

The Lake Chad Basin: from the water crisis to geopolitical emergency

[Nicoletta Varani, Simone De Andreis*]

Abstract—The paper has the aim of reflect on the current situation of the Lake Chad Basin, characterized by the increasing Humanitarian Situation , determined not more only from the water crisis, but from the progressive presence of terrorist militias of the fundamentalist group Boko Haram.

Indeed, today, environmental and social degradation of forests, increasingly advanced, the increasing salinization of soils, the proliferation of aquatic vegetation, the high concentration of population around the lake and wetlands exacerbate exploitation of resources and stir up the anarchist social conflicts. Scholars therefore speak of climate refugees, who face not only climate change, but also international terrorism .

In the realization of the paper we will use the Human Development Index (HDI), the Human Poverty Index (HPI) and the Global Hunger Index referring to countries bordering Lake Chad, in order to better understand the phenomena under investigation.

Keywords – water resources, basin , water crisis , ecosystem , terrorism , Human Development Index , Human Poverty Index , Global Hunger Index.

Introduction

Population growth, climate change , food insecurity and geopolitical instability : the Lake Chad Basin has become a symbol of all the biggest challenges facing mankind in the near future . The future of this area is crucial, not only for Africa, but also for the Mediterranean and Europe .

I. The State of Chad

Since it gained independence from France in 1960, Chad has faced a civil war that lasted 40 years which saw the northern regions, islamic and supported by Libya (that assumed power) against those of the South, predominantly Christian and supported mainly from France. The internal context has long inhibited the economic development and made the national political system of the most unstable in the world. After a decade of dictatorial rule¹ in 1990 a coup brought to power General Idriss Deby, still president.

Although the Country seems to have embarked on the path of democratization with the introduction of a multiparty

system and the approval of a constitution, most of the power is concentrated in the hands of the president, his party (*Mouvement Patriotique du Salut*, MPS) and the military has always been his supporters and what makes Chad an incomplete democracy, which registers low levels of political and administrative transparency among the last places in the world rankings.

Since 2003, waves of refugees have begun to come in from the neighboring Darfur, fleeing the conflict in this region of Sudan². Chad is thus entered a new phase of political turbulence that, interweaving with the increasing internal political opposition, has produced three attempts of coup: in April 2006, February 2008 and May 2013. This effort has created many questions as it does not yet clear whether there has been really. According to the official, provided by Communication Minister Hassan Bakary Sylla, some people have tried to destabilize state institutions. Despite recent attempts to destabilize internal stability of the regime does not seem to be at risk because Deby and his party, the MPS, control all the main public institutions³.

At present the greatest risks to the stability and security of the regime of Deby come from the threat posed by the widespread use of Islamic terrorism in the Country and around its borders. The role of Libya of Muammar Gaddafi, who had mediated successfully is to resolve tensions between Chad and Sudan, both to promote the national reconstruction of Chad has been crucial in the balance of internal and regional dynamics⁴.

Also the United States and China are two major players involved in the process of regional stabilization. The first Country claims in the Saharan area a major operation to combat terrorism and securing the borders (*Trans-Sahara Counterterrorism Initiative*), strengthening its regional presence through the opening of a military base in Niger engaged in counterterrorism operations; China, instead, has invested large amounts of capital for oil exploration in Sudan such as in Chad. China is still the major economic player in the Country despite the growing tensions on environmental issues in the oil industry have led to a cooling of bilateral relations.

The growth rate of the population in Chad has recorded annual percentage of around 3%. The most significant population increases have affected the southern regions that have a more favorable climate than the central and northern areas dominated by the Sahara desert and the vast and arid plains of the Sahel. The population of Chad has abundant ethnolinguistics variety: there are more than 200 groups. This heterogeneity has resulted over the years some disputes among ethnic groups that developed mainly around the different models of social organization of the communities - nomadic, semi-nomadic and sedentary - and different

Nicoletta Varani, Simone De Andreis
Disfor, Università di Genova
Italy

*The paragraphs 1 and 4 are of Nicoletta Varani, while the paragraphs 2 and 3 are of Simone De Andreis

economic interests of the various regions (livestock, agriculture and trade).

The national education system is at very low levels and insufficient both in qualitative and quantitative terms: education suffers a significant lack of investment, as well as for the rest of social policy, is explained by the high level of national insecurity. Negative statistics are then linked to child labor, gender discrimination and the conditions of everyday life: the life expectancy at birth is low, just over 50 years, and the median age of the population stood at 17.1 years.

In recent years, the humanitarian situation has become progressively worse, due to the sharp increase of refugees from western Sudan (about 263,000 people, according to UNHCR figures in January 2013) and the Central African Republic (about 80,000). Because of the constant flow of refugees from the neighboring Central African Republic and fearing a spillover effect of the conflict on its territory, in May 2014, Chad has officially closed its border for security reasons. We must also add the 40,000 internally displaced and more than 118,000 displaced Chadians return to the Country. Banditry is on the rise and affecting mainly the refugee camps and internally displaced persons, makes difficult the intervention of humanitarian workers.

Livestock and agriculture continue to be the main activities of the population, although in the last decade, the primary sector has weighed increasingly on the national gross domestic product: a trend that coincides with growing earnings from exports of oil. By early 2000, Chad started a considerable mining of oil has increased in extent dizzying GDP. The export of crude oil is done through a tube that comes in Cameroon. The years after 2005 marked a major setback in GDP growth that was an overall very fluctuating also because of falling oil output. In any case, the estimates of the IMF (International Monetary Fund) show a growth rate of over 9% of GDP in 2014 (about \$ 1218 per capita GDP) and was in line for years to follow.

The main cultivation, which employs almost a million Chadians, is cotton: a production valuable for the national economy, which each year is likely to be affected by adverse weather conditions, as well as the constraints of the unfair world trade. From activities related to the animal, comes, however, about 10% of GDP.

Political instability, poor infrastructure, corruption and poor administration investments represent chronic deficits for the Chadian economy that, in fact, have inhibited the ability of a diversified development. Chad is the bottom side of the world rankings in terms of global competitiveness (148th of the 148 countries assessed by the World Economic Forum), both in the annual ranking that the World Bank draws up analyzing the rules and procedures required to start a business (189° of 189 countries).

The army in Chad is an important player and deeply involved in the struggle for political power and has proved a valuable tool for governments since independence to today, both for the control of ethnic tensions in the more turbulent, but for the defense governmental strongholds in the capital.

From its ranks have emerged several leaders and activists of the main rebel groups over the years have challenged the executives settled in N'Djamena. In recent years Chad has made significant investments in weaponry:

the peak was reached in 2009 with a ratio of military spending of 6.2% of GDP. However, subsequently, the budget has been drastically reduced and is now just below 2% of GDP. Chad is the main military partner of France in the crisis in Mali and in the Central African Republic and N'Djamena hosts one of the main French bases in the region. The African crises⁵ have confirmed the importance to France's relationship with the former colonies and the need to protect its interests in Central and West Africa. Thanks to these positions N'Djamena has taken center stage in the fight against Islamic terrorism in Africa. In view of the political commitment of France in Mali and in the Central African Republic, Paris has granted a license Chadian ally of intervention in both crises. The renewed partnership Franco-Chadian represented a new direction for the policy of *Françafrique* of Paris. Compared to a start of term in which French President François Hollande was inclined to change the rules of French policy in Africa, diverting them towards a greater respect for democracy and human rights, the approach now seems marked by a continuation of current regional balance .

II. Lake Chad and its basin

TAB . 1 Some social indicators of the countries of the Lake Chad Basin

Country	Population	Density of population	Global Hunger Index (GHI)	Human Development Index (HDI)	Human Poverty Index (HPI)
Niger	18,045,729 (July 2015 est.)	8 ab./kmq	34,5	187	134
Chad	11,631,456 (July 2015 est.)	8,9 ab./kmq	46,4	184	132
Nigeria	181,562,056 (July 2015 est.)	174 ab./kmq	32,8	152	114
Cameroon	23,739,218 July 2015 est.)	42 ab./kmq		152	95

Enclosed in the borders of the States: Chad , Cameroon, Nigeria and Niger, Lake Chad is one of the major river systems of the African continent. It is the fourth⁶ largest body of fresh water in Africa after lakes Victoria, Tanganyika, Nyasa. No outlet (endorheic), the lake receives at SE the waters of the Logone and Chari, who flock to form a vast delta , and at S0 those of Komadugu - Yobe, which marks the border between Nigeria and Niger .

The banks , especially those of Eastern Zone, intersected by numerous canals wind their way through thousands of islets, were once densely populated by the abundant fishing and intense coastal trade . For centuries, the lake is crossed by canoes and rafts carrying food and natron , a mixture of natural salts derived from seaweed , used to preserve foods,

tan leather and fabric work. Reclamations recovered fertile land planted with cereals or left to pasture, a place of nomads who lead herds of cattle, goats and camels.

Over the last fifteen years, satellite measurements have raised the alarm about the health of the lake, which for some years worried scientists as likely to disappear becoming a barren marsh . In the last 40 years its surface was reduced by 90 %, going in the rainy season from 25,000 sq km in 1960 to the current 2,500 sq km a prairie marsh losing day after day its depth . In the dry season it is reduced to 1,000 sq km.

The causes of the slow but inexorable process of draining of the lake to be found, on the one hand, in the environmental situation: the terrible drought in the Sahel region over the last thirty years, the low rainfall (with a lack of rainfall found $50 \div 65\%$ from 1970), the strong evaporation, seepage into the ground; on the other, in the poor management of water resources by local governments, which have systematically ignored the alarms of the scientists and continued to indiscriminately exploit the waters with drainage canals for the irrigation of arable land. This practice, increased uncontrollably over the past decade is largely responsible for the drying up of the lake.

The African governments have used for a long time Lake Chad, considering it an inexhaustible gold mine blue.

Politicians in power have in fact chosen to ignore the warnings of scientists, allowing - sometimes encouraging - the construction of hundreds of water drainage channels that farmers have dug to irrigate the fields. This practice has increased uncontrollably in the last decade and today is heavily responsible for the draining of the lake.

Given the ecological importance, cultural and economic life of this ecosystem, the prospect of a drainage basin is likely to result in a humanitarian and environmental disaster of such proportions as to threaten the food security of coastal population (over 22 million people: fishermen, farmers, farmers and villagers who sees wither water lilies and papyrus reeds) and trigger forced migration. Just think , for example, that the production of dried fish it decreased from 140,000 t in 1960 to 45,000 t today.

Die hippos and crocodiles, buried by sand advancing. The fish is no longer and thirst and hunger increase for all, men and animals. It happens on this planet, but no one ever asks where is the Lake Chad and it is sinking in the dust. The eye of the satellite from where you overlook informed NASA scientists that the situation is plummeting. It is not only the drought and climate change that has reduced over the last forty years the basin by 90 %, but the human irresponsibility often squanders natural resources as if they were inexhaustible. In a competition to see who sucked more the big lake, neighboring countries and global enterprises have squandered the mine blue building hundreds of channels of drainage water to reduce it to a swamp.

To avert catastrophe and save the lake, the commission of the Lake Chad Basin, bringing together Niger, Nigeria, Cameroon, Chad , Central African Republic and Sudan, put forward several hypotheses⁷. The commission aims to address globally the various aspects of the problem : the

management of natural resources , the environmental impact lifestyle of the coastal population , food security , conflict prevention.

To address the economic emergency triggered by the environmental crisis it was also proposed day replace races and native plant species, the result of millennia of natural selection and established traditions, with more profitable varieties⁸.

The UN tries to discourage this type of interventions that are likely to upset the already precarious balance of an ecosystem, and demands that we invest on existing crops to improve production capacity.

No money and funding to overcome the disaster and Pharaonic projects to stop the drying up, like a huge dam, are considered even more devastating. In addition to the existing one is necessitated an International Commission : The Commission for the Lake Chad Basin (LCBC) , which is a member of the former Nigerian President Obasanjo Olusengun , to save what remains of the blue mirror in agony , which has already caused migrations and wars.

III. The great works assumed and a new hypothesis on the “drying up” of the lake

The World Bank has allocated 1 billion and 500 thousand dollars for the five Sahel Countries (Chad, Burkina Faso, Mali, Niger, Mauritania). In Europe, Germany has put on the table of 5.5 million Euros .

Among the bodies African ECOWAS (Economic Community of West African States) has pledged to support the projects of two member Countries, Niger and Nigeria.

The West African Monetary Union budget has instead adopted a project to bring water in some villages of Niger.

To save the lake have been several hypotheses. A first Pharaonic project, fortunately not fulfilled, provided for the draining of the marshy system which covers 8,000 sq km in Sudan (one of the most important wetlands in the world) for groped to raise through a 360 km long canal, the level of Chad. The idea has been shelved for the prohibitive costs and heavy recoils that would cause environmental option.

The Commission has now decided to build a canal along more than 100 km in order to enter in the Chad side of the waters of the Oubangui River, a tributary of the Congo, which marks the southern border of the Central African Republic. It is an ambitious project that is expected to cost at least seven million dollars. One million dollars was collected by the riparian States. It remains to understand how to recover the rest of the money. Needs to be done quickly, scientists warn. Because an emissary of Chad, the Logone River, in busy periods, has a tendency to overflow and spill its waters to the west, in the basin of the Benue River which flows into the Atlantic.

If erosions were to set up a permanent road to this course of Logone, Lake Chad would be destined to dry up even faster today .

Action is needed on the factors of fragility of this delicate and complex ecosystem. The progressive desertification, the loss constant and progressive water and food make it inhospitable the entire area by encouraging the radicalization of the conflict and fundamentalism contributory causes of the current large waves of immigration.

The crisis in the Lake Chad was also addressed recently at a conference⁹ where there were: the Consiglio Nazionale delle Ricerche (CNR), the FAO, the Società Geografica Italiana and the Accademia Nazionale delle Scienze, the Fondazione per la Cooperazione fra i popoli, the Minister of Hydraulics and the reclamation of the Republic of Niger, the lake Chad Basin Observatory. The event was an opportunity to take stock of the causes of drying up and possible interventions to save the lake .

But on this occasion a new hypothesis have been advanced by scholar Jacques Lemoalle of the Institut de Recherche pour le Développement: Lake Chad continues to change, often with a fast pace, because of its particular shape . On the troubled surface of the lake, characterized by long peninsulas that come off of the Kanem by the ERG, a myriad of islands, islets of herbs floating, the effect of changes in thickness of the lens of water are indeed massive. Characterized by shallow water (3-5 meters), the difference of the annual floods of the influent increased (the Chari, from which 83% of contributions) has an impact quickly on the level of the water blade and on the flooded areas .

The lake is transformed quickly: its extension can pass in a few years of a large area of open water in set of ponds, and vice versa. In fact, the region is located in the Sahel, transition zone between the desert climate and the Sudanese moist: the area therefore has a great interannual variability of rainfall. This section gives movement to the space anthropic: move the herds, move the crops to follow and exploit the humidity. They move, of course, the people. The same space amphibians of the lake lend themselves to many activities: they offer opportunities for fishing, for agriculture, for grazing , for wood cutting , for business. The continuous changes of the coastal area and forms the basin involving a redesign incessant production and territorial organization¹⁰.

The Cirad, French Agricultural Research Center for Development, studied the lake for 17 years. The latest report on the health of the basin is titled "Expertise collegial. The development of Lake Chad. Current situation and possible future. " It was developed by scientists specializing in paleontology, hydrogeology, hydrology, agro, pastoral, human geography and contemporary history. It says that the Lake Chad is a "variable geometry". Its surface has changed in different geological eras. Also it varies on the scale annual and seasonal. In recent times, a wet period in the 50 and 60, when the surface was about 20,000 square kilometers, and followed a drought lasting up to 80 years that has seen some of the lake dry up completely (as had

happened in 1908), after which the surface has started to expand. Between 1991 and 2013, the annual average surface of the lake has fluctuated between 7,000 and 11,000 square kilometers. In the same period, the minimum area detected was 3,000 square kilometers, and the maximum of 14,800. "Climate models today - the report concludes - do not allow to predict whether a warmer climate may again raise or lower the lake."

IV. From the environmental crisis to the "risk " terrorism

Recently, the spread of the terrorist group Boko Haram in the state of Borno in Nigeria (south - east of Lake Chad) has altered even more the fragile balance of the region¹¹.

The entry in the "scene " of the movement of the Boko Haram jihadist Sunni terrorist organization¹², whose literal translation, as it is known, means: *Western education is forbidden*, shocked world public opinion for the combination of the acts and violent fanaticism religious deployed in the north of the largest and most populous African country such as that of Nigeria¹³.

In the first weeks of 2015 the attacks of Boko Haram are intensified with the start of the election campaign of President Goodluck Jonathan (the elections are held on February 14) .

In January 2015 the rebels of the terrorist group Boko Haram in Nigeria took the town of Monguno and its military base , near Lake Chad , after clashes with the Nigerian army.

Also in January 2015 the Nigerian Boko Haram Islamic terrorists took control of an army base on the shores of Lake Chad in the north-east of the country where the group has its stronghold. The so-called Taliban of Africa attacked several fishing villages (Kuayen Kuros, Mile 3, Mile 4, Doron-Baga, Bundaram) past the town of Baga, where after heavy fighting tore the military base of Nigerian troops. Thousands of residents have fled by boat in the direction of neighboring Chad. The attack on the army base comes in a day in which Boko Haram has set fire to the country and ello state of Adamawa, in the village of Lugda, terrorists detonated a bomb IED contained in a nylon bag that He killed one person and injured several others. Some members of Boko Haram have also captured a fishing community in the state of Borno. Clashes between terrorists and police forces have also occurred in the state of Yobe.

In April 2015, approximately fifty soldiers of Niger were killed in an army base on the island of Karamga in Lake Chad.

In November 2015 a joint attack aviation Nigerian and Nigerien killed many militants of Boko Haram, in their bases around Lake Chad. 20 more terrorists were captured by ground forces. Nigerian President, Muhammadu Buhari, said: "Terrorism does not respect borders. We must therefore 'increasing joint actions between different countries. I visited all the countries to strengthen regional and international cooperation against terrorism ' .

In this area is close the link between poverty, migration, political instability and terrorism, where people are forced into misery and exploit natural resources in an alternating terrorism is scope easier¹⁴; not surprisingly one of the most brutal fighting took place in Nigeria between security forces and Boko Haram terrorists has fought in Baga, a town on the lakeshore.

The geographical area of the basin is among the fastest growing demographic in the world: if in 1991 the inhabitants of the Lake Chad Basin were 21 million in 1991, they are now 45 million over the next few years and will grow even faster . An explosive situation also geopolitically, as poverty and lack of future feed terrorist groups such as Boko Haram and that in addition to violence block any draft sviluppo. The causes of the crisis around Lake Chad are so vast and deep that solutions must be equally strong .

The Basin countries must overcome divisions and work out a unitary discourse that engages the international community as it is necessary to improve and increase the economic and social development. The crisis in the Lake Chad is the source of a large flow of refugees to other African countries and to Europe, fleeing poverty , ecological disaster and terrorist violence to begin to address the situation , the EU is working on a trust fund specifically for the Sahel and especially lake Chad, funded by the European Social Fund , to European countries and third parties and from other sources . This is the first attempt to intervene on the structural causes of the great migration, with interventions designed to increase the resilience of local populations . To give peace and development serves solid authority, if there is no control of the territory can not be done.

References

1. Governed by Hissène Habré , in exile in Dakar and under investigation on charges of genocide and torture .
2. The continuous series of incidents along the border convinced the government in N'Djamena to declare , in December 2005 , the state of war with Khartoum , guilty , according Déby , to support groups and Chadian anti-government rebels want to destabilize the country by exporting conflict from Darfur to Chad .
3. The majority in parliament by the MPS (110 seats out of 188 total) allowed Déby to change some provisions in the Constitution , including those on the incompatibility between public office and sull'inamovibilità of Supreme Court judges .
4. The emergence of a new political crisis in Libya has once again demonstrated the strategic importance of the country for Chad . The renewed interest of Chad against Libya manifested itself again when participating in N'Djamena at the summit in Tunis on risks for regional security of July 2014, which was also attended by Nigeria , Cameroon, Tunisia , Algeria , Egypt , Sudan and Niger .
5. The Malian crisis of 2012-13 and the coup in the Central African Republic in March 2013 opened a period of profound instability throughout Africa Sahel . In an effort to stabilize the region , the government of Déby intervened decisively thus assuming a strategic position of the foreground . The African conflicts , the political isolation of Omar al - Bashir and the tensions between Sudan and South Sudan have secured a new role to Chad , with the support of France , looking for an ally militarily strong and politically stable

6. It occupies the lower part of a tectonic basin (243 m) and is the remnant of an ancient inland sea that covered an area in the Pleistocene 300,000 km² .

7. Abandoned a colossal project which aimed to raise the level of Chad through the draining of a major wetland of southern Sudan , a marshy 8,000 sq km , and the construction of a 360 km canal day , it was decided to build a canal more than 100 km (with an estimated cost of seven million \$) to enter in Chad of the waters of the *Oubangui* , a tributary of the Congo , which marks the southern border of the Central African Republic .

8. This is the case of efforts to replace the *Kouri* cow, particularly suitable for wet area , with varieties able to produce more milk , or sorghum lake , considered very productive but is very resistant to pests and drought is more productive species that would require but the massive use of pesticides .

9. Il lago Ciad: un serbatoio di cibo e acqua tra disastro ambientale e cooperazione internazionale. Quale contributo possibile dal 'sistema Italia' che si è tenuto il 14 ottobre a Milano – Expo (Biodiversity park- Teatro della Terra).

10. M.Bertoncin, A. Pase, *Progetti di sviluppo e trasformazioni territoriali: l'esempio di una zona umida saheliana (Camerun)*, in Rivista geografica italiana, n.1, 2015.

11. Currently the terrorist group controls 70 % of the state of Borno

12. The official name in Arabic is Jama'atul ahlis lidda'awati sunnah wal Jihad, meaning "People committed to spreading the teachings of the prophet and the jihad". Having made known its opposition to Western education, he earns the nickname of Boko Haram, which in Hausa language means "Western education is probity". In 2009 she launches its first steps to create a state where Islamic law is in force, the sharia. The founder, Mohammed Yusuf, was killed by police in 2009 and his place is taken by Abubakar Shekau. In 2013 it is entered from the US list of terrorist groups. The religious factor that sees Nigeria divided between the Muslim north and the Christian south overlaps the competition for power and the division of resources based on ethno-regional, without thereby becoming the main reason for the continuing insecurity that plagues the country. As the Boko Haram Islamic fundamentalists are and have as a stated goal to establish a new caliphate, extending Sharia in the whole country (Islamic law is already in force in 12 States of the Federation), the reasons for the increased activity of the movement are to be found in the reports that its members would closely with local politicians and members of the security forces belonging to the ethnic groups of the North, interested in the radicalization of violence in order to make the state ungovernable. It is then clear that the Boko Haram have found fertile ground in the widespread sense of alienation from the central government and the extreme poverty faced by the majority of Nigerians, with their higher incidence in the northern territories, where many unemployed youth constitute a large tank in which to recruit new followers. The increasing frequency with which Boko Haram hit since the election of Jonathan is therefore the symptom rather than the cause of instability.

13. Nigeria is opposed to the internal enemy, but with little success. The group has now become cross-border involving the State of Cameroon. The latter shares a border of 2,100 km with unrecognized neighboring Nigeria which is becoming more and more land to anyone. The recent sectarian civil war in the Central African Republic, "sedated" very clumsily by French troops, drove hundreds of thousands of refugees across the border in Cameroon and Chad. It might be easy for Boko Haram recruits begin leveraging the poverty and despair of displaced Central Africans. For international observers it is still vivid memories of the city of Goma in the Democratic Republic of Congo, which became border of refugee camps and detonator of the Rwandan genocide and the Congolese civil war. In this region the fragile boundaries drawn by colonial powers are nothing but furrows in the earth. Wander without control from a coastal State to another of Lake Chad is very simple and, as claimed by Habib Yaba, a politician of Chad, people trust on the membership of religious and ethnic residents around the lake rather than on borders of nations. Therefore, paraphrasing Yaba, it may be very difficult to fight against the development of Boko Haram as a "product" of Lake Chad. Poverty and Holy War could permanently destroy this precious African jewel.

14. The people who live on its banks that , according to the seasons and periods , go fishing breeding Agriculture, made particularly profitable thanks to the fertile wetlands that are discovered when the water level is lowered .

Bibliography

1. AA. VV. *Atlante delle guerre e dei conflitti del mondo*, V edizione, Terra Nuova, 2014.
2. AA. VV. *Encore un projet criminel: transfert d'eau du bassin du fleuve Congo au Lac Tchad, éléments pour une prise de décision éclairée*, in " 7sur7!", lunedì 26 maggio 2014.
3. M.Bertoncin, A. Pase, *Progetti di sviluppo e trasformazioni territoriali: l'esempio di una zona umida saheliana (Camerun)*, in Rivista geografica italiana, n.1, 2015.
4. A. Celant *Sahel, geografia di una sconfitta*", Pacini editore, 1984.
5. CIA, *World Factbook*, annate varie