INSTITUTE FOR CRISIS RESOLUTION,
PEACEBUILDING AND CONCILIATION

PEACE, SECURITY AND CLIMATE CHANGE TRAINING

BY

INSTITUTE FOR CRISIS RESOLUTION, PEACEBUILDING AND CONCILIATION (ICRPC)

Produced By: Education and Training Centre

Emerging Realities in Peace, Security and Climate Change Training

Table of Contents

1.1 Overview and context of Climate Change on Peace and security

Climate change is one of the most pervasive global threats to peace and security in the 21st century. But how many people would list this as a key factor in international relations and domestic welfare? In reality, climate change touches all areas of security, peace building, and development. The impacts of climate change are already adversely affecting vulnerable communities, as well as stretching the capacities of societies and governments.

Climate change is best understood as a 'threat multiplier', i.e. something that interacts with existing pressures (such as social conflict, economic inequality, large-scale migration, or competition for resources) and further compounds these issues—increasing the likelihood of instability or violent conflict.

On the 12th July 2018: The UN Security Council convened a session to discuss the nexus between climate change and global conflicts and to deepen understanding of climate-related security risks. The session marked the Council's first debate on climate change and security in seven years.

While speakers agreed that climate change and its impacts pose serious threats, they disagreed over the degree to which the Security Council has a responsibility to address climate change, with some arguing that the Council must address climate change as a security risk, and others warning against expanding the Council's mandate or encroaching on the jurisdiction of other bodies. Some delegates proposed, *inter alia*, the appointment of a Special Representative on Climate and Security, and the establishment of an "institutional home" or hub for climate and security-related issues within the UN system.

Environmental degradation coupled with political, economic and social insecurity have become major drivers of migration and refugee movements. It is estimated that an annual average of 21.5 million people have been displaced by weather-related natural disasters since 2008, and thousands more have fled their homes due to droughts or land degradation and coastal erosion.

Climate change action - that is mitigation of climate change and global warming - is directly tied to the maintenance of peace. In the absence of substantial mitigating action, climate change is expected to lead increasingly to severe food and water shortages in many areas, in addition to coastal flooding, eventually leading to mass migrations and increased conflicts

worldwide. That is, unchecked global warming will increasingly lead to the breakdown of peace, and threats to national and international security.

1.2 What is Climate Change

Climate change refers to a significant variation in either the average state of climate or in its variability, persisting for an extended period (typically decades or longer). Natural processes may cause climate change or be caused by external – human related - events that cause long term changes in the composition of the atmosphere or in land use. Note that the United Nations Framework Convention on Climate Change (UNFCCC), in its Article 1, defines "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." The UNFCCC thus makes a distinction between "climate change" attributable to human activities natural causes.

WEATHER and CLIMATE

Weather events are short-term (minutes to months) changes in the atmosphere, e.g. temperature, rain, cloudiness, to wind etc. Climate is the average of weather over time and space, i.e. climate is what you expect, weather is what you get.

GLOBAL WARMING

Global warming is a term that describes the rise in the average temperature of Earth's atmosphere and oceans since the late 19th century. Since the early 20th century, Earth's average surface temperature has increased by about 0.8 °C, with about two-thirds of the increase occurring since 1980. Scientists are more than 90% certain that global warming is caused by increasing concentrations of greenhouse gases produced by human activities such as the burning of fossil fuels and deforestation.

GREENHOUSE EFFECT and GASSES

The Earth gets energy from the sun in the form of sunlight. As a result, the Earth's surface absorbs some of this energy and heats up. The Earth cools down by giving off a different form of energy, called infrared radiation. But before all this radiation can escape to outer space, greenhouse gases in the atmosphere absorb and reflect some of this infrared radiation energy back to earth, making the atmosphere and the Earth warmer. This process is called the greenhouse effect. Water vapor (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), and ozone (O_3) are the primary greenhouse gases in the Earth's atmosphere.

CARBON and CARBON DIOXIDE

Carbon is an element that's found all over the world and in every living thing. Oxygen is another element that is in the air we breathe. When carbon and oxygen bond together, they form a gas called carbon dioxide, which is a heat-trapping greenhouse gas. Whenever we burn fossil fuels such as coal, oil, and natural gas—whether it is to drive a car, use electricity, or make products, we are producing carbon dioxide. Forests are also very important because they keep CO2 in a solid form, thus helping mitigate global warming. But, when they are cut down and burned, they add CO2 to the atmosphere. As a common reference in climate talks, the term 'carbon dioxide equivalent' is used to reflect how much global warming a type and amount of greenhouse gas may cause.

CLIMATE CHANGE IMPACT

Climate change impact is the resulting effect of global warning related to change. Assessing this impact/ change includes the use of climate data such as temperature, rainfall and the frequency of extreme events, and non-climatic data, e.g. the current situation on the ground for different sectors including water resources, agriculture and food security, human health, terrestrial ecosystems and biodiversity, and coastal zones as a result of change.

CLIMATE CHANGE MITIGATION

Climate change mitigation should be thought of as human actions to reduce the intensity or severity of climate change. Actions are to result in the decrease of radiative forcing via decreasing the amount of greenhouse gasses in the atmosphere to reduce the effects of global warming. Most often this is done by reducing sources of greenhouse gas emissions, or by increasing sinks – a natural or artificial reservoir that accumulates and stores 'carbon' for an indefinite period. Examples of reducing a 'source' would include using fossil fuels more efficiently for industrial processes or electricity generation, or switching to renewable energy such as solar energy or wind power. Replanting forest or creating new ones is a good example of increasing carbon sinks, i.e. sequester greater amounts of carbon dioxide

CLIMATE CHANGE ADAPTATION

Climate change adaptation is understood as the things we do, planned or not planned (autonomous), that result in adjustments to climate induced hazards. Adaptations are considered as adjustment in natural or human systems in response to actual or expected effects of climate change. These adjustments are intended either to reduce the harm caused by these effects or to take advantage of opportunities that climate change may present, e.g. adaptation funding.

Adaptation activities can be proactive (before the effects of climate change are felt) or reactive (after the effects). They can also be planned and implemented, by public and private actors, or happen autonomously.

HAZARD EVENTS

In terms of 'climate change', a hazard event is a potential event caused by a climate condition that causes the loss of life, and or damage to property, environment, livelihood, and or human dignity. Most common climate related hazards include changes in rainfall patterns resulting in drought and flood events, severe weather related storms resulting in property and or crop losses, to changes in biodiversity within an ecosystem, e.g. loss of species and or pest infestations resulting in the loss of ecosystem services.

CLIMATE VULNERABILITY

Vulnerability is considered as the degree to which physical structures, people, or natural and economic assets are exposed to loss, injury or damage caused by the impact of a hazard. This is similar to 'climate vulnerability', but is broken down into three constituents in direct relation to climate hazards, 1) the degree of exposure to climate related hazards, 2) the degree of capacity available to deal with climate related hazards, and 3) the degree of sensitivity to the given climate related hazard.

DISASTER RISK REDUCTION

Disaster risk reduction is the concept and practice of reducing disaster risks through systematic efforts to analyze and reduce the causal factors of disasters. Reducing exposure to hazards, lessening vulnerability of people and property, wise management of land and the environment, and improving preparedness for adverse events are all examples of disaster risk reduction. Disaster risk reduction as a conceptual framework of elements considers the possibilities to minimize vulnerabilities and disaster risks throughout a society, e.g. to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards within the broader context of sustainable development.

ADAPTIVE CAPACITY

Adaptive capacity refers to individual and or collective strength and resources that can be accessed to allow individuals and communities to reduce their vulnerability to the impact of hazards. These capacities can either prevent or mitigate the impact of a given hazard, or prepare the community to respond to the impact better (readiness).

RESILIENCE

Resilience refers to the capacity of a system, community or society potentially exposed to hazards to adapt via either resisting or changing in order to reach and maintain an acceptable level of function and structure.

This is often determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters to improve risk reduction measures.

ADAPTATION and RESILIENCE BUILDING

The simplest way to understand the difference between adaptation and resilience building is to look at 'adaptation' as the 'what to do' to lower vulnerability to climate change, e.g. increasing household water storage capacity. Resilience building can be looked at as the 'how to' design and or deliver the adaptation to bring forward development value in the context of systems, community, and or society, e.g. establishing a community managed emergency water storage facility. There are six (6) key characteristic to the 'how to' to consider: 1) scale, 2) robustness, 3) rapidity, 4) redundancy, 5) flexibility, and 6) self organization.

1.3 Causes of Climate Change

The Earth's climate has changed throughout history. In the last 650,000 years there have been seven cycles of glacial advance and retreat, with the abrupt end of the last ice age about 7,000 years ago. Most of these climate events are caused by very small variations in Earth's orbit that changed the amount of solar energy our planet receives. However, the current warming trend is of particular significance because most of this is very likely to be human-induced and moving at a rate never experienced in the last 1,300 years.7

Technological advances have enabled scientists to see the big picture, collecting many different types of information about our planet and its climate on a global scale. Studying climate data collected over many years reveal the signals of a changing climate.

(A) We live in a greenhouse (Internal Causes)

Is the greenhouse effect a good thing, or bad thing? Life on Earth depends on energy coming from the sun. About half the light reaching Earth's atmosphere passes through the air and clouds to the surface, where it is absorbed and then radiated upward in the form of infrared heat. About 90 percent of this heat is then absorbed by the greenhouse gases and radiated back toward the surface, which is warmed to a life supporting average of 15 to 17 degrees Celsius.

The greenhouse effect is a good thing. But, too big of a greenhouse effect can cause the temperature of the earth to increase and affect life as we know

it. For example, on the planet Venus, greenhouse gases are abundant, and the average temperature at the surface is more than 457 oc.

People often talk about the greenhouse effect as if it is a bad thing. This is because people are concerned that the Earth is warming up very rapidly. This is happening because 'we' are currently adding more and more greenhouse gases to the atmosphere, e.g. water - H2O, Carbon Dioxide - CO2, Nitrous Oxide - N2O, and Methane - CH4. This increases the 'greenhouse effect' and causes unwanted changes to our planet and our lives. Gases that contribute to the greenhouse effect

Water vapor (H2O): Water vapor is the most abundant greenhouse gas. Water vapor increases as the Earth's atmosphere warms, but so does the possibility of clouds and precipitation, making this one of the most important feedback mechanisms to balance the greenhouse effect.

Carbon dioxide (CO2): A minor but very important component of the atmosphere, carbon dioxide is released through natural processes such as respiration, volcanic eruptions, and through human activities such as deforestation, land use changes, and the burning of fossil fuels. Humans have increased atmospheric CO2 concentration by a third since the industrial revolution began.

Methane (CH4): A hydrocarbon gas produced both through natural sources and human activities, including the decomposition of wastes in landfills, all forms of agriculture – especially rice cultivation, and livestock. On a molecule-for-molecule basis, methane is a far more active greenhouse gas than carbon dioxide, but also one that is much less abundant in the atmosphere.

Nitrous oxide (N2O): A powerful greenhouse gas produced by soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.

Chlorofluorocarbons (CFCs) CFCs are human made compounds used in a number of applications. On a good note, these compounds are regulated from their production phase to their release into the atmosphere by international agreements because they have the ability to contribute to the destruction of the Earth's ozone layer. They are also greenhouse gases.

(B) Human activity as the cause (External Causes)

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), a group of 1,300 independent scientific experts working through the support of the United Nations, concluded there's a 90%+ probability that human activities over the past 250 years have warmed our planet. Industrial activities that our modern civilization depends upon have

raised atmospheric CO2 levels from 280 parts per million to 379 parts per million in the last 150 years. The panel also concluded there's a better than 90% probability that human-produced greenhouse gases such as CO2, CH4 and N2O have caused much of the observed increase in Earth's temperatures over the past 50 years.

Globally, the primary sources of greenhouse gas emissions are electricity and heat (28%), agriculture (14%), transportation (12%), forestry (12%) and manufacturing (12%). Energy production of all types accounts for 65 % of all emissions.

Who's emitting, who's not

Top five (8) greenhouse gas emitting countries – 2005-2011

1. China
2. United States of America
3. European Union
4. India
5. Russia
6. Brazil
7. Japan
8. Indonesia

M***aking the human link***

Agriculture : A large source of methane and nitrous oxide responsible for 15% of the worldwide greenhouse gas emissions. Climate friendly agricultural management, e.g. organic farming, could reduce emissions significantly.

Deforestation: Nearly a quarter of CO2 emissions worldwide result from deforestation. Net forest loss since 2000: 7.3 million hectares/ year – similar to the size of the country Panama. Emissions reductions in this sector include afforestation, reforestation and avoided deforestation initiatives.

Transportation: One quarter of all human made CO2 emissions is transportation related. 750 million cars worldwide emit approximately 2.25 billion tons of CO2 each year.

Industrialization : Industrial production is responsible for more than ½ of all CO2 emissions. Largest quantities of CO2 are emitted by energy producers and energy intensive industries. New filtration technologies could reduce CO2 emissions by 30 to 50%.

EVIDENCE OF A RAPID CLIMATE CHANGE

Global Temperature Rise

All three major global surface temperature reconstructions show that the Earth has warmed since 1880. Most of this warming has occurred since the 1970s, with the 20 warmest years having occurred since 1981 and with all 10 of the warmest years occurring in the past 12 years. Even though the 2000s witnessed a solar output decline, surface temperatures continue to increase.

Warming Oceans

The oceans have absorbed much of the increased heat within the top 700 meters (about 2,300 feet) of ocean, showing a warming of 0.302 degrees Fahrenheit since 1969.

Sea Level Rise

Global sea level rose about 17 centimetres (6.7 inches) in the last century. The rate in the last decade is nearly double that of the last century.

Ocean Acidification

Since the beginning of the Industrial Revolution, the acidity of surface ocean waters has increased by about 30%. This increase is the result of humans emitting more carbon dioxide into the atmosphere and more being absorbed into the oceans. The amount of carbon dioxide absorbed by the upper layer of the oceans is increasing by about 2 billion tons per year.

Shrinking Ice Sheets

The Greenland and Antarctic ice sheets have decreased in mass. Data from NASA's Gravity Recovery and Climate Experiment show Greenland lost 150 to 250 cubic kilometres (36 to 60 cubic miles) of ice per year between 2002 and 2006, while Antarctica lost about 152 cubic kilometres (36 cubic miles) of ice between 2002 and 2005.

Declining Arctic Sea Ice

Both the extent and thickness of Arctic sea ice has declined rapidly over the last several decades.

Glacial Retreat

Glaciers are retreating almost everywhere around the world — including the Alps, Himalayas, Andes, Rockies, Alaska and Africa.

Extreme Events

The number of record high temperature events in the United States have been increasing, while the number of record low temperature events have been decreasing, since 1950. The U.S. has also witnessed increasing numbers of intense rainfall events.

97% of climate scientists agree

Climate-warming trends over the past century are very likely due to human activities. Most of the leading scientific organizations worldwide have issued public statements endorsing this position.

Intergovernmental Panel on Climate Change: Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level. "Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.

International academies - joint statement: Climate change is real. There will always be uncertainty in understanding a system as complex as the world's climate. However, there is now strong evidence that significant global warming is occurring. The evidence comes from direct measurements of rising surface air temperatures, subsurface ocean temperatures, and from phenomena such as increases in average global sea levels, retreating glaciers, and changes to many physical and biological systems. It is likely that most of the warming in recent decades can be attributed to human activities.

1.4 Climate Change Impact and Vulnerability

Climate change has many impacts; some are felt on regional and national scales, some specific to an economic or development sector, some at the community level, and others amongst different members of a family. In general, climate change impact is described by the IPCC as the effects of climate change on natural and human systems. For example, loss in biodiversity or ecosystem function, to losses incurred to people's livelihoods or to their health. Thus, often climate change impacts are described as 'losses', and in some cases 'gains'.

Agriculture

Climate change is expected to affect the agricultural output in Nigeria in several ways. For example, irrigation systems will be affected by changes in rainfall and runoff, and subsequently, water quality and supply. Yet the region already faces water stresses, and future climate change effects on regional rainfall will therefore have both direct and indirect effects on agriculture.

Faced with a 2-4°C increase in global climate, studies suggest there is potential for both gains and losses. For example, for less than 2 °C, agricultural losses will occur in the Philippines, while rice yields in Indonesia and Malaysia are projected to increase. However, overall changes in the net effect around the region is uncertain because of local differences in growing season, crop management, and other factors.

Climate studies generally indicate increasing rainfall throughout much of the region. But even with rainfall increases, temperature increase may threaten agricultural productivity, stressing crops and reducing yields. For example, major cereal and tree crops are very sensitive to projected changes in temperature, moisture, and carbon dioxide concentrations for the region. For example, projected impacts on rice and wheat yields suggest that any increases in production associated with CO2 fertilization will be offset more by losses due to temperature and or moisture changes. Such agricultural impacts particularly affect low-income rural populations that depend on traditional agricultural systems or on marginal lands.

Coastal systems

The coastlines of Southeast Asia are highly vulnerable to the effects of climate change due to the geology and geography of the region's coastal areas, and the growing density in population and infrastructure in the coastal zone. Large tidal variations, tropical cyclones, coupled with the potential increase in regional rainfall, suggests the potential for increased coastal hazards to occur in frequency and in magnitude.

Sea-level rise and increases in sea-surface temperatures are the most probable climate change-related stresses on coastal ecosystems. Densely settled and intensively used low-lying coastal plains, islands, and deltas are especially vulnerable to coastal erosion and land loss, sea water inundation and sea flooding, upstream movement of the saline water into freshwater sources, to the intrusion of seawater into freshwater sources. Especially at risk are the large delta regions of Bangladesh, Myanmar, Thailand, and Viet Nam, and the low-lying areas of Indonesia, Malaysia, and the Philippines.

Ecosystems

Ecosystems in the South-south region of Nigeria represent a key asset contributing to the regional economy by providing food and water that sustain human life and natural resources that support commercial enterprises, e.g. fisheries and forestry. Additionally, the loss of ecosystems can threaten the economic, social and cultural stability of the region.

Land-use change and degradation, overexploitation of water resources and biodiversity, and contamination of inland and coastal waters may threaten many species. Coral reef communities, mangrove wetlands, tropical and temperate forest are being affected. Coral reefs may be able to keep up with the rate of

sea-level rise but may suffer bleaching from higher temperatures. Mangrove communities are also being affected by sea-level rise, and by changing rainfall patterns and runoff that change the flow of freshwater to the coastal zone. A change in the distribution of saline habitat may hamper the function and survivability of the mangrove habitat. Further inland, forests and vegetation may experience some positive effects from climate change, e.g. advancement into new areas. In Thailand, the area of tropical forest could increase from 45% to 80% of total forest cover.

Water

Maintaining the security of water resources is a key priority for Nigeria's rural poor. The region already faces water stresses, and many areas are often dependent upon limited groundwater and rainfall collection. Climate change will further aggravate water shortage by extreme events such as droughts that undermine food security, or extreme rainfall events that increase the risk of flooding. Challenges to water resource management will therefore be exacerbated by sea-level rise that would contribute to salt-water intrusion into available freshwater resources.

Scientific assessments project changing patterns of runoff and river flows in the region in the next decades, as well as increases in water management costs and increases in the number of rural poor affected by water stress. Runoff from rainfed rivers may change in the future. A reduction in snowmelt water would result in a decrease in dry-season flow of these rivers.

Larger populations and increasing demands in the agricultural, industrial, and hydropower sectors will put additional stress on water resources. Pressure will be most evident on drier river basins and those subject to low seasonal flows. However, national studies suggest both gains and losses as a result of increased runoff in some river basins in response to increasing rainfall. For example, water stress in the Mekong Delta will rise, and water shortages in the Philippines may rise or fall depending on the location.

1.4.1 Vulnerability

Climate change impacts are often described in the context of vulnerability to natural hazards such as floods, droughts, cyclones, and seasonal variations and landslides, to extreme weather events vis-à-vis those being affected. Vulnerability to these natural hazards is not new, and for the most part, the hazard has remained the same. Thus, when considering climate change impact, the intent should be to understand impact in terms of 'projections to future changes' due to climate change. And if climate change adaptation is considered, then climate change impacts should be distinguished in two ways:

• Potential impacts: All impacts that may occur given a projected change in climate, without considering adaptation. • Residual impacts: The impacts of climate change that would occur after adaptation.

In general terms, the level of climate change impact felt on a system and or community, etc. is linked to the three (3) constituents of climate change vulnerability:

1) exposure to hazards,

2) sensitivity to hazards, and

3) one's adaptive capacity to deal with hazards

When a community, or even a forest, is unable to cope with the adverse effects of climate change, e.g. climate variability and or extremes, then it is considered to have a high degree of climate change vulnerability. This inability is made up of other factors. For 'exposure', this can be thought of in two different ways. For example:

1) am I exposed to the full force of the hazard, or just some of it, and

2) how often am I exposed to this hazard.

Sensitivity to hazards has a lot to do with the surrounding conditions within and around the location of the hazard. For example, if an area is highly populated and natural resources are scarce, communities would be very sensitive to small climate change stressors, e.g. the dry season being prolonged by 2 weeks. Conversely, the same area but with a much lower population would not result in a similar outcome. Adaptive capacity carries a similar meaning as to when development practitioners refer to 'capacity'. With this shared understanding, note that the level of capacities that can be mobilized to adapt to climate change stressors changes the outcome of the impact.

By Definition

Climate Change Vulnerability: Defined as the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity;

• ***Exposure:*** Defined as "the nature and degree to which a system is exposed to significant climatic variations";

• ***Sensitivity:*** Defined as "the degree to which a system is affected, either adversely or beneficially, by climate-related stimuli"; and

• ***Adaptive Capacity:*** Defined as "the ability of a system to adjust to climate change (including climate variability and extremes), to moderate the potential damage from it, to take advantage of its opportunities, or to cope with its consequences".

1.4.2 Vulnerability of different social groups

It is widely said that the **poor** will be hardest hit by the impacts of climate change, especially those whose livelihoods are most heavily *dependent* on natural resources. The vulnerability of the poor is generally seen as resulting from limited access to assets combined with physical exposure to predicted climate-related hazards. From a different perspective, many development practitioners are asking for more of a multi-dimensional analysis of vulnerability in relation to poverty at the micro-level. This puts focus on existing vulnerabilities of different groups of poor people to natural variations in the climate and the coping capacity they already possess.

Women: As the majority of the world's poor, women are likely to be disproportionately affected by the impacts of climate change. Girls and elderly women especially are often the most vulnerable in times of stress. Particular vulnerabilities are identified with regards to

1) access to health services

2) dependence on agriculture as a subsistence and or livelihood source

3) access to water

4) access to formal and informal labor in times of climate-related disasters, and
5) displacement and conflict.

However, the thought of women solely as victims of climate change is being challenged. There are calls for a more thorough gendered analysis of climate change impacts so that responses can be better tailored to the specific needs of both men and women, and women's ideas for adaptation are included in decision-making processes.

Children: Children are particularly susceptible to disaster-related and health impacts of climate change including an increased occurrence of malaria, diarrhea and under-nutrition. As with other social groupings, the idea that children should be seen solely as victims of climate change is contested. Instead, children are increasingly portrayed as active agents of change who have an important stake in the future. Hence, a rights based view of this situation requires that greater attention be paid to children's issues in adaptation policies and that they play a role in decisions that affect them.

Minorities and indigenous peoples: 'Minorities', defined as those groups that are numerically smaller within a population, and who share a common religious, ethnic, or linguistic identity. 'Indigenous peoples' refers to groups who are seen as the 'first people' to inhabit a territory, and who have a special connection with the natural environment. For both groups, the impacts of climate change are rarely mentioned. What is clear is that Indigenous peoples and some minorities often have a close relationship with their natural environments be it for food security, livelihood, and or spiritual fulfilment. This makes them especially sensitive to climate change on many levels. Also, these groups tend to live in poverty, that of which heightens their degree of vulnerability. Social exclusion and discrimination is also part of their vulnerability profile, with the aforementioned making it harder for them to cope with the impacts of climate change, or to exert influence over governments regarding support for adaptation.

NOTE: Men, women, children, minorities and indigenous people are not impacted by climate change equally. This is because each has a different degree of vulnerability given their adaptive capacity. This capacity is, among others, a combination of their socio-economic status, access they have to natural resources and technology, to infrastructure. Thus, it is important to know as much about individual and group vulnerabilities in order to plan and support adaptation needs, and who best to support their integration into decision-making processes

1.5 Climate Change Adaptation and the Development Sector

Adaptation

Adaptation simply put is something that we do as a reaction to some form of stimuli, e.g. new conditions, stresses, and or natural hazards. Sometimes the reaction is planned and sometime not. Together, if done right, they enhance people's resilience to climate change. The main objective to climate change adaptation is to achieve ***RESILIENCE***. Resilience is the ability of a community to resist, absorb, and recover from the effects of hazards in a timely and efficient manner, preserving or restoring its essential basic structures, functions and identity. How does adaptation start?

Adaptation most often will begin when a 'hazardous' condition is felt, or expected, i.e. the climate change impact. For communities, the impact is shaped by factors of exposure, sensitivity, and their adaptive capacity. Important to note is that factors related to exposure and sensitivity are greatly influenced by the condition of the surrounding ecosystems, peoples livelihood types, and the level of infrastructure within a given area. This is part of the 'enabling

environment' for adaptation. How communities respond to climate change impacts within this enabling environment is dependent on the availability of assets (financial, human, natural, physical, and political), and how these can be mobilized to respond to a given impact.

Autonomous and planned adaptation

There are two forms of adaptation

1) Autonomous Adaptation or coping strategies, and

2) Planned Adaptation.

The main differences between the two is that Autonomous Adaptation/ coping strategies are not well planned, and more of a short term reaction that ends when the stimuli ends. Planned Adaptation is just that, planned, and sustained for the long term.

For the individual, household, village and beyond, adapting to climate change means adapting to losses, losses in areas of livelihood production, food security, human safety and general health, and ecosystem services. The driving forces behind adaption constitute a range of climate related cause and effect stimuli on ecosystems, combined to a range of socioeconomic and political influences. These influences often shape if an adaptation attempt will be successful or not, and for whom. Often autonomous adaptation actions result in negative consequences.

This is influenced by a number of factors:

- The ability of information, goods, and services to flow into and out of affected areas
- Existing patterns of vulnerability created by gender, income and social position
- The nature of livelihoods within a given area
- The ability of people to migrate or access non-farming sources of income
- Access to education, self-help groups, government departments, banks, NGOs and social networks
- The nature of physical infrastructure (communication and early warning systems, roads, houses, water supply systems, dikes etc.)
- The ability of a household to obtain secure sources of water for domestic use
- The quality of the natural resource base.

Planned adaptation at the local level begins with the mobilization of assets; how this is done, supported, and or influenced determines the result. Conceptually, local level adaptation strategies and their outcomes operate in a cyclic process of influences, those operating at the level of the individual and or household, and those at the community level. Each has a set of component factors that

influence one another. For example, the opportunity for a person or household to adapt often depends upon their state of poverty, social status, and knowledge. Whereas, options for adaptation are more so influenced by community social structure, land tenure security, and an ability to access assets

1.5.1 Adaptation and the development sector

Understanding what is meant by vulnerability in the context of climate change is crucial for developing effective adaptation responses. Vulnerability is generally defined as either a biophysical or social condition, depending on whether climate change is seen as a scientific or a social concern. A related distinction is made between vulnerability as a result of pre-existing political, institutional, economic and social context within which the impacts of climate change are experienced. From a scientific view, focus tends to be on developing technical responses/ adaptations at the sectoral level based on future climate change scenarios, whereas the social approach focuses on building the capacity of social groups and institutions to cope with a range of potential stresses and changes, including but not limited to, climatic changes.

For many development agencies, climate change takes a social perspective to vulnerability, emphasizing the importance of social and institutional context in shaping the vulnerability of the poor - desegregated into gender, age, culture, education and ethnicity to determine vulnerability. Increasingly, attention is also being given to the role of these social groups to develop effective adaptation responses to climate change, and at the same time trying to realize the Millennium Development Goals (MGDs). This is a key challenge for development agencies given the linkages between climate change, poverty, social marginalization and the MGDs.

1.6 Climate Change and Resilience

Resilience – The capacity of a system, community or society exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of function. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures.37

Responding to climate change threats through adaptation is just one component of a larger sustainable development framework. Globally, moving towards an ever-changing climate change context, looked for are development options that will enable communities, systems, and/ or society to become more resilient to climate change today and into the future. As the focus of this manual is on adaptation, it is important to understand that in the most simplistic context,

‘adaptation’ is the ‘what to do’ to lower vulnerability to climate change, resilience building should be seen as the ‘how to do it’ in the context of systems, community, and or society.

Resilience is a debated concept, and definitions differ among different writers, yet common to all is the ability to withstand an external disturbance, and the ability to change and sustain this change in the face of an external disturbance, i.e. going beyond survival.38 Resilience can be seen as synonymous with ‘adaptive capacity’; for example defined as ‘the ability of a system to adjust to climate change (including variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences’, yet there are specific attributes, sometimes referred to as sub-properties of a system, that set firm the importance of focusing on resilience building.

1.6.1 Six Factors of Resilience in Adaptation

Ospina, A., V., and R., Heeks (2010) have summarized these ‘attributes’ into six (6) elements:39 In context:

• **Robustness:** refers to the ability of the system to maintain its characteristics and performance in the face of environmental fluctuations or shocks. Within robust systems, reinforcing influences between CBA components help spread the risks and effects of disturbances widely to retain performance. This could include the strengthening of livelihood assets or of the connection between the assets. Examples of climate change specific actions to improve robustness include investment in strong flood barriers, developing local knowledge management systems with complete data needs, to the selection of crop varieties that are physically able to survive under changing climatic conditions, yet may have lower yields.

• **Scale:** refers to the range of assets and structures a system can access in order to effectively overcome or bounce back from the effects of disturbances. Scale involves, for example, access to networks of support beyond those existent at the immediate community level. From another view, are adaptation interventions large enough to create a difference, e.g. 10 farmers adapting or 100 farmers adapting their farms to ensure food security in a given area?

• **Redundancy:** refers to the extent to which components within a system can compensate for another in the event of disruption or degradation. Redundancy may also be seen as a collection of processes, capacities and response pathways that allow for partial failure within a system without complete collapse. Collaborative and multi-sector approaches can contribute towards redundancy as they facilitate the existence of overlaps and multiple sources of support and expertise that can help fill the gaps in times of need.

• **Rapidity:** refers to how quickly assets can be accessed or mobilized to achieve goals in an efficient manner. This can be critical particularly when responding to an acute climate related disturbance. This could be the availability of financial mechanisms, savings, credit or insurance that can be mobilized. Rapid access to information, both incoming to and outgoing, will also be key to making quick decisions and mobilizing support after hazardous events.

• **Flexibility:** refers to the ability of the system to undertake different sets of actions to make use of opportunities that may arise from change, e.g. a combination of processes, structures or policies that can be utilized to maintain function and direction of a system. This suggests the relevance of flexibility to respond to the challenges at micro, meso and macro levels. Flexibility in the face of climate change can come from various sources, including the existence of social networks that can suggest different courses of action for problem solving.

• **Self-organization:** refers to the ability of the system to independently re-arrange its functions and processes in the face of an external disturbance, without being forced by the influence of other external drivers. Self-organization can be a threefold process based on thinking, communication, and co-operation, brought together to address climate change impacts.

1.7 Impact of climate change on global peace and security

Using facts and analysis from the *SIPRI Yearbook 2016,* we've taken a look at 7 of the most important 'compound factors' that climate change can influence….

1. Local resource competition

The impacts of climate change directly affect the availability, the quality, and access to natural resources, particularly water, arable land, forests, and extractive resources. Growing competition when supply cannot meet demand can lead to instability and even violent conflict where there are no adequate management institutions or dispute resolution mechanisms in place. In the worst case, natural resource competition can contribute to regional instability or civil conflicts. For example, land disputes were a major driver of 27 of the 30 civil conflicts in Africa between 1990 and 2009.

2. Livelihood insecurity and migration

Climate change increases the human insecurity of people dependent on natural resources for their livelihoods. Rising human insecurity can induce them to migrate or seek out alternative, illegal sources of income, which in turn can also drive conflict. Where there is also resource scarcity in the alternative location or job sector, there is an increased risk of conflict between the newcomers and

those who were there first. For example, in northern Kenya, many nomadic pastoralists have turned to fishing on Lake Turkana as recurring drought has reduced the viability of maintaining cattle herds, leading to lethal conflicts between rival Kenyan tribes and with Ethiopian fisher folk on the other side of the lake.

3. Extreme weather events and disasters

How a government reacts to and prepares for natural disasters can increase or mitigate the risk of conflict following such an event. In the worst case, government action after a disaster can create grievances and increase the risk of conflict, while in the best case government action can be a springboard to build peace and increase resilience. Disasters put additional strain on already weak government systems, disrupt economic activity, displace communities and often require a large-scale humanitarian response which a weak state is less able to manage.

4. Volatile food prices and provision

Climate change, in conjunction with other factors such as population growth, rising energy prices, and the rapid advance of biofuel production from crops, has heightened the volatility of food supplies and prices around the world. While higher food prices do not always lead to violent conflict, sudden food price hikes are a major driver of civil unrest and protest. High unemployment, as well as social and economic marginalization also contribute to this political instability – with food price riots often used as a political tool to demonstrate people's discontent. In 2008 a global food crisis saw riots in response to food and fuel inflation across 48 countries, most notably including Bangladesh, Burkina Faso, Haiti, and Pakistan.

5. Trans-boundary water management

Shared water resources are often a source of cross-border tension. As the impacts of climate change affect the supply and quality of water, and at the same time the demand for water continues to grow, competition over water is likely to increase pressure on existing water-sharing agreements and governance structures. There have been no occurrences of wars fought over water to date, but as water supply becomes less certain and demand grows, climate change could compound the risks.

6. Sea-level rise and coastal degradation

Rising sea levels threaten the viability of lives and livelihoods in low-lying areas. More frequent flooding and the risk of loss of territory to the sea increase the prevalence of displacement, migration, and social unrest. Particularly at risk are the small island states, which face the loss of their entire territory, and cities built on river deltas and coasts, such as Karachi in Pakistan and Lagos in Nigeria, where flooding and storm surges will have a major impact on economic

development and large, highly concentrated populations. Territorial loss may increase migration, which in turn can increase competition for resources— in some cases, this causes heightened tensions between migrants and host communicates, increasing the risks of conflict.

7. The unintended effects of climate policies adaptation and mitigation

In an already fragile context, policies designed to help vulnerable communities adapt to climate change can increase fragility risks if they fail to consider the wider economic, political, and social impacts—particularly any knock-on consequences they may have on access to resources, food security, and livelihoods. Efforts to cut carbon emissions through shifts to green technologies and renewable energy could also pose a risk of conflict as these will create new power dynamics within highly politically sensitive energy sectors.

CASE STUDY

Recharging Lake Chad: Key to Ending the Conflict Between Nigeria's Farmers and Herders

The years-long battle over land between herdsmen from Nigeria's Fulani tribe and farmers in the central region known as the Middle Belt has grown dramatically this year. The dispute has led to the killing of thousands of persons in attacks often carried out with traditional weapons including arrows, bows, and machetes. According to a report released in late July by the International Crisis Group (ICG), as many as 1,300 people have been killed as a result of the conflict in the Middle Belt since January, making the fighting between herders and farmers six times deadlier than Boko Haram-related attacks so far this year.

The root of the conflict lies in the forced southern migration, owing to drought, of herdsmen from their traditional grazing grounds, mostly in the northeast of Nigeria. Lake Chad began to shrink in the 1960s due to changes in climate patterns and was once the sixth largest lake in the world, providing freshwater to over 40 million people across Nigeria, Chad, Niger, and Cameroon. The lake has decreased in size from 22,000 square kilometers in the 1960s to fewer than 1,500 today; and it may even completely dry up within 20 years according to the Nigerian government. As the lake shrank, large numbers of herders had to search for alternative pastures and sources of water for their cattle, leading to encroachment on settlements and farmlands. These encroachments have brought on disputes over crop damage and cattle theft that mostly turn violent. And because the herders are predominantly Muslim and the farmers largely Christian, religious radicals have exploited the conflict.

Before drought began to suck up Lake Chad more than five decades ago, the best grazing land was in the Sahel area of the lake's basin. An article published by the Guardian noted that an estimated seven hectares of land in the basin could feed one Tropical Livestock Unit for six months of the year at the time. The drought, the report explains, "led to the loss of pasture and the initiation of the transhumance migration towards the guinea savanna in the south of the basin."

But this migration into the savannah and rainforest of the Middle Belt did not just increase pressure on the land and pave way for the conflict in the region, it also created an opening for militant groups to establish themselves in areas around the Lake Chad Basin.

Boko Haram, for instance, moved in and created a base in the area, as most of the traditional populations moved out. The group's activities in northeast

Nigeria have also had an effect on the conflict in the Middle Belt. ICG report noted that the "growing availability of illicit firearms—locally produced, circulating from other Nigerian conflict zones in the North East and Niger Delta or smuggled in from other countries—has also enabled the carnage."

Over the years, Nigeria has struggled to find a simple solution to the herdsmen-farmers crisis as it gradually expanded deeper into southern portions of the country. Peace initiatives at local levels have failed to yield tangible results, attempts by Nigerian authorities to establish grazing areas in the north-central and in southern states have been opposed by the locals, and new laws banning open grazing in some states in the Middle Belt have made matters worse, as the efforts of the government to clamp down on erring herdsmen have only escalated the conflict.

The most regular, but often inadequate, response from the Nigerian government to the conflict in the Middle Belt has been the deployment of police and army units to affected areas to address the problem. But even Operation Whirl Stroke—unveiled by the military in May—has not stemmed the violence in the region. Moreover, as a consequence of the military operation, soldiers have been among the casualties. Clearly, a purely military response is not the most effective solution to the crisis.

On the other hand, it is also clear that this conflict that will not simply disappear on its own. As long as herdsmen keep moving their cattle southwards in search of pastures, there are bound to be encroachments into farmlands that could lead to clashes with farmers. And if nothing is done to deal with this problem, the violence could go far beyond the Middle Belt into areas in the Niger Delta region. A number of suggestions have been made on how to end conflict. For its part, ICG proposed a few steps for the government to implement including strengthening security arrangements for herders and farming communities in the north-central zone, building conflict mediation and peacebuilding mechanisms, and establishing grazing reserves in consenting states.

But history has shown that these steps, though useful, are not alone enough to deal with the conflict. In fact, constant debating about them could trigger renewed conflict, as has been the case in the last two years. Between January 2016, when the government announced a plan to appropriate land for grazing areas across the country, and November 2016, when the government inaugurated a railway-based arrangement for transporting cattle from north to south—plans which were later shelved—more than 2,000 people were killed as the debate between the federal and state governments over how and where herders can take their cattle for grazing created even more tension. The increasingly ethnic and religious tone of the clashes has also made any permanent resolution more complicated. While the social dimensions of the violence will no doubt require longer-term measures, in the short term the most pressing concern is to save lives, and an effective means for achieving this goal is to recharge Lake Chad.

In February, Nigeria's Vice President Yemi Osinbajo, at a conference in Abuja, admitted that the foray of herdsmen deeper southwards has "led to deadly clashes" with farmers and that saving Lake Chad is paramount to the "security of the fastest growing population in the world." In other words, replenishing the

lake will boost vegetation and ensure that herders do not move southwards in search of already available water and pastures, which could also exacerbate food security issues in a region where more than three million people are currently facing malnutrition.

But recharging the lake will not be easy. Plans by the Lake Chad Basin Commission (LCBC) to replenish it entail pumping water through a 2,500 kilometre navigable channel from the Ubangi River in the Congo Basin at a reported cost of $23 billion, a project that, as Osinbajo affirmed, will "require greater regional, continental, and international support" to achieve. Since the plan to boost the lake was announced by the LCBC in 1984, however, very little progress has been made, a sign that complete replenishment of the lake is far from a certainty. The sum of $5 million dollars donated by Nigeria in 2004 for a feasibility study that took about eight years to achieve has been the highest amount so far invested into the project. But recent interest by leaders of affected countries in discussing the project gives hope of wider action in the near future.

While recharging Lake Chad will not solve the crisis permanently, it will address drought mitigation, control desertification, and could even act as a catalyst for the establishment of fisheries and irrigation activities. These together could ultimately provide a livelihood and home for displaced herders and, most importantly, save thousands of lives.

By: Philip Obaji Jr. is a journalist based in Nigeria. His work on jihadist groups, terrorism, and Africa has appeared in numerous publications.

1.8 Main conclusions and recommendations on Peace, Security and Climate Change.

Climate change risks affect human security but also raise hard security issues at the national, regional and global levels. Key areas where security implications are already visible include extreme weather events, food security, transboundary water management, energy production, climate -induced mass migration and increased competition over natural resources.

Compound risks

Climate change is not a direct cause, but a contributor to security risks and even violent conflict. Climate change is no longer considered merely a threat multiplier but more a catalyst for conflict, as climate change impacts tend to accelerate instability in vulnerable areas of the world. Addressing these compound risks is important for preventive diplomacy, climate diplomacy and a more proactive risk management. The compound risks are interlinked, are driven by socio-economic, environmental and political pressures across sectors and intensify each other. While ***awareness*** about the security implications of climate change

has been growing, there is still a need for clear communication and political will to translate this into action. There is a clear need for reconciling long-term commitments in the field of climate change with near-term political objectives. There is also a need for mainstreaming climate change and security and for governance mechanisms at the global level.

Transboundary co-operation and trust-building

There are already examples of good practices in the OSCE region where joint climate action has been an effective catalyst for transboundary co-operation. Climate change co-operation and climate diplomacy are also good entry points for contributing to preventing conflict situations and strengthening trust. They can also have significant benefits for broader relations between countries. This, however, requires a different level of engagement from foreign policymakers. Technical assistance to transboundary co-operation, e.g., in shared river basins, has to be accompanied by high-level political processes and complemented through multiple tracks in order to lead to political co-operation, at the same time including more informal settings with civil society and international and regional organizations such as the OSCE.

Multi-dimensional responses

In order to ensure ownership and effective policies to address the security impacts of climate change, integrated, multi-Sectoral and comprehensive policies among foreign affairs, humanitarian action, development and Security, communities are needed. International and regional organizations have an important role to play in this context. The emerging discourse on "resilience" could be used as an umbrella to integrate different policy fields such as foreign policy and preventative diplomacy, peace building, climate change adaptation and humanitarian assistance.

The OSCE could contribute in this regard by inter alia providing security perspectives and by continuing to provide an inclusive platform for dialogue among heterogeneous stakeholders.

Nexus approach

The climate-water-food-energy nexus is a useful approach to assess and address multi-dimensional security impacts and balance the interests of different sectors.

Systematic dialogue

There is a need for more awareness about climate change and more systematic dialogue between different sectors and with international

organizations such as the OSCE. This includes a common terminology and improved information flow among the various stakeholders, in particular policymakers, the scientific community and experts.

Partnerships:

Although time-consuming and resource-intensive, partnerships and cooperation at all levels are essential and should include civil society, academia, the private sector and the public at large. The African Union should explore opportunities for co-operation, including through partnering with relevant business and academic networks.

Broad participation and local action

Active involvement of civil society organizations, community level action and bottom-up approaches to climate change mitigation and reducing vulnerabilities are important, which also necessitates adequate tools to understand risks at the local level. Broad engagement of people in addressing climate change, including in climate-related disaster risk management, can become an important confidence-building measure

.

Regional action

Addressing climate change at the regional level is critical as it links the efforts undertaken at the global and national levels. For climate change mitigation, enhancing regional co-operation on sustainable infrastructure and integrated energy systems is essential.

Decarbonization is a priority

If human impact on climate change is not mitigated, it will not be possible to manage the crisis only by addressing emergencies and increasing resilience. Therefore, de-carbonization is a priority of the first order.

Renewable energy:

Technologies such as hydropower are important for climate change mitigation and sustainable development. However, it is important to make use of tools such as environmental impact assessments to balance benefits and possible negative effects on the environment.

Better analysis

A better understanding of the drivers of instability, including those related to climate change, can contribute to developing more effective security policies. The tremendous analytical, research and development capacities of the military and intelligence community should be used for development and civilian purposes such as the mapping of environmental

risks. The OSCE could engage in assessing and mapping climate change hot-spots.

Role of the OSCE

Due to its experience in crisis management, conflict prevention and confidence-building, as well as its comprehensive security approach, the OSCE is well placed to identify and act on the security implications of climate change. The OSCE can also play a meaningful role in supporting implementation of relevant global commitments by its participating States . The OSCE's experience in addressing climate change is considered valuable beyond the OSCE area, including in the Southern Mediterranean region. The African union should do same within the African continent.

==========**END OF TRAINING**==========