it is up to you the students in the different places, and the experts in this field to come and see us, to arrange talks like you did today to explain to us these recent things, so that we can be at the same level as you and find solutions together”. Community actors are open to discussions of all kinds to carry out awareness raising at their level in a local language they are familiar with. Indeed, “Young women and young people can make their peers aware of the dangers of climate change and encourage them to reflect and look for innovative solutions to effectively combat climate change by organising television sketches, forums, seminars and training workshops”. On the whole, the communities do not have effective means to combat climate change, as this adaptation requires so much money. In Kafountine and Guéréo, people provide the example of the breakwaters installed in Saly, calling for these measures to be applied all along the coast.

Figure 38: The main expectations of the communities for climate change adaptation according to sex

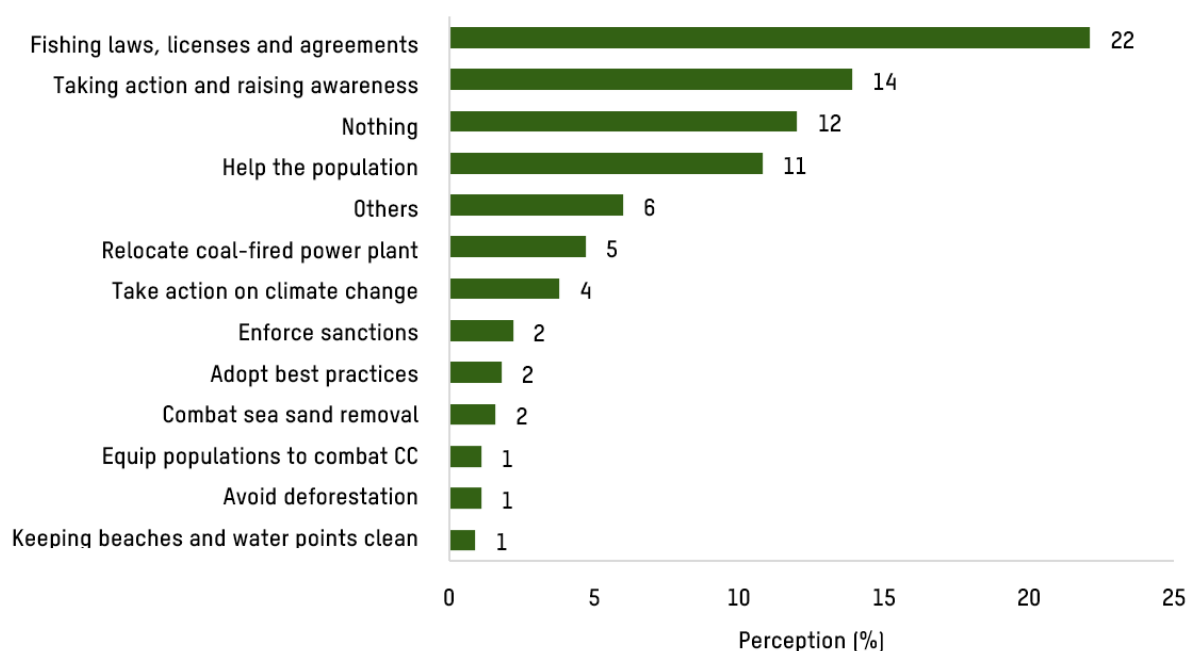


Source: OXFAM 2023 survey

6.2. EXPECTATIONS WITH REGARD TO THE GOVERNMENT

In connection with climate change adaptation, several communities in the coastal area of Senegal lament the lack of resources and guidance, above all the fishermen. 22% of the sample polled complained of legislation unfavourable to them, the unavailability of fishing permits, and above all the fishing agreements with foreign governments which, in their opinion, are continually plundering the ocean. In addition, 10% of respondents expressed the need to raise the awareness of the populations of community measures that could deal with the impacts of climate change. The concerns of the remainder of those polled were limited to preserving the living environments.

Figure 39: The various expectations of the populations with regard to the decision makers

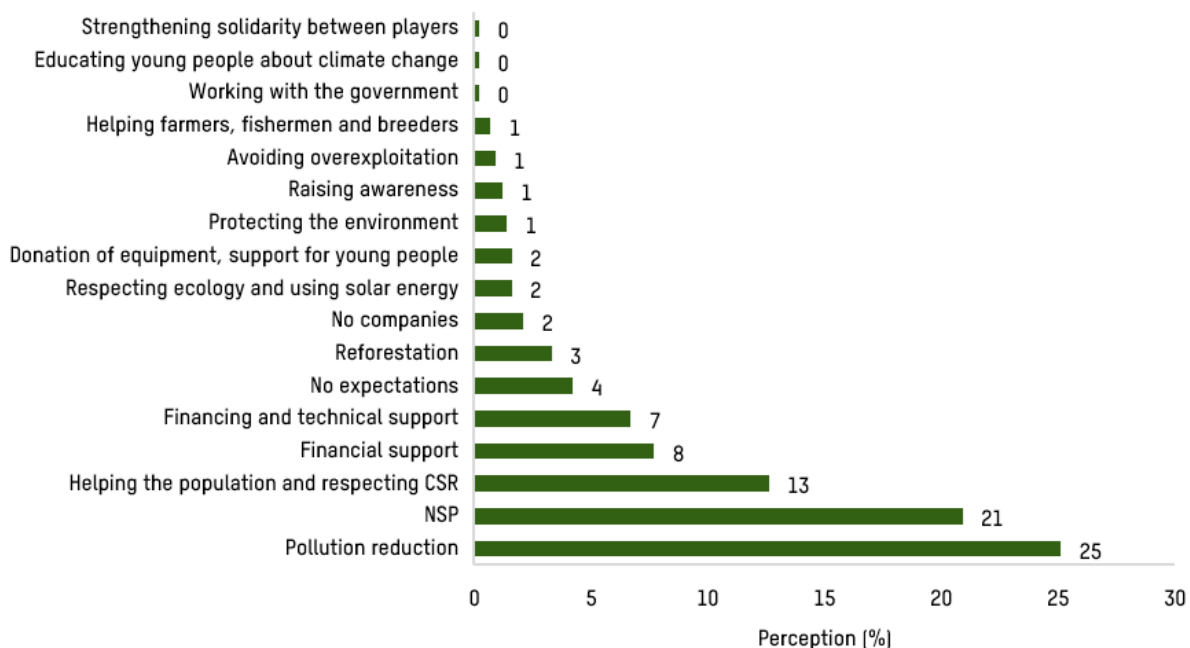


Source: OXFAM 2023 survey

6.3. EXPECTATIONS WITH REGARD TO COMPANIES

According to the qualitative survey both western and local industries damage the environment. In Palmarin the respondents expressed fears of potential pollution of the sea due to the exploitation of oil in Sangomar, gas in Saint-Louis, zircon in Lompoul, and in Bargny with the cement company (SOCOCIM Industries) as well as of the effects on air quality of the coal fired power plant in Sendou. Palmarin remembers the rupture of the Point of Sangomar, Saint-Louis is still experiencing the consequences of the opening of the breach (flood relief channel), and in Bargny the inhabitants live with the risk. This shows that the coastal communities express legitimate expectations in the quantitative survey regarding extractive industries.

Figure 40: The various expectations of the populations with regard to companies



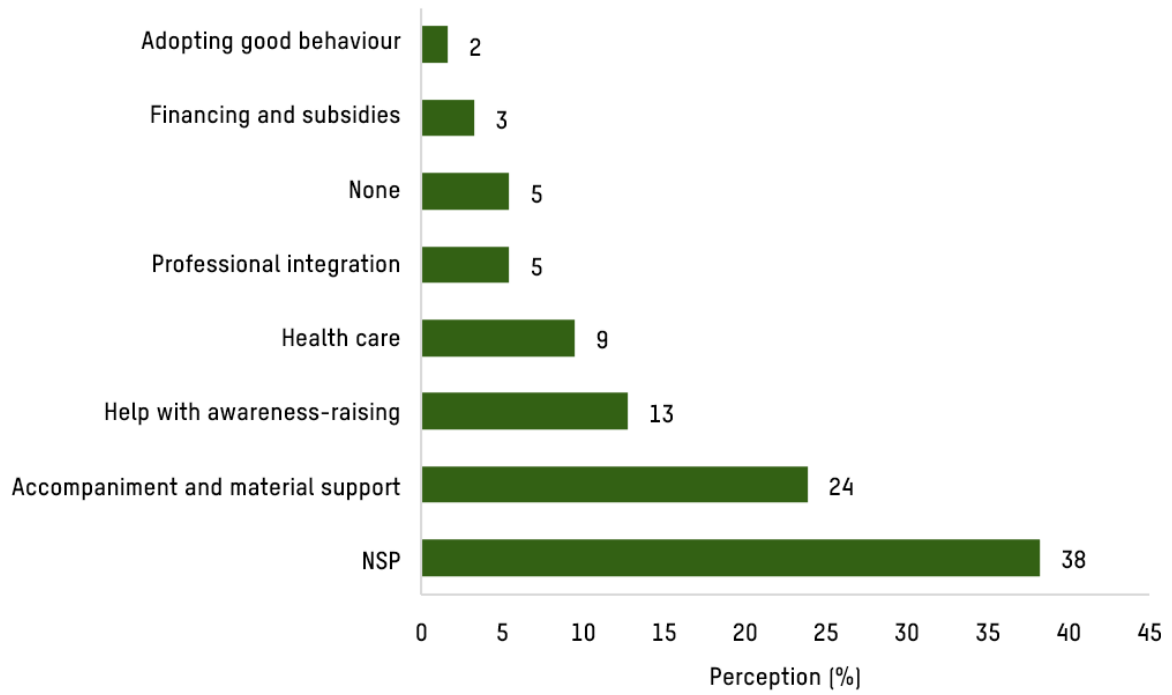
Source: OXFAM 2023 survey

Alongside the commitments made by the governments, companies must do more than limit their use of resources. The populations expect more commitments by companies, such as funding and support for young people, financial and material support for farmers, fishermen and stockbreeders, civic action, employing young people, controlling the exploitation of resources, reducing pollution, and organising seminars to improve the populations' knowledge of climate change. The populations expect corporate social responsibility (CSR) to be effective.

6.4. EXPECTATIONS OF PEOPLE LIVING WITH DISABILITIES

Persons with disabilities are disproportionately affected by climate change. Whereas poverty, stigmatisation and discrimination are generally the three main problems of people living with disabilities, the effects of climate change aggravate these problems. The 369 responses analysed regarding the expectations of such people show that 141 people, i.e. almost 40% of those polled, do not know how to meet the expectations of people living with disabilities. This shows society's ignorance of their condition. However, all the other responses show the extent of the problem of persons with disabilities as they are requests for help and complaints, not relating to climate change but rather to social issues. 24% of the sample consider that they need support including material support, 10% are in favour of medical care, 6% recommend integration into employment and finally 2% think they need funding and grants to develop activities. 13% think it is essential to make these vulnerable persons aware of climate change to prevent them as far as possible from suffering the harmful effects.

Figure 41: Level of perception of the expectations of persons with disabilities



Source: OXFAM 2023 survey

7. CONCLUSION AND RECOMMENDATIONS

Senegal suffers from signs of climate change that are increasingly worrying for the development of the country, as it is exposed to various hydro-climatic hazards, and in view of its socio-economic production activities that are sensitive to the climate and changes in it. The consequences that may be mentioned include loss of land, infrastructure and facilities, as well as a decrease in water and fishery resources. Very often the populations speak without distinction of environmental deterioration and the consequences of climate change. For example, the distinction is not necessarily obvious for them between the removal of sea sand and coastal erosion due to the ocean's waves. Similarly, granting fishing permits to foreign operators is sometimes seen as a cause of climate change.

Furthermore, poverty aggravates the consequences of climate change. The impact of climate change makes the life of households increasingly difficult, at the same time as the mechanisms of social solidarity are deteriorating.

To the question on the populations' expectations from decision makers regarding the consequences of climate change, 16% of the sample of those polled in the qualitative surveys classified by age group say that they want to "understand climate change better", and 12% of respondents ask for an "improvement in living conditions". In their answers to the same question, but this time classified according to sex, women mention firstly "improvement in living conditions", unlike men who declare that they want to "understand climate change better" and expect a "change in behaviour". In view of Figures 37 and 38, poverty appears to be a bigger obstacle than the need for knowledge.

Women suffer the repercussions of climate change as much as men, insofar as their work depends on business sectors run by men, in particular when it involves obtaining fishing products in order to process and market them. Poverty has insidious effects on mobilisation for the protection of the environment.

Not only are the notions of climate justice and environmental justice linked, as the environment is an inclusive reality, but the notion of economic justice adds to the intersectionality of the causes of poverty. Environmental awareness appears to be an issue of justice at every level, whether environmental, economic, social, gender or cognitive.

It is necessary for governments and above all the coastal communities to combat this phenomenon, but this is prevented by a lack of financial and technical resources. The fundamental bases of the means of support, i.e. agriculture, water, fishery and forestry resources, have been suffering from the impacts of various climate hazards for a few decades. With poor control of climate risks, the combined effect of these hazards is often likely to overshadow the efforts made by states to achieve the double aim of ensuring the economic emergence and well being of the populations. It is a huge challenge, all the more so because the coastal communities are barely involved in planning and implementing the adaptation

policies in their territory. The lack of environmental awareness of most of the populations influences their tendency to adapt.

The outlook caused by climate change puts the methods of managing resources and individual behaviour to the test, and questions contemporary methods of production and consumption. The issue therefore involves redefining the methods of access to resources, anticipation, and the ability to include political ecology in the collectives and numerous environments. Governments and companies must be held liable, and each party must fully play its part to use the resources properly, reduce the risks and adopt preventive measures for the environment. The aim is for joint assets to be protected and shared for the benefit of the populations and in compliance with social, economic and climate justice.

To do so, the populations and coastal communities must be involved in the adaptation and area planning strategies, in order to guarantee protection of the means of support and favour the strength of the socio-ecological systems. This crucial momentum cannot be achieved without the populations firstly being aware of the phenomenon of climate change, and then aligning themselves with expert knowledge. The fishing communities in particular declare their need for training on environmental issues and challenges and note the efforts of NGOs which replace an often inefficient state.

The communication required must be more social than institutional. The power of women to mobilise people around socio-community issues, as well as to promote and successfully implement collective action is firmly established and is confirmed several times in the interviews conducted. Their knowledge of the phenomenon of climate change is not very accurate and is too superficial for them to carry out decisive awareness or advocacy actions.



Oxfam field visit to communities affected by climate change in Bargny. Photo credit: Oxfam

Nevertheless, awareness of the existence and consequences of climate change leads some of the people interviewed, in particular women and young people, to call for the setting up of climate change awareness, training and support centres, that will create the educational resources required for understanding and action. The subjects relating to climate change are not mastered by community actors due to the ineffectiveness of the communication channels and means of raising awareness. Everyone wants the community to take part in awareness and advocacy campaigns, as it is one of the most appropriate and effective means of raising awareness and informing. The respondents also remind the local players that climate information can be passed on by community intermediaries, the presidents of Economic Interest Groupings (EIGs), Sports and Cultural Associations (SCAs), the various associations of young people etc. In their opinion, the community pays more attention to these channels.

Recommendations regarding the methods for including the needs and perceptions of the victims of climate change in the climate change adaptation strategies developed by political decision makers and CSOs (on both a local and a national scale):

ACTIONS TO IMPROVE CITIZEN PARTICIPATION

- 1. Actively involve the coastal communities in all stages of planning, identifying adaptation options and implementing the adaptation measures in the coastal areas.**
It will be necessary to organise consultations and feedback sessions to ensure that their involvement is effective. This will also provide an opportunity to include the local knowledge of the populations, as their representational schemas condition their behaviour and social practices on a daily basis and in the long term. Taking into account their experiences also provides a means of measuring the impact of climate change from a psychosocial and cognitive point of view.
- 2. Take into account the specific needs of women, young people and men in planning adaptation strategies, ensuring that women have an equal say in the decision making processes.** It is important to take gender justice into account, to reduce the socio-environmental disparities and social and gender inequalities already accentuated by climate change.
- 3. Organise discussions with groups of women in the sectors most affected by climate change** to inform them of the causes and consequences of this change as well as their role in the adaptation processes.
- 4. Ensure that young people have a say by creating frameworks for dialogue dedicated to them.** At the level of the town councils, youth councils can provide a place for agreement and change, insofar as the representation of young people will stem from a civic rather than political impetus. SCAs and pupil and student associations can be involved in this mobilisation.

ACTIONS TO IMPROVE EDUCATION AND AWARENESS RAISING

- 1. Increase awareness of climate issues to improve communities' participation.** Education and awareness raising are crucial, but they must be adapted according to the target population: young people, women, men, vulnerable persons or persons with disabilities. Mobilisation can be carried out by organising media campaigns, open days, civic camps

etc. The content of the programmes should be based on the scientific information available on climate change, in a spirit of activism and community commitment. Artistic and cultural initiatives such as graffiti, music and theatre can also make it possible to transmit messages on climate change creatively and emotionally. For example, Oumar Pène, who is already strongly committed to the environment, could be an ambassador for the climate. Young artists and influencers could also sing a song based on the discoveries of researchers and professionals about climate change. It would be important to include the communities, and for the song to be sung in all the national languages. A “green festival” could also be created. Mobilisation on climate issues can also be developed via intergenerational discussion groups, community investments, environmental clubs, environmental emulation initiatives such as the set-setal in districts, advocacy by CSOs, social networks, projection of films and public debates etc.

- 2. Awareness raising can be organised in an educational manner, by age group, as climate information may vary according to the person’s age and sex.** At the same time, and for the purpose of more general awareness raising, the information can however be grouped together as follows: firstly, a definition of climate change that shows its causes and consequences and distinguishes it from the concept of climate variability; secondly, an explanation of the right actions that make it possible to minimise the carbon footprint, save energy etc. It is important to encourage young people to get involved and make as many people aware as possible, and to inform them about new scientific discoveries that



Photo credit: Albert Yéra BOUBANE

change our knowledge of climate change and give hope. Young people at school can be involved and receive this information at school and in their curricula, and for young people not at school, in the circles they move in (daara, workshop, district etc.). In the same way, women can receive information via their district organisations, and men via their trade associations. Workshops, seminars and training courses can therefore be organised and adapted according to the populations and areas. Training opportunities can also be given to organisations of young people active in the field of the environment, sustainable agriculture, management of natural resources, CSR, the conclusions of the COP etc. In addition to community commitment, there must be mentoring and networking for young people, and innovation and entrepreneurship for women and young people. Finally, for the information and training to reach those who do not go to school, persons with disabilities and vulnerable groups, it is necessary to develop tools suited to their situations by professionals from these fields and socio-educational centres. Simple language, images, videos and accessible formats which facilitate understanding should be used. Similarly, podcasts and audio recordings can make the information more accessible to persons with visual or learning disabilities and the partially sighted.

3. Develop education and continuous awareness programmes for the coastal communities using the results of the study and other scientific data to inform and educate about climate risk management.

These efforts to provide training and awareness raising should not be made for the benefit of certain local actors who are more like “development brokers” than faithful intermediaries for the community. The active participation of members of the communities is crucial to ensure that the programmes meet their real needs effectively. It is therefore necessary to identify and train really local or social actors, so that they become competent facilitators. It is also necessary to involve other experts, such as environmental specialists, researchers and youth workers, to guarantee the accuracy of the information transmitted. Continuous monitoring of the effectiveness of the programmes, carried out by collecting feedback from the coastal communities, is essential to adapt them and make them more effective.

4. Make the environmental and sustainability issues and challenges central to school and university curricula.

Like all forms of education, environmental education requires a bottom up approach. Young pupils and students are powerful intermediaries for information. It is therefore necessary to include training modules on climate change in the training courses for young people.

Make the environmental and sustainability issues and challenges central to school and university curricula

5. Develop environmental citizenship to ensure constant management of the environment, from generation to generation.

With the assistance of the departments of the Ministry of the Environment concerned, the regional education authorities can decide to create vegetable gardens in establishments. At university level, this can take the form of a service to society. They can be involved in the reforestation campaigns. Distribution of plants to the populations must be organised by the water and forest authorities.

ACTIONS TO IMPROVE ADAPTATION STRATEGIES

- 1. Put in place Early Warning Systems (EWS) and systems for disseminating climate information to enable the coastal communities to prepare for extreme climate events.** This involves being on the alert for the occurrence of extreme events such as floods, coastal flooding and high winds which threaten houses, facilities and infrastructure. This is in fact a question of human safety.
- 2. Encourage the use of alternative forms of energy to firewood which leads to deforestation.** Tree felling is still very widespread, in spite of the awareness campaigns and bans by the departments concerned. It is therefore necessary to move towards solutions that emit less greenhouse gas (GHG) and are less destructive for trees.
- 3. Make the notion of climate justice and Article 25 of the Constitution of Senegal better known.** The populations have limited knowledge of their rights, in particular in relatively new fields such as the climate. Unequal access to natural resources fuels social disparities. Substantial work is required at this level to provide information, in order to steer their participation and demands more effectively. In this regard, it is necessary to develop a relationship between the journalists and the communities, to promote climate justice, in particular by investigating the issues of protecting joint assets and the challenges of sustainability. For this reason, journalists must not only give priority to active listening to the communities' expectations, but also make the information on environmental issues available in a flexible manner, by using accessible language. The communities must also make this easy for them by informing them of the situations or conditions of the living environment, conducting a form of call for witnesses which the journalists can pass on to the general public and decision makers.

ACTIONS TO IMPROVE PUBLIC POLICIES

- 1. Favour coordination between the different government sectors, civil society organisations, NGOs and private actors, for a holistic approach to climate risk management.** This sector specific coordination makes it possible to judge the best methods to overcome the complexity of the phenomenon of climate change. It avoids dispersion of the initiatives and measures and favours the adaptation and compartmentalisation of the political strategies and other civic actions.
- 2. Promote the development of intermunicipal links faced with a global and systemic problem such as climate change, in order to bring the authorities' environmental action into line with the interconnection of the ecosystem.** Without the partnership and cooperation of the different regional entities, it is not possible to find long term and comprehensive solutions to the upheavals that entirely disrupt the balance of socioecological systems. Developing local leadership is one way of solving the communities' problems. Introducing a mechanism for monitoring the adaptation policies, bringing best practice into general use and possibly creating and awarding a prize, may encourage the involvement all of the resources of a community.

Promote the development of intermunicipal links faced with a global and systemic problem such as climate change

3. **Set up effective communication channels between the communities, political decision makers, NGOs and CSOs, to ensure the smooth flow of information on climate risks and adaptation measures.** These communication channels can be the television, radio, websites, social networks, SMS alerts, conferences and workshops, collaboration with schools, universities and CBOs etc. The suitability of the channel will depend on the target population. Finally, the communication must be aimed more at social acceptance of the change in behaviour and support for the collective reforestation, awareness and monitoring activities etc.
4. **Advocate inclusive climate policies that take into account the needs of the victims of climate change.** This action can only be taken by CSOs and in particular by NGOs. With arguments based on proven scientific data, this involves firstly targeting members of Parliament, councillors and senior councillors of the local authorities, and secondly creating a broad coalition of CSOs for accountable climate policies.

ACTIONS TO IMPROVE ACCESS TO FINANCE

5. **Allow access to funding that is suitable, such as microcredits or grants, for community and women's organisations, in order to respond to climate shocks that jeopardise their production activities.** The households' means of support can therefore be protected. Resilience will also be possible. The prospect of the social and solidarity economy is an opportunity for the resilience of women and revitalising social solidarities within the communities.
6. **Facilitate access to financing facilities by coastal local authorities to implement local adaptation projects.** Applying for green funds requires great expertise regarding the procedures and expiry dates. It is essential to devise a plan to increase the ability to master the tools for requesting funding. The same applies to developing multiactor partnerships that will make it possible to have a greater chance of success in large scale climate change adaptation projects.

PRIORITY ACTIONS WITH THE MEDIA

Recommendations on the levers to be used so that the media improve the communities' awareness in favour of a change in behaviour for better climate change adaptation:

1. **Use the power of the media to encourage the populations to demand concrete measures as regards climate change by regional elected representatives and companies established in the different places.** To do so, it is essential to put in place an effective communication strategy. Firstly, it is necessary to work out hard hitting media campaigns that emphasise local climate issues and the possible solutions. Next, you should collaborate with the various media, in particular newspapers, radio stations, television channels, blogs and social networks, to transmit these messages. Personal stories and accounts by people affected by climate change may lead to greater empathy and mobilisation. It is also important to provide examples of best practice, showing how certain communities are already committing themselves to the environment. By organising media events and bringing in local influencers, we can make the public more aware. At the same time, it is essential to educate the public by providing factual information on climate change and explaining how citizens can help to combat this problem. Finally, by encouraging

citizen participation by means of petitions, demonstrations and direct contact with the communities, we can press for concrete measures.

2. **Promote awareness of climate issues and climate risk management by using social network platforms.** These provide effective means for transmitting climate information and implementing innovative communications strategies, such as creating video clips that make it possible to reach a wider and more committed audience.
3. **Organise regular awareness campaigns, in particular climate weeks and specific awareness days, to keep attention focussed on the problem of climate change.** To do this, it is necessary to have a local approach that favours participation by the populations. Meetings between CBOs and women's and young people's organisations can provide a specific framework for discussion, sharing and mobilisation.
4. **Invite experts in climatology, the environment, social anthropology, sustainable development, theory of change and media forecasting to explain climate change issues and the possible solutions in a credible and accessible manner.** For example, Oxfam can establish a scientific and strategic partnership with experts and the media to develop a transmission cycle on the subject.
5. **Plan a training course on the environment for journalists.** A network of environmental journalists can be created and maintained to ensure efficient media treatment of environmental issues.
6. **Promote clear and accessible communications suited to climate change according to the target populations, avoiding scientific jargon as far as possible.** To do so you can use firstly interactive images and photographs, and secondly the local languages, taking the trouble to translate the concepts associated with climate change.
7. **Use narratives directly inspired by the lives of the populations in order to present the impacts of climate change and the innovative solutions as regards adaptation.** In reality, this involves developing a narrative that is more meaningful for the populations than expert views.
8. **Create hits with inspiring young artists who have an influence over young people and women.** A refrain can be written in several national languages to reach more people, with lyrics that are short but rich and profound.
9. **Developer a theory of change approach aimed at awareness and the spread of best practice.** This cannot be achieved without a certain level of teaching skills, for social acceptance of a change in behaviour. With adverts or infomercials, the populations can be enabled to appropriate the measures to protect and conserve natural resources.

Use narratives directly inspired by the lives of the populations in order to present the impacts of climate change ...

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