



Tackling Lake Chad Basin Challenges with Climate Resilient Technologies

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Abstract: Lake Chad Basin is facing increasing drought, desertification and climate change induced terrorism which has resulted into killing, destruction of socio-economic facilities and movement of people from the basin in search of greener pasture for their livestock down south of the country. The movement has exacerbated farmers and herders' fight as the historical animal routes had been encroached upon by urbanization processes and farmland development. The study utilizes descriptive analysis and theory to draw inferences, recommendation for the Lake Chad basins conflict resolution. The study opines that member states had not adequately provided developmental projects for their people and the Lake Chad Basin Commission is relying heavily on international organization for funding as a result of unsatisfactory financial commitment of the member states. This paper posits while relying on the conflict resolutions theory that a rallying point or projects are needed for the conflict to end, that the Lake Chad Basin Commission members states need to capitalize on opportunities offered by climate resilient technologies such as Air to Water Technologies; technology for conversion of silt in the lake to fertilizer for agricultural development use and packaging of sun for electricity generation in the basin for member states and later for export purposes as been done in Arab desert can help to reduce the conflict in the basin area.

Keywords: Lake Chad Basin, drought, desertification, Climate change induced terrorism, conflict resolution theory, Climate Resilient Technologies

INTRODUCTION

The Lake Chad Basin, situated in the Sudano-Sahelian region, with coordinates 12° 20 N – 14° 20 N and 3° 00 E – 15 ° 20 E, North Central Africa has been a source of livelihood to multitude of people who carry out a water-dependent activities like fishing, fetching for drinking and irrigation, which made more human being settled down around the basin (FAO, 2009). The Lake Chad Basin was once Africa's largest freshwater body that spread over seven countries in Africa, fed over 30 million people and had transboundary contact with four major countries: Nigeria to the West, Niger to the North, Chad to the East and Cameroon to the South (FAO, 2009). The hydrological basin is of 2.4 million km² extent

and shared by eight African countries - Niger, Cameroon, Nigeria, Chad Republic, Central African Republic, Sudan, Libya and Algeria. Two major river systems fed the basin – Chari - Logone river from the South and Komadugu/Yobe - Ngadda river from the West. The basin area occupies approximately 2,434,000 km² (approx. 8%) of African total continental land surface (Luxereau, Genthon, Karimou, 2012).

As at 1960s, records show that the surface area of the lake was 25,000 km² while currently it has reduced below 2,500 km² (Onamuti, Okogbue, Orimoloye, 2017) attributable to climatic and human activities (FAO, 2009). For instance, the climatic characteristic were high temperatures, strong winds, high evapo-transpiration (2,200



mm/annum)³ and rainfall patterns (1,400 mm in the southern and 150 mm in the northern end) (Odada, Oyebande, Oguntola, 2006). The population of this tribally diverse population is about 30 million as at the year of 2011, with a worldwide acclaimed highest population growth rate of 2.8 percent (UNFPA, 2017).

Moreover, historical records revealed that the highly populated people living in villages, communities and towns around the basin area were abandoned by government and non-governmental agencies for development activities. The basin area witnessed political, economic and social neglect like non-inclusion in national development plans and investments for several decades. Thus, there was state of lawlessness, with no framework for effective prevention and response to the emerging climate, unemployment, migration, terrorism issues by the governments of countries around the Lake Chad basin.

Furthermore, unfavorable climatic characteristics brought scarcity of water, desertification and drought, with great impact on the people. Several human survival and livelihood measures were employed by the people such as changing from cultivation of low water intensity food crops (such as wheat) to high water intensity food crops (such as rice). Several people also migrated out of the basin area to get grasses for the animals or to cultivate farmlands for agricultural activities. However, these measures were affected by challenges posed by demographic changes and overpopulation which has brought more

pressures on limited environmental resources. The aftermath effects of this was major conflict, social crises to the extent of terrorism, including Boko Haram violence attack (LCBC, 2015).

In response to this, the countries in the basin area form Lake Chad Basin Commission to manage the use of Lake Chad. Also, as a way to curtail incidences of lawlessness and terrorism, the Executive Secretary of Lake Chad Basin Commission was made the Head of Mission of the Multinational Joint Task Force, with military contributions from Benin, Cameroun, Chad, Niger and Nigeria. However, challenges of ineffective governance, corruption, lack of inadequate basic services, mistrust of security forces and a great sense of isolation from the central government still persists (FAO, 2017).

The crises created by the Lake Chad Basin dryness, neglect of people in governance and the incidence of terrorism has gone to the extent that over eleven (11) million people are reported to be in need of humanitarian support including women and girls across northeastern Nigeria, Cameroon's far north, western Chad and southeastern Niger. According to the Food and Agriculture Organization (2017), 6.9 million people are facing food insecurity in the sub-region. Not only that, 515,000 children are suffering from severe acute malnutrition; 2.4 million of people are displaced internationally; over 1 million people are internally displaced (IDP) in four countries; under five mortality rates in IDP locations are higher than the emergency threshold while 75.7% of IDPs are staying with



host communities thereby increasing their vulnerabilities.

Even though, the establishment of the MNJTF and Special forces has reduced the areas under Boko Haram's control, the rate of violence still persists, especially suicide bombings and attacks at civilians. Thus, lives are still being lost, infrastructure and trade and communications destroyed, while intercommunity relations were also affected. Communities and individuals, especially women, have withstood numerous crises in the past decades and yet still relied on life-saving humanitarian assistance.

The African Union Commission (AUC) in collaboration with Lake Chad Basin Commission then thought of development interventions to strengthen resilience in the region, especially to help people and communities recover as quickly as possible. They developed the Regional Stabilization Strategy for the year 2017-2019, in line with AU's Agenda 2063 and the Sustainable Development Goals 2030. This was with the intention of strengthening cooperation between the Lake Chad Basin Member States, AUC and LCBC and international actors in combating Boko Haram and protecting civilians.

The Strategy was poised to tackle key challenges affecting the LCB, such as climate change and promoting good governance, transparency and accountability in both the political and socio-economic areas. The Strategy also is to address the short, medium and long-term needs of the region towards stabilization, resilience and recovery of the affected areas.

However, the challenges of conflict, climate change, migration and terrorism still persists in the study area. This paper argue that the conflict in the Lake Chad Region is best addressed by improving the social well being of the people, recharging the lake and reducing the terrorism. The need for the conflict to be addressed holistically, especially achievement of socio-economic resilience in the Lake Chad area and Africa at large, is the problem this paper wants to address. Therefore, the formulation of the problem in this paper is 'how can the conflict in the Lake Chad Region be resolved by the adoption of climate resilient technologies in improving the well being of the people in Lake Chad, thereby reducing the conflict and increasing Africa's national resilience.'

METHODS

This paper utilizes descriptive qualitative methods, relying on desk review and literature study which allows description of the causes of the conflict, policies and measures used so far to solve the conflict, impact and challenges of such policies and measures and how climate technologies can be of great help in resolving the crisis. Content analysis of literature material forms the data analysis approach for this study. The paper proceeds with the results and discussion where first of all a review of the existing policies and laws, among which are Lake Chad Basin Commission Act, International Water Charter and various policies establishing Ministry of Water Resources in LCBC member states were carried out and followed with



analysis and discussions on the subject matter of concern of concern to this paper.

RESULTS AND DISCUSSION

The Statutory Regulations for Lake Chad Basin

The Lake Chad Basin Commission (LCBC) which was established in 22 May 1964 as saddled by Fort Lamy Convention, in recognition and conformity with Charter of the United Nations Organizations of 1945; Economic and Social Council of the United Nations Organizations recommendations on International cooperation in the regulation and Use of Waters, No 417 of year 1952; No 533 of year 1954 and 675 of 2 May 1958 respectively. The convention was also in conformity with the Charter of Organization of Africa United of 25th May 1963 (LCBC, 1980). The Commission was initially initiated by four riparian countries that bounded the Lake – Cameroun, Chad, Niger and Nigeria and did not include those in the upstream side of the basin (Central African Republic, Sudan and Libya). These new countries were added at various Summits of Heads of State. The Central African Republic was added as a member at the Eighth Summit at Abuja while Sudan was admitted as a member in the year 2000. Libya was admitted as the 7th member state in 2008 making the conventional basin area to be 2,397,423 km². From the mandate of Lake Chad Basin Commission, it was obvious that utilization of science, technology and innovation (STI) are advocated as a major platform to ensure sustainable and equitable management of the Basin, conservation of the

natural resources of the Basin and promotion of economic integration, cooperation, peace and security. However, the use of STI in this basin has been very low.

International Water Charter

The Charter provides a more comprehensive approach to transboundary and regional environmental issues that is not captured in the earlier regulations. The Water Charter was drawn and adopted during the Lake Chad Basin Commission workshop held on 28 April 2010. The Article 1 of the Water Charter elaborated the Lake Chad definition to extend to all watercourses, aquifers and aquatic ecosystems that interacts with it thereby making the Lake an international waters. The Water Charter set out with the responsibilities of collaboration to achieve the sustainable management and development of Lake Chad in compliance with the rules and principles governing international lakes and watercourses (LCBW, 2011).

Article 4 of the Water Charter spelt out the specific objectives of quantitatively and qualitatively managing surface water resource with special considerations on the use of STI related best practices. Also, each countries also put in place Ministry of Water Resources to oversee and ensure that their representative at the Lake Chad Basin Commission give feedback and are guided accordingly based on the interest of the country. To manage the conflict in the region, LCBC activated relevant sections of the Charter to put in place the Multinational



Joint Task Force (Multinational Joint Task Force, MNJTF) with the contribution of military and financial resources from all countries. Also, each state put in place Intelligence Gathering Units contributed by the Defense Intelligence Unit to provide the MNJTF with reputable intelligence for effective military response and quick resolution of the conflicts.

Theoretical Framework

This paper relied on three major theoretical frameworks – the game theory, the Conflict Resolution theory, and Socio-Economic Resilience theory in providing suggestions. Game theory which studies the relationship between several interdependent decision makers and how the decision maker or player's decision depends not only on his actions but also on other players' activities. In this theory, cooperative and non-cooperative perspectives are employed to explain Member States' decision and propensity to engage. A non-cooperative approach to the game of resilience building would be a situation whereby Member States are free to make their choices and stand by it while in a cooperative context, member states developed strategies together and put machinery in place to ensure it works. The instruments and machinery, which can either be domestic as well as external, can strengthen the resilience of the Basin either in the short or long run. Thus, Lake Chad Basin Member States resources at the moment rest on the ability to access critical resources from an external environment which is full of uncertainty. The

uncertainty is caused by power imbalance and mutual dependence. The mutual dependence explains a situation wherein member states recognised that the present conflict can only be resolved if they are mutually cooperated. They join hands to 'acquire' resources that could be useful for the achievement of resilience. The power imbalance in this context is appreciation of the power play at domestic and external level and the decision to downplay this power play to achieve resilience (Tiziana and Piskorski 2005).

Conflict transformation theory, propounded by Kriesberg (2008) was used to explain how conflict can transform from damaging exercise from terrorists to a more productive and engaging resolution among conflicting people. This theory, further enhanced by Abel (1973) asserts that 'conflicts of any kind, are always in a state of transition'. The conflicts can therefore be transformed to peace 'when some conditions or critical ideas or projects can be put in place' (Wagner-Pacifici, 2005). This is also in line with a scholar, Coser (1961) who comments that the choice to wind up a conflict seldomly depends on figurative events or aftermath that main actors agreed to. In the words of Collins, conflict transformation can be achieved when material resources being used by conflict actors are used up or diminished and cannot be reimbursed or when the main actors lose human support (Collin 1993). Thus, in this paper the conflict occurring at Lake Chad Basin has been proposed to be resolved by proposing some conditionalities and projects which shall be put in place that will



solve some of the agitation and challenges that people are clamoring for in the basin. In line with the theory suggestions, this paper believes development of climate resilient companies as well as recharging of the lake will reduce easy access to human resources which the terrorists are using to perpetuate their crime. It will also ease the food insecurity problem in the place, thereby leading to the end of the conflict at the basin.

Theory of Community Resilience was used to explain the involvement of the community members in community resources management to achieve resilience especially during the time of chaos (Magis, 2010). Thus, achieving resilience is dependent on the state of community members' personal development and sagacity of the system to collaborate (Fikret & Helen (2013). This is because achieving community resilience should be an ongoing procedure of 'personal development' (early experience, social networks and support and community problem solving) in dealing with shocks through adaptation (Almedom et al, 2007). In this context, this paper asserts that socio-economic resilience can be achieved at the community level, when focus is put on development of individuals, strengthening of social networks, educating and re-orientating the community on social and economic resilience characteristics.

Strategic Environment of Lake Chad Basin

The Lake Chad Basin has strategic relationships with the United Nations, European

Union, France Government, Africa Union, ECOWAS and many international donor organizations. The International Organisation led by United Nations (UN), European Union, World Bank, USAID, DFID and others responded to the plight of the Lake Chad Basin by sponsoring the 2016 Recovery and Peace Building Assessment (RPBA) to quantify the physical, social and economic impacts of the crisis in the North-East, Nigeria particularly and Lake Chad Basin in specific. This led to the development of a comprehensive Post-Insurgency Recovery Plan in April 2016. Food and Agriculture Organization (FAO) in collaboration with Non-governmental Organization (NGOs) also undertake specific assessments both at country and regional levels on the impacts of the crisis on food security and livelihoods with a particular focus on women, girls and youth. FAO supported Nigeria in establishment of three agricultural programme FADAMA Floodplains Programme, the Community Based Agriculture Rural Development Programme and the National Programme for Food Security while in Chad Republic, FAO supported in the development and funding of the National Rural Sector Investment Plan (2016-2022) to serve as coordinating framework for all plan and interventions in the rural sector in areas such as: sustainable natural resources development and climate change adaptation; rural infrastructure and equipment development; silviculture, pastoral and fisheries value chain development; food security and nutrition, gender and



strengthening of rural household resilience; and research, adoption and dissemination of technologies, human and institutional capacity strengthening.

In the Niger Republic, the International Organization supported the Government to put in place a strategy for Sustainable and Inclusive Development (*Stratégie de développement durable et de croissance inclusive Niger 2035 [SDDCI]*), for social and economic development in the country. The SDDCI is a five-year economic and social development plan and the reference framework for all interventions in Niger. One of the strategies titled *Nigerians Nourish Nigerians* is a “zero hunger” strategy. The Government of Cameroon has also developed its National Programme for Food Security (*Programme national de sécurité alimentaire du Cameroun [PNSA]*), aimed at securing local production (agriculture, fisheries and livestock) through the support of micro-projects. Despite these efforts, the Boko Haram terrorist attack still persists, while humanitarian activities are enlarging due to increase in refugee, internally displaced people and illegal migration. Also, the support of these international bodies have been under intense query of ineffectiveness as the large chunk of the humanitarian support is expended on their workers who live in hotels in cities without spending the support on the needy. Also, these organisations are accused of hiding and abating the terrorists especially in terms of monitoring terrorist financing system as well as arms purchase and movement. This has led to

mistrust on the side of the international organization and in fact the call by social activists for nations to monitor the activities of the international organizations in the basin.

The African Union put in place the Regional Stabilization Strategy in 2018 in collaboration with the United Nations Development Programme (UNDP). The strategy was an all-involving approach covering education and skills acquisition, socio-economic recovery, environmental sustainability, and empowerment and inclusion of women. Towards implementation of this, UNDP promoted a donation of 60 million dollars to jumpstart the humanitarian programme (Igbobor, 2020a). Another regional effort put in place by the African Union is the “Silencing the Guns by 2020” campaign. The campaign was put in place to look at the problems in the Lake Chad Basin and find a lasting solution. From campaigning on use of drought resistant crops, use of new farming techniques for efficient use of water. However, this regional effort is still very much relied on by the international community for funding and coordination as the countries involved are not financially buoyant and technically imbued to provide gigantic projects needed (Igbobor 2020b). Equally, the continuous threat of Boko Haram in the region has prevented implementation of the Oubangui transfer project as there are no stable situations for technicians and experts to work (Zakari, 2018). Coupled with unresolved bilateral disputes especially those on island territories in the Lake which terrorist are using as base as well



as the “blame game” over a quick and early military support and intervention in containing the insurgent threat, were already affecting negotiations and agreements (Kelsey, 2015).

The Economic of West African States (ECOWAS) put in place the Lake Chad Basin Commission as a Strategic Office that coordinates both the technical and military interventions toward solving problems emanating from the Lake Chad Basin. The Lake Chad Basin Commission had been working on the protection and restoration of Lake Chad and this can be seen in a number of joint water management initiatives that have been put in place (Onuoha, 2010). One major attempt is the recharge programme from Congo Basin (Oubangui) to Lake Chad in a project named – the “Transaqua” project launched in 2009. The “Transaqua” project, a 14 dollars project was endorsed by the Nigerian government and the Chinese state owned engineering company Power China and Bonifica (an Italian company) and the United Nations Development Programme (Romano, 2020). This basin wide cooperation, although was argued to be as a result of power imbalances between the riparian countries. The imbalances were reported to be caused by riparian countries claim of unequal shareholders in the commission which has been undermining trust and supporting of mutual solutions of equitable benefits. Whereas, the real issue was that Nigeria remains the largest donor and therefore wields substantial influence in citing three quarters of all irrigated areas in the basin

to the country. Nigeria also because of the financial contribution has influence over agreed outcomes, development and security strategies (Galeazzi, 2017).

Analysis of Solutions to Lake Chad Basin Conflicts in Africa

This paper presents an analysis of socio-economic resilient measures that will be needed to curtail the spread of the conflict in the basin area. According to the Indonesian National Institute for Resilience, socio-economic resilience are dynamic measures which contains the social and economic tenacity and toughness and capability to develop national strength to face and overcome all social and economic obstacles or disturbances, externally or internally, in order to guarantee the socio-economic survival (NRI,2020). Thus, the socio-economic measures are measures, in line with game theory of game, conflict transformation and community resilience theories, that need to be put in place to awaken the socio-economic activities in the region. The conflict transformation had suggested the need for the conflict to be anchored on economic projects that will solve social problems such as unemployment and addressed the root causes of the conflict, which is government neglect. However, it should be added that it is in the opinion of the community resilience theory, that the community people must be involved in the decision making and the implementation of such socio-economic projects.



This paper proposes the creation of a Free Trade Zone (FTZ) in the Lake Chad Basin with emphasis on setting up companies that utilizes the abundant resources in the region. In this FTZ, creation of climate resilient technology driven companies are one of the best industries that should spring up. Companies such as solar power generation plants, desiltation technologies companies that can convert silt from the lake to fertilizer for agricultural purposes; solar harvesting, packaging and exporting; and conversion of air to water technology, should be encouraged in the zone.

Creation of Free Trade Zone in the Lake Chad Basin. The paper opine that resuscitation of businesses in the Lake Chad Basin need to be well organized under an internationally recognised economic plan and using the God-given gifts in the region. The presence of huge natural resources in the region, such as crude oil, water resources, fisheries resources, among others, which has contributed to the fight between the Boko Haram terrorists and the member states, need to be properly planned for. The recent discovery of crude oil in the lake chad basin has been alleged to be contributing to early non-resolution of island conflict in the region by member states and which terrorists are capitalising on (Guoyu, 2011). Thus, one of the ways out of this conflict is the creation of a Free Trade Zone in this basin. Since this region is a special geographic area with a number of national frontiers, and has natural resources that can be tapped, manufactured, packaged and exported, creation of a Foreign Trade Zone

(FTZ) is an option of great regional importance (World Bank, 2008).

This option will address the cry of the people over neglect of the government of member states for decades. The FTZ is expected to house industries that will be utilizing the natural resources in the region such as solar energy, crude oil, agricultural opportunities, fishing, livestock and in return bring about employment opportunities, food security and prosperity, thereby reducing acute malnutrition and other challenges in the region.

In line with the socio-economic resilience theory, the creation of the FTZ will boost the survival power of the people, as many of them will be gainfully employed in the industries and reduce the number of youth, women and ladies that could be used as suicide bombers or engaging in transhumance.

Setting up of Climate Resilient technology based Industries. The new technology has brought to the fore many climate resilient technologies that can be used in a climate induced conflict area like Lake Chad basin. The presence of high temperature and low rainfall makes this region a huge business center for the setting up of solar power generation plants, exportation of solar harvested energy among others. Also, for the management of the Lake Chad basin itself, a desiltation technologies companies which can convert silt from the lake to fertilizer for agricultural purposes can equally be established. The Silt Tank Technology, being widely used in India, can effectively collect silt in the Lake Chad basin into a tank and convert to



fertilizer which can be added to the agricultural lands (Dhan Foundation, 2020). This will restore Lake Chad storage capacity as well as increase productivity of farm lands that use the fertilizer. Research Institute in India has proved that this tank silt is useful in release of nutrients such as total nitrogen and beneficial to sandy and alkaline soils. It therefore became a source of manure for crop production and also an organic supplement capable of increasing water-use efficiency and productivity. Another climate resilient technology is the Air to water technology, which can be put in place and has the capacity to convert air to water in this zone. The Nordic Technologies is capable of generating water from humidity in the air and can serve communities like Lake Chad Basin (Nordic Technology, 2021).

CONCLUSION AND RECOMMENDATIONS.

Lake Chad Basin, an important fresh ecosystem for mankind, has been struck with drought, desertification and led to the drying of the Lake Chad water. The neglect of the governments of the country that form the basin has also exacerbated the dryness challenges as the challenges have turned to conflict. The conflict, which started as pressure group responses from citizens as a result of neglect by the government, was later hijacked by the non-state actors. Some citizens formed vigilante group to secure there area while other people became a violent non-state actors, that transformed into Boko Haram terrorist that kill,

destroy market, educational institutions, health facilities and means of incomes and livelihood. This led to the movement of people from the basin in search of greener pasture for their livestock down south of the country, as well as for farmland to practice agriculture. This movement brought the farmers and herders to engage in a fight over the land. Most of the historical animal routes had been encroached upon by urbanization processes, and farmland development, thereby bringing the livestock rearer in conflicts with the farmers in many states down south of Nigeria. Other sets of people become refugees, internally displaced, illegal migration with attendant implication on increased humanitarian expenditure.

Several responses and measures put in place by the international organizations, African Union, Economic Community of West African States, Lake Chad Basin Commission as well as non-governmental organizations, contributed to slowing down of the conflict but has not totally solved the Boko Haram attack and socio-economic neglect of the people in the basin. At the moment, Boko Haram terrorists are still attacking in this region, the much taunted recharge of the basin from the Congo river is yet to be done as Lake Chad Basin Commission is expecting the international organisation to provide the funding for these project. Even though the funding is huge, it is the expectation of this study that cheaper approaches that can be handled by the member states should be taken up now.



This paper believes that a lasting solution to these challenges is possible, especially achieving social resilience through analysis of actual challenges that are making the conflict unresolved. Consequently, the paper identified that member states had not adequately provided developmental projects for their people around the basin by capitalizing on opportunities offered by climate resilient technologies. Utilizing the theories of game, conflict resolution and community resilience, the paper concludes that a rallying point is needed for the conflict to end and the best rallying point or a project has to be one that will take care of socio-economic needs of the people. Thus, this paper is suggesting the utilization of climate resistant technologies for provision of social needs like water for sanitation using air, conversion of silt in the lake to fertilizer and packaging of sun for electricity generation in the basin for member states and later for export purposes as has been done in the Arab desert at the moment.

This paper recommends the following. The Member States need to consider exploration of other funding options such as the Africa Infrastructural Development Fund and creation of a Marshall Plan by the African Union for the restoration of Lake Chad.

There is a need to create a Free Trade Zone (FTZ) in the Lake Chad Basin with emphasis on setting up companies that utilize the abundant resources in the region. In this FTZ, creation of climate resilient technology driven companies are one of the best industries that

should spring up. Companies such as solar power generation plants, desiltation technologies companies that can convert silt from the lake to fertilizer for agricultural purposes; solar harvesting, packaging and exporting; and conversion of air to water technology, should be encouraged in the zone.

The setting up of Climate Resilient technology based Industries by the governments of member states in this climate induced conflict area is a huge business opportunity for governments to take care of the socio-economic needs of their citizens. The setting up of solar power generation plants can lead to exportation of solar harvested energy to member states as well as other countries. The same can be said of desiltation technologies companies which can convert silt from the lake to fertilizer for agricultural purposes using Silt Tank Technology widely used in India and can help to restore Lake Chad storage capacity as well as increase productivity of farm lands that use the fertilizer.

Another climate resilient technology is the Air to water technology, which can convert air to water in this zone, has been deployed by the Nordic Technologies using humidity in the air and can serve communities in the Lake Chad Basin.

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