SCIENCE DIVISION

UN environment

FORESIGHT Brief

001

August 2017

Early Warning, Emerging Issues and Futures

Saving Lake Faguibine

Background

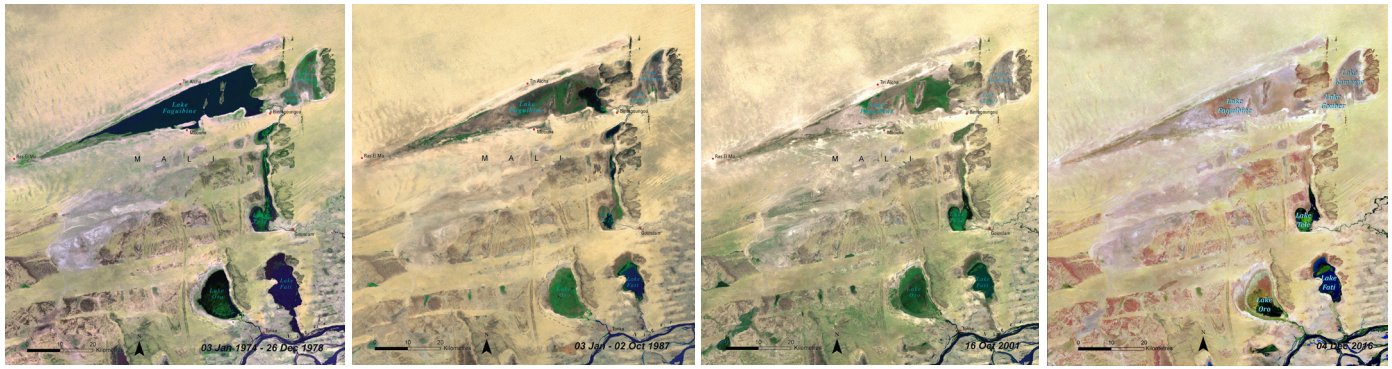
The UN Environment Foresight Briefs are published by UN Environment to, among others, highlight a hotspot of environmental change; feature an emerging science topic; or discuss a contemporary environmental issue. The public is thus provided with the opportunity to find out what is happening to their changing environment and the consequences of everyday choices; and to think about future directions for policy.

Introduction

The Faguibine system, located in the Tombouktou region in Mali is a series of five interlinked lakes (Télé, Takara, Gouber, Kamango and Faguibine) (**Figure 1**). The system is fed from the overflows of the Niger river during the rains; and when full, it was among the largest lakes in West Africa, covering approximately 590 km^2 with a total shore line of 213 kilometers (Lakepedia 2017).

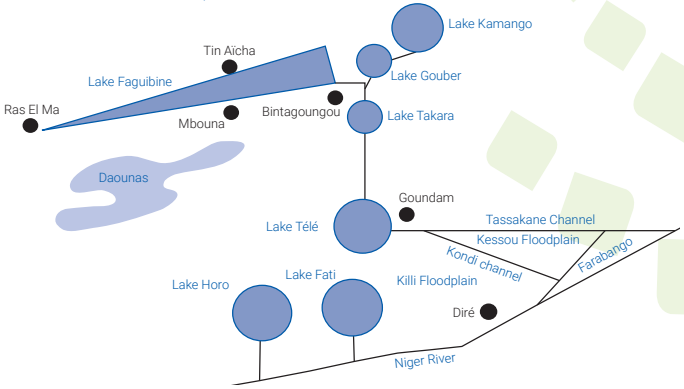
The annual flooding was key to renewing the fertility of the area and supported fishing, pasture and over 60,000 ha of agriculture (IRIN News 2008). During the floods, the lake was also breeding grounds and habitat for aquatic biodiversity and migratory birds. An economic valuation in 2011, indicated that each square kilometer of flooded land had an annual net income of US $100,000 (Hamerlynck, et al. 2016).

In the late 19th century the floodplain extended over an area of 1,000 km–, however declining rainfall led to it shrinking to about 90 km² by 2010 (Hamerlynck, et al. 2016). Prolonged droughts over the years also led to the lake completely drying up in 1914, 1924 and 1944 (Pérez, Fernández and Gatti 2010).



Dark color is wetland. One can see significant difference in extent of water in the lake between 1990 and 2010. After rehabilitation efforts initiated in 2009, there seems to be no recovery as can be seen in the 2016 image.

Figure 1: The Faguibine system of 280 metres and drains a watershed of 8,200 km^2



(Pérez. Fernandéz and Gatti 2010)

Connecting channels and main depressions that become 'lakes' when filled in the Faguibine system downstream from Diré, Mali. The Faguibine channel is the western branch that recoonects to the main river downstream of the Tussakane channel

Source: Lakepedia, 2017

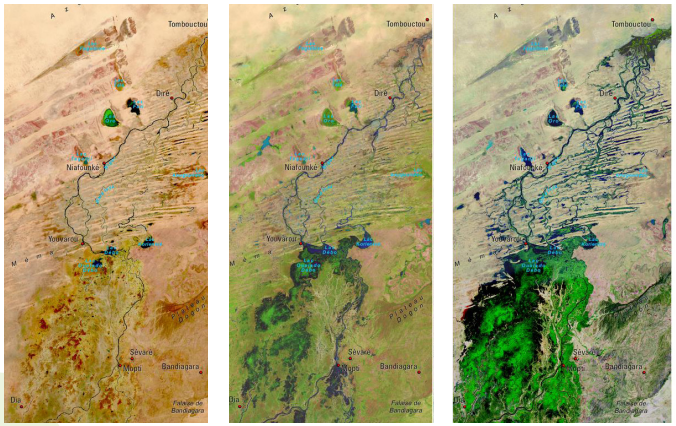
Why is this issue important

The decline of the Faguibine is an important issue because of its impacts on livelihood's, food security and the resulting collapse of the natural ecosystem. In 2009, 43.6 per cent of the Malian population was living below the national poverty line (World Bank 2017).

The combination of poverty, insecurity and increasing scarcity of natural resources due to the drought, increased the vulnerability of the people. Farmers and nomadic herdsmen had to abandon their traditional livelihoods and many were forced to migrate to other areas. The erratic weather patterns seem set to continue, and there is a risk of the return of a prolonged drought linked to the Atlantic multi-decadal oscillation index (Hamerlynck, et al. 2016). Although security is much improved, the restoration of the Faguibine ecosystem would go a long way in alleviating the security situation by contributing to the development of the area.

What are the findings?

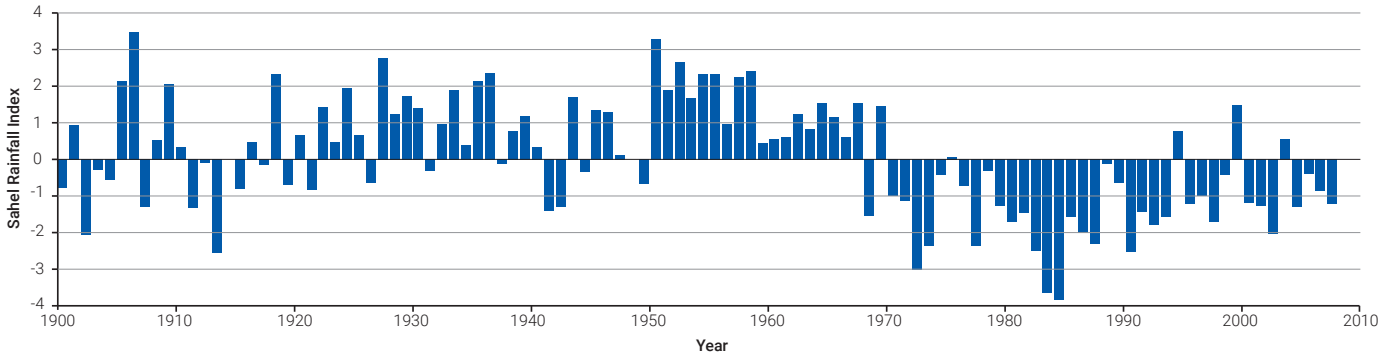
Climate change is a growing threat that has been linked to the droughts that frequently beset this region. Lake Faguibine is mainly fed from the overflows from the Niger River as its elevation is below that of the river. Flooding begins when the Niger and the Bani Rivers begin to rise in July. The waters rise between 4-6 m in 100 days depending on the rains (Zwarts and van Horssen 2009). It is this excess water that flows into the Faguibine depression at the peak season between September and December. The low flood levels of the drier years are insufficient to reach many lakes and depressions.



May 2015 | September 2015 | December 2015

So, any decline in precipitation in these areas affects the level of the lake. An analysis of rainfall trends over the last 100 years (**Figure 2**) shows a long period of extremely dry years between 1970 and 1990. This drought led to a serious famine that caused the abandonment of traditional livelihoods, decline in biodiversity and migratory species, livestock and human deaths and massive human displacement. It is estimated that the livelihoods of up to 200,000 people were affected (Pérez, Fernández and Gatti 2010). Since that drought, the lake has never quite fully recovered its original area extent. Climate change data is also pointing to reduced precipitation in the upstream areas which will reduce the average discharge of the River Niger (Pérez, Fernández and Gatti 2010).

Figure 2: Rainfall time series of the Sahel region

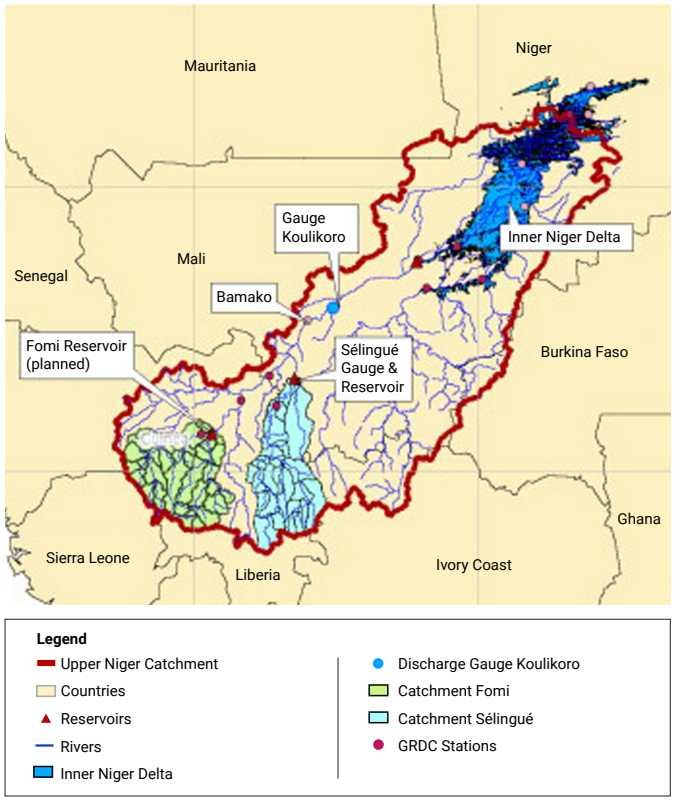


Source: Benedikt.Seidl - Own work, based on JISAO data 2008. https://en.wikipedia.org/wiki/Sahel_drought#/media/File:Sahel_rainfall_timeseries_en.svg

Water scarcity is a major concern in parts of Mali. As such, reservoirs and dams for water storage and electricity generation are of utmost importance. However, they ultimately affect the hydrology of the water bodies on which they are built as the amount of water they use remains constant irrespective of dry or wet years. The size of Lake Faguibine is mainly dependent on overflows from the Niger. So, dams built along the Niger are likely to have impacts on it. For instance, the Sélingué dam has already reduced the amount of water flooding the Inner Niger Delta and further declines are expected once the Fomi Dam in Guinea and the planned expansion of two planned upstream irrigation schemes that will irrigate cotton, rice and sugar plantations are built (see **Figure 3**) (Hamerlynck, et al. 2016).

Poverty, political crises and conflict over resources have also increased the vulnerability of the people. Political crises are complex but their varied impacts boil down to issues of personal safety and in such cases access to natural resources may be hindered. Most people choose to migrate to urban centres or refugee camps, thus further limiting their access to natural resources, traditional lifestyles and livelihoods. Relations between sedentary and pastoral communities have changed aggravated by the changing climate. There are conflicts over natural resources because traditional land use arrangements are no longer viable (Grünewald, et al. 2015).

Figure 3: Location of large water projects in the Niger River basin



What is/has been done?

In the 1980s, the government undertook a massive reforestation program in which *Acacia tortilis raddiana*, a locally found species and *Prosopsis julifora* were planted. High soil fertility, reduction in animal pressure and the rebellion that happened during the 1990s led to their quick spread covering about 30 per cent of the former lake area with high-density forests (Brockhaus and Djoudi 2008).

In 2006, the government established the Office for the Development of the Faguibine System (OMVF) (see **Box 1**). Then in 2009, UN Environment and other development partners launched the US $15 million Lake Faguibine ecosystem restoration project.

The project aimed to re-flood the lakes and restore the ecosystems and involved making the communities aware of the need to regulate and preserve the flow in the Niger River and its channels.

Box 1: Legal framework for the Office for the Development of the Faguibine System (OMVF)

The Office for the Development of the Faguibine System (OMVF) was established under Law No. 06-011 of 27th January 2006. It mandates the OMVF to manage and the protect the Faguibine system. Some of the activities stipulated include:

- Desilting and maintenance of the river channels of the Faguibine system
- Promote agriculture and livestock productivity and development
- Encourage livelihood development by promoting community groups and supporting functional literacy programmes.
- Carry out activities to protect the environment

ECOLEX 2006

Source: https://upload.wikimedia.org/wikipedia/commons/thumb/0/0a/Prosopis-glandulosa-foliage.JPG/1200px-Prosopis-glandulosa-foliage.JPG

In 2011, UN Environment and West African Economic and Monetary Union (UEMOA) started implementation of the second phase of the project but halted activities due to insecurity. The entire project remit is now being expanded by the United Nations to include livelihoods support, infrastructure development and socio-economic interventions. UN Environment will address issues regarding the health and sustainability of the lake ecosystem, while the United Nations Multidimensional Integrated Stabilization Mission in Mali (MINUSMA) will contribute to peace-building. It is important to note that a Niger Basin wide approach will be critical for the Lake Faguibine initiatives to succeed.

What are the implications for policy?

Restoration of the lake ecosystem: The best option for the communities would be for the restoration of the lake ecosystem as its degradation is part of the root cause of the multi-dimensional poverty that currently characterizes the area. For peace and security to prevail, local development, good governance, ecosystem restoration and conservation must be all pursued simultaneously. However, this will only be possible if all stakeholders work collaboratively.

UN Environment has experience in working with governments in complex areas requiring an integrated approach with the support of all actors. Together with UNDP, UN Environment can also engage the different stakeholders in peace negotiations.

Need to address land tenure and land rights: With the transition from lake to forest ecosystems, political social changes like decentralization and land tenure systems have emerged. Pastoral systems are now viewed as ecologically and economically unviable systems and the authorities are keen to discourage them. These changes need to be addressed within the community.

Management of the new forest resources: Various factors undermine the sustainable use of forest resources and therefore drive vulnerability in the former lake area. It is therefore important for the government and development partners to consider the new roles and services provided by the forest ecosystem. Interactions between the different groups have to be taken into account in planning processes to reduce competition.

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