A dialectic relationship: How do Environmental Challenges affect Human Security? Climate Change and Armed Conflict Nexus in Africa as a case study

Dr. Hala Ahmed Rashidy
Associate Professor of International Law
Faculty of Economics and Political Science - Cairo University

Abstract:

No doubt that climate change and global warming are one on the main crucial problems facing the international Community in the 21st Century. It was since the 1950's when accumulated universal efforts were paid in order to address such severe challenge and its impact on livelihoods, health and well- being of millions of people worldwide, and in particular the poorest and most vulnerable ones.

Thus, growing attention has been paid by the academia and several international platforms to social, political, economic and humanitarian consequences of environmental challenges, especially violence and security concerns.

Therefore, it is quite important to understand the interchangeable relationship between climate change and armed conflict (or security) in Africa, and how does each of them affect human security of the African peoples and constrain Africa's Agenda of 2063. It's the core aim of this study to shed the light on the environmental disasters as a trigger of armed conflicts in some African areas from a side, and from the other side analyze how the existence of such armed conflicts is threatening human security, including the environmental security, in the aforementioned areas.

By applying the legal methodology, the study covers the following elements:

1. New dimensions of Human Security: the case of Environmental Security.
2. Climate change as an environmental risk threatening Africa.

(ISSN : 2536 - 9555)

3. The interchangeable relationship between climate change and armed conflicts in Africa.
4. The African Experience on Combating Climate Change: Opportunities and Challenges.

Keywords: Climate Change, Climate - related Conflicts, Human Security, Africa's Mitigation and Adaptation to Climate Change, Environmental Security, Africa's Vulnerable Climate Situation.

First: New Dimensions of Human Security: The Case of Environmental Security:

Security is a fundamental value in the lives of individuals and peoples. As states seek to achieve their security and stability by various means and in all fields, individuals also seek to live in a safe environment in which they can enjoy their rights, exercise their freedoms and develop their capabilities as a step towards the development and prosperity of society as a whole. Hence the issue of human security has evolved as one of the main societal priorities that clearly links development to individual safety.

The aim of this section is to explore what is meant by human security and to discuss its new threats in the international context, with special concern given to environmental security as a new dimension of human security as stated in UNDP report on 1994.

A) Evolution of Human Security as a political concept: The shift from traditional military threats to new broader human – based ones:

Since the adoption of Westphalia Treaty in 1684, the concept of security has been linked to the stability of states alone. With the emergence of international organizations era, attention has been shifted from individual states' security to the security of the whole international community.

Along with the escalation of international concern for human rights, the challenges and dangers that are negatively

affecting individuals' lives and threatening their security prompted states to revise security issues from a new approach where fulfilling the vital needs of individuals have a special place.[1]

In this context, the concept of human security has emerged by the United Nations Development Program in 1994 as an integral part of national security to address the shortcomings of traditional policies and to confront the new threats and challenges that surround individuals economically, politically, socially, and environmentally.

As stated in 1994 Human Development Report, human security concept is built on dual aims: "freedom from fear" and "freedom from want". The first aim means freedom from violent threats, excessive use of armed force, terrorism and all forms of crime that are threatening individuals' lives. While, the other aim means liberating individuals from the dangers of threats of a predominantly economic, social, cultural, environmental and health nature.[2]

It's clear that the objective of human security concept is to protect the vital core of all human lives from critical threats in a way that is consistent with long-term fulfillment.[3]

Since the ninetieths of the twentieth century, the international community has been swamped by globalization accompanied by liberalization of trade and rapid mass movements of people, goods, money, and information beyond international boundaries. However, globalization results in various negative aspects like environmental degradation, international organized crime, terrorism, proliferation of small arms, and illegal trade of weapons and so on. Such circumstances have prompted

[1] Axworthy, Lloyd, A New Scientific Field and Policy Lens, (Security Dialogue, 2004, Vol. 35, No. 3), p: 348-349.
[2] Annan, Kofi A., Millenium Report: We the Peoples. The Role of the United Nations in the 21st Century (New York: United Nations, 2000).
[3] Sabina Alkire, A Conceptual Framework for Human Security, (University of Oxford: Center for Research on Inequalitiy, Human Security and Ethnicity, 2003), P. 24.

(ISSN : 2536 - 9555)

international community to seek out a new framework where individuals can feel safe and secure from different threats, in order to be finally to ensure security of individuals, communities, and states.[4]

Hence, the focus began on preserving human dignity, meeting his physical and moral needs, achieving economic development, social equality and the rule of law as key components of achieving the national security equation.[5]

In this context, security is no longer to be achieved by silencing the sound of guns, but also by achieving sustainable development, good governance, improving the quality of life of individuals, and freedom from want, poverty and fear (non-military threats of to security). Thus, it can be said that the distinguishing feature of the concept of human security is the unprecedented shift towards considering the individual as a reference for achieving security rather than focusing exclusively on the security of states.[6]

B) Dimensions of human security with special concern to environmental security and its threats:

As a result of continuous and increasing scale of depletion of natural resources and environmental degradation, scholars predict that climate change is posing a menace over states' security that can lead to armed conflict due to its severe negative impacts on primary forest cover, biodiversity, natural ecosystems, coastal and marine areas, and finally the livelihood of human beings.

Increasing international consciousness about environmental problems and their serious impacts on human survival and life on earth as a whole, along with increasing international concern to human rights issues, were sufficient enough to securitize the problem. It has begun in the 1960s, when prominent studies were conducted to monitor political impacts of environmental problems

[4] UNDP, Human Development Report, 1994.

[5] Barry Buzan, Ole Wæver, Jaap de Wilde, Security: A New Framework for Analysis (London: Lynne Rienner, 1998).

[6] Barry Buzan, Human Security in International Perspective, (Kuala Lumpur: presentation at the 14th AsiaPacific Roundtable, 2000).

and the rise of number of international NGOs working in the field of saving the environment, such as Friends of the Earth groups, and Greenpeace has given huge push to the issue.

However, it wasn't until the 1970s when the emergence of international summits focusing on environmental issues and an associated adoption of several multilateral environmental agreements have begun. The first major global environmental summit was the 1972 United Nations Conference on the Human Environment. After that, the preliminary concept of environmental security in its contemporary idea has been shaped in the 1970s and 1980s, when a number of peace and environmental scholars began to highlight the inability of national security institutions, and in particular the military ones, to manage common environmental problems that pose threats to both international stability and national well-being. Then, in 1987, the World Commission on Environment and Development released its landmark report titled *Our Common Future*, which popularized the concept of sustainable development, and introduced the term 'environmental security'. This report in turn lead to the 1992 United Nations Conference on Environment and Development, which has been followed by several global environmental conferences since then till now, where major environmental problems are discussed and tackled.

Then, and according to the UNDP, environmental security has been considered as a core element of both national and international security and one of the main seven dimensions of human security concept which are as follows:[7] Economic Security, by which we mean freedom from poverty and unemployment; Food Security, which means freedom from hunger and starvation; Health Security, which refers to freedom from diseases and epidemics; Environmental Security, referring to freedom from environmental degradation, drought and depletion of natural

[7] Braden R. Allenby, Environmental Security: concept and implementation, (International Political Science Review, Vol. 22, Issue 1, January 2000, at: https://doi.org/10.1177/0192512100211001)

(ISSN : 2536 - 9555)

resources; Social Security, which means liberation from racial, ethnic and sectarian divisions; Political Security, referring to freedom from conflict, tyranny, corruption and oppression; Personal Security, which means freedom from fear, violence and vulnerability.

It is obvious now that environmental security includes mitigation and prevention of energy threats, including lack of resources and supply chains, environmental risks and related stresses that directly contribute to political and economic fragility and instability causing mass violent or regional conflicts.[8]

Although of recognizing the interchangeable relationship between environmental and human security, there isn't a global consensus on what's meant by environmental security. The plurality of meanings of environmental security can be categorized into six principal interpretations. First, environmental security can be seen as being about the impacts of human activities on the environment. Second, environmental security can be seen to be about the impacts of the military–industrial complex, including war, on the environment. Third, environmental change can be seen as a security problem common to all states, therefore requiring collective action. Fourth, environmental change can be seen as a threat to national security. Fifth, environmental change has been identified as a possible cause of violent conflict. Sixth, environmental change can be seen as a risk to human security.[9]

Some important remarks should be noted here. Firstly, it's the fact that environmental threats are diverse to the extent that they affect all different aspects of human life. Secondly, it worth noting that confronting these threats requires some kind of collective international action, which is articulated by scholars as the phenomenon of "internationalization of internal/national-origin problems" so that, international cooperation, undoubtedly, is the

[8] Hans Günter Brauch, Conceptualizing the Environmental Dimension of Human Security in the UN, (UNESCO, Oxford: Blackwell Publishing Ltd, 2008).

[9] J. Barnett, Environmental Security, (International Encyclopedia of Human Geography, 2009, at: https://doi.org/10.1016/B978-008044910-4.00774-4)

most effective way to solve such universal threats.[10] Finally, it remains to be emphasized that policies to achieve human security must also adopt pre-emptive and preventive approaches that focus on addressing the sources of threat to this security in its onset to avoid the escalation of the cost of these risks to individuals and communities, physically and morally, as the earlier the treatment, the higher chances of success and efficacy could be reached.

With regard to environmental degradation and climate change as threats to human security, it is noted that its catastrophic repercussions are harming all of humanity. In this context, the concept of climate security appears, as the cornerstone for understanding the security risks resulting, whether directly or indirectly, from climate change to individuals and communities on all fields of life, and in particular, at the economic and social levels.[11] Some international reports have revealed that in light of global warming, it is likely that the planet will soon witness a noticeable rise in temperatures exceeding 2.7 degrees Celsius above pre-industrial levels. This requires work to reduce carbon dioxide emissions and reduce them to a minimum in the coming years to immunize the planet and other creatures from unprecedented environmental disasters.

Second: Climate change as an environmental risk threatening Africa:

Although climate change is a global phenomenon, its impacts are clearly felt at the regional and local levels, and it is at these levels where actions to adapt to it and mitigate its effects are required. Despite having contributed the least to global warming and having the lowest emissions, the African continent has suffered some of the world's worst impacts of climate change, from famine

[10] High-level Panel [United Nations], 2004: A more secure world: Our shared responsibility. Report of the Secretary General's High-level Panel on Threats, Challenges and Change (New York: United Nations Department of Public Information) for download at: http://www.un.org/secureworld/.

[11] Jon Barnett, The Meaning of Environmental Security. (Ecological Politics and Policy in the New Security Era, 2001, London – New York: Zed).

(ISSN : 2536 - 9555)

to flooding to heatwaves to drought which posing systemic risks to its economies, infrastructure investments, water and food systems, public health, agriculture, and livelihoods, threatening to undo its modest development gains and slip into higher levels of extreme poverty.

In this section, the study focuses on climate – related hazards and risks that are threatening both environmental and human security in Africa, after shedding the light first on the definition of climate change as adopted in different international documents.

A) Towards Scientific Consensus on the Meaning of Climate Change:

It should be noted first that despite the international consensus on dangers of climate change and its devastating environmental and social effects, a similar consensus on what is meant by this phenomenon has not been achieved yet. Despite this, the 1992 United Nations Framework Convention on Climate Change defined in Article 1/2 climate change as: "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." Thus, the term climate change refers to the imbalances and significant and long-term changes that occur in the average weather condition worldwide, including rainfall rates and the change in temperature, rising or falling.[12]

The Intergovernmental Panel on Climate Change (IPCC) defines climate change as: "A change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer".[13]

It has been agreed that in order to avert and respond to the impacts of climate change the increase in global temperatures

[12] https://www.britannica.com/science/climate-change
[13] https://www.ipcc.ch/sr15/chapter/glossary/

needs to be limited to 1.5 degrees Celsius above pre-industrial levels in order to preserve the habitability of the planet. However, the Earth is currently about 1.1 degrees warmer than it was in the late 1800s, and emissions continue to rise. In order to reach this goal, greenhouse-gas emissions need to be reduced by 45 % by 2030 and reach net zero by 2050. Transitioning to a net zero world is one of the greatest challenges that humankind has ever faced. It calls for nothing less than a complete transformation of how we produce, consume, and move around. Despite the consensus among policy-makers about the need to achieve this goal, the discourse about how to attain it has been characterized by major controversy.[14]

In its report issued on August 9, 2021, IPCC revealed that the recent changes in the climate system have become unprecedented for centuries, and that the planet is heading towards a catastrophic warming of 2.7 degrees Celsius above pre-industrial levels. So, the planet needs to cut emissions by 45% by 2030 to reach carbon neutrality by mid-century. The global fear of an increase of global temperature by more than two degrees Celsius can be justified, because this means a turning point after which the earth's heat will be fed from sources within the ecosystem itself, a transformation whose consequences will be dire and catastrophic for everyone. As a result, cutting the emissions of the greenhouse gases that cause global warming to as close to zero as possible must now be an international priority.[15]

In this context, the issue of climate change has emerged as a security issue that requires political solutions along with scientific solutions, by focusing on how to link the causes and effects of climate change to environmental and social justice. Climate change has become a catalyst for water, food and energy scarcity in many

[14] Sam Fankhauser and others, The meaning of Net Zero and how to get it right, (Nature Climate Change, 12, 15 -21, at: https://www.nature.com/articles/s41558-021-01245-w#citeas).
[15] Laura Schmitt Olabisi, Reducing Greenhouse gas emissions for Climate Stabilization, (Environment, Science and Technology, 2009).

(ISSN : 2536 - 9555)

regions around the world, and a significant contributor to the forced mass flows of population in what is known as the phenomenon of environmental asylum, some of which may be internal, but their effects may extend beyond national borders. In addition, there are four potential pathways linking climate change to conflict, as identified by the German Advisory Council on Global Climate Change, which are as follows: 1) Deterioration of fresh water resources; 2) Food insecurity; 3) Increase in the frequency and severity of natural disasters; 4) Increasing or changing migration patterns.[16]

In this way, the issue of climate change is closely related to human rights issues, given that the first issue as an environmental, social, economic, political and security issue has profound repercussions on human well-being and the actual enjoyment of human rights and social justice. Hence, the necessity of implementing human rights and their values as a framework for guiding national and international policies concerned with addressing the phenomenon of climate change, so that the burdens and benefits of climate change and the costs of confronting it and mitigating its effects are distributed on individuals, groups, states and generations in justice and equity, respecting and protecting the values of human rights.[17]

The UN Human Rights Council has recognized that climate change has a significant impact on the full enjoyment of human rights. The Council made clear that the impact of climate change poses an immediate and far-reaching threat to people and societies around the world. Climate change threatens human rights such as the right to life, the right to water, the right to food, the right to health and adequate housing, and this is the importance of taking a

[16] Kate Burrwos, Patrick L. Kinney, Exploring the Climate Change, Migration, and Conflict Nexus, (New York: International Journal of Environmental Research and Public Health, 2016, 13(4), at: https://doi.org/10.3390/ijerph13040443).

[17] Climate Change and Security, Stockholm International Peace Research Institute, at: https://www.sipri.org/research/peace-and-development/climate-change-and-risk/climate-change-and-security

human rights perspective when considering climate change mitigation and adaptation measures.[18]

B) State of Climate Change in Africa: Hazards and Consequences:

During the last decade, several climate events affected the African continent and were associated with loss and damage to vital aspects of communities and populations, resulting in issues relating to food security, population, displacement, and the safety, health and livelihoods of people. Scientists and researchers have justified the occurrence of these events by the durable rise of temperatures in Africa by rate faster than that of the world's other continents. In addition, Africa's climate has warmed more than the global average since pre-industrial time.

Climate change and global warming have extreme effects on entire regions of the continent. Such effects are undermining human health and safety, food and water security, and socio-economic development. Severing droughts and devastating floods that are hitting communities, economies and ecosystems hard are just a snapshot to how extent climate change effects are serious to African nations. Africa also is facing what's called consequences of consequences of climate change. In the following, we are going to provide further details on how climate change is negatively affecting African communities.

B.1) Continuing Temperature Rise:

The year 2021 has been ranked between the third and the fourth warmest years on record for Africa. The rate of temperature across Africa continues to rise by approximately +0.3 ^{o}C per decade from 1991 – 2021, which is faster than the global average.

Warming isn't distributed equally across the continent. For example, in 2021, the North Africa area have recorded raise in its

[18] Understanding Human Rights and Climate Change, at: https://www.ohchr.org/sites/default/files/Documents/Issues/ClimateChange/COP21.pdf

(ISSN : 2536 - 9555)

temperature by about 1.22 ºC more than the average recorded during 1981 till 2010. Meanwhile, West Africa's temperature was 0.91 ºC above the same average. However, 2021 was among the three or four warmer years on record in both regions. Generally, temperature rise presents in many different ways, causing wide – range complex impacts.[19]

Experts and reliable international reports have predicted that the state of African climate will continue to warm leading to rising sea levels and occurrence of extreme weather fluctuations. This constitutes a snapshot within a continuous chain of long term rapidly rising climate change related risks, that severely affect agriculture and crop production which are the backbone of Africa's economy and accounts for the majority of livelihoods across the continent.

Generally speaking, temperature increase, heat waves, destructive floods, tropical hurricanes, prolonged droughts, and sea level rise resulting in loss of lives, property damage, and population displacement, undermine Africa's ability to achieve its commitments to meet the targets of the UN Sustainable Development Goals. (SDGs) and the African Union Agenda 2063: "The Africa We Want", which outlines Africa's path for attaining inclusive and sustainable economic growth and development.[20]

B.2) Climate change in Africa as a trigger of Water Stress:

The state of climate in Africa Report of 2021 reveals that water stress due to lack of water resources or decreasing their supplies as a result of climate – related causes, threatens to aggravate conflict and displacement which in turn can destabilize the concerned countries and their communities. For instance,

[19] State of Climate in Africa Highlights water stress and hazards, September 2022, WMO, at: https://public.wmo.int/en/media/press-release/state-of-climate-africa-highlights-water-stress-and-hazards#:~:text=Temperatures%3A%20Africa%20warmed%20at%20an,%2B0.2%C2%B0C%2Fdecade.

[20] Agenda 2063: The Africa we want, at: https://au.int/en/agenda2063/overview

disrupted rainfall patterns, disappearing glaciers, shrinking key lakes and aquifers combined with prolonged famine in some African regions are threatening the lives and human security of hundreds of thousands of African peoples. It has been estimated by the state of climate report of 2021 that high water stress will affect about 250 million people and displace up to 700 million by 2030.

B.3) The effect of Climate Change on Sea level:

Sea level rise is another example on how climate change impacts vary across the continent. Overall, the rate of sea level rise around Africa is higher than the global mean.

In some cases, the increase reached 5 mm per year in coastal and oceanic areas, however, the sea level in the south – western Indian Ocean from Madagascar towards and beyond Mauritius increases by greater rate and both levels are already more than the average global sea level rise of 3-4 mm per year.

The sea level rise along African coastline which is faster than the global mean (3-4 mm per year) is contributing to increase the frequency and severity of coastline flooding and erosion and salinity of groundwater in lowland cities due to water intrusion. By 2030, 108 – 116 million people in Africa are expected to be exposed to sea level rise risk.[21]

As a result, changes in water bodies all over the continent, such as lakes, rivers and aquifers, will have major impacts on the agriculture sector, ecosystem, biodiversity.

B.4) Melting of Glaciers:

Three countries in Africa host glacier mountains. Although these glaciers are too much small to act as water reservoirs, they are of highly touristic and scientific importance.

[21] Rising Sea-levels besieging Africa's booming coastal cities, (Relief Web, November 2022, at: https://reliefweb.int/report/world/rising-sea-levels-besieging-africas-booming-coastal-cities).

(ISSN : 2536 - 9555)

Climate change profound consequences for African countries include also the shrinking of these glaciers to less than 20% of their total mass comparable to their extent late 19th Century. If current rates of shrinking are to be continued, African Mountains will totally lose their glaciers due to climate change and mainly decrease of snowfall amount and frequency.

In addition, ocean warming and accelerated loss of ice mass from the ice sheets contributed to global mean sea level rise which has reached one of its highest records in 2021.[22]

B.5) Occurrence of Extreme Heat Events:

Africa is also experiencing an increase in the frequency of extreme heat events, causing unprecedent damage and acute humanitarian impacts, including hundreds of casualties and hundreds of thousands of displaced persons. Such events accompanied by other climate related effects results in the occurrence of either wide – range floods or prolonged drought. Many African areas and regions have suffered from severe impacts of prolonged drought as the case of Southern Africa. Other areas like the Sahel and Greater Horn of Africa have experienced radical changes in weather changes as shift from very dry conditions to floods and heavy rainfalls.

For example, South Sudan experienced the third straight year of extreme floods. Nigeria experienced very intensive rainfalls that led to flooding across many parts of the country contributing to the spread of cholera.[23]

In the past 50 years, drought – related hazards have claimed the lives of over half a million people and led to economic losses over 70 billion USD in the region. More than 1000 flood – related disasters were reported involving more than 20,000 deaths in

[22] Glaciers in Africa will disappear by 2050, UN warns, at: https://countercurrents.org/2022/11/glaciers-in-africa-will-disappear-by-2050-warns-un/

[23] Oli Brown, Climate Change and the Risk of Conflict in Africa, (International Affairs, at: DOI:10.1057/9780230115538_5).

Africa over this period. It's estimated that by 20050, climate impacts could cost African nations about 50 billion dollars annually.

However, East Africa and the Southern part of Madagascar have experienced several continued below – average rainy seasons in comparable to their historical records. High food prices hindered food availability and access leaving more than 58 million people in conditions of acute food insecurity.

Other extreme weather events that hit the African continent include heatwaves and wildfires, especially in Tunisia, Algeria, Morocco and Libya. Algeria, for instance, was affected by a serious of major wildfires across its different regions.[24]

In addition, extreme weather events that African countries are facing recently, includes sand and dust storms. For instance, Central and Southwestern Libya was hit by a severe sandstorm that led to car crashes and downed power lines.

B.6) Changing of Rainfall Patterns as a result of Climate Change:

Annual rainfall varied geographically, recorded remarkable decrease in its amount in Southern Africa and West of the High Atlas Mountains, as well as above – average rainfall in other regions, particularly in Central and East Africa. In other words, fluctuations in rainfall leads to multi – seasonal drought which prevailed over much of the northern and eastern African regions, Nigeria, South Western Cameroon, Central Chad, and Southern DRC, across Eastern Angola, Northern Botswana, Zambia, Zimbabwe, Malawi, Central Mozambique and isolated areas along the coast of South Africa and Madagascar.[25]

In contrast, rainfall precipitation occurred in a rate more than its normal average in parts of Guinea, Liberia, Southern Chad,

[24] Ibid.
[25] Climate Change is an increasing threat to Africa, (New York: UNCC, October 2020, at: https://unfccc.int/news/climate-change-is-an-increasing-threat-to-africa).

(ISSN : 2536 - 9555)

Northern Cameroon, parts of the Central Africa Republic, much of the Democratic Republic of Congo, Burundi, Western Tanzania, Western Angola, much of Namibia, Southeastern Botswana, parts of South Africa, and Northern and Southern Mozambique.

Changing in rainfall levels greatly affect the refill of almost of these lakes. Consequently, the total surface area of some of these lakes are getting shrunk by time. For example, Lake Chad has lost about 90% of its surface area since the 1960s and then remained stable as been recorded in the 2000s.

The crisis has got worsened as the shrinking of the Lake's surface has been accompanied by a reduction in cultivable land and grazing sites, a decline in fish production, a loss of biodiversity and therefore the deterioration of livelihoods of inhabitants of the whole Lake Basin. International reports have found that increased temperature contributed to a 34% reduction in agriculture productivity growth in Africa since 1961 more than any other region in the world.[26]

B.7) Destructive effects on African Small Islands Developing States:

Devastating effects of climate changes on Africa can also be noticed when discussing the challenges and existential threats posed by it on African Small Islands Developing States (SIDS). Although of being the least contributor to climate change whether in the continent or generally in the globe, communities of SIDS are the ones who actually facing irreversible impacts of climate change.

It's not a secret that the inhabitants of these islands are usually from the least developed communities who don't have the elements of a green or blue economies and the means of technological progress that help them to confront climate change

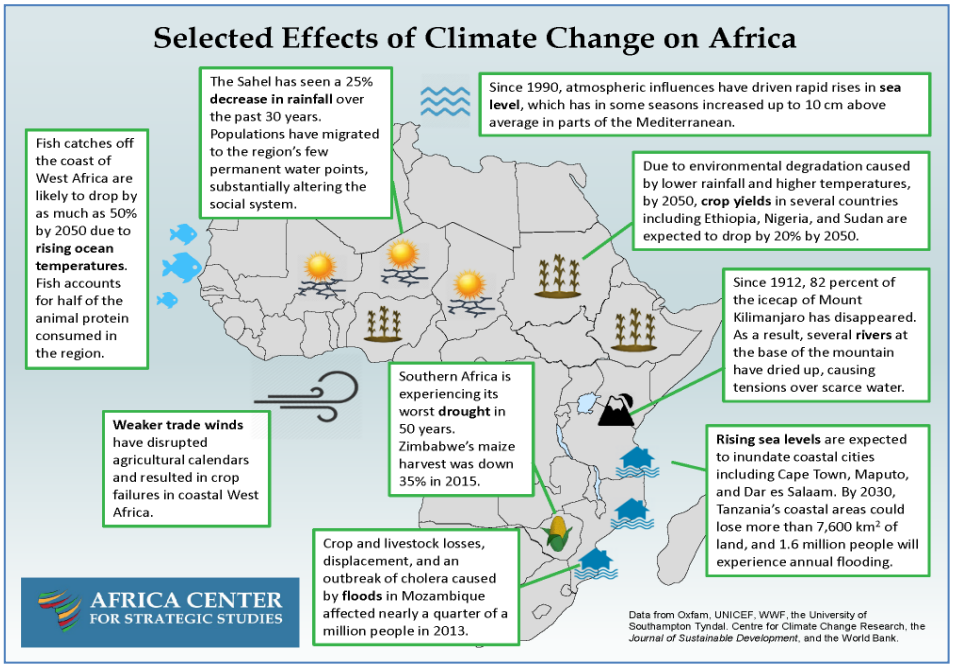
[26] Binh Bham Duck,, and others, The Lack Chad Hydrology under Climate Change, (Scientific Report, Article No. 5498, at: https://www.nature.com/articles/s41598-020-62417-w#citeas).

and its serious economic, social, humanitarian and security consequences on all societies and states.

From this standpoint, the calls for more international efforts have been raised to protect coastal and island states which are on the first front line with climate change risks in implementation of the prevailing "Climate Justice" principle in this regard and in respect of human rights for the populations inhabiting these islands and their lives are daily exposed to grave damage unless urgent and effective solutions are taken to address such serious environmental problem.

The following figure shows the devastating effects of climate change on African people.

Figure No. (1):
African regions that are highly affected by climate change



Source: Infographic, Africa Center for Strategic Studies, November 2016, accessed: 22 October 2022.

(ISSN : 2536 - 9555)

C) Indirect effects of climate change on individuals and communities:

In addition to all mentioned direct consequences and effects of climate change on African communities and countries, other indirect ones can be monitored. It has been accepted that these indirect effects can greatly harm the human security of communities, particularly in the developing countries. The most prominent indirect consequences of climate change are as follows:

C.1) Trade and Economic Disturbance and infrastructure damage:

Heat waves, wildfires, floods and droughts will negatively affect food security and energy and water infrastructure, affecting industry and business sectors. Thus, stock markets are likely to experience sudden shifts as a result of the destruction of infrastructure and crops, as well as the impact of international trade on climate change, which will eventually lead to the deterioration of the economic and social conditions of thousands of people.[27]

Also, International reports indicate that countries that rely heavily on agriculture, such as African countries, and those that rely on tourism, such as small island states, are usually the most vulnerable to the devastating effects of climate change.

Another field that will negatively get affected by climate changes in this regard, is infrastructure. Coastal erosion and increased flooding will threaten livelihoods and destroy homes and infrastructure, particularly in urban areas where there are large informal settlements. Flooding from Cyclones Idai and Kenneth, for example, will require an estimated $3 billion in infrastructural reconstruction costs in the energy, transport, water supply, communications, housing, health, and education sectors. About one-third of African cities with populations over

[27] Renee Cho, How Climate Change impacts the Economy, (State of the Planet, June 2019, at: https://news.climate.columbia.edu/2019/06/20/climate-change-economy-impacts/

300,000 are located in areas that are at high risk from climate hazards.

C.2) Migration and Mass Displacement Pressures:

Climate change is likely to produce many factors that put individuals in a situation of poverty and constant displacement. Floods caused by climate change may wash away urban slums and destroy homes and livelihoods. The heat usually makes outdoor work difficult. Water scarcity may affect crops, and all of these factors are likely to lead to loss of life, human rights violations, increased pressures on public institutions and infrastructure, and consequently, deteriorating social and economic conditions. In this context, international experts expect that this will lead to more displacement of citizens and consequently to the growing manifestations of migration, mass displacement and environmental asylum.

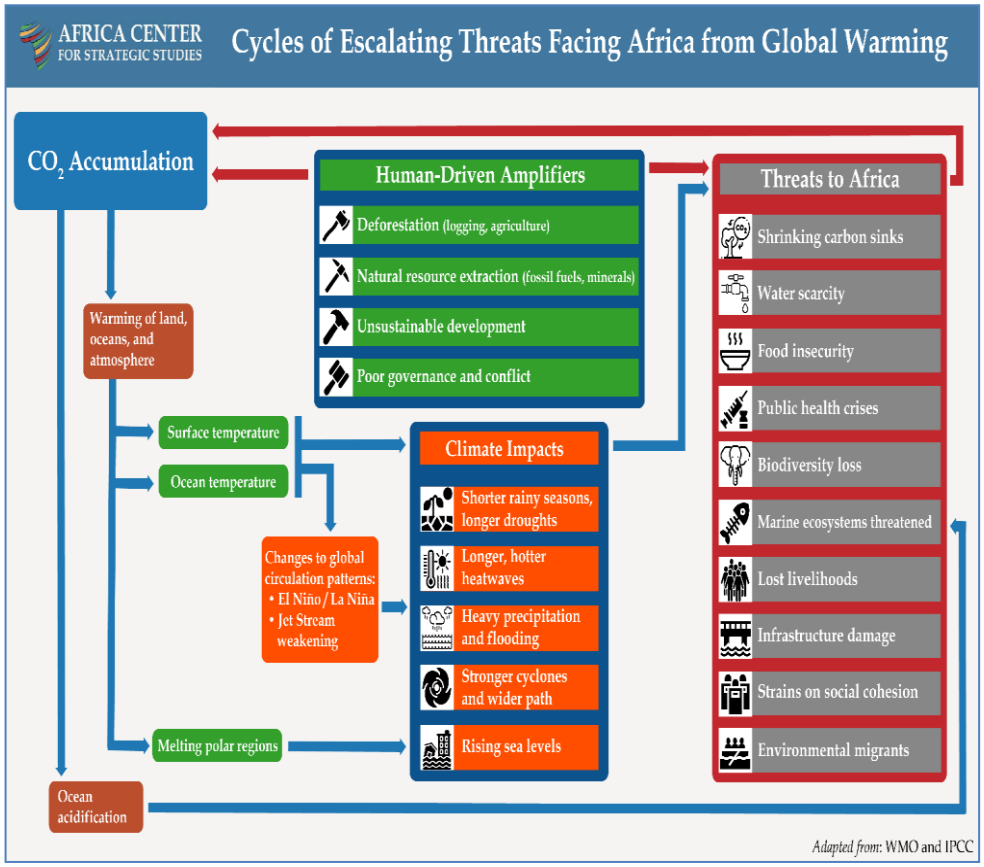
Therefore, relevant international organizations have monitored that over the past decade (2010-2019), weather-related events have displaced an estimated 23.1 million people on average each year, due to weather-related disasters of extreme heat, drought, floods and storms, and forest fires. Most refugees come from countries that are the most vulnerable and least prepared to adapt to the effects of climate change and the stresses of climate change.

The case in Africa is getting worse. For example, the World Bank predicts that by midcentury, 19 million people in North Africa and 86 million in sub-Saharan Africa could become internal migrants due to climatic shocks that affect their homes and livelihoods—such as devastating storms, flooding, and prolonged heatwaves and droughts. Sea levels are predicted to rise by 1 meter by the end of the century. This would expose hundreds of millions of Africans who live in coastal areas. Nile River Delta for example is facing a trajectory situation as its people are at serious risk of becoming submerged in the next three decades. If no mitigation is taken, some 5 million people may be forced to relocate inland to

(ISSN : 2536 - 9555)

Cairo, a city of about 10 million that is also vulnerable to flooding.[28] The following picture shows several climate change threats on the African Continent as been illustrated by the WMO and IPCC.

Figure No. (2):
Cycles of Escalating Threats Facing Africa from Global Warming



Source: Infographic, Africa Center for Strategic Studies, June 2022, Accessed: 15 November 2022.

[28] Aimee-Noel Mbiyozo, East Africa and the Horn light the way for Climate Migrants, (Institute for Security Studies, September 2022, at: https://issafrica.org/iss-today/east-africa-and-the-horn-light-the-way-for-climate-migrants#:~:text=In%202021%2C%202.6%20million%20people,effects%20of%20climate%20change%20worsen.)

C.3) Acute Food Insecurity:

Climate extremes expose millions of people to acute food and water insecurity, particularly in Africa, Asia, Central and South America, small islands and the Arctic, places that have contributed little to climate change. In light of the growing phenomenon of food shortages as a result of climate change, it is expected that many animal and plant diseases will appear, which in turn will contribute to the lack of crops, and consequently high rates of famine and malnutrition, as well as an increase in the prices of commodities and food products. Moreover, global warming and the resulting extreme climate fluctuations, drought and desertification will cause major changes in the livelihoods and, in particular, the lifestyle of farmers; and in turn, this can lead to societal breakdown, as well as exacerbating poverty, widespread crime, societal tensions, migration, displacement and armed conflict.[29]

C.4) The Spread of Infectious Diseases and Health Crises:

Climate change increases the spread of infectious diseases, disrupting ecosystems and increasing the risk of disease transmission. Some international reports have stated that pathogens are increasing due to climatic changes. In a related context, public health experts point to another problem, which is the lack of adequate health and medical facilities for the displaced population. Therefore, the biggest problem, according to World Bank estimates, is that climate change is likely to lead to the displacement of about 140 million people by 2050, from within Sub-Saharan Africa, South Asia and Latin America (together they represent about 55% of the population of the developing world),

[29] Wasiu Olayinka Fawle, Ida Ilbasims, Burhan Ozkan, Food Insecurity in Africa in Terms of Causes, Effects and Solutions: A Case Study of Nigeria, (Konya - Turkey: 2nd International Conference on Sustainable Agriculture and Environment, September 2015).

(ISSN : 2536 - 9555)

Thus, these individuals will be more likely to bring disease and its spread.

C.5) Threatening both National and International Security and Stability:

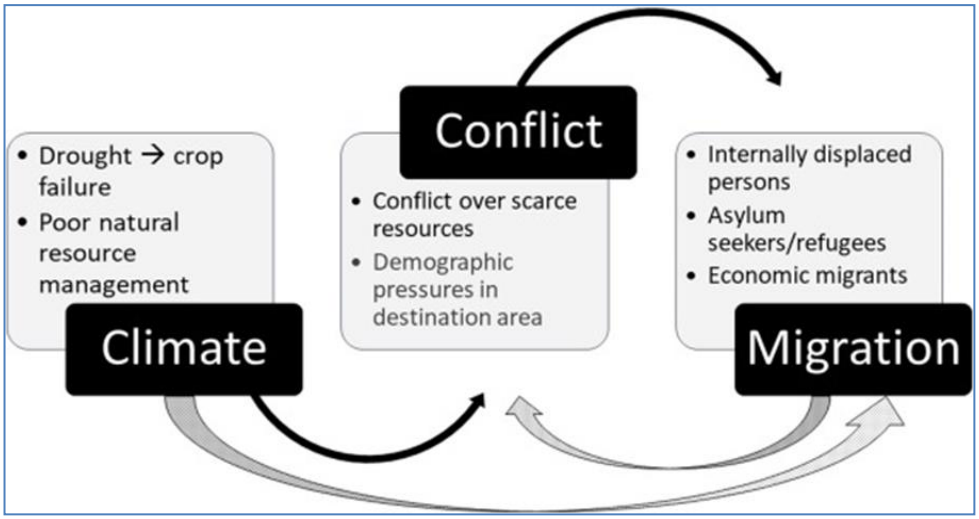
Of course, the deterioration of the economic, security and social conditions accompanying climate change would jeopardize national and global security, causing political instability, violation of human rights, onset of mass violence and constraining social cohesion. Moreover, climate change is expected to lead to the rise of extremist groups, which at the end will raise the potential for conflict between communities and states competing to secure resources for their citizens.[30]

The "Global Trends 2040" report issued by the US National Intelligence Council in March 2021 highlights the effects of climate change and the possibility that it will exacerbate risks to human and, consequently, national security, and therefore countries will be prompted to make difficult choices and trade-offs, and perhaps there will be uneven distribution of burdens, which increases competition and intensity, contributes to destabilization, and encourages insurgencies and terrorism to threaten the security and survival of states. Lake Chad, for example, has shrunk by 90 percent since the early 1970s. Misgovernance and evaporation of the lake has led to increased tensions among local communities and made it easier for armed groups and criminals to extort from and recruit vulnerable civilians.

The following figure represents a conceptual model on how climate change, migration, conflict nexus can be understood.

[30] Brauch, Hans Günter, 2002: "Climate Change, Environmental Stress and Conflict - AFES-PRESS Report for the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety", in: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Ed.): Climate Change and Conflict. (Berlin: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, 2002): 9-112; available at: http://www.bmu.de/english/download/files/clim ges.pdf

Figure No. (3):
Exploring climate change, migration and conflict nexus



Source: Guy Abel and others, Climate, conflict and forced migration, Global Environmental Change, Volume 24, January 2019, at: https://doi.org/10.1016/j.gloenvcha.2018.12.003, Accessed: 23 November 2022.

Third: the interchangeable relationship between climate change and armed conflicts in Africa:

Although of being the least contributor to greenhouse gas emissions, Africa is also considered to be the most continent at risk of climate induced conflict, because of its people's close dependency on natural resources and its high vulnerability to climate change challenges as a result. Such effects can be clearly noticed in Darfur as for example. The goal is to determine which sectors and regions are most likely to suffer from the conflict impacts of climate change.

It has been clear now that climate change holds potentially serious implications for national and international security. Not only by raising tensions and trigger new conflicts through more food and water insecurity, but also it could increase forced migration. As a result, the African Union and its constituent

(ISSN : 2536 - 9555)

regional communities have paid during, the last decades, more attention to tackle different conflict triggers and security threats, including environmental problems and climate change.[31]

It worth mentioning that climate change is only one of the many factors impact on the probability of armed conflict. It is also only one of the many security, environmental, and developmental challenges facing Africa. While climate change can contribute to violence and conflict, climate change isn't the only cause. However, leaving climate and environmental factors out of risk analysis can omit their impact on local, national and even regional security through both direct and indirect consequences. The Sahel and West Africa are one of the main hotspots of climate change and insecurity in the continent.

It has been broadly agreed that four main climate links to conflict in Africa may emerge:

1. Water Scarcity accompanied by growing demand on water supply will in some places, lead to rising competition between different members of society, different communities, and different countries. Under certain conditions, such as poor governance and already existing ethnic divisions, these stresses may turn into violent.
2. Food insecurity resulted from reductions in crop yields due to changing weather patterns around the world may lead to outbreak of competition on controlling productive agriculture lands which at the end may turn into conflicts among the concerned communities and states. In other words, climate change could intensify land-use conflicts and trigger environmental migration by exacerbating existing environmental crises, such as drought, water security and soil degradation.
3. Negative impacts of changes in sea-level that may reach a dramatical level as the disappearance of whole islands and

[31] African Union, African Union Climate Change and Resilient Development Strategy and Action and Action Plan (2022- 2032), at: https://au.int/sites/default/files/documents/42276-doc-CC_Strategy_and_Action_Plan_2022-2032_23_06_22_ENGLISH-compressed.pdf

coastal regions, may cause large scale and destabilizing population movements. In other words, entirely new causal relationships between environmental conditions and the emergence of conflict may appear as a result of climate change in the form of sea- level rise, flooding disasters and melting glaciers that threaten downstream water supplies.

4. The cumulative impact of all these challenges on the prevalence of poverty and the ability of governments to provide services to their citizens could be a factor that triggers conflicts in fragile states and finally cause their socio-economic and political collapse.

Also, there is the concern that global warming could pass certain irreversible points where impacts of climate change reach its momentum and cause large – scale changes in the Earth's systems such as the collapse of the Amazon rainforest or the loss of the Asian monsoon which could have acute consequences for the concerned communities.

Climate change, then, is actually a "threat multiplier" that makes existing concerns such as water scarcity and food insecurity, more complex and interactable. Thus, it is non– climate factors such as poverty, governance, conflict management, regional diplomacy and so on, that will largely determine whether and how climate change moves from being a developmental challenge to presenting a security threat.[32]

Generally speaking, three main factors exist on the African Continent are increasing its vulnerability to climate change as follows:

1. According to its position, Africa is already facing warm climate and many of its areas is exposed to heavy rains all over the year. Thus, this fact accelerates the bad impacts or effects of

[32] Philip Osano, Climate Change amplifies the risks for violent conflicts in Africa, (Stockholm Environment Institute, January 2022), at: https://www.sei.org/perspectives/climate-change-amplifies-risks-violent-conflicts-africa/#:~:text=This%20document%20underscores%20that%20climate,more%20climate%2Dlinked%20human%20displacements.

(ISSN : 2536 - 9555)

climate change on the continent. The Sahelian climate is a prominent example in this regard.

2. Second factor is correlated with the first one which is the dependency of many African economies on sectors that are susceptible to climate fluctuations, such as agriculture fisheries, forestry, tourism.[33]
3. Third is the socio-economic context: the lack of good governance; persistent and widespread poverty; poor economic and social infrastructure; conflicts; and limited human, institutional and financial capacities means that as a continent, Africa is least able to adapt to the effects of climate change.

In this regard, the African Union has expressed in its January 2007 decision, high concern about the vulnerability of Africa's socio-economic and productive systems to climate change and variability and to the continent's low mitigation and response capacities.

To make it clear, water scarcity for instance is one of the features of climate change, and its effects have begun to become evident in Africa, due to the difficulty of accessing water for many remote communities in the countries of the continent, either due to the fragility of infrastructure or economic marginalization resulting from political difficulties or armed conflicts. Some studies predict that "by 2025, approximately 230 million Africans will face water scarcity, and up to 460 million will live in water-stressed areas."

Water scarcity plays a dual role. At a time when people have difficult access to water due to ethnic, tribal and political conflicts, water scarcity is also a cause of conflicts, including disputes over water around Lake Chad and in separate parts of Sudan over the areas of agriculture and grazing that have rain and water availability. subterranean.

[33] Patrick Guillamont, Catherine Simonet, To what extent are African Countries Vulnerable to Climate Change? Lessons from a new indicator of physical vulnerability to climate change, (Foundation pour les études et Rechearches sur La dévelopment International, Working paper 8, November 2011, at: https://ferdi.fr/dl/df-rKATnzmJv2KH9SKi8eijFqK7/ferdi-i08-to-what-extent-are-african-countries-vulnerable-to-climate-change.pdf

In Kenya and Ethiopia similar cases of violence due to the conflict over water resources, more than 167 people were killed in Mali and more than 50,000 fled their homes during the violence that erupted in 2019 due to water scarcity, according to United Nations estimates. The United Nations expects agricultural yields to decline by 20 percent every decade by the end of this century in some parts of the African Sahel, and the emergence of other crises that may lead to international conflicts, such as the Renaissance Dam crisis between Ethiopia on the one hand and Sudan and Egypt on the other.

The dispute over water has also exacerbated the displacement crisis, in addition to the drying up of some African lakes and rivers that used to provide water to the local communities around them, which is part of the global crisis that came in the United Nations estimates that: "Some of the effects of climate displacement are already being felt around the world, and an average of 21.5 million people around the world are displaced by sudden-onset disasters each year."

As a result, the effective and large-scale implementation of adaptation policies is the only available way to prevent impacts of climate change from turning into triggers for conflict. In addition to enhancing international cooperation on the following levels:

1. Developing comprehensive international strategies to manage human mobility and migration.
2. Sharing good practices and most innovative approaches on adaptation to climate change impacts.
3. Comprehensive management to international common resources and to cope with insecurity.

From another side, violent conflict is both a cause and a consequence of poverty. The human security report found that the overwhelming majority of armed conflicts are fought within and not between states and that the most take place in the poorest parts of the world in particular in Sub-Saharan Africa.

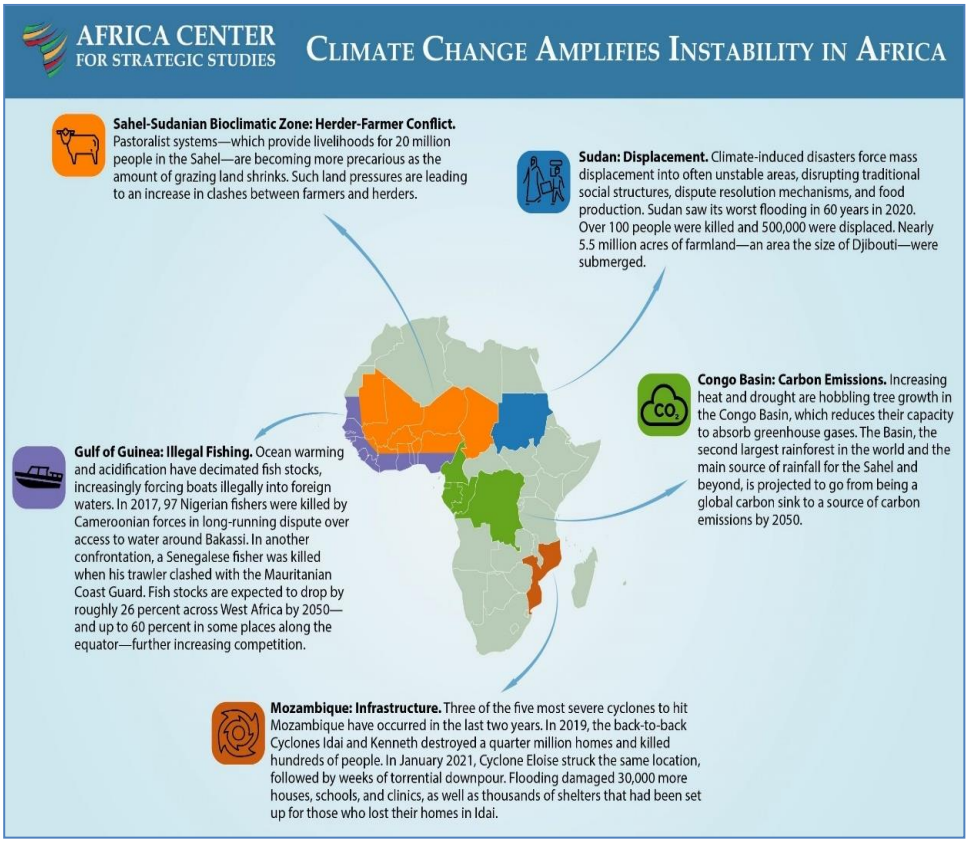
The African special Advisor on Human Security noted in 2005 that several factors account for conflict in the continent, like

(ISSN : 2536 - 9555)

scarcity of basic necessities of life, extreme poverty, competition on land, oil, or other natural resources, food insecurity and so on. For instance, the UNEP 2007 report has argued that climate change and environmental degradation, mainly reduction of rainfall, has been playing an important role in the conflict in Darfur. The report also warned of the outbreak of more wars and armed conflicts across Africa unless more is done to contain the danger of climate change.

The following figure shows how the relationship between climate change is reinforcing conflict in Africa.

Figure No. (4):
Climate change as a driver to instability in Africa



Source: Infographic, Africa Center for Strategic Studies, April 2021, Accessed: 22 October 2022.

Fourth: The African Experience on combating climate change: opportunities and challenges:

As it is mentioned above, climate change in addition to economic crises, food insecurity, depletion and lack of access to natural resources is among the key drivers of instability and conflicts all over the world, and particularly in the African continent. That's why continuous efforts are being exerted in the field of combating climate change, mainly on three integrated levels: Mitigation, Adaptation and Resilience. The aim of this section, is to present the essence of several regional and universal efforts exerted to deal with climate change as a global threat needs multi-lateral comprehensive actions to avoid its serious consequences on humankind, especially in fragile communities where there are a lot of factors that hinder human security and exposing existential threats to both mankind and other living organisms. Particular concern will be given to the African experience in this regard.

A) Universal efforts on Combating Climate Change at a Glance:

By realizing the danger of human activities on nature and the devastating effects of environmental degradation on the survival of other creatures, the Stockholm Environment Conference in 1972, which came as the culmination of both national and international efforts concerned with preserving the environment, has recommended international cooperation to confront environmental problems and to develop bound rules compatible to legal definitions of liability and compensation for environmental damage and pollution victims, in a manner that is consistent with the specific nature of the environmental damage as a transnational trans-national damage.

In applying this approach, countries have tended since the early twentieth century to conclude and adopt many international agreements, global, regional and bilateral alike, with the aim of protecting the environment with all its components, preserving its

(ISSN : 2536 - 9555)

resources and addressing environmental problems of all kinds and severity. The number of these agreements reached about 152 during the period from 1921-1991, and today there are more than 2,100 international agreements related to environmental protection, according to the ECOLEX website.

Among the most important international agreements concluded in this regard are the 1954 London Convention on the Prevention of Pollution of the Seas by Oil, the 1985 Vienna Convention on the Protection of the Ozone Layer, the 1992 Rio de Janeiro Convention on Biological Diversity, and the 1994 International Convention to Combat Desertification. The aim of conducting these agreements, whether at the bilateral, regional or global levels, is to protect the environment and to keep it clean and appropriate for human life and other living creatures. The ratification of or accession to the said conventions is not only sufficient for states compliance to address such widespread complex environmental problems, but in addition suitable legislative, organizational and administrative measures should be taken to ensure the effective implementation, enforcement and compliance with the provisions of those conventions at the national level.

Since then, several multilateral conferences have continued to discuss the major environmental problems facing the international community to find alternatives to adapt to them and address their effects. In this context, the Agenda for the Twenty-first Century issued by the Earth Summit in 1992 presented a program of action for a sustainable future for humanity based on a strong and inextricable relationship between environment and development. The summit came to keep pace with the growing global concern about the quality of life and its fate on the planet, which began to witness a sharp and unprecedented deterioration all over the history which has reached extreme levels in many regions and exceeded the probability of being reformed. Hence, facing intractable environmental problems will not be possible without adopting urgent and comprehensive global solutions, including working to increase public awareness among peoples towards

preserving the environment and its resources and rationalizing their use. The main important environmental problems in this regard are the problems of soil and groundwater pollution, food shortages, the excessive use of pesticides, the spread of epidemics and diseases, the depletion of energy resources, pollution and environmental degradation, climate change and global warming, and much more.

It worth noting that just prior to the holding of the Earth Summit, the Intergovernmental Negotiating Committee had started its work in Geneva from June 19-28, 1991, to draw up an international agreement to work on reducing the Earth's temperature, in the presence of representatives from 127 countries. After many consultations, the United Nations Framework Convention on Climate Change was drafted, and the door was opened for initial signature in April 1992 by representatives of 143 countries.[34]

As its name indicates, this agreement aims to establish a general framework for contemplating what can be done to reduce global warming and its repercussions on life on the planet's surface. Despite the importance of this agreement, it did not include a clear definition of the amount of emissions that the states parties should reduce to face this phenomenon.

Five years after the United Nations Conference on Development and Environment, known as the Earth Summit, the New York Conference known as the Rio +5 Summit was held in 1997 in which the international community has realized that the road to sustainable development is still long, and that the environmental problems that were the focus of the agenda of the twenty-first century, such as the lack of fresh water resources, desertification, health issues, the protection of the marine environment and coastal areas from pollution and others, are increasing and exacerbating day after day, as a result of many

[34] United Nations Framework Convention on Climate Change, agreed on 9 May 1992, entered into force 21 March 1994, 1771 U.N.T.S. 107; United Nations, Treaty Series, vol. 1771, p. 107.

(ISSN : 2536 - 9555)

reasons, foremost of which are the following; The lack of commitment of the developed countries to provide financial and technical support to the developing countries as it was agreed upon at the Earth Summit. In addition to the lack of sufficient support for the development of human and institutional capacities in developing countries to meet the requirements of sustainable development. The summit made it clear that the human relationship with the environment is at stake, and therefore urgent and immediate intervention is needed to heal it.

In conjunction with these efforts, the 1997 Kyoto Protocol was adopted to accelerate efforts of combating climate change, which include obligating developed countries (List A countries) with specific amounts of emissions reduction. Despite the entry into force of the Protocol in February 2005, some major countries have adopted positions rejecting it due to what these countries claim that the Protocol contains unequal obligations among its parties, and therefore binds them to a number of obligations that exceed those imposed on developing countries. As the case, for example, with Canada, which withdrew from the Protocol after signing it.

Despite this, the Kyoto Protocol of 1997 represents a quantum leap on the path of globalizing the global environmental issue, and creating the necessary mechanisms for its implementation. This protocol also represents the first implementation step of the 1992 United Nations Framework Convention on Climate Change.

Broadly speaking, the Kyoto Protocol contains two sets of obligations for states party to it, with the aim of achieving the goals of the Climate Change Agreement. The first group of obligations states in this Protocol includes those obligations assumed by all contracting parties, while the other group of obligations includes specific obligations imposed mainly on the developed countries (List A countries) in which they should bear alone towards developing countries.

With regard to the obligations that make up the first group, it can be said that the protocol obliges the signatory states to a specific list of obligations in which there is no distinction between developed and developing countries.

- The reduction of greenhouse gas emissions by 38 applicants at rates that vary from one country to another, provided that this reduction takes place during a specific time period starting in 2008 and continuing until 2012. The percentage of reduction prescribed in the case of the European Union was 8% less than the level of 1990, while in the case of the United States and Japan, this percentage was 7% and 6%, respectively. These decreases include 6 specific gases: carbon dioxide, methane, nitrogen oxide, in addition to three fluorescent compounds.
- Preserving sinks and reservoirs of greenhouse gases such as forests, and working to increase them in order to absorb greenhouse gas emissions that cause climate change.
- Establishing systems and research methods to estimate greenhouse gas emissions, as well as studying the negative effects resulting from them, and the economic and social consequences of the various policies to confront the problem.
- Effective cooperation in the fields of education development, training programs and public awareness in the field of climate change, with the aim of reducing greenhouse gas emissions.
- Working on the production and development of environmentally friendly technologies by focusing on that type of fuel that consumes less fuel, and therefore less in terms of fuel combustion and emissions of harmful gases.
- Enhancing states' resilience mechanisms that reduce emissions and reduce harmful effects, but at the same time take the economic dimension when calculating their production costs. This part refers to the possibility of achieving the goal with the least possible losses, and sometimes without losses at all. It is even possible to gain benefits from following these mechanisms. These mechanisms allow trading in ERUs.

(ISSN : 2536 - 9555)

However, as for the duties contained in the other set of obligations contained in the Kyoto Protocol of 1997, as previously mentioned, developed countries are committed only to them and are obligated to assist developing countries so that they can fulfill their obligations in light of the provisions of the Climate Change Agreement on the one hand, and to encourage the latter to cooperate effectively within the framework of on the other hand, the international system for environmental protection. The obligations of this sect can be defined as follows:

- Developed countries undertake to finance and facilitate technology transfer activities from them to developing and least developed countries, especially those environmentally friendly technologies in the fields of energy, transportation, communications and others.
- Developed countries pledge to support the efforts of developing and least developed countries in the areas of confronting and adapting to the negative effects of climate change.
- Joint cooperation with developing and least developed countries in the Clean Development Mechanism, which is one of the most important mechanisms defined by the Kyoto Protocol. This mechanism stipulates a clear commitment on the part of developed countries to undertake projects in developing countries in order to help them meet the requirements of sustainable development, and at the same time contribute to achieving the main objective of the climate change agreement, and assist developed countries in committing to reducing emissions to the specified limit. This mechanism benefits both developed countries and countries alike, and the benefit that accrues to the economies of developing countries is the presence of investments coming from developed countries on their lands, while developed countries can use the emissions resulting from the activities of these projects to contribute to the realization of part of their commitments to limit and reduce the amount of emissions.

Then, international collective action to confront climate change and achieve climate justice moved to another level with the convening of the 2007 Conference of the Parties to the Climate Change Convention, known in the media as the Bali Summit, where the first international climate justice coalition was established, which brought together global networks and non-governmental organizations fighting for Climate justice case. The Bali Summit is also credited with launching a series of international negotiations and consultations to adopt a new international agreement to assist countries, especially poor and vulnerable countries, in facing and adapting to the effects of climate change, allocating financial support and transferring the necessary technology to these countries, and promoting the adoption and implementation of appropriate national measures in the context of sustainable development. to mitigate the effects of climate change.

In an attempt to promote the participation of countries in a broader way, the 2009 Copenhagen Climate Summit called on all developed and developing countries to divide national contributions to reduce their carbon dioxide emissions in a voluntary manner commensurate with their capabilities. However, the contributions of countries came below the required level, and the need to adopt a binding international agreement in this regard remained. The convening of the Conference of the States Parties to the United Nations Framework Convention on Climate Change in Durban in 2011 marked the beginning of discussions on the preparation of a legally binding agreement to enhance climate resilience, and until then a new working group will be formed to consider issues that need more rules and guidance.

On December 12, 2015, another major turning point occurred in this file, which was the adoption of the Paris Agreement to combat climate change, entered into force only less than one year after its adoption (December 4, 2016). The agreement aims to significantly limit temperature rise to two degrees Celsius over the pre-industrial era while encouraging

(ISSN : 2536 - 9555)

members to target a rise of only 1.5 degrees Celsius, and to bring global greenhouse gas emissions to their highest levels as quickly as possible, followed by a rapid reduction in emissions to reach To the state of carbon neutral, or what is known as the net zero state, which is the balance between the rates of gas emissions and the rates of their discharge in forests and others in the second half of the current century.

On the eve of the Paris Conference, more than 180 countries representing 90% of emissions made their national contributions, and accordingly, it was estimated that the amount of emissions would reach about 55 gigatons by 2030, while to achieve the goal of not exceeding the rise in global temperature of more than two degrees Celsius, it should be Work to reduce emissions up to 40 gigatons only. This means that urgent action is needed to confront this dangerous environmental problem, which will not remain or disappear.

As of the date of this writing, 192 countries have acceded to the Paris Agreement.[35] The agreement contains a number of provisions under which all state parties commit to reduce their emissions of greenhouse gases and work together to adapt to the effects of climate change. Implementation of this agreement is essential to achieving the Sustainable Development Goals because it provides a roadmap for climate action that will reduce emissions and build resilience to climate change.

However, the agreement does not obligate any state party to specific amounts of emissions reduction, but it obligates each state to provide voluntary national contributions to reduce emissions that reflect its capabilities and responsibilities, provided that its contributions are determined every five years at a higher rate than before, and these contributions are recorded in a public registry at the Secretariat of the agreement.

[35] Jorge E. Vinuales, "The Paris Agreement on Climate Change" (2016) 59 German YB Int'l L 11.

When determining their contributions to reducing greenhouse gas emissions, the Parties shall observe integrity, accuracy and transparency, and shall provide their calculations that are complementary, comparable and harmonized in accordance with the requirements of the Agreement and its guidelines.[36]

The agreement also stipulates those two types of inventories take place, first for the world's carbon quantities every five years, which will take place for the first time in 2023, and the other to be conducted by countries every two years, the results of which are recorded in their report submitted to the secretariat of the agreement, and accordingly determines their emissions and their national contributions to reducing global carbon levels and achieving global goals. Convention. As well as providing information on financial aid and cooperation efforts between developed and less developed countries to adapt, confront and address the problem. And the need for these efforts to be consistent with the goals of sustainable development, human rights and the protection of vulnerable groups.

In addition, the agreement has obliged the states parties to submit periodic reports that include the inventory, adaptation efforts, and the assistance provided by the concerned state or received from another state, provided that all these reports are kept in a public record with the agreement's secretariat. The areas of international cooperation here include early warning systems, emergency preparedness and chronic changes, and a commitment to provide $100 billion annually to developing countries to support efforts to adapt and adapt to the effects of climate change until 2025, with continued spending on this amount of funding after that, compensating losses and damages to countries most vulnerable to the effects of climate, supporting technological

[36] Anju Sharma (ed), *Guide to the Paris Agreement* (Oxford: Oxford Climate Policy, 2020), 21 and Ralph Bodle, Lena Donat and Matthias Duwe, "The Paris Agreement: Analysis, Assessment and Outlook" (Dessau-Roßlau: Umweltbundesamt, Research Paper, 2016

(ISSN : 2536 - 9555)

progress and transferring knowledge to developing countries and help them in building their capacities, supporting environmental education and community participation in environmental protection efforts, and subjecting these efforts to two international reviews every five years.

It is remarkable recently that international attention to the problem of climate change has reached an unprecedented level, as the UN Security Council put it on its agenda to discuss its repercussions on international peace and security in general, and as a trigger and catalyst for the outbreak of armed conflicts in particular. An evolution that reflects the extent of the global mobilization to confront climate change problem that has become a warning bell for the annihilation of humanity and life on planet Earth.

In November 2021, the climate summit known as COP 26, or the Glasgow Summit, was held, and the concerned leaders of the world south, youth activists, scientists and members of civil society institutions invited the delegations and delegates of participating countries to cooperate in order to help remedy the issue by establishing a balance between the rights of states Developed or industrialized countries and the rights of the least developed and the poorest.

Therefore, many analysts considered the 2021 Glasgow Summit as one of the most important summits in history to protect the environment and confront one of its most important problems, which is the problem of climate change. Negotiations during the summit have resulted in the revival of the goal of limiting temperature rise to 1.5°C above pre-industrial levels, over the past two years, by encouraging countries to continue to introduce and implement new and updated national climate strategies to achieve this goal.

However, observers have warned of the possibility of global warming by more than 1.5 degrees Celsius despite the adoption of these strategies and work to implement them, which reflects the existence of a credibility gap due to conflicting national goals and

actions planned until 2030. For their part, fragile countries vulnerable to climate change felt The Global South is concerned after leaving the Glasgow summit and feeling that the rich countries will not abide by the charter adopted at the end of the summit and will abandon them. Hence, these countries are working to exploit the COP 27 summit scheduled to be held in Sharm El Sheikh, Egypt in November 2022 to give great impetus to critical issues and to advance international efforts towards the cause of climate justice, and continue to provide the necessary financing to address the effects of climate change on it, and to regulate the issue of carbon markets in a respectful manner It includes the rights of forests and indigenous communities.

B) African Efforts on Combating Climate Change:

As we discussed above, Africa is one of the most vulnerable continents to climate change. This vulnerability interacts with a complex socio-economic challenges like poverty, poor governance, ecosystem degradation, severe disasters and conflicts and together undermine communities' ability to adapt to climate change.

Although Africa contributes only 2 – 3% of global greenhouse gas emissions, more than 83% of national climate plans include greenhouse gas reduction targets with focus areas including energy, agriculture, waste, land use, and forestry. The philosophy behind this is that it was realized by African policymakers that if the target of limiting global warming to 1.5℃ above pre-industrial levels is missed, Africa could be facing catastrophic temperature increases of up to 3℃ by 2050.

At the same time, the threat to GDP of African nations that are most vulnerable to these changes – meaning the amount of economic activity that stands to be lost if these changes are severe enough – is projected to increase from £660 billion in 2018 to over £1 trillion in 2023. That's almost half of the continent's projected GDP.

Given these estimations, continued actions and more efforts have been exerted on the African continent to tackle climate

(ISSN : 2536 - 9555)

change and its acute consequences on the concerned communities. Such efforts include various actions that are taken on both national and regional levels as follows.

B.1) African National Policies and Initiatives to Adapt to Climate Change:

While realizing and implementing their related international commitments, African countries have outlined bold aspirations to build climate resilient and low-carbon economies in their Nationally Determined Contributions (NDCs) to the Paris Agreement. Having signed and ratified the Paris Agreement, nearly all African countries have committed to enhancing climate action through reducing their greenhouse gas emissions and building resilience. For the continent, adaptation to the adverse impacts of climate change is urgent. However, many of their commitments are conditional upon receiving adequate financial, technical and capacity building support. The continent will need investments of over 3 trillion USD in mitigation and adaptation by 2030 in order to implement its NDCs.

In this regard, several African countries have moved forward to adapt with climate change consequences through adopting more eco – friendly policies in different economic fields and through working on raising the public awareness about the destructive nature of such consequences and how individual behavior can affect this acute problem whether positively or negatively. Some important national policies have been adopted in this regard as follows:

- Unleashing the Potential of Solar Energy in Rwanda: Emissions from the energy sector have been increasing by approximately 1% per year since 2015. With an average 5 hours of peak sunshine per day, there is great potential to increase the shares of off-grid to 42% and connect 326,884 households through solar mini-grids. The Government of Rwanda wants to tap into this potential to electrify rural areas with mini-grid solar PVs by creating tax exemptions on solar PV materials. This demonstrates the possibility of reducing the cost of access to

electricity for rural households and avoiding government investment in transmission infrastructures. The estimated mitigation potential of the adoption of mini-grid solar PVs could reach 1.3 Mt CO2eq from 2020 to 2030.

- Launching the National Initiative to plant 10 million Trees in Somalia: The Somali President Dr. Hassan Sheikh Mahmoud, has recently inaugurated the national initiative to plant trees under the slogan (Green Somalia), stressing the importance of preserving the environment and increasing the green area throughout the country. The initiative aims to plant ten million trees distributed over the country's cities to increase the green area and reduce the effects of desertification, encourage community members to contribute to afforestation projects and raise awareness of the importance of vegetation cover in preserving the environment and improving the climate. The President pointed out the importance of trees for our country, which was afflicted by repeated droughts, which had a strong impact on the difficult conditions the country experienced, which caused severe erosion that affected life and the environment. He also directed government agencies to take the lead in this plan and plant trees in their offices with the environment that the government prepares for citizens, and assigned the Banadir Region Administration and the Ministry of Environment and Climate Change in the Federal Government of Somalia to plant 100,000 trees in the capital in the remaining two months of the year in order to move forward in reforestation of state capitals and all governorates of the country.
- Decarbonizing Electricity Generation in Eritrea: one of the main priorities to reduce greenhouse gases is to decarbonize electricity generation. Eritrea wants to introduce renewable energy to improve the security of its electricity supply, minimize dependence on unsustainable imported fossil fuel use and reduce greenhouse gas emissions from the national power generation system. The country plans to introduce 50 MW of solar power, 40 MW of wind power and 30 MW of geothermal

(ISSN : 2536 - 9555)

energy into the existing national grid by 2030. Additionally, with the implementation of a 15MW mini-grid hybrid system and promotion of individual solar home systems ongoing in rural areas, Eritrea aims to avoid 113 kt of CO2 emissions per year by 2030 from electricity generation.

- Launching "Rewild Zambezi Project" to move wild animals from drought Zimbabwean areas to save their lives: After the emergence of animal deaths in a number of African countries due to drought in some areas, the Zimbabwean government decided to take action to confront the crisis. According to different news agencies, the government decided to move more than 2,500 species of wild animals out of their environment to escape the drought that has become threatening their lives in the southern regions. The transportation process will take wild animals to a northern region where water resources are available, after the southern regions were subjected to drought that killed a large number of animals. The animals that will be transported include 400 elephant species, 2,000 African impala, 70 giraffes, 50 bulls, 50 predatory cat species, 50 zebras, 50 antelopes, 10 lions and 10 wild dogs. Other neighbor countries are experiencing the same problem as news websites revealed that Kenya witnessed a record number of elephant deaths during the current year 2022 due to drought alone, amounting to 179 elephants. This number of deaths occurred due to a severe drought that affected Kenya, Somalia and Ethiopia, and this number exceeds the causes of elephant deaths from poaching more than 20 times.
- Investing in Sustainable Agriculture in Morocco: The agriculture sector accounts for the second largest source of greenhouse gas emissions in Morocco. The country is implementing a total of 13 projects, with an estimated cost of US $5.3 billion between 2020 and 2030 to cut emissions by 19% of the cumulative scenario benchmark for the agriculture sector for the same period. Examples include using agroforestry to enhance carbon reserves, using renewable energy in agricultural production and adopting sustainable agriculture

practices. These measures are further described in two strategic plans "Green Morocco Plan" and "Generation Green 2020-2030."

- Running 27 clinics in rural Uganda with solar energy: Uganda's electricity supplier, Equatorial Power, has agreed with the German Agency for International Development Cooperation to provide solar energy to at least 27 health centers in rural areas. The project aims to introduce solar energy to at least 27 health care facilities in villages located in Uganda's West Nile region. The small stand-alone solar power plants, which will have a total capacity of 150 kilowatts, will be connected to battery storage systems with a total capacity of 1.2 megawatt hours. According to the Ugandan company, this project is expected to affect the health of 250 people in the West Nile region. The company, headquartered in Kampala, Uganda, is working to provide electricity to island villages in Lake Victoria. The company has also installed small networks in the Democratic Republic of the Congo, Rwanda and Tanzania. It also recently agreed with an investment company to deploy and operate small solar power grids in the Democratic Republic of the Congo and Rwanda at a total cost of $1.7 million.
- Papua New Guinea: Addressing Deforestation: Papua New Guinea holds one of the largest zones of intact tropical forests in the world. Deforestation and forest degradation are responsible for 90% of the country's total greenhouse gas emissions. Papua New Guinea's overarching target in the agriculture, forestry and other land use sector is to halt the upward trend of greenhouse gas emissions due to increased deforestation and forest degradation by 2030 through REDD+. The REDD+ programme will address issues of unsustainable commercial agriculture, especially palm oil development, as well as improve the sustainability of timber supply and coordinate land use planning. The estimated emission reductions from the implementation of the REDD+ is 26 Mt CO2 eq by 2030.

(ISSN : 2536 - 9555)

B.2) Steps taken by Relevant Regional Organizations to avoid climate consequences on the African Peoples:

Important steps are being taken by some African Organizations to protect the continent against the worst climate consequences through multilateral work and investment on the environment. For example, both African Development Bank and the UN Environment Programme are leading climate change adaptation measures, like working to protect mangroves on over 200 million hectares of land.

- The role of the African Development Bank:

The African Development Bank continues to prioritize mainstreaming climate change and green growth in its portfolio and has committed to incorporating climate-informed design into 100% of its investments. The Climate Change and Green Growth Department continues to make progress in driving Africa's transition towards greater climate resilience and a low-carbon development path, in line with the second Climate Change Action Plan 2016-2021. The Bank is on course to meet the following commitments made under this Action Plan:

1. Allocating 40 percent of project approvals to climate finance by 2021, with equal proportions for adaptation and mitigation.
2. Mainstreaming climate change and green growth into all Bank investments by 2021.
3. Securing significantly increased access to climate finance for low-income African countries with a target of $25 billion by 2025 and positioning Africa's financial sector at the forefront of financing innovations.

- The role of African Climate Policy Centre:

In 2008, the African Climate Policy Centre (ACPC) was established to study and assess the potential environmental, social and economic impacts of climate change and to contribute to the design of effective response strategies to this serious environmental

problem and the challenges it poses to development plans and the goals of the Millennium Development Goals for the people of the continent.

The Centre has been given a dual mandate to provide guidance in the formulation and implementation of climate public policies to the member states of the center and to contribute to their poverty reduction through successful mitigation and adaptation to climate change in Africa and to raise the capacity of the countries of the continent to participate effectively in multilateral climate negotiations. In addition to serving as the secretariat of the Climate Information for Development in Africa Program (ClimDev-Africa), As a joint initiative of the Economic Commission for Africa, the African Union Commission and the African Development Bank to help focus the collective efforts of these three institutions on promoting a common and coordinated response to climate change across the continent.

Since its operation in 2011, the Center has succeeded in building strong partnerships and relationships with various development institutions operating in the African and global fields. He also succeeded in providing a space for African participation in relevant international platforms and raised the issue of the CIS Climate Information Service to exchange information with African countries on the variability of weather patterns and climate change, In addition, the Center has invested heavily in strengthening and modernizing meteorological and hydrological monitoring networks, supporting research in climate sciences and generating ideas to support development on the continent.

In this context, ACPC considers NDCs to represent concrete actions to be taken towards achieving the Sustainable Development Goals and the goals of the African Union's Agenda 2063.

- The Role of Africa Finance Corporation:

As Africa's leading infrastructure solutions provider, AFC is advocating for consideration of Africa's energy deficit and the need for quantum leaps in industrialization for job creation and reducing

(ISSN : 2536 - 9555)

poverty, as well as climate-proofing built infrastructure and protecting Africa's powerful carbon sinks which absorb more carbon dioxide annually than any other region's rainforests.

In its 2022 recent report, AFC argues that, while cutting emissions is vital for the more developed and highest polluting wealthier nations, there is a more limited universal impact to be gained from reducing the far lower emissions of sub-Saharan Africa. Thus, African nations will drive a far greater effect in combatting global warming by focusing instead on the following three significant areas of change: 1. Developing local industries by putting processing and manufacturing at the centre of sustainable circular economies. Doing so will avoid the spewing of carbon emissions abroad in the form of raw material and minerals and being reshipped again in the form of finished goods. Local manufacturing of renewable energy com technology components gains especial importance in this regard. It is critical for these metals to be mined in such a way that minimizes further pollution and for resource-efficient sustainable mining techniques to be combined with ecosystems fostering local production centres. 2. Rebuild Africa's infrastructure and water bodies to raise it resilience to withstand acute climate shocks. Without intervention, the cost of structural damage caused by natural disasters in Africa will increase to US$415 billion a year by 2030 from between US$250 billion to US$300 billion now, according to the UN Office for Disaster Risk Reduction. 3. Financing innovation to support investment in localised mass-scale manufacturing and processing.

Conclusion:

Africa is facing various environmental threats that are hindering development and stability all over the continent. When intersecting with social, economic and political fragile context, these threats are seriously affecting human security of African nations.

By analyzing climate – related hazards, we can easily conclude how they hit all dimensions of human security, which include: economic security, food security, health security, social

security, political security, of course environmental security and finally personal security. As a result, it was long time ago since the international community began to concern on addressing climate existential threat and its devastating impacts on livelihoods, health and well- being of millions of people worldwide, and in particular the poorest and most vulnerable ones. No doubt, the African continent wasn't away from these interactions. The situation in Africa is more dangerous and critical as it's facing what is called " the consequences of the consequences " or for simplicity considerations " the indirect impacts of climate changes".

There's a growing link between climate change and violent or armed conflict and this link is clearly seen across the African continent.

Climate change is widely recognized as a threat multiplier due to its role of exacerbating the traditional cause of conflict. The clearest form is the way changes in climate alter competition over increasingly scarce resources. For example, international reports clarify that there's a 10% – 20% increase in the risk of armed conflict associated with each 0.5% increase in local temperatures, which is a shocking fact indeed. If we have a look on what statistics say in this regard, it has been found, generally speaking, that 159 countries all over the world that have experienced continuing rise in their local temperature, also witnessed an increased number of violent actions and subsequent deaths.

Such accidents and events accompanied with other socio-economic factors are worsening and deepening the crisis especially in fragile countries which the practice has proved their high vulnerability to different threats, and in turn the potential to conflict.

It worth noting that it is often difficult to distinguish in practice between conflict and disaster as direct causes of internal displacement. This is based on the fact that many of the factors behind the outbreak of armed conflict are also often linked to the occurrence of disasters, and thus it is often more difficult to

(ISSN : 2536 - 9555)

separate these factors that lead to forced displacement from each other. An example of this complexity is the tragic cases currently emerging in countries such as Nigeria, South Sudan and Somalia, where drought coupled with conflict and violence is increasing displacement, severe food insecurity and famine.

So, we can conclude that three variables are feeding each other and at last hindering human security interchangeably which are: Climate change, conflict, and migration or displacement. For example, as one of the main impacts of climate change, water scarcity has begun to become evident in Africa, due to the difficulty of accessing water for many remote communities in African countries, either due to the fragility of infrastructure or economic marginalization resulting from political difficulties or armed conflicts. Some studies predict that "by 2025, approximately 230 million Africans will face water scarcity, and up to 460 million will live in water-stressed areas."

Turning to Africa where adaptation to climate change is an urgent matter. Having ratified the Paris Agreement, nearly all African countries have committed to enhancing climate action through reducing their greenhouse gas emissions and building resilience in their NDCs. In this regard, additional concern is given to adopt policies and measures like strengthening of early warning systems and shifting into eco- friendly industries to mitigate and adapt to climate change and at the same time achieve sustainable development. Some prominent examples can be given here as the tendency to use solar energy to electrify rural areas in Rwanda, the same happened in Eretria which is now using renewable energy to generate electricity, launching a national initiative to plant 10 million trees in Somalia, and investing in sustainable agriculture in Morocco. However, many of their commitments are conditional upon receiving adequate financial, technical and capacity building support.

Important steps have been taken by some African Organizations to protect the continent against the worst climate consequences through multilateral work and investment on the

environment. The role of both African Development Bank and Africa's Finance Corporation are ideal examples here.

Finally, to conclude, yearly held COPs represent a priceless opportunity to raise the African voices loudly to mitigate disproportional impacts of climate change in Africa from developmental and human security approaches. Thus, it's time to focus on issues like climate justice, and financing innovation to support investment in local manufactures. Also, it's time for African solidarity in front of developed countries to beer their responsibilities in mitigating climate change and addressing its devastating impacts on African vulnerable communities in order to be able to reach their developmental agenda of 2063.

(ISSN : 2536 - 9555)

Bibliography:

Documents:

1. United Nations Framework Convention on Climate Change. (1992). *Agreed on 9 May 1992, entered into force 21 March 1994, 1771 U.N.T.S. 107; United Nations, Treaty Series, vol. 1771, p. 107*.
2. African Union. (n.d.). *Agenda 2063: The Africa we want*. https://au.int/en/agenda2063/overview

Books:

1. Anju Sharma (Ed.). (2020). *Guide to the Paris Agreement*. Oxford: Oxford Climate Policy.
2. Barnett, J. (2001). *The meaning of environmental security. Ecological politics and policy in the new security era*. London – New York: Zed.
3. Bodle, R., Donat, L., & Duwe, M. (2016). The Paris Agreement: Analysis, assessment and outlook. *Dessau-Roßlau: Umweltbundesamt, Research Paper*.
4. Brauch, H. G. (2008). *Conceptualizing the environmental dimension of human security in the UN*. UNESCO, Oxford: Blackwell Publishing Ltd.
5. Buzan, B., Wæver, O., & de Wilde, J. (1998). *Security: A new framework for analysis*. London: Lynne Rienner.
6. Philip Osano. (2022, January). Climate change amplifies the risks for violent conflicts in Africa. *Stockholm Environment Institute*. https://www.sei.org/perspectives/climate-change-amplifies-risks-violent-conflicts-africa/#:~:text=This%20document%20underscores%20that%20climate,more%20climate%2Dlinked%20human%20displacements.

Periodicals:

1. Allenby, B. R. (2000). Environmental security: Concept and implementation. *International Political Science Review*, 22(1). https://doi.org/10.1177/0192512100211001

2. Alkire, S. (2003). A conceptual framework for human security. *University of Oxford: Center for Research on Inequality, Human Security and Ethnicity*, 24.
3. Axworthy, L. (2004). A new scientific field and policy lens. *Security Dialogue*, 35(3), 348-349.
4. Brown, O. (n.d.). Climate change and the risk of conflict in Africa. *International Affairs*. DOI:10.1057/9780230115538_5
5. Burrwos, K., & Kinney, P. L. (2016). Exploring the climate change, migration, and conflict nexus. *International Journal of Environmental Research and Public Health*, 13(4). https://doi.org/10.3390/ijerph13040443
6. Fankhauser, S., et al. (2021). The meaning of net zero and how to get it right. *Nature Climate Change*, 12, 15-21. https://www.nature.com/articles/s41558-021-01245-w#citeas
7. J. Barnett. (2009). Environmental security. In *International Encyclopedia of Human Geography*. https://doi.org/10.1016/B978-008044910-4.00774-4
8. Schmitt Olabisi, L. (2009). Reducing greenhouse gas emissions for climate stabilization. *Environmental Science & Technology*.
9. Vinuales, J. E. (2016). The Paris Agreement on climate change. *German Yearbook of International Law*, 59, 11.

Reports:

1. Annan, K. A. (2000). *Millennium report: We the peoples. The role of the United Nations in the 21st century*. New York: United Nations.
2. United Nations Development Programme (UNDP). (1994). *Human Development Report.*
3. United Nations Human Rights Office of the High Commissioner. (n.d.). Understanding human rights and climate change. https://www.ohchr.org/sites/default/files/Documents/Issues/ClimateChange/COP21.pdf

(ISSN : 2536 - 9555)

4. United Nations High-level Panel. (2004). *A more secure world: Our shared responsibility. Report of the Secretary General's High-level Panel on Threats, Challenges and Change*. New York: United Nations Department of Public Information. http://www.un.org/secureworld/
5. African Union. (2022). *African Union climate change and resilient development strategy and action plan (2022-2032)*. https://au.int/sites/default/files/documents/42276-doc-CC_Strategy_and_Action_Plan_2022-2032_23_06_22_ENGLISH-compressed.pdf
6. Duck, B. B., et al. (2020). The Lake Chad hydrology under climate change. *Scientific Reports*, Article No. 5498. https://www.nature.com/articles/s41598-020-62417-w#citeas
7. World Meteorological Organization (WMO). (2022, September). State of climate in Africa highlights water stress and hazards. https://public.wmo.int/en/media/press-release/state-of-climate-africa-highlights-water-stress-and-hazards#:~:text=Temperatures%3A%20Africa%20warmed%20at%20an,%2B0.2%C2%B0C%2Fdecade.

Websites:

1. Britannica, Climate change: https://www.britannica.com/science/climate-change
2. Intergovernmental Panel on Climate Change (IPCC), Glossary: https://www.ipcc.ch/sr15/chapter/glossary/
3. ReliefWeb. (2022, November). Rising sea levels besieging Africa's booming coastal cities. https://reliefweb.int/report/world/rising-sea-levels-besieging-africas-booming-coastal-cities
4. Countercurrents. (2022, November). Glaciers in Africa will disappear by 2050, UN warns. https://countercurrents.org/2022/11/glaciers-in-africa-will-disappear-by-2050-warns-un/