



**International
Journal of
Social Sciences**

Impact of Climate Change and Resource Scarcity on Human Resource Development in the Lake Chad Basin

by

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Abstract

This paper uses historical and inter-disciplinary approach as its methodology. Evidence indicates that there is a high percentage and concentration of carbon dioxide, methane, nitrous oxide and chlorofluoro-carbons on the earth than the pre-industrial era. This gas concentration is as a result of human activities. The implication is that the earth is feverishly experiencing high temperatures than before. This phenomenon became the focus of attention and generated much interest at the Earth Summit in Rio de Janeiro in June 1992 and likely to remain so for a very long time. However, climate change has affected economies and dislocated many people economically and socio-culturally thus retarding national development. This has been seen through incessant flooding, desertification and desiccation (dryness) of some lands. This in a long run leads to resource scarcity in many climes. Hence, desiccation as a result of climate change is responsible for (the dryness) of Lake Chad today. This dryness has affected quite a large number of people who depended on it for their livelihood. Many of those persons were either farmers, pastoralists (nomads) fishermen and even recreation. It is the suggestion of this paper that nations within Lake Chad Basin and those bordering Lake Chad and indeed African nations should find a way of reviving the Lake. Apart from its contribution to economies of the region, it will also prevent conflict arising from search for fodder and internal migration.

Keywords: Climatic Change, Resource Scarcity, Human Resource Development.

1) Introduction

Of recent, one of the most vexed issues faced by the global citizens is the environmental challenges such as flood, desertification, erosion, increased carbon dioxide etc. These environmental challenges have dislocated economies in many perspectives – generate diseases, human and animals' deaths, sacked communities etc. This evil phenomenon radiates partly from climate change. Climate change is the term used to

explain the phenomenal changes in the earth's climatic systems. Climate change, therefore, connotes the varied changes in the amounts and patterns of climatic conditions or variables such as rainfall, humidity, sunlight and wind. Thus, climatic temperatures are rising and its impact has been rapid due to geometric population explosion, economic activities (high level industrialization, agriculture, mining, etc.) and the exploits by man to create wealth and comfort (Thomas, 2009; Ayo, 2009).

The fall-out of this global climate change has altered weather patterns in many regions, causing droughts, floods, ocean surge, pollution, freezes and widespread disruption of natural ecosystem (Goldstein & Pevehouse, 2008). The alternation of the weather patterns and its negative impacts have come to bear on the Lake Chad Basin. Already Lake Chad Basin borders the fringe of the Sahara Desert, hence drought and other desert conditions aggravated the desiccation of the Lake. This regenerates to resource scarcity thus affecting human resource development.

Resource is an available supply that is valued because it can be used for particular purpose, usually to satisfy particular human wants or desires. Such resources may be divided into two types or three categories – open access, fugitive, and migratory- based on spatial relationships between resources and resources users (Mayhew, 2009). Torado and Smith (2009) see resource in Two ways; physical and human resources. To physical, it is a non-human factors of production used to produce goods and services to satisfy wants; while human resource expresses the quality and quantity of a nations labour force.

By daily geographical usage, a Basin is a region in which the strata or layers of rock dip in all directions towards a central point. There are several of such formations all over the word, and at least in every continent. There are three types of Basins – a River Basin, A Lake Basin, and a Hollow or Trough. A River Basin is the total area drained by the river and its tributaries. A Lake Basin is the Basin filled by the water of the lake. Any hollow or trough in the earth's crust, whether filled by water or not (Moore, 1963). Basin and range describes a landscape where ridges made of asymmetric faults blocks alternate with lowland Basin (Mayhew, 2009). For our purpose, we are concerned with the Lake Chad Basin, since our concern is to examine the impact of global warming in the Lake Chad Basin, we would concentrate ourselves mainly with Chad, Niger, Cameroon, Nigeria, Libya, Sudan, Central African Republic and Algeria as a region.

Scarcity in non-economic terms implies non-availability of something of value for utilization by people for either production, consumption that adds value to them or the environment. Hence resource scarcity is a condition in which materials are not available for utilization in a given time. It may be natural or man-made material base. An indication that such materials would not be available in a short period or may lack supply for a very long time.

The utilization of available materials in a given environment by people to develop their potentials that may lead to productive, creative lives in accord with their needs and interests. People are the real wealth of nations by making use of what is available in their environments to expand their choices and add value to themselves and environment. Torado and Smith (2009) see human resource development as the quantity and quality of a nation's labour force. It means the quality and quantity are the products of environmental forces- using what is available in the environment to build the potentials of the people and add value to human life.

2) The Study Area

Lake Chad Basin geographically covered an area of over 2 million square kilometers and made up of the following countries – Algeria, Central African Republic, Cameroon, Chad, Nigeria, Niger, Libya and Sudan. Demographically, Lake Chad Basin has a population of about 280 million people (UNDESA, 2018). There are very many ethnic nationalities occupying Lake Chad Basin, some include Arabs, Fulani, Hausa, Fang, Berber, Bulu, Beti, Kanuri, Dosso among others (Uweche, 1991).

The Lake Chad Basin as an area or region revolves around the Lake Chad. In other words, without the Lake Chad, perhaps, there would have been no Lake Chad Basin. In this connection, it becomes necessary to deal with the history and description of Lake Chad itself.

Lake Chad is an inland drainage lake. It is the fourth largest African lake after Lake Victoria, Tanganyika and Nyassa (Malawi). Lake Chad itself is a vast expanse of shallow water with $\frac{3}{4}$ of its shores lying outside Nigeria. The actual area under water (1970) varies from 4,000 to 10,000 square kilometers according to the season of the year, being most extensive between the middle of December and the end of January. Its depth is only 14 – 22 meters, making it (then) the shallower lake of its sizes in the world; however, during the low water season, the depth of water is much less. The average elevation of the Basin is 1000 meters above sea level and the lake level being 800 meters above sea level. A few rivers flowing towards Lake Chad actually reach the lake, but rivers as the Tedseram and the Alo disappear into firki swamps at considerable distances away from the lake (Udo, 1978).

In the Nigerian section, the most important river draining into Lake Chad (considering its length and volume of water) is river Yo or the Komadugu- Yobe. Its course is marked by an alternation of well-defined valleys carrying a single stream, and open swampy flood plain (firkin), with many stream channels. However, 50 kilometers from Lake Chad the Yobe River virtually disappears and only a trickle reaches the lake. It contains no running water during the greater part of the year and consists only of a few large and many smaller pools during the end of the dry season. Normal flow begins from July, and by November its flat valley is completely fleeced; and can no longer be forded till the end of January. Other rivers such as the Bunga, which flow through Jos as the Delimi, reach Lake Chad in flood once in a generation (long time).

However, it is worth mentioning that, the Lake Chad Basin is drained by the River Shari- though Shari lies outside Nigeria, it is important because it is by far the most important feeder of Lake Chad. It is estimated that about $\frac{2}{3}$ of the volume of water discharged into the Lake come from this river and it is therefore not surprising that the rise and fall in the level of the lake is determined by the regime of the river. The Shari rises outside the Sudan, and flows Southwards into the drier north. Shari rises outside the dominating position because of the period of its flow into the Lake. The Shari feeds the Lake from the end of December – that is in the heart of the dry season, when all other effluents are at their lowest level and when the majority of the Nigeria effluents are already dried up, the lake will be actually rising because of the large quantity of water it receives from the Shari at this time. For interest and understanding, the Lake Chad Basin is shared by Algeria, Cameroon, Chad, Niger, Nigeria, the Central African Republic, Libya and the Sudan. The Basin is about eight percent of the size of the African continent, providing direct and indirect support to a population of about 40 million people (Akpan, 2018).

The size of Lake Chad which is one of the major Africa's fresh water reduced and keeps reducing at an alarming pace for the past 45 years. The length of time of water reduction produced today is what cannot be recollected. It is estimated that in 1960, the size of the lake was 26,000 square kilometers as opposed to 2,000 square kilometers currently (Mahamadou, 2007; Punch, March 23, 2018, p.20).

Akpan (2014) observed that by 1960, the Lake Chad was the largest reservoir of fresh water in the Sahel region of Africa with 26,000 square kilometers of water. However, recently, less than 2,500 square kilometers of water is left because it is drying up and causing serious challenges for the communities around the lake region (Akpan, 2014).

3) Dependence On the Lake Chad

Lake Chad is the epicenter and of immense value to the inhabitants of the zone. The life of the people nearly all depends on it. It is so, because, it provides a means of livelihood to the millions of people who maximize the use of the environment to their advantage. Lake Chad, therefore, is the economic power house to the people – fishing, agriculture (crop production) pastoralism, etc.

Fishing:

Lake Chad is one of such fishing grounds in Africa. It is known that a large number of youths and elderly people mainly live by fishing from the Lake. In other words, small scale fishermen using traditional fishing gear and watercrafts dominate the fishing industry. It is agreed that Nigeria produces about 5,000,000 metric tons of fish annually, it means that these fishermen from the Lake Chad are part of those responsible for over 80 percent of the annual fish output (Yahmed, 2002). The fishes are delivered fresh daily to nearby markets while distant markets are supplied with low quality smoked or sun-dried fishes. However, it would be contended that fish provide food for the population, employment and a means for exchange relations.

It may be of interest to know that the entire Lake Chad Basin holds 179 fish species, of which more than half are shared with the Niger River Basin, about half shared with the Nile River Basin, and about a quarter shared with the Congo River Basin. Lake Chad itself holds 85 fish species (Wikipedia, 2018).

Livestock (Pastoralism)

It may be difficult to estimate the number of livestock available or kept in the Lake Chad region. But it is on record that it is large and includes cattle, goats, sheep, donkeys, horses, camels and poultry. The concentration is not about poultry, but about animals that feed mainly from available vegetation or fodder. For goats, sheep, donkeys, during the rainy seasons these animals are tied to pens and feed brought to them. But during the dry season the animals are allowed to roam and graze freely in the open fields. On the other hand, the majority of the Basin's cattle are being moved from one location to another as a result of seasonal changes that give rise to dryness or wetness. This leads to high rate of transhumance among Fulani herdsmen. In a perspective, these animals provide employment to many: some engage in milk distribution, some meat, some work on hide and skin and other derivations. These activities to a large extent, engage the population that lives around the Lake region. It may be of interest to add that human

activities here provided for both internal and external trade. Trade is an axis of development through exchange relations.

Crop Production

Geographically, the physical environment plays an important role in the type of crop grown in a particular environment. Countries bordering the Lake Chad are in Sahel Savannah with minimal rainfall and a long dry spell. Thus, the people grow mainly cereal crop such as maize, guinea corn (sorghum), millet, rice and other crops such as groundnuts and yams. This is possible during the three to four months' rainy period. For those who dwell very close to the Lake, they make use of the Lake during the dry season to irrigate their farms. Crops here provide food, employment to a large number of people, thereby ushering in development. That had been the scenario over the years. Until recently, the people in the region lived a semi-sedentary life (Yahmed, 2002).

4) Climate Change and Resource Scarcity on The Lake Chad Basin

Climate change has many features such as high temperature, low rainfall that given rise to desertification, others include: erosion, landslides, flood as a result of rainfall and increase in volume of water in oceans among other things. However, it should be noted that these features caused by climatic depends on the region. For instance, in the West African sub-region it is characterized by desertification (aridity) erosion, flood etc. For Lake Chad, it is dryness owing to low rainfall, low humidity and increase evapotranspiration etc. In this connection, Lake Chad is posing a serious challenge on the people who depended on it for their livelihood and by extension this challenge has diffused to grip the states of the Chad Basin. It is generally believed that the Lake was much more extensive in the past and there is considerable evidence to show that it is still diminishing. In the early 1920s, Bage Ngelowa was large shore market, but in the 1930s the market had ceased to exist since the water had become too shallow to allow the approach of canoes. Apart from the loss of water due to evaporation, the reasons for the retreat of the Lake is not yet fully understood. But the whole thing is due to climate change and its impact on the environment.

To portray the level of dryness of the Lake and its influence on the whole Basin over time, in one of the correspondences, Iyorchia Ayu in an interview with the Tell Magazine on the issue of insecurity in Nigeria, contends that... some insecurity challenges faced are caused by people who moved from the Lake Chad region Southwards because of the dryness for space to graze their cattle. Against this background, he statistically opined that in 1963, Lake Chad had 28,000 square kilometers of water which was then used for fishing, irrigation and cattle rearing. But by 1997, Lake Chad had dried up to less 13,000 square kilometers. Today, it is estimated that it has shrunk to less than 1,700 square kilometers. He added, that Lake Chad has virtually disappeared – there is no more fishing, irrigation and no more effective cattle rearing.

Indeed, the dryness of the Lake has negatively affected human activities in the area. For instance, the region no longer sustains the quantity of fish usually caught in the Lake. Mahamadou puts it that fish declined from 243,000 tonnes between 1970 – 1977 to 56,00 tonnes in 1986 – 1989. As at now, the reduction in tonnage of fish caught is much and difficult to quantify, in this connection, it has deprived the people of revenue and put in poverty. Many persons in the North-east of Nigeria, Cameroon, Chad and Niger even

the immigrant farmers and fishermen from Sudan, Central African Republic, etc. are caught in this web (Mahamadou, 2007).

On the other hand, the dryness has also affected livestock as fodder is no longer available sufficient enough for them. There is also very low production of crops for human and animal consumption, leading to food insecurity. This loss of livelihood has aggravated the poverty situation in the region. This is so because there is high insecurity conducting in the high cost of food. There is also large scale unemployment because of the loss in fishing, agriculture, and livestock production, leading to internal insecurity and social cohesion. Many tend to migrate to Europe across the Mediterranean Sea, some have lost their lives and some fall into modern slavery.

The indigenous people and the immigrants who attached themselves to their cattle appear helpless and most affected by the dryness of Lake. To save their cattle from dying, they need to shift their base to where they can find enough fodder for their cattle. For now, there appears to be no other alternative than the Benue Trough or Benue Valley. The Benue Valley covers an area of over 22,000 square miles (35,000 square kilometers) in Nigeria, and is made up of two physiographic divisions: the river and its flood plains, and the lowland areas which lie above flood levels. The 200,000 square miles covers Benue State, part of Taraba, Nasarrawa and Kogi states. The Basin covers the *tse-tse* fly free highlands of the Jos Plateau and the upland of the eastern borderlands (Udo, 1978).

There are two things in the Benue valley. Numerous fishing villages are built on natural ridges rising above high-water level. Such villages include Numan, Yola, Ndom, Yumburu, Kabawa and Jen (these villages have had their urban status today). The numerous rivers in the Benue Trough provide enough water and moisture and green grass all year round. These grasses are free from cellulose and good enough for pasturing. The Benue valley has a vast land and sparse population. Yet, this empty land is very fertile, particularly along the Fadamas or river flood plains, which are well cultivated in the vicinity of the few settlements.

This is the condition of Lake Chad Basin, the challenges posed on the local communities around it and by extension the human insecurity challenges in the North-east and Central Nigeria, Mali and Chad. The issue of insecurity is for another research.

6) Need to Revive the Lake Chad

Lake Chad is of immense value to Africans, thus it is important to protect it from the present desiccating stage. The Lake is a wetland in the sea of sand bordering the Sahara Desert. It is one of the most important lakes or reservoirs in the continent of Africa" before, its present state. The living or life line is translated in many ways. Firstly, many Nigerians, Chadians, Nigerians, Cameroonians living bordering the lake or doing business therein, equally some migrants fishermen in these countries eke out their livelihood through fishing, farming and pastoralism. Fishing provides food for the population, assist financially in exchange relations among the people of the region - by extrapolation provides employment or create jobs for thousands of people (Udo, 1978).

Besides, farming is practised among the people bordering the Lake and indeed the Basin itself. They grow crops such as rice, beans, potatoes, vegetables and other food crops; they also grow groundnuts, cotton etc. These crops are grown all year round through irrigation. Irrigation is possible because of the water from the Lake. In the good days of cash crop economy, these countries used to contribute large quantity of groundnut and cotton for export thereby earning their countries foreign exchange (Udo, 1978).

On the other hand, the agricultural practices that had to do with transhumance was very important, because during the dry season when available grass dried up, the cattle rearers would move their pasture to the lake region. Animals would be kept there until the climatic conditions become favourable (during wet season) for them to pasture their animals outside the lake region. In other words, animals here provide two things - employment for pastoralists, food for the population thus improving the living standard of the people. Transhumance has been an old way of life of the people of the region. They keep cattle, sheep, donkeys, camels, goats and have provided an advantage to their means of livelihood.

Indeed, it is the presence and importance of the Lake that necessitated the establishment of the Lake Chad Basin Commission in 1964. As a commission, it has a management team and organs running its affairs. The commission has directly or indirectly employed a number of staff from these countries that share the Lake's Basin (Niger, Chad, Nigeria and Cameroon). For instance, the organization's secretariat is located in N'Djamena, the Chaldean capital. The lake Chad Basin Commission is Africa's oldest river or lake-basin organization. What this translates to is that this commission employs men and women and this has added value to human living condition in these countries.

Recently, because of the importance of the lake to Africa, an international conference on the Lake involving the six member countries of the region - Nigeria, Chad, Niger, Cameroon, the Central Africa Republic and the Sudan was convened in Abuja. (When?) Apart from countries bordering Lake Chad other international organizations involved in the conference included the United Nations Educational, Scientific and Cultural Organization, the African Development Bank, AFDB, the World Bank. Countries outside Africa were equally part of the conference - Germany, China, Canada and the European Union (Punch, March 23, 2018, p. 20). If there is availability of water and food for both animals and man, the idea of migration would be reduced and by extension conflict reduced. When people are gainfully employed it, adds value to their existence and by extension, reduce insecurity.

7) Conclusion and Recommendations

Lake Chad had long been neglected by the countries owning the lake directly - Chad, Nigeria, Niger and Cameroon. It is known that there is Chad Basin Commission, the Basin is handicapped otherwise the Lake's desiccation would have long been checked by it. However, there are a lot of setbacks to the commission's progress such as lack of fund to prosecute the projects envisaged; there was the issue of the Chaldean civil war which hampered the Chaldean government to participate effectively on the projects.

The Lake Chad, because of the use of its water for various purposes - agriculture, fishing, minerals (potash) is reducing in size owing to various reasons such as siltation, desert encroachment and neglect on the part of the governments owning the lake. The Head of States' yearly meeting is held occasionally without adequate resolution to improve the lake.

The governments and various agencies interested in the Lake should commit their contributions towards dredging the lake to evacuate excess sand and other debris in the lake. For the Lake to be revived after dredging, deliberate channeling of water from Yobe River, River Yo and Bunga among others to the lake especially during rainy seasons for utilization in the drier times would assist in reviving the lake. There is the need for a

construction of wetland from the debris of the Lake to rejuvenate it for agriculture. There is also the need for afforestation of the lake and indeed the entire Lake Chad Basin. Lake Chad is a wetland - but its dryness is becoming a challenge both for man and biodiversity.

Before now, the lake was an axis of development especially to the communities bordering it in all eight countries - Niger, Chad, Nigeria, Cameroon, Algeria, Sudan, Central African Republic and Libya. Again by extension, the lake before its dryness had been a vehicle of human development and survival through fishing, farming and mining of salt and potash. It also preserves biodiversity for research or studies.

The lake then used to provide food for the people even before the emergence of the Europeans on our shores. To a large extent, it provided employment to the teeming population in countries sharing the lake and immigrant labourers from neighbouring states. The value of the lake was responsible for the creation of the Lake Chad Basin Commission which today employs hundreds of people from Chad, Niger, Nigeria and Cameroon etc. employment has a linkage effect on human development.

Lake Chad still holds pleasant future for the region if dredged and certain rivers such as Yobe, Yo and Bungo are channeled to feed the lake during raining season. The Lake Chad also needs some afforestation and construction of wetlands to complement its status. Apart from farming, fishing and the mining of salt and potash, Lake Chad has assisted in the preservation of biodiversity, an avenue for studies and research. As a reservoir it provides for tourism and assists in moderating the temperature of the area.

Indeed, it is also believed that part of the emerging challenges in the Nigerian State today is as a result of the desiccation of Lake Chad. To a large extent, it is assumed that the Boko Haram insurgency with its atrocities is as a result of the loss of employment necessitated by the reduction in water from Lake Chad. Of recent, the incessant killings, maiming, kidnapping and abduction in states such as Benue, Kogi, Nasarawa, Plateau, Taraba, Adamawa and parts of Cameroon among others is as a result of nomads migrating from north-east Nigeria, some from Chad, Cameroon, Niger to look for vegetation for their flock. Besides, others too look for another permanent home outside Lake Chad region - in the process do all they could to displace the indigenous people especially those of the Benue Valley. The nomads have the backing of the well-to-do in the society because these people are the owners of the cattle and other animals. They are, therefore, armed against any attacks from the owners of farm lands in which they constantly destroyed.

In all, the emerging challenges, the only way out is to revive Lake Chad so that some youths can return to farming, fishing and games. The owners (countries) and agencies interested in Lake Chad and by extension ending of conflict there should have a political will through financial contributions to bring back the lake: to develop human capacity for the advancement of civilization in research and development. Lake Chad and indeed its basin, is Africa's pride, every government should show concern if not for economic reasons at least to bring about peace in the region and human development for the future.

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