

Environmental Problems, Insecurity In The Sahel Region And Implications For Global Security

Temitope Francis Abiodun, Akanbi Jamaldeen Oluwasegun & Akinlawon F. Adebola

Abstract

Human security issue remains an empathetic approach towards comprehending the security environment in Sahel region as there is strong connection between the environment and human survival. Though, it remains indisputable that every region of the global world has one issue or the other bedeviling it at a particular point in time. The Sahel region is not an exception as it is faced with diverse environmental problems, impacting heavily on her survival and global security. The study therefore examines the various environmental problems and insecurity confronting Sahel region, and effects of the decadence on the region and global security. Various concepts are clarified for thorough comprehension of the study while the study adopts the use of primary and secondary sources for data gathering with adequate reliability index. The study also portrays the various causative-factors of environmental problems confronting the Sahel region which include: human activities such as: over-farming, over-grazing, climate change, overpopulation of marginal lands, natural soil erosion, among others, resulting into serious desertification, and thus making shelter construction activities difficult respectively. The study, however, recommends the need for crafting and effective policy and as well full implementation of such, embellished with adequate intelligence, critical analysis and expertise for the states: Niger, Mali, and Chad among others to retain their landmass. In the same vein, the modest technique to achieve this is dependent on focused and collaborative efforts of global system towards ensuring a more secured, peaceful and prosperous Sahel region and the world at large.

Keywords: Environmental issues, Human security, Sahel region, Desertification, Systems theory, Global security.

Introduction

Although, industrial revolution improved productivity, but due to the overexploitation of natural resources and consumerism growth, it has had devastating effects on the environment (Casalo and Escario, 2018). Global warming, water shortage, air pollution, soil erosion, natural resource depletion, deforestation and loss of biodiversity are some of the current environmental problems which greatly threaten the sustainability and make human vulnerable to disasters and tragedies (Lange and Dewitte, 2018). In same parlance, the global community has now become seized with the spiraling crisis in the Sahel. For centuries ago, the climate of the Sahara and the Sahel regions began appearing drier at an exceedingly quick pace; lakes and rivers began to shrink significantly with increasing desertification as a result of climate change. The phenomenon, in turn, decreased the amount of lands that were conducive for settlements and resulted into migration of farming lands to a more West African humid climate respectively (Centre for Strategic and International Studies, 2019).

However, the Sahelian kingdoms had a series of monarchies centred between the 9th and 18th centuries and her wealth is said to have come from controlling the trans-Saharan trade routes across the desert, especially the slave trade with the Islamic world respectively. It was, however, observed that the energy force of Sahel came from large pack of animals which include:

camels and horses that were fast enough to keep a large empire under central control and were also useful in battlefields. All of these empires were quite decentralized with member cities having a great deal of autonomy. Also, the first large Sahelian kingdoms emerged after 750 AD with the support of several large trading cities in the Niger Bend region, Timbuktu, Gao, and Djenné (Lange and Dewitte, 2018). The Sahel states later were restrained from expanding towards south into the forest zone of Ashanti and Yoruba people as the horses and camels could not survive the heat and diseases in the region.

Moreover, the most sustainable way of utilizing the Sahel is through the traditional way in which the people of the region have found themselves in activities such as semi-nomads, farming and raising livestock in a system of transhumance. The difference between the dry North with higher levels of soil nutrients and the wetter South with more vegetation is utilized by having the herds graze on high quality feed in the North during the wet season, and trek several hundred kilometres to the South to graze on more abundant, but less nutritious feed during the dry period (Lamprey, 1975). The constant increase in population due to polygamy, child marriage, lack of birth control amongst many others coupled with global environmental issues have overtime reduced the land in which both famers and herders use and have increased the need for

more food consumption. These issues have gradually brought about collision between the farmers and herders, leading to violence, lack of food security, lack of human security and many others (Lamprey, 1975).

Environmental problems have extended beyond the local level and sometimes threaten the stability of our planet's life-support systems. Greenhouse gas emissions, long-range air pollution, careless dispersion of toxic chemicals, transport of unwanted species by ships and air as well as the extinction of species and the unwanted spread of genetically modified organisms all have global effects even if they started only at a local level (Xie, 2004). For centuries before now, herdsman across Africa's Sahel used to head towards south during the long hot dry season, in search of green pasture to feed their animals. As a result of this, the herders are usually welcomed because of their cattle and goats. Complete violence is also controlled through customary arrangements and swift mediation from local leaders. In spite of the peace driven process, the relationship still seems to be crumbling. As a result of this, thousands of civilians from Burkina Faso, Chad, Mali, Mauritania, Niger and Nigeria are killed every year in bloody inter-communal violence level (Xie, 2004). Several lives are caught up and claimed in deadly overlapping conflicts that are spinning out of control.

Therefore, every African life that ends diminishes all of us in many and various ways. The world has now become a global village as

whatever happens in African continent automatically has great impact on the rest of the globe, to include the most successful and technologically advanced states. The global implications of human insecurity in Africa are highly evident as everything is intertwined, connected and related in all ramifications.

Conceptual Clarifications

Environmental problems

This is conceptualized as complex problems that have taken different dimensions of: economic, social, ecological among others. Globally, mankind is at the sea of global crisis that is characterized by dangerous environmental problems such as; climate change and global warming. This remains conceptualized as a global environmental security problem and at the same time, environmental problems being discussed here are related to scarcity of land or other vital resources in which the scarcity has in turn rendered the space environmentally disordered (Azam, 1999). The global environmental problems however have direct impacts on and remain some of the triggers of the rural environmental problems.

Global security

Understanding the concept of security adequately aids our comprehension of what the global security means. Therefore, security is conceptualized to be freedom from potential harm (or other unwanted coercive change) caused by others. In the same vein, the

beneficiaries of security include various: individuals, social groups, objects and institutions, ecosystems or any other entity or phenomenon that appear vulnerable to unwanted harm in the society. Also, security is defined to mean adequate protection from hostile forces and this may take some different dimensions which include; freedom from want or desires; presence of an essential good (food security); resilience against potential damage or harm (secure foundations); secrecy (a secure telephone line); containment (a secure room or cell); a state of mind (emotional security) among others (Centre for Strategic and International Studies, 2019). At the same time, the concept of security is in tandem with acts and systems whose purpose may occur to be provisioning security (e.g. security forces, security guard, cyber security systems, security cameras and remote guarding).

Having gained the knowledge of security, global security is therefore known to be international security. It is a concept that encompasses all the measures taken by states and international organizations such as the United Nations (UN), European Union (EU), and others, to ensure mutual survival and safety. However, these measures include; military action and diplomatic agreements such as treaties and conventions. International and national security is invariably linked as international security is national security or state security in the global arena. Therefore with the end of World War II, calls for security on a global scale gained

momentum respectively. Thus the concept of global security has expanded over the years as it encompasses an interconnection of global issues that affect human survival (Centre for Strategic and International Studies, 2019). This ranges from the; conventional modes of military power, the causes and consequences of war between states, economic strength, to ethnic, religious and ideological conflicts, trade and economic conflicts, energy supplies, science and technology, food, as well as threats to human security and the stability of states from environmental degradation, infectious diseases, climate change and the activities of non-state actors respectively.

Overview Of The Sahel Region

The word Sahel emanates from an Arabic pronunciation, "*sa:ħil*" meaning, coast or shore. It is, however, known to be the transition of the eco-climatic and bio-geographic zone of Africa between the Sahara to the North and the Sudan Savannah to the South (Azam, 1999). In the same vein, Sahel as a region has a semi-arid climate that extends across the south-central latitudes of Northern Africa between the Atlantic Ocean and the Red Sea. The Sahel region is defined as the area of Africa lying between 12°N and 20°N. This area shares two climatic characteristics: one rainy season per year and August as the month of highest precipitation. The area covers all or part of 12 countries from the Atlantic coast to the Red Sea: Mauritania, Senegal, The Gambia, Mali, Burkina

Faso, Niger, Nigeria, Chad, Sudan, Ethiopia, Eritrea and Djibouti respectively (Azam, 1999).

The United Nations in its report (1992) estimates that about eighty percent of the Sahel's farmland remains degraded and the climate change comes into play as temperature rises faster than the global average. As a result of this, droughts and floods are growing longer and more frequent, therefore undermining food production in all ramifications. However, large population of about fifty (50) million in the region lives on livestock rearing for survival but the land available to pastoralists is fast being lost due to the land shrinking in the area. This situation, is however being worsened by population growth that has now pushed farmers northward in the region in a bid to cultivate more crops for man's use.

As the adverse climatic conditions degenerates to violence, breeding all sorts of terrorist upsurge has in addition worsened the already bad situation existing in the region. Studies have shown that temperatures in the region could a times be around 3-5 ° C warmer by the year 2030, leading to higher temperature degrees. Furthermore, rainfall has remained erratic as wet seasons continue to decrease drastically; the situation led to the food crisis experienced in 2012 where more than 33 million people in the region suffered from food insecurity (United Nations , 1992). During the year, decreasing grain and food production in Sahel region forced pastoralists to search desperately for fertile pasture.

Also in the region, grassland and savannah are mostly found while the region is almost dominated by various annual grass species like: *Cenchrus biflorus*, *Schoenefeldia gracilis*, and *Aristida stipoides*. In the region, species of acacia are also the dominant trees. During the long dry season, many trees lose their leaves and the predominantly annual grasses die (United Nations Office for the Coordination of Humanitarian Affairs, 2013). The Sahel was known to be formerly populated with grazing mammals, including the scimitar-horned Oryx (*Oryx dammah*), dama gazelle (*Gazella dama*), Dorcas gazelle (*Gazella dorcas*), red-fronted gazelle (*Gazella rufifrons*), the giant prehistoric buffalo (*Pelorovis*) and Bubal hartebeest (*Alcelaphus busephalus buselaphus*), along with large predators like the African wild dog (*Lycaon pictus*), the Northwest African cheetah (*Acinonyx jubatus hecki*), the Northeast African cheetah (*Acinonyx jubatus soemmeringii*), the lion (*Panthera leo*). Most species have been greatly reduced in number due to overhunting and competition with livestock, leaving the region with some vulnerable species such as (Dorcas gazelle, cheetah, lion and red-fronted gazelle) and fewer more endangered (Dama gazelle and African wild dog) (Lamprey, 1975). The existence of seasonal wetlands is significant for migratory birds to move within African and on the African-Eurasian flyways.

Climatic Condition in the Region

The region is characterized with a typically hot, sunny, dry and somewhat windy climate

throughout the year. The climate in the region is similar to, but less extreme than the one in Sahara desert situated to the north. The region gets a moderate amount of rainfall annually (Potts, 2013). The steppe has a very long, prevailing dry season and a short rainy season. It can also be said that the precipitation is also extremely irregular, and varies considerably from season to season. Most of the rain usually falls during four to six months in the middle of the year, while the remaining months may remain absolutely dry. In addition to the statements above, the entire Sahel region generally receives between 100 mm and 1,000 mm of rain yearly (Dregne, 1994). A system of subdivisions often adopted for the Sahelian climate based on annual rainfall is as follows: the Saharan-Sahelian climate, with mean annual precipitation between around 100 and 200 mm (such as Khartoum, Sudan), the strict Sahelian climate, with mean annual precipitation between around 200 and 700 mm (such as Niamey, Niger) and the Sahelian-Sudanese climate, with mean annual precipitation between around 700 and 1,000 mm (such as Bamako, Mali). The relative humidity in the steppe is low to very low, often between 10% and 25% during the dry season and between 25% and 75% during the rainy season. The least humid places have a relative humidity under 35% (Dregne, 1994).

Besides, Sahel region is most characterized by constant heat and unvarying temperature as it rarely experiences cold temperatures. However,

during this hottest period, the average high temperatures usually fall between 36 and 42 °C (97 and 108 °F), often for more than three months, while the average low temperatures are around 25 to 31 °C (77 to 88 °F). During the "coldest period", the average high temperatures are between 27 and 33 °C (81 and 91 °F) and the average low temperatures are between 15 and 21 °C (59 and 70 °F). Also in the Sahel, the average mean temperature is usually over 18 °C (64 °F) while it experiences a very high range of sunshine duration annually and it is usually between 2,700 hours (about 61% of the daylight hours) and 3,500 hours (more than 79% of the daylight hours) (André-Michel, 2013). The sunshine duration in the Sahel approaches desert levels and is comparable to that in the Arabian Desert, although Sahel is known to be only a steppe and not a desert.

Methodology

The study employed the use of qualitative research method with significant reliability index. Primary data sources included copies of Google questionnaire administered online to some knowledgeable respondents to gather environmental information resources while a reasonable number of them were selected through purposive sampling technique for online interview because of their expertise and knowledge on environmental security and management. The secondary data employed include: existing literature on the topic such as books, internet, journals, newspapers, magazines, conference papers, AU and

ECOWAS publications, and other related documents. In the course of the research, the researchers thoroughly constructed the impact index of the menace on global security, while a descriptive analysis was used for the analysis.

Theoretical Framework

The study is defined within the confines of Environmentalism in International Relations Theory. Works on global politics and environmental issues took a shape in the 1970s with the Stockholm conference that was coordinated by the United Nations Environment programme (UNEP) and the 1980s, with some treaties signed and ratified by states (O'Neil, 2017). The theory is promoted with the works of Price Smith, 2009; Kavalski, 2011; and O'Neil, 2017). The outburst of the theory questions at the centre of the political science on inquiry into global environment, international relations; and its anarchic nature and focus on the conflictual history of the global sphere. The theory analyses how environmental conflict is taking place and sharpening international politics in ways that traditional theories of IR (International Relations) fail to explain, by assessing several modes and sites of global environmental governance. The theorists focus attention on international cooperation among rival and conflict-ravaged states on how to manage environmental issues on a global scale (O'Neil, 2017).

Other than cooperation, the tenet of environmental security and violence play a significant role in global environmental politics; and at the same time, the notion that environmental degradation will lead to conflict remains highly central to environmental security. That is the bane of the submission that global deficiencies and degradation of natural resources, renewable and non-renewable, coupled with unequalled distribution of raw materials, leads to national rivalries and conflict or war (Westing, 1998). The first portion of the theory sheds light on the dynamics of IR theory and an analysis of environmental security and conflict, followed by the cursory look at the role of state, non-state actors and science; while concluding that the environment is urging global relations to make use of the dynamics that in turn give critical looks or insights into the merits and barriers post by the environment. That is the reason Harris (2009:202) argues that it is exciting to have a real crisis on your hands when you have spent half of your political life dealing with humdrum issues like the environment. Therefore, having witnessed the various environmental problems bedeviling the Sahel region and others parts, there is need for global and joint rescue of the states from the lethal menace. This is evident in the activities of the global community; UNEP, UN, AU and ECOWAS respectively

Environmental Problems And Insecurity In The Sahel Region

The various environmental problems posing insecurity in the Sahel region are as follows:

Problems of over-farming and over-grazing

Activities like over-farming, over-grazing, over-population of marginal lands, and natural soil erosion, have caused serious desertification of the region. Major dust storms have become frequent as well with examples like the dust storms in Chad in November 2004 and its reoccurrence on average on 100 days every year. Sandstorms have been occurring too with instances like the heavy hit in Mauritania, Senegal, Gambia, Guinea-Bissau, Guinea, and inland Sierra Leone in 2010 (Online Research Survey, 2020).

Desertification

This is the process of ecological degradation in which economically productive land becomes less productive, in some cases leading to the development of a desert-like landscape. Studies have indicated over cultivation, overstocking and deforestation as primary causes of desertification, recent researches make it known that desertification often occurs as a result of the combination of drought and mismanagement of land, particularly where there is a lack of harmony between land use and management on one hand and prevailing climate on the other. Desertification occurs mainly in hyper arid, arid, semiarid, and sub humid climatic zones, ranging from precipitation.

Drought

Sahel has overtime experienced regular droughts and mega droughts. One mega drought lasted from 1450 to 1700, 250 years. There was a major drought in the Sahel in 1914 caused by annual rains far below average, leading to large-scale famine. From 1951 to 2004, Sahel experienced some of the most consistent and severe droughts in Africa. The 1960s saw a large increase in rainfall in the region, making the northern drier region more accessible. There was a push, supported by governments, for people to move northwards. When the long drought period from 1968 through 1974 began, grazing quickly became unsustainable and large-scale denuding of the terrain followed. The constant drought has led to a large-scale famine, mass hunger and starvation and in turn, it leads to lack of food security and human security becomes feeble in the region.

Food crisis

Whenever the Sahel region becomes featured in global news, the first impression is due to the fact that millions of people are at risk of going hungry. A humanitarian crisis usually unfolds following the food crisis. In 2012 to 2016, the lives of up to 18 million people were put at risk following a major food crisis in the region. This year, more than 11 million are facing the same plight, while about 1.4 million children are being threatened with severe malnutrition. Even in normal years, millions are in a permanent state of food insecurity. In the last fifty years, persistent droughts have contributed to famine

problem in the region (Online Research Survey, 2020).

Climate change

Environmental issues confronted by the Sahel region have contributed to the increasing rate of global warming. Unfortunately, if the change in climate in the Sahel region is not checked and desertification possibly reversed through sustainable practices and any form of reforestation, it is only a matter of time before countries like Niger among others lose their entire landmass to desert due to unchecked unsustainable human practices. Climate change could also have negative consequences on agricultural production and food security in the Sahel, says UNEP. All in all, the countries of the Sahel perform poorly on UNDP's Human Development Index, a measurement of a country's economic and social well-being. Activities like over-farming, over-grazing, over-population of marginal lands, and natural soil erosion, have caused serious desertification of the region (Online Research Survey, 2020).

Fragile economies

Agriculture in the Sahel employs a majority of the region's work force and contributes heavily to its gross domestic product (accounting for up to 45% in some countries of the region). It also plays a central role in food security. Yet it remains highly underdeveloped and is characterized by an almost total dependency on three to four months of rainfall per year, as well as by low use of external inputs such as seeds

and fertilizers, the absence of mechanization and poor links to markets. According to UNEP, the recurrent droughts of the 1970s and 1980s caused massive losses of agricultural production and livestock, loss of human lives to hunger, malnutrition and disease, massive displacements of people and shattered economies (Online Research Survey, 2020).

Flooding

From the time immemorial, the Sahel region has been characterized by strong climatic variations and irregular rainfalls, which pose two of the biggest obstacles to food security and poverty reduction in the region, according to the United Nations Environment Programme (UNEP). Things have gotten worse in recent decades, experts say. Between 1970 and 1993, the region recorded 20 years of severe drought. The frequency and severity of droughts and floods has increased over this period. FAO reports that over 80% of the region's land is degraded. Over the years, the heavy rainfalls though irregular and but whenever it rains occasionally, it erodes the surface layers of the farming and housing soils in the area. In the same vein, lack of good environmental policies and misplaced developmental measures, have transformed a large proportion of the Sahel into barren land, resulting in the deterioration of the soil and water resources (Online Research Survey, 2020).

Insecurity and political instability

Political instability has plagued some of the Sahel's countries for years. In Mali, the military

coup of March 2012 brought an abrupt halt to 20 years of stable democracy. In its aftermath, terrorists who had occupied most of the northern region started heading south, intent on taking control of the whole country. In January 2013 a French-led and Chad-supported intervention stopped their advance. The conflict compounded the security and humanitarian crisis, in part by disrupting supply routes and causing food shortages (Online Research Survey, 2020). The crisis in neighbouring Darfur, Sudan, and the presence of an armed rebellion in the east did damage to Chad's security that will last for many years. During Niger's 50 years of independence, notes a report by the International Crisis Group, a think tank, the country has seen two armed rebellions, four coups, seven governments and periods of promising democratic change as well as reversals. In a region with porous borders, a political or security crisis in one country is often a serious threat to neighbours. These borders have benefited criminal networks and drug traffickers. The UN Office for Drugs and Crime (UNODC) has estimated that major illicit flows linked to criminal activities in the Sahel amounted to \$3.8 billion annually.

The Implications Of Sahel Environmental Problems On Global Security

Environmental problems and insecurity bedeviling Sahel region usually pose great threats to global security in several ways:

Desertification for instance has not only caused an alarming increase in dry lands in the Sahel region, it has also resulted in soil salinization. It has been estimated that there is possibility of having arable land loss over the next 25 years and up to fifty percent land loss by 2050. And this will definitely make it difficult for some crops to thrive in the region, hence, food scarcity looms. The longer effect of this is long-term food scarcity as desertification detrimentally affects plant physiological processes and increases soil erosion (Online Research Survey, 2020).

However with combined effects of climatic changes, global warming, drought, and salinity, there will be more deserted lands in Sahel and this will definitely lead to more difficulty in food (plant and animal) production, thus leading to more scarcity of food. Human security is sure going to be at stake when food, one of the basic human needs, is scarce and no medium of alleviating the scarcity is put in place (Online Research Survey, 2020).

In the same vein, since more and more lands are getting deserted as population continues to yield higher numbers, lesser and lesser spaces will be available for farming as people would begin to occupy the supposed farmlands or grazing reserves as it is being witnessed in some states like Nigeria where grazing routes are turned into commercial towns and city where people now reside. The more deserted the lands become, coupled with the alarming increase in the population growth, the lesser spaces there

are for farming activities and this will lead to more conflicts arising. The herders for examples will need lands for grazing and they would want to occupy some lands so they will survive, the farmers will also need more lands for plant production, people also need more lands to live in, hence causing clashes and conflicts in the region (Online Research Survey, 2020).

In addition, the environmental problems facing Sahel region leads to over-exploitation of the scarce items (food, land among others). Since agricultural activities is at low ebb as a result of flood making demand higher than supply, exploitation becomes inevitable. This then leads to economic challenges and if not properly managed with productive measures, economic recession looms. Local inhabitants also strive to exploit the situation by increasing high value of the lands available for farming activities (Online Research Survey, 2020).

In the area of shelter, people in need of housing are forced to occupy only the deserted lands while construction may also be affected as more new materials will be needed for construction of the deserted lands. While constructing and building on deserted surfaces, dry slurry diffuses in the atmosphere causing air pollution and possible pollution to nearby water and other natural resources or environments because of its high alkalinity. In addition, there is high probability that harmful corrosive materials are diffused into the atmosphere causing problems for human respiration activities and also may cause eye sores; hence, human health becomes

more fragile and gets enmeshed in danger (Online Research Survey, 2020).

In the same vein and in addition to the already known global issues such as ozone depletion, global warming, new viruses' discoveries, pollution in its diverse dimensions, dispersion of toxic chemicals, and transport of unwanted species by ships and air will all make the planet endangered and might be difficult to handle all at once.

The ravaging operations of terrorist organizations of: Boko Haram, Al-Qaeda in the Islamic Maghreb (AQIM) in the Sahel have contributed to the increasing violence, extremism and instability of the region, further disturbances pose more threat to the already dilapidating region. All of these effects will definitely extend beyond the local and rural level of just the inhabitants of Sahel to sometimes threatening the stability of planet's life-support systems (Centre for Strategic and International Studies, 2019). However, Mali's absence of political will and the vast region's counterproductive security response to the conflict are considered to have ceded the advantage to extremist groups, Jama'at Nusrat al Islam wal Muslimeen (JNIM), a coalition of extremist factions, and the Islamic State in Greater Sahara (ISGS) have exploited government errors or mistakes, increased their footprint, and stoked communal tensions to execute various coordinated offensive attacks.

JNIM and ISGS now freely operate across the central Sahel and have also carried out various attacks in littoral West Africa. JNIM has hurriedly broadened its reach by provoking feuds between rival communal groups and then offering to protect the victims, a service that several of the governments have been unwilling to provide. Likewise, the extremists have established themselves in communities across the region – not just ethnic Fulani villages, but within the Dozo, Mossi, and Babara provinces respectively (Centre for Strategic and International Studies, 2019).

Efforts And Strategies Taken So Far To Overcome The Environmental Problems And Insecurity In The Sahel Region

Though the environmental problems in the region pose dangerous threats to global but at the same time, there exists some functional regulatory and policy measures to avail the region of insecurity. The strategies include:

United Nations' assisting on food crisis

Throughout the lean seasons of the year, - the period between harvests from May to September, the World Food Programme (WFP) under the UN usually give foods to between 5 and 6 million people each month through its nutrition and food security programme. Also, the Food and Agriculture Organisation (FAO) used to help more than 5.2 million people through support to off-season food and crop production, soil and water conservation and rehabilitation projects, and desert locust control and monitoring. And with its partners, the

Office for the Coordination of Humanitarian Affairs (OCHA) also mobilizes resources and assisting communities in need (Boozar, Yazdanpanah, and Abdeshahi, 2019).

Assistance of insecurity and political instability

UNODC had recently helped to broker an agreement among; Mali, Morocco, Niger, Burkina Faso, Chad and Algeria to address the problems caused by drug trafficking, organized crime and terrorism. Also, the UN Security Council has also been authorizing the deployment of a peacekeeping mission to assist Mali on its way back to stability (Online Research Survey, 2020).

World Bank aid on fragile economies

The World Bank believes irrigation could allow the Sahel's agriculture to overcome the challenges posed by a hostile environment to produce more food for its people, therefore, more assistance is being rendered (Online Research Survey, 2020).

Adapting natural resources to climate change

The Sahel is one of the best places in the world for generating solar power, and engineers are beginning to appreciate the potential of small-scale energy systems. The region is also suited to small-scale water management systems. Farmers will need to alter inputs to lessen the burden of lost crops as the climate changes. Also, farmers will need to change inputs, switch crops, and redesign and reconstruct water storage systems. Such new technologies could compensate for some of the losses in crop production (Boozar

and et al, 2019). However, the ability of communities to adapt to climate change will largely depend upon adopting relatively small-scale appropriate technologies, which, if multiplied many times, will help increase crop yields and restore degraded environments.

Help on environmental crises

Among other recommendations, United Nations has urged regional cooperation to defuse tensions between countries of the region, and thereby reduce the risk of increased conflict and environmentally induced migration. According to Achim Steiner, Executive Director of UNEP, has pointed to “the urgent need for scaled-up investments in adaptation, moving forward on the Green Fund, and supportive measures such as reduced emissions from deforestation and forest degradation as well as realizing the climate finance of \$100 billion a year by 2020 (Online Research Survey, 2020).

The need to improve the status of women

It is essential to make women, particularly adolescent girls, functional and useful in the development of Sahel development agenda. Female genital mutilation scars women psychologically, as well as physically, and puts them at a lifelong disadvantage in their relations with men. Community efforts to stop these terrible practices are beginning to prove successful. Child marriage is also a human rights abuse (Akintunde, 2017). Investing in adolescent girls and young women so that they can hold on to their childhood and — defer childbearing to post adolescence — is also

intrinsically good in itself. Postponing the first birth by five years in a country such as Niger can reduce population size by 18% and lower maternal mortality associated with early childbearing. Girls’ education enables them to make positive choices about their own health and the health of their children. Less than 10% of girls with no education are delivered in a health facility, compared with 90% of those who have been to secondary school (Akintunde, 2017). Also about seven percent of children of mothers with Women are to be educated and more empowered in all ramifications.

The need to increase accessibility to family planning

Family size has fallen more slowly in sub-Saharan Africa than in other parts of the world. In much of Sahel, the contraceptive prevalence rate (CPR) remains below 10%, even though countries such as Burkina Faso and Niger has adopted policies to reduce fertility. Family planning is widely seen as a human right. Niger has set a bold goal of raising the contraceptive prevalence rate from 12 percent in 2012 to 26 percent in 2015. Women need to be empowered to choose the method of contraception with which they feel most comfortable (Abedi, 2012). Unfortunately, in several countries in Sahel, there is a lack of political will to make family planning widely available, accessible, and affordable.

At the community level, there are often social and cultural norms and gender inequities, or interpretations of religion that make access to

family planning services and supplies difficult. Family planning needs to be both democratized and demystified. At the individual level, low levels of basic education, lack of information, and widespread misinformation often inhibit use of family planning. Sahel is considered to have the problems of polygamy, child marriage, and often highly patriarchal cultures because of the fact that family size has fallen in many other low resource settings and this suggests that the problem in Sahel may be seen under the condition of the fact that family planning has never been a genuine priority. If dutifully considered, there are chances that population will reduce and giving out children out in marriage due to lack of resources to cater for them will also be checked (Online Research Survey, 2020).

Conclusion

The human security paradigm is a holistic approach toward comprehending the security environment. The bunch of human and environmental security issues strongly intensifies the roots of all insecurity and instability in the Sahel region. However, analysis of the state of insecurity bedeviling some states in the region has clearly portrayed the condition of the Sahel's regional security environment. Therefore significant to this factual estimate and the implications of crises and potential for insecurity is affirmation of the strong synergy between the environment and human survival. This knowledge is a highly significant step in drafting effective policy and it is indisputably imperative to recognize that

policy making and implementation will take adequate time, intelligence, critical analysis, patience, and empathy. Lastly, the modest strategy for success will depend on the incremental, tireless, and focused work of a cooperative international community that will best succeed in creating a more peaceful global world for man's habitation. The study aims to provide a synthesis of policy guidance and recent developments related to multilateral cooperation in the area of environmental security and other development risks on the African continent.

Recommendations

Aforementioned interventions require a strong research base, excellent management capabilities, and good metrics to measure progress. It is important to introduce rapid assessment and response institutions that can facilitate the design and implementation of 'climate smart' agriculture strategies. In all categories, crop development should be prioritized, and technical training of individuals to carry out these large-scale agricultural interventions should occur. Temperature and precipitation observations in Sahel are sparse or non-existent and needs to be improved.

All solutions need to be evidence-based. In some parts of Sahel, there is capacity to expand water storage and irrigation, but such policies require a strong research base and a competent management capacity. Much additional research, for example, on soil moisture levels and afforestation models, will need to be completed in a multi-disciplinary fashion.

It is important to identify synergies between climate adaptation and food security. The foreknown common-sense solutions, such as planting trees, need careful research. Planting trees in a semiarid region can increase precipitation and ultimately eliminate the need for irrigation. Reforestation can be a source of income as well as carbon sequestration. In the research process, it has also been observed that large-scale planting in the Sahel could reduce the impact of global warming, thus making it one of the methods that should be imbibed at the global scene at large.

Sensitising the farmers, herders, and communities in Sahel is very important to facing the challenges of Sahel, implementing practicable policies void of political or religious ambitions is more important.

References

Abedi S. A. (2012). Environmental Attitude and Behaviour of Students of Gorgan University of Agricultural Science and Natural Resources. Iranian Agric. Ext. Edu. J. 7 (2), 77e91 (In Persian).

Akintunde, E.A., 2017. Theories and concepts for human behaviour in environmental preservation. J. Environ. Sci. Public Health. 1 (2), 120e133. <https://doi.org/10.26502/JESPH.012>.

André-Michel E. (2013). From Africa Renewal: Human and Environmental Security in the Sahel; assessed on www.googlesearch.com, 23 December, 2016

Azam, E. (1999), "[*Conflict and Growth in Africa: The Sahel, Organisation for Economic Co-operation and Development*](#)". Sahel publications: accessed from <https://en.wikipedia.org/wiki/Sahel> on 10-04-2020.

Boozar, M., Yazdanpanah, M., and Abdeshahi, A. (2019). Response to water crisis: how do Iranian farmers think about and intent in relation to switching from rice to less water-dependent crops? J. Hydrol. <https://doi.org/10.1016/j.jhydrol.2019.01.021>.

Casalo, K. and Escario, M. (2018). Manufacturing in the Fourth Industrial Revolution: a Positive Prospect in Sustainable Manufacturing. Proceeding Manufacturing 21, 671e678.

Centre for Strategic and International Studies (2019). Politics at the Heart of the Crisis in the Sahel. Retrieved December 6, 2019.

Dregne, H.E. (1994), "Soil degradation" Method of Assessment of Soil Degradation. Pp450

Harris, A. (2009). Country Classifications for a Changing World. Sage Publications, London, Routledge.

Janmaimool, P. (2017). Application of protection motivation theory to investigate sustainable waste management behaviors. Sustainability 9 (7), 1079.

Kavalski, E. (2011). From the Cold War to Global Warming: Observing Complexities of Environmental Security. Political Studies Review, Vol. 9, 1-12

- Lamprey, K. (1975). "The grazing land ecosystems of the African Sahel". *Journal of the African Sahel*. Issues 26-28 Pp 91
- Lange, S. and Dewitte, H. (2018). "Deforestation and loss of biodiversity are some of the current environmental problems". www.books.google.com.ng, assessed on 10-05-2018
- O'Neil, M. (2017). *Philosophy and Public Policy*. University of York. <https://www.online.library.wiley.com>, retrieved 2 September, 2017.
- Potts, M. (2013). "Crisis in the Sahel, Possible Solutions and the Consequences of Inactions". *AFIDEP Journal*: University of California, Berkeley Press: California.
- Smith, P. (2009). *Environmental Cooperation*. <https://www.justice.gov>
- United Nations Office for the Coordination of Humanitarian Affairs (2013). "Sahel: \$1.6 billion appeal to address widespread humanitarian crisis". Accessed on 08-04-2020
- United Nations (1992). "Framework convention on climate change". FCCC/INFORMAL/84 GE.05-62220 (E). Accessed 09-04-2020
- Westing, A. H. (1998). People and Tourism in Fragile Environments. In M. F. Price (eds.), *Duke University Press*, Durham, Vol. 26, Issue 2.
- Xie, P. (2004), "The recent Sahel drought is real" (PDF). *International Journal of Climatology*: pp 1323– 1331.