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The Interdependent Relation Between Climate Change And Social Vulnerability: The Case Of Africa.

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Abstract

Climate change is a global crisis on several levels: it affects the social, environmental, economic, ecological and humanitarian aspects. The intertwining of these aspects means that dealing with this crisis requires the close involvement of several actors, most notably humans, as they are the trigger and at the same time the victim. Related climate research accumulated over the past decades has clearly shown that human activity and industrialisation, strongly driven by energy use, contribute significantly to global climate change, as well as to the frequent outbreak of natural disasters that has affected the availability of basic needs (food and water) that are becoming increasingly scarce and difficult to obtain. This increases the risk of violence and conflict that can be triggered by their scarcity, and the inequalities that can result, especially for women and children. This work aims to highlight the intertwined relationship between climate change and social vulnerability in the case of Africa, its consequences and the remedies that can be identified.

Keywords: climate change, energy, conflict, social vulnerability, natural resources.

1 Introduction

Fires, floods, droughts, water scarcity and many more; all these cataclysms are the results, among others, of the worsening state of climate change that the planet is experiencing. These events are evidently produced by the exacerbation of global warming, resulting from the continued use of energy and especially the burning of fossil fuels, which continues to grow. This has worsened the global climate and led to hotter summers, record high temperatures and other serious consequences (IUCN, 2020).

Global warming, the depletion of green spaces to bring out coal, as well as the reality of limited stocks of fossil fuels that are on the verge of disappearing, given their growing use; the reserves are estimated to be emptied within this century, on average in 72 years (between oil, natural gas, and coal), according to a research based on 2015 data (METGROUP, 2021). All these events have prompted international actors to reconsider their behaviour and that of any human being responsible for the natural disasters resulting from global warming. Given these circumstances, policymakers around the world are doubling their efforts to come up with several reforms and strategies to reduce the negative and dangerous effects on the environment, and to promote the transition to an ecological energy system. In addition to all this, climate change not only affects the environment and all existing ecosystems, but also has a serious impact on social vulnerability. Displacement, forced migration, conflict over scarce resources, and malnutrition are considered few of the many recurring topics in the literature of climate change.

Climate variability and extremes are associated with more prolonged conflict through food price spikes, food and water insecurity, loss of income and loss of livelihoods, as well as noticeable organised violence events within countries than for major or international armed conflict. The influence of climate on conflict may have been weighed as being relatively weak (compared to other socioeconomic factors such as income or employment), but insecure land tenure, weather-sensitive economic activities, weak institutions and fragile governance, poverty and inequality aggravate it further and worsen the level of social vulnerability. Even with current, moderate climate change, vulnerable people will experience a further erosion of livelihood security that can interact with humanitarian crises, such as displacement, involuntary migration, violence and armed conflict, and lead to social tipping points. Under higher emissions scenarios and increasing climate hazards, the potential for societal risks also increases (IPCC, Intergovernmental Panel on Climate Change , 2022).

2 Social vulnerability as a direct impact of climate change:

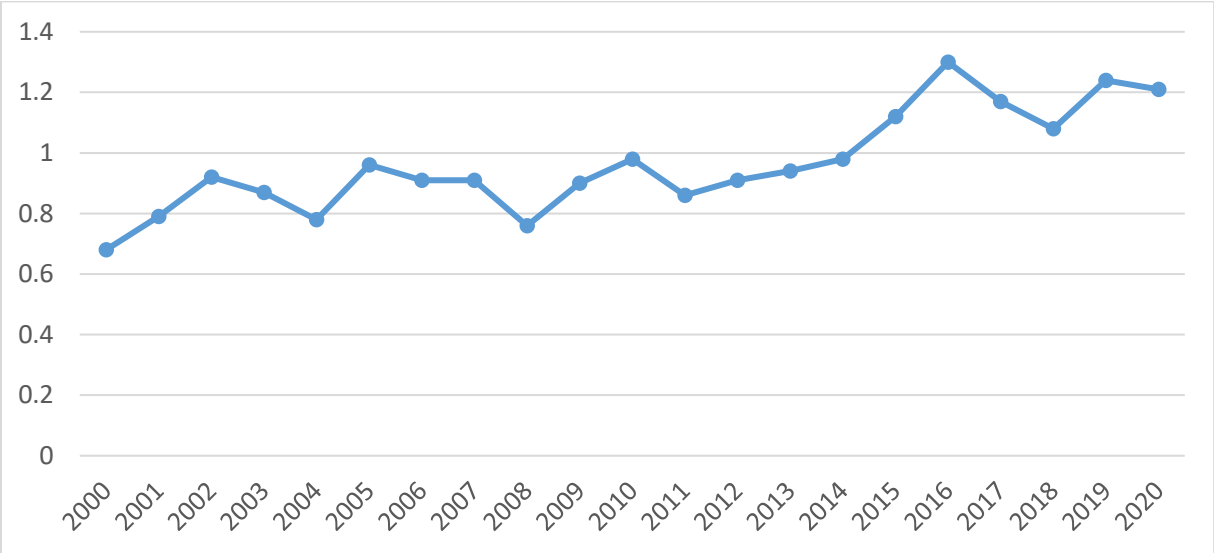
Temperatures and precipitation changes are the first-order impacts of a changing climate, whereas the second-order effects are driven by these signals, such as longer seasons, endangered species or human health repercussions during heat waves. These impacts are considered as chains of causation; rising sea levels for example are a second-order impact of rising temperatures and occurs predominantly as a result of melting land-based glaciers accompanied by the thermal expansion of water. These rising sea levels then can lead to flooding, erosion damage and altered ecosystem distribution, which constitute a third-order impact of climate change (Anderson, 2022).

Climate change impacts can be defined as the damage report that results from the mass combustion of fossil fuels and present colossal challenges to both human and natural systems. Vulnerability to climate change is the convergence of exposure to impacts complemented by sensitivity to them (ICG, 2021). In the literature, social vulnerability was defined as "the features of a person or group and their situation that impact their capacity to anticipate, deal with, repel and recuperate from the impact of a natural menace" (Wisner et al., 2004). Cutter and Finch (2008), describe social vulnerability as "a measure of both the sensitivity of a population to natural threats and its aptitude to counter and recover from the effects of hazards". And according to the UN's Development Programme (UNDP, 2000), "it is the degree to which societies or socioeconomic groups are influenced by pressures and risks, whether brought about by external forces or intrinsic drivers—internal and external—that adversely impact the social stability of a nation" (Kathy Lynn, 2011).

People from different regions of the world, are experiencing the impacts of climate change, be it flooding, heat waves or droughts. These events have caused the social vulnerability levels to increase, especially in Africa (WMO, 2022). For instance, Sub-Saharan African countries are the most widely affected by climate change due to the shortcoming of their production systems that rely largely on subsistence agriculture. The latter depends on climatic hazards, weak harvests and lack of adequate adaptation strategies. The decline in harvests thus exposes rural households to food insecurity, poverty and growing inequalities (Issoufou Soumaïla Mouleye, 2019). When it comes to health, climate change affects health both directly through heat waves, extreme weather events, and indirectly through forced migration, increased time spent outdoors and increased use of cooling systems (CLIMAT.BE, 2019). Direct consequences of climate change on health include heat waves that cause dehydration, heat stroke and exhaustion, which have a serious negative effect on the human body. They lead to increased mortality and illness,

especially in vulnerable groups, which include infants and young children, the elderly and women. Rising temperatures in Africa allows the spread of mosquitoes, which renders people more exposed to diseases such as malaria, dengue and other insect-borne infections (Kasotia, 2022).

Evolution of temperatures in °C in Africa (1990-2020) (Source: WMO JRA55 Data)



As the graph demonstrates, the temperatures have fluctuated differently throughout the 2000-2020 period, translated by two decreases in 2004 and 2008 (0.78° and 0.76°) followed by a slight and graduate increases in the period 2011-2014, to reach a spike in 2016 (1.3°). The WMO report confirms that the year 2016 was the warmest on record – a remarkable 1.1 °C above the pre-industrial period, which is 0.06°C above the previous record set in 2015. This increase in global temperature is consistent with other changes occurring in the climate system," said WMO Secretary-General Petteri Taalas; but overall it has increased by approximately 80% to reach a global African temperature of 1.23° in 2020, following the coronavirus pandemic.

These results are few of the many of climate change. Africa is facing extreme events such as droughts and flooding that are causing serious damages on African people, and on their daily resources and basic needs. Water is becoming scarcer than ever, resulting in failed crops and thus less food security. Following this situation, Africa is in serious risk of conflict and violence occurrence, and exacerbation of inequalities and social vulnerability (Adé, 2022).

3 Climate change is leading to increasing conflict over scarce natural resources:

The impacts of climate change are too serious to be overlooked as they affect every aspect of life. As it is apparent and shown in numerous reports, such as the IPCC's sixth Assessment Report and the WMO report on the State of Climate in Africa, climate change has caused an uncountable amount of natural calamities, which have led to either extreme droughts, cyclones,

high temperatures leading to fires, and destructible floods (WMO, 2022). These events have produced damages that affected natural resources in a way that they became rarer or difficult to obtain. For example, heat waves resulted in water scarcity in many regions around the world, which made obtaining water a difficult daily task. This issue alone triggers two scenarios; women, who are mostly responsible for fetching water in poor countries and refugee camps, are exposed to the threat of harassment, sexual assault or even rape during their trip to get water (IUCN, 2020). The second scenario is conflict that arises over natural resources as they become more and more unavailable, hence, the focus that has been given to issues regarding water distress. Climate change will continue to affect the availability of natural resources around the world: while some regions will get more water over the coming decades, the other ones will see their water supply drop under pressure caused from probable CO2 scenarios. In other words, prolonged dry seasons followed by irregular and intense rainfalls (DPPA, 2020).

To put it simply, extreme climate leads to exceptionally severe living conditions. For example, across the Sahel[1], changing patterns of precipitations have amplified competition among farmers and herders over fertile soil. This has contributed to increased violence between two groups, such as the deadly 2018 clashes in Nigeria, where over 4000 people were killed until 2018 and thousands were displaced forcibly. As of 2020, these clashes accounted for more than 30000 deaths and displacement of approximately 2.1 million people (Sanni, 2021). In the region of eastern Africa (also known as The Horn), extreme and intense weather events: droughts and floods alike, hit the area (ICG, 2021). The 2020 floods in South Sudan caused massive displacement and instability that helped fuel violence in Western Equatoria. The floods caused over 500 000 people to be displaced against their will. More conflict arised over land between the displaced herders and resident farmers in the Equatoria Region. The conflict is expected to result in more damages and fatalities if no actions are taken to address the matter (UNMISS, 2021)[2]. With the growing number of impacts caused by climate change, the number of governments and non-state actors like Jihadis and gangs are using climate change and exploiting people's anger at the state's failure to boost their ranks and influence in Somalia, and in Mexico where gangs provide services in the aftermath of disasters in a bid to win support (ICG, 2021).

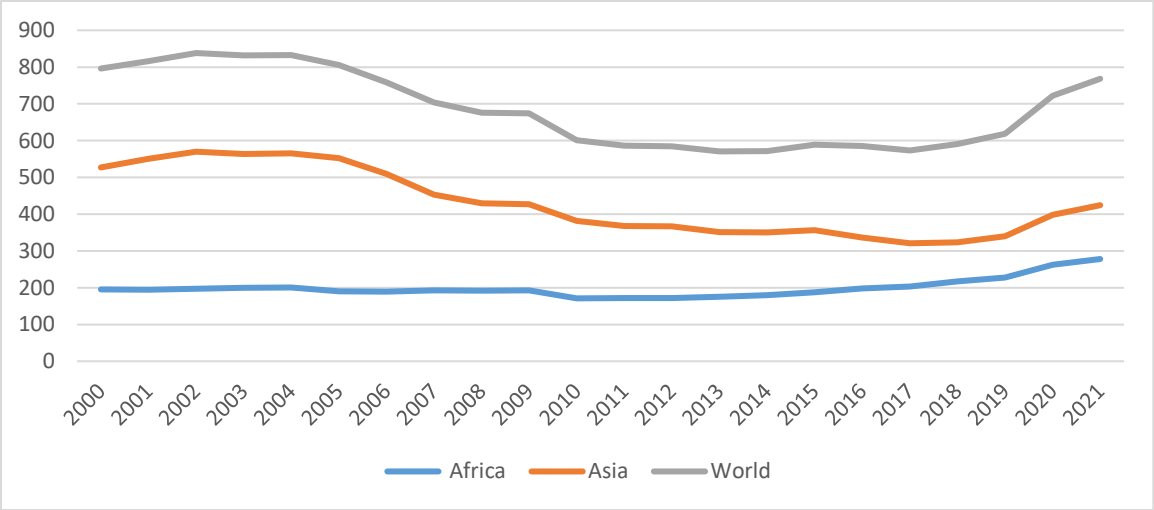
In the IPCC's 6th Assessment Report, climate variability and extremes are concluded by experts to be associated with more prolonged conflict via food price surges, food and water shortage

[1] Western and north-central Africa extending from Senegal eastward to Sudan.
[2] United Nations Mission in South Sudan, Human Rights Division.

and loss of income and sources of revenue, with more consistent evident for low intensity organized violence within countries than for major or international armed conflict (IPCC, Intergovernmental Panel on Climate Change , 2022).

The mentioned climate extreme events are also present in developed countries. For instance, in the USA, researchers Andreas Miles-Novelo and Craig A. Anderson (2022) from the Iowa State University, have illustrated that hotter US states record more violence than cooler ones, and that there is more violence in hot summer months than in winter. They also argued that as natural resources become more limited by climate change, there would be more competition over them, which could eventually lead to political unrest, civil war or even international conflicts. Another party that would be highly affected and hurt by climate change is kids. According to Novelo and Anderson, the climate crisis could hurt kids in a way that will make them more prone to violence as adults; problems like crop failure and natural disasters are causes for stress, economic instability and food shortage; sometimes it leads to forced migrations. All of these causes, especially malnutrition for the developing brain, can hurt the growth of kids in a way that makes them more aggressive than adults (Anderson, 2022).

Evolution of malnutritioned people in millions (2000-2021)((Source: Food & Agriculture Organization (FAO, 2022))

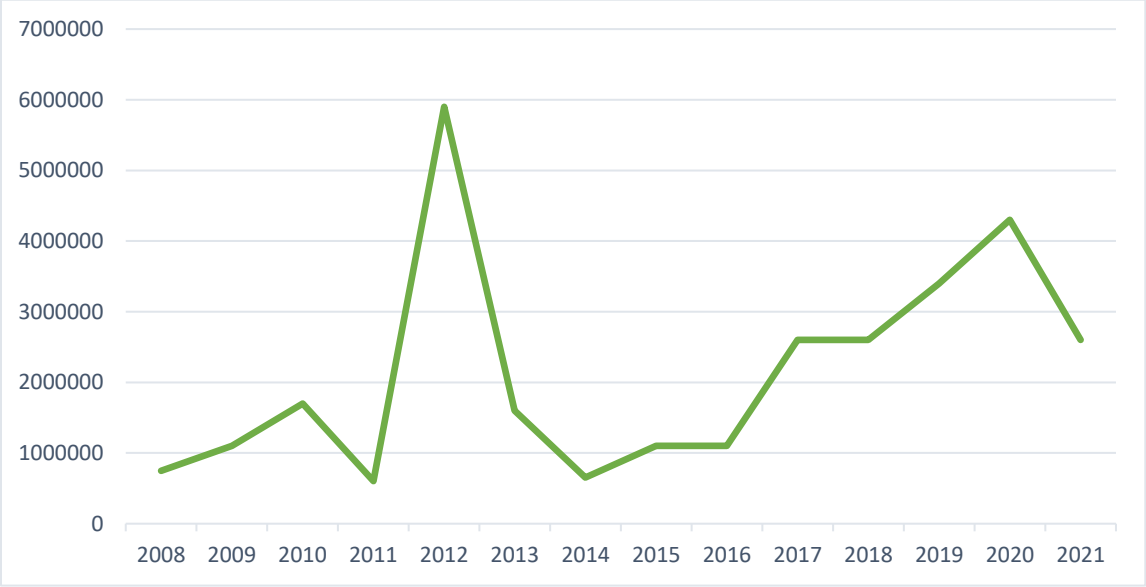


The graph above shows the evolution of underfed persons on a period from 2000 to 2021 in Africa, Asia and the world. Africa alone takes up 36% of the total undernourished people in the world, behind Asia that represents 55%. These two continents have proved to be the most vulnerable to climate change. The State of the Climate in Africa 2019 report, a multi-agency publication coordinated by the World Meteorological Organization (WMO), highlights the impact of climate change on the economy and vulnerable sectors like agriculture in Africa.

According to Ovais Sarmad, Deputy Executive Secretary, UN Climate Change, climate change threats for human health are in continuous rise, as well as the food and water security and socioeconomic development that are deteriorating significantly in Africa. The report urges the need of accurate and current data for adaptation planning. It further indicates that in future predictions from the period 2020 to 2024, there will be more warming and decreasing precipitations more specifically over North and Southern Africa, and more precipitations over the Sahel (WMO, 2020).

Extensive areas of Africa will exceed 2°C of warming above pre-industrial levels by the last two decades of this century under medium scenarios as reported in the Intergovernmental Panel on Climate Change Fifth Assessment Report (IPCC, Intergovernmental Panel on Climate Change , 2022). Much of Africa has already warmed by more than 1 °C since 1901, with an escalation in heat waves. A decline in precipitation is to be expected over North Africa and the south-western parts of South Africa by the end of the century, according to the IPCC (WMO, 2020).

Number of internally Displaced Persons (IDP) in Sub-Saharan Africa (2008-2021)(Source: (IDMC, 2022))



Around the world in the year 2021, 59.1 million people were internally displaced, the majority of which were displaced as a result of climate-related catastrophes. The spike (2012) in the graph is due to the floods, earthquakes, and storms that caused 8.2 million Africans to be displaced, registering a high record among the global 32.4 million that were accounted that year (Ian Fry, 2022).

4 increasing violence against women and children:

According to a recent report published by the environmental organization International Union for Conservation of Nature (IUCN), climate change and environmental degradation are driving up violence against women, and exacerbation of conditions across the globe are very likely to cause more violence as natural resources shrink. The report estimates that 1 in 3 women experiences gender-based violence in her lifetime (IUCN, 2020). Another thorough review has concluded that extreme weather events are the main cause of gender-based violence, especially physical, sexual and domestic abuse of women. The most affected from these disasters are the poor; households with lower economic conditions have proved to be the most vulnerable to weather phenomena as they, for starters, do not live in disaster-ready homes. In their hand-to-mouth living conditions, they barely have enough finance to rebuild their homes, which puts them in states of mental breakdowns and stress. These conditions create the perfect setting for gender-based violence. Its risk is most critical for women and girls who face multiple forms of discrimination and inequality (IUCN, 2020).

In Africa, the majority of African women's livelihoods and incomes rely on land, they are considered food producers as they take part in the entire food chain, from planting grains to feeding their families, which is why, when natural disasters strike, African women are affected the most. Africa remains the most vulnerable continent to climate change, despite the fact that it contributes with less than 4% of the global GHG emissions (WMO, 2022). For example, women in Kenya are struggling with the aftermath of the droughts that hit the country; a whole year with no rainfalls, directly caused by climate change. This has affected the lands fertility and resulted in the death of the cattle that the Kenyan people rely on significantly.

In addition, in many parts of Africa, women are responsible for fetching water. With water being a number one necessity in any household, daily trips for retrieving water are mandatory. Women are obliged to walk long distances to bring water to their families, which exposes them to the risks of being attacked: they could be robbed, abducted, sexually assaulted or even raped, especially when even the availability of this necessity is decreasing more and more. One trip of fetching water could take on average up to 33 minutes in rural sub-Saharan Africa, multiplied by how many trips are made a day, since it is almost never just once. This causes women to miss on the time to practice other activities such as going to school, or practicing any hobbies for some relaxation time and peace of mind (Castañeda Camey, 2020).

In a recent case study, that analyses the cost of the gender deviation in agricultural efficiency and performance in Malawi, Uganda and Tanzania, it was highlighted that the psychological

and physical effects of gender-based violence decrease women's efficiency, which could lead them to give up on completing their daily chores (Castañeda Camey, 2020). Participating in generating incomes and collecting basic necessities are among these women's daily tasks; when not executed, they result in greater food insecurity and poverty levels (Castañeda Camey, 2020). Women and girls are frequently subjected to violence and deprived of most of their rights, especially regarding access management or profit from natural resources to provide for themselves. Being victimized of such circumstances renders women and girls dependent and more prone to poverty, which increases their risk of being exposed to violence and sexually exploited (IUCN, 2020).

5 the role of sustainable development goals (SDGs) in amending the effects of climate change on social vulnerability:

By meeting Sustainable Development Goals (SDGs), individuals, communities and households can manage climate risks and maintain peace through adaptive capacity support. Meeting SDGs can also contribute to reducing violence and risks of armed conflicts through the improvement of livelihoods, addressing social vulnerability and strengthening institutions. Conflict prone regions that are more vulnerable to climate change, like Africa, could be offered new avenues to build peace by formal institutions arrangements for natural resources management and environmental peace building, gender sensitive approaches, conflict sensitive adaptation, as well as climate responsive peace building.

The SDGs play an important role in balancing the situation of social vulnerability in Africa. A report published by the UN's Economic Commission in Africa, the African Development Bank, and the UN's Development Programme (UNDP), shows that the average score of all African member states is 53.82 in 2020, slightly greater than that of 2019. This score demonstrates that Africa has accomplished half of its SDG goals during the last four years since their launch, which is relatively slow given the dire situation that the majority of African countries is facing, excluding northern Africa. However, the continent's efforts were praised in the report, as it has recorded a significant progress: decreasing deaths among mothers and children, decline in rates of infectious illnesses, as well as a remarkable rise in youth literacy, enrolment of children in schools, and most importantly, a remarkable growth in women's representation in governments (Economic Commission of Africa, 2022).

Nevertheless, further evaluation and monitoring of the situation is primordial to achieving successful results of these actions and goals, as current insufficient evidence shows otherwise. (IPCC, Intergovernmental Panel on Climate Change , 2022).

6 solutions and implemented policies:

Several international organizations initiated programmes and strategies to help alleviate the adverse effects of climate change on multiple levels. The United Nations developed the National Adaptation Programmes of Action (NAPA) under the United Nations Framework Convention on Climate Change (UNFCCC). It is mainly directed towards the least developed countries, most of which exist in Africa. The purpose from the NAPAs is to limit and minimise the detrimental effects of climate variability on vulnerable people's livelihoods; and improve their resilience to eventual climatic disasters. The Programmes suggest strategies that reduce risks for the most vulnerable groups, especially rural communities and small-scale farmers, by improving their agricultural methods, introducing sustainable land management, and ameliorating infrastructure development in those areas (UNFCCC, 2023).

Africa Union's Agenda 2063, introduced by the African Union with the aim of transforming Africa into a global power of sustainable practices and development, self-sufficiency, and progress. The Organization of African Unity (OAU) aims to make it a priority to improve Africa's social and economic development and prosperity, integration on the continental and regional levels, and insuring national and international peace and security in African countries (African Union, 2021).

Several policies were also implemented to mitigate negative effects of climate change on socially vulnerable groups and individuals in Africa; they focus, among other things, on strengthening Africa's renewable energy sector by carrying out projects in this arena to guarantee secure, available and affordable energy security and reducing energy poverty. Morocco's solar plan (NDC Partnership, 2021), and Kenya's Geothermal expansion (Maguire, 2023) are proof of the continent's resolve in the matter. Other strategies shed light on an important factor, which is agriculture. The Comprehensive African Agricultural Development Programme (CAADP)'s objectives by 2025 of eliminating famine and hunger by increasing economic growth through agricultural development. The CAADP aims to promote climate-smart agriculture (CSA), improve irrigation infrastructure, and diversify crop production to reduce the risk of food insecurity. It also puts emphasis on sustainable agriculture-led growth and resilience building in response to climate variability (African Union, 2021).

7 conclusion and discussion:

Throughout this paper, we have tried to highlight the linkages between climate change and social vulnerability. Through thorough research, we found that the continuous growth of energy consumption, more particularly that of fossil fuels is the main cause of the extreme rise in temperatures these past few decades. These temperatures contribute significantly to the exacerbation of climate change and global warming resulting in more frequent natural catastrophes such as droughts, landslides and floods around the world, and more particularly in Africa. The latter has proved to be one of the most vulnerable regions to climate change effects in the world. This is where the irony of this anthropogenic phenomenon resides: even though due to relative lack of or late industrialization, this continent contributes little to the total amount of global greenhouse gas emissions (about 2% to 3% of global GHG emissions), but still suffers the most of its harmful impacts. Northern Africa, which is mostly Sahara, experiences very little precipitations which triggers drought and causes crops to die and water flow to become weak, therefore, food and water security are deteriorated and could very likely lead to rising conflict over them. Central and Western Africa faced destructive floods that killed over 70 people and affected more than 500 000 individuals in 2021 alone. The Central African Republic was labelled as the most food insecure country in the world since 2019. Lack of nourishment and displacement, which are the consequences of the flooding and cyclones that hit numerous countries in Eastern Africa, leaving behind 33 million people in alarming levels of food insecurity yet again, more than half of them were children. The UN's IPCC is confident that these floods are a direct consequence of climate change.

To prevent further damages and harmful effects of climate change on African people, actions must be implemented to take on a different path that reinforces any African country's independency and political stability. Many of the African countries (53 countries) are engaging to better their climate policies by submitting their Nationally Determined Contributions (NDC) that have for major goal mitigation and adaptation to climate change, thus reflecting their strong commitment in the matter. Most of the NDCs focused not only on the urgency of setting up policies on water management, gender integration, health and agriculture, but also on the strong determination of the African region in taking part in reducing its overall GHG emissions. To do so, efforts of mitigation are to be concentrated more on the sectors of energy, agriculture, waste, land use, and most importantly land-use change and forestry. Deforestation constitutes a huge obstacle since it plays a big role in the exacerbation of climate change; moreover, reforestation and afforestation are still too modest to counterattack the damage done by

deforestation, which is more of a reason to give them priority.

Gender-based violence, human aggression and conflict rising over natural resources, affecting social vulnerability, are only one of many effects of climate change. This human induced crisis is urgent and must be put to an end very soon or else irreversible consequences will begin to happen with no room for rectification.

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