# Chapter 3

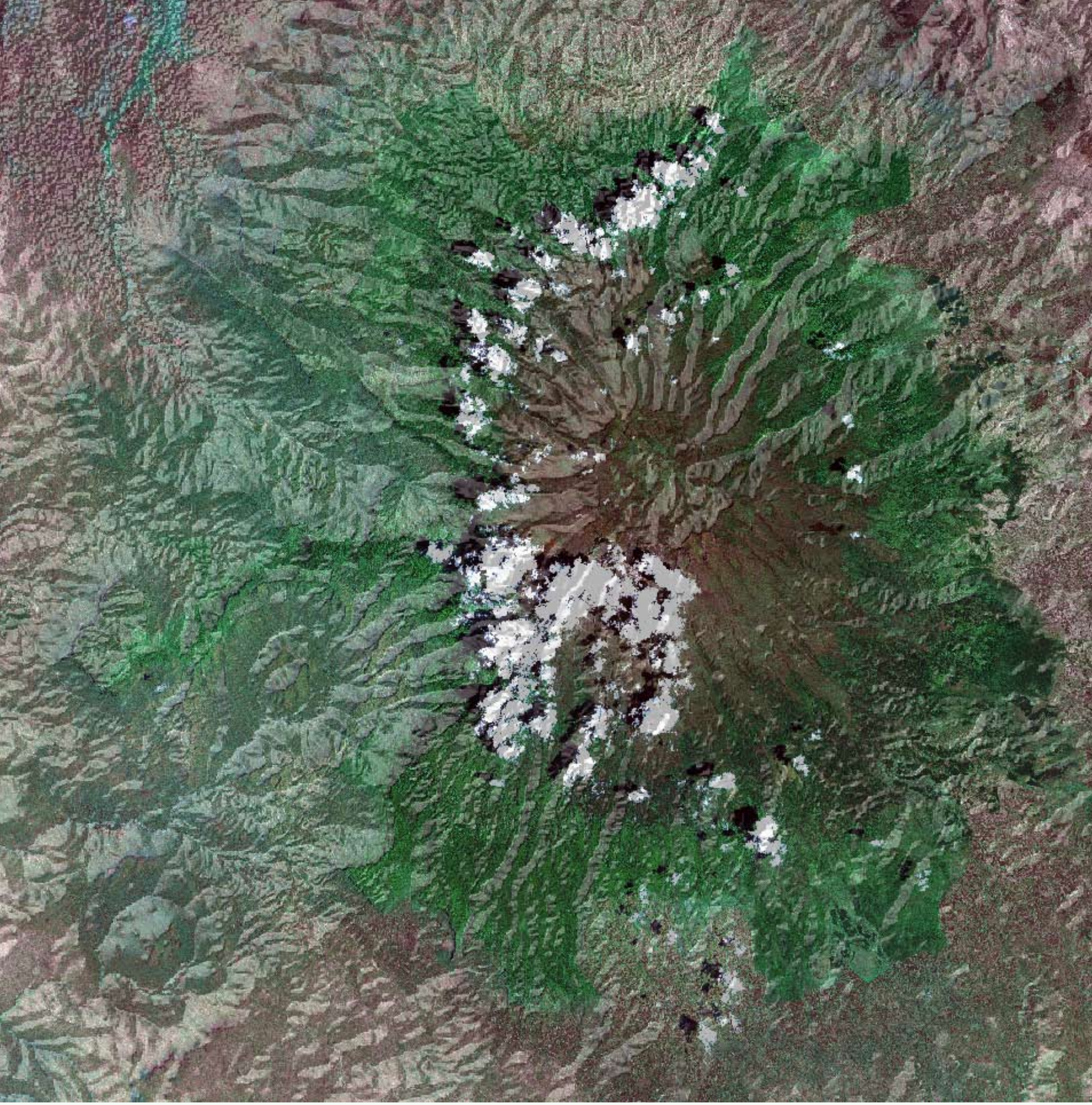
## Transboundary and cross-border environmental issues in Uganda


The source of River Nile at Jinja. The River Nile leaves Lake Victoria at Jinja. The tributaries of the Nile flow through nine countries in Africa into the Mediterranean Sea.

Distribution of natural resources and biodiversity does not respect boundaries, which makes their management of transboundary in character. Uganda shares boundaries with Kenya, Tanzania, Democratic Republic of Congo, Rwanda and Sudan. Many protected areas, rivers, lakes in Uganda are shared with these countries. For example one of the longest river in Africa, the Nile and is shared by many countries has its source in Uganda. Furthermore, Uganda now has 80 districts and many ecosystems are shared among districts which calls for increased collaborative efforts to manage these resources. Uganda has signed several agreements with its neighbors to manage some of these resources. The Nile Basin Initiative (NBI) is a partnership initiated and led by the riparian states of the Nile River through the Council of Ministers of Water Affairs of the Nile Basin states (Nile Council of Ministers, or Nile-COM). The NBI seeks to develop the river in a cooperative manner, share substantial socioeconomic benefits, and promote regional peace and security.

Lake Victoria is also another resource where Uganda has gone into partnership with its neighbors to manage it sustainably. The East African Community has designated Lake Victoria and its Basin as an “area of common economic interest” and a “regional economic growth zone” to be developed jointly by the Partner States. And Lake Victoria is the focus of new attention following the declaration by the East African Community Heads of State that a joint programme be developed for the overall management and rational utilization of the shared resources of the lake.

The East African Community established the Lake Victoria Development Programme in 2001, as a mechanism for coordinating the various interventions on the Lake and its Basin; and serving as a centre for promotion of investments and information sharing among the various stakeholders. Currently there is the Lake Victoria commission that became effective in 2005 with its headquaters at Kisumu. It is the apex institution of EAC mandated with overall coordination.

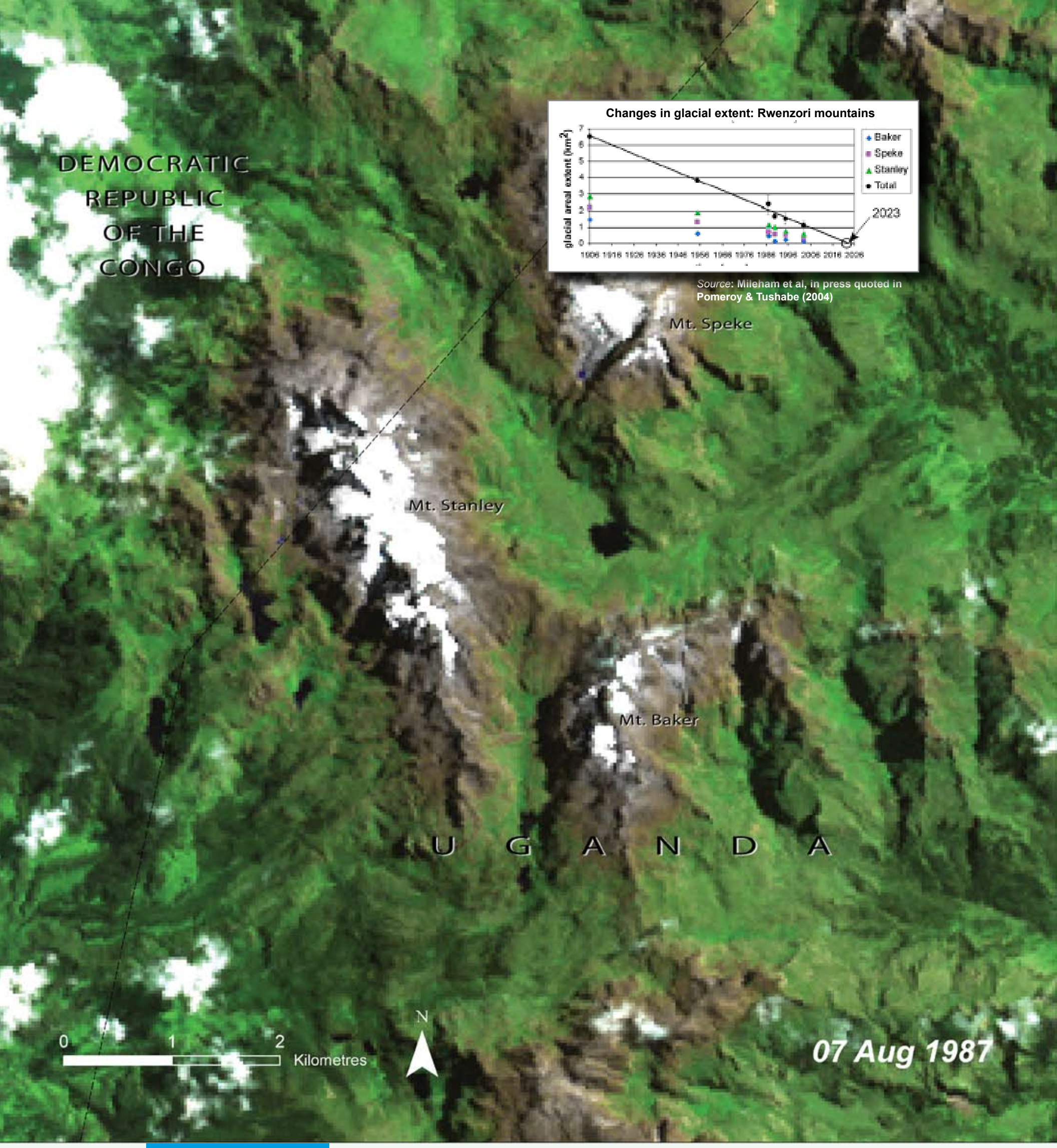


**Mt. Elgon borders Uganda and Kenya in the east**

The Mount Elgon National Park straddles the international boundary between Kenya and Uganda and is a watershed of international importance, feeding the waters of Lake Victoria, the Nile River system, and Lake Turkana. The core ecosystem in the Mt Elgon area is characterized by large montane forest landscapes; it comprises several protected areas. Adjacent is a vast, heavily populated agricultural landscape supporting up to 2 million people, whose livelihoods and economic activities are largely dependent on the ecosystem goods and services of the highlands. The mountain ecosystem of Mt Elgon is thus vital to the social and economic functioning of the surrounding areas, both in the highlands and in the lowlands.

NEMA 2006

**A Mutuku herdsman tends his cattle near Mt. Rwenzori ranges at the border of Uganda and the Democratic Republic of Congo (2006)**





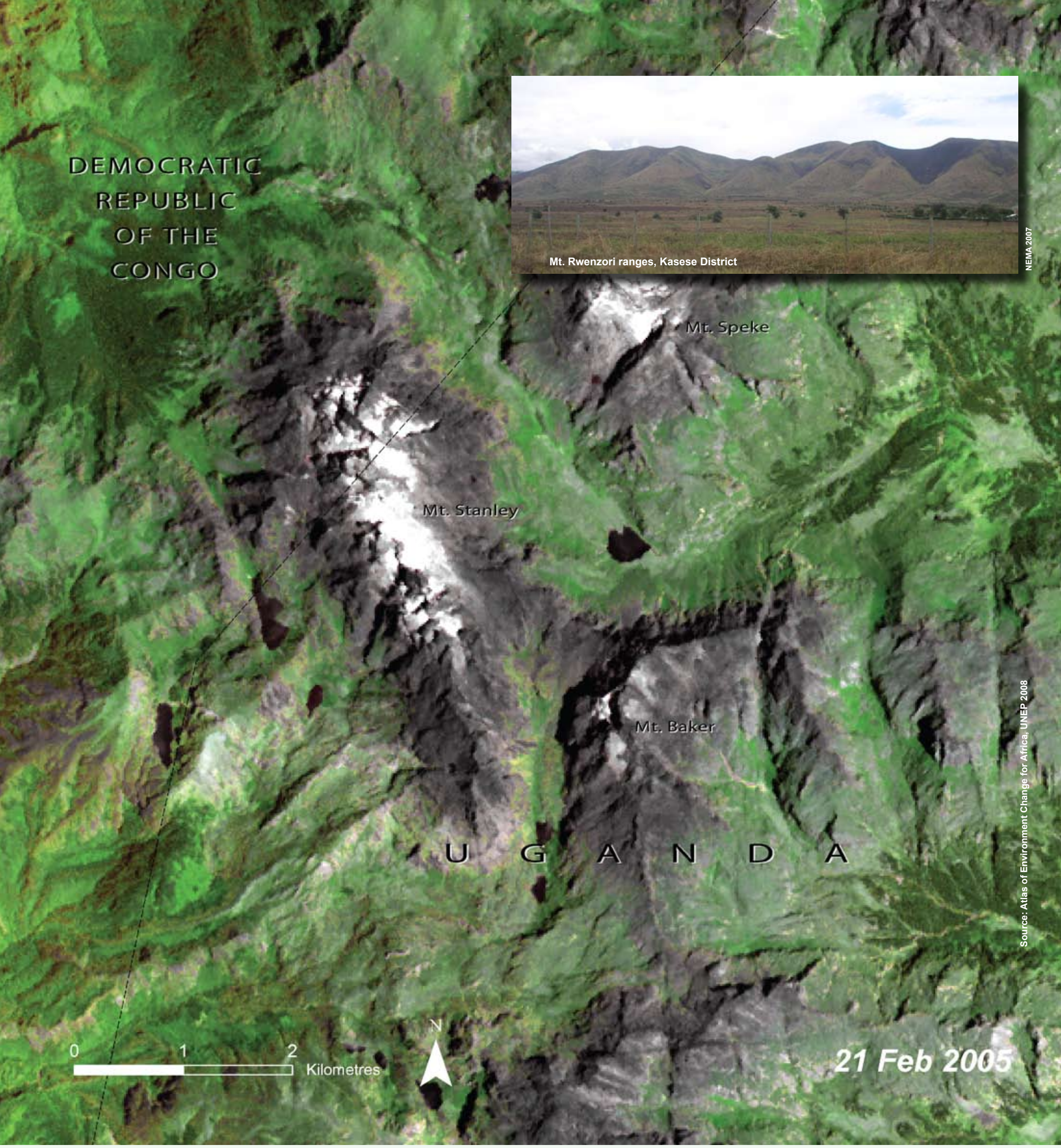


*Source*: **Mileham et al, in press quoted in Pomeroy & Tushabe (2004)**

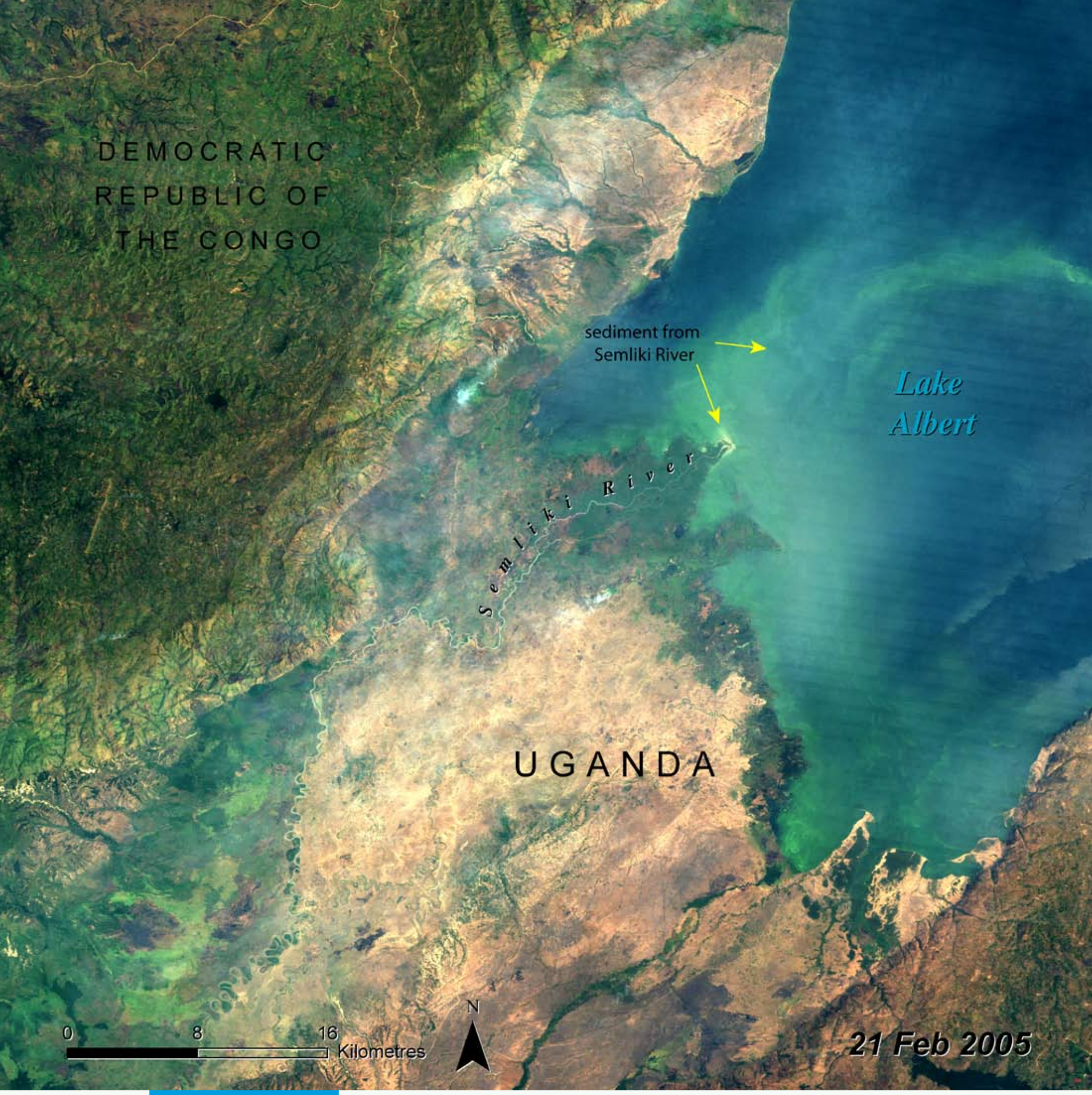
## Mt. Rwenzori Glaciers

### Global warming, disappearing ice caps, reduced stream water

If global warming persists, ice cover on the peaks of the Rwenzoris (Baker, Speke and Stanley) will disappear altogether by 2023 (Mileham et al in press). In 1987 there was more snow on the Stanely, Baker and Speke peaks but by 2005 there are strong signs of reduction in snow. The disappearance of the ice cover will mean reduced water



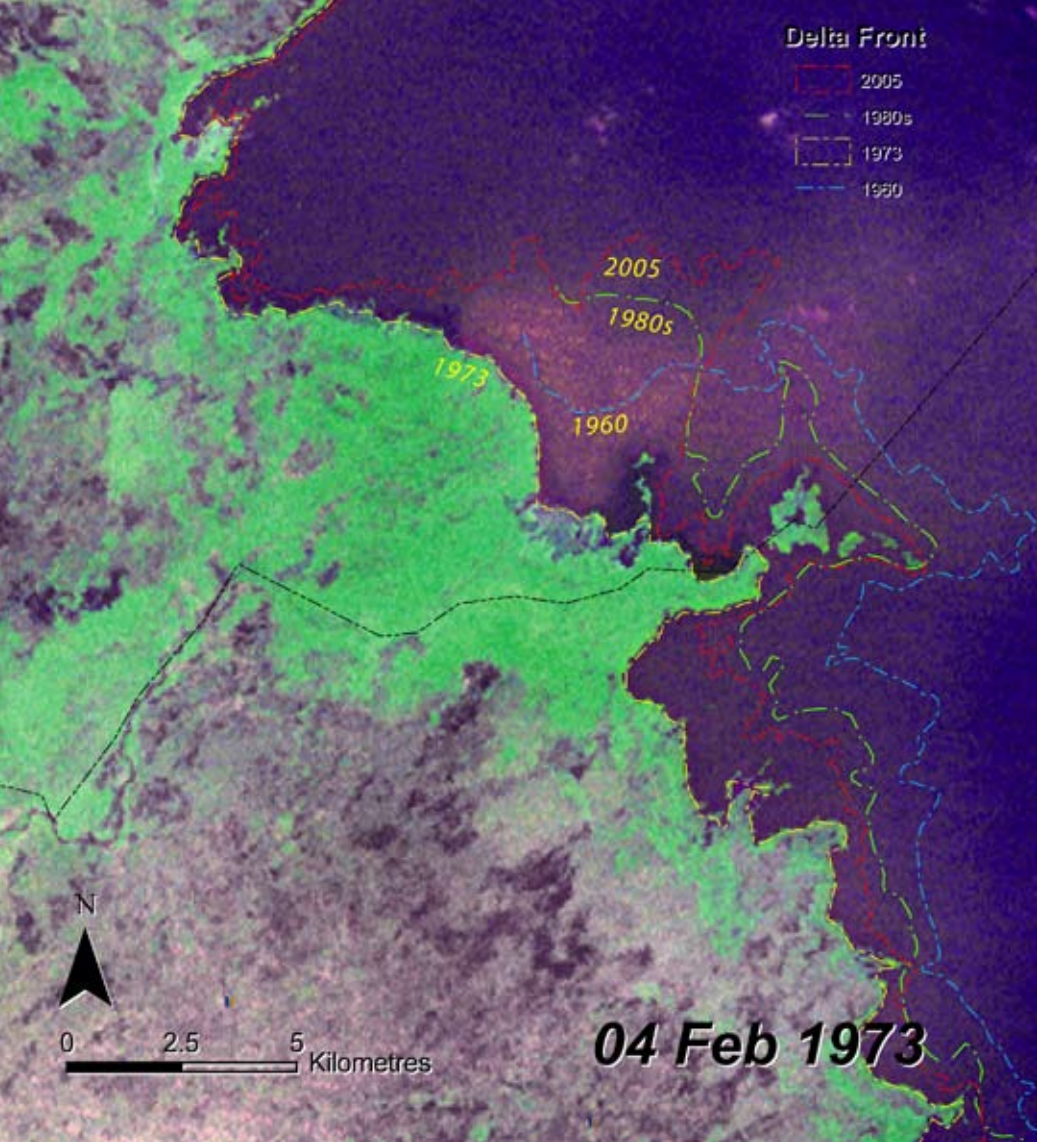

flow in the receiving streams which feed into Lakes George and Edward and Semliki River, discharging water into Lake Albert and finally into the Nile. The biodiversity and tourism potential of the Rwenzori will also be affected.

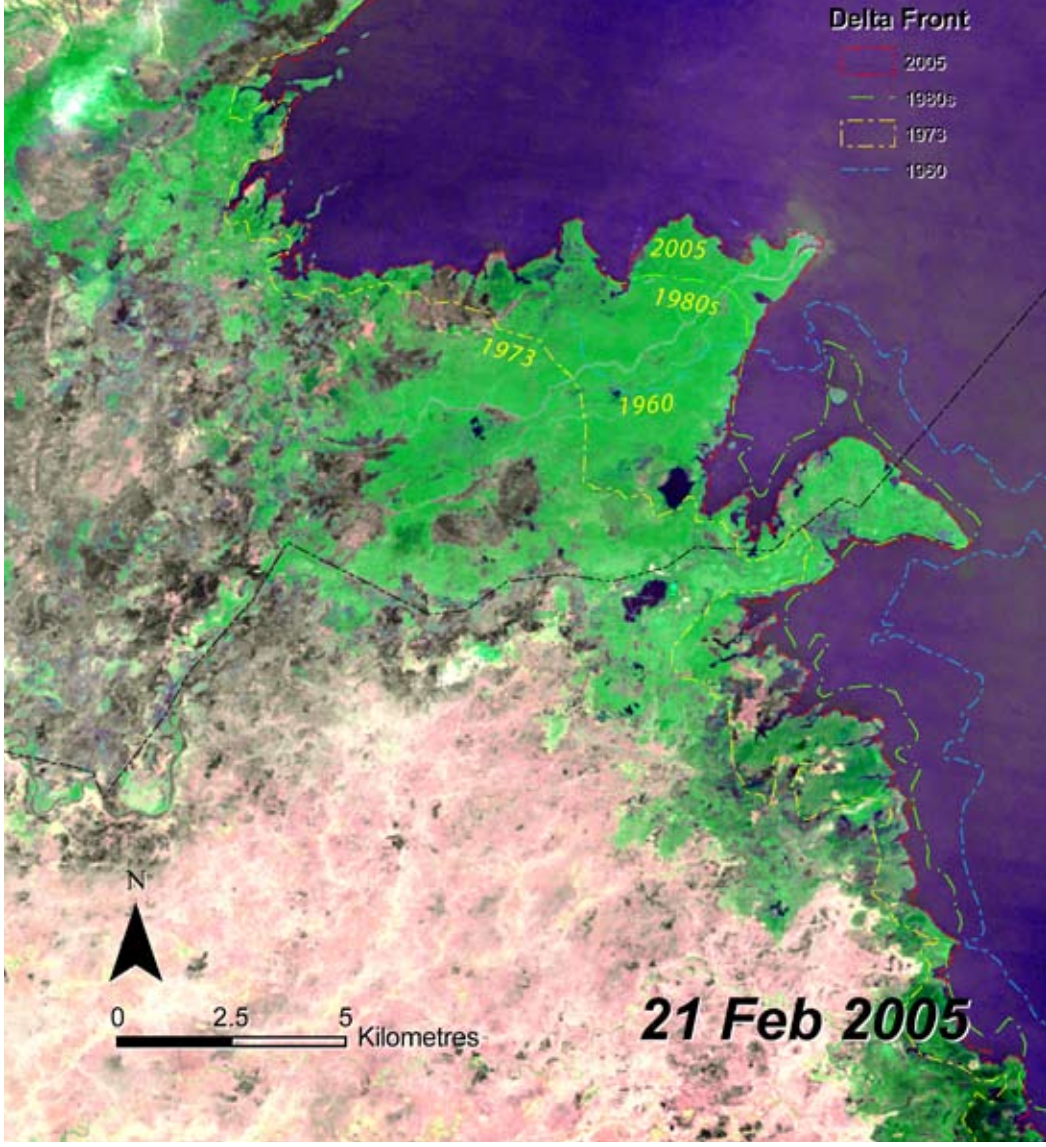


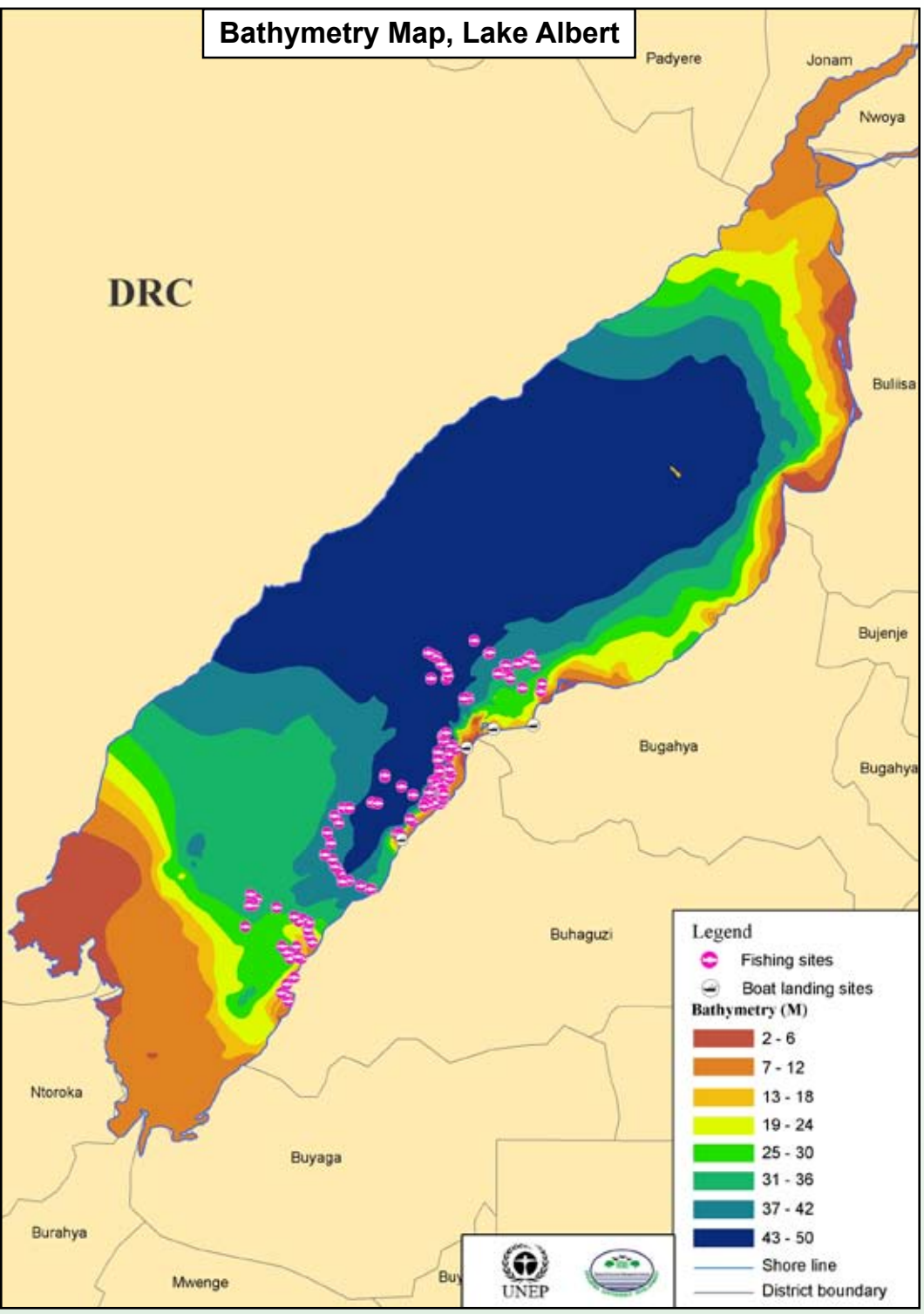

## River Semliki

**Eroded banks of River Semliki; Expansion of shoreline due to increased siltation of Lake Albert due to land degradation**

River Semliki is one of the most important rivers that form Uganda's natural drainage system. The river derives its origin from Lake Edward through Mt. Rwenzori and a series of tributaries that join it along its 140 km course in the Albertine Rift (Western Rift Valley), before draining into Lake Albert. In the first 40 km, the river travels through a heavily forested Semliki National Park, while for the remaining distance it flows through grasslands that are inhabited by the Batuku pastoral community. The river is geopolitically important because it defines the border between Uganda and the Democratic Republic of Congo (DRC). The satellite image of February 2002 shows River Semliki depositing silt into Lake Albert.




Lake Albert is Africa's seventh largest lake situated in the western rift valley on the border between Uganda and the Democratic Republic of Congo. It lies at an altitude of 616 m above sea level, is 160 km long and has an average width of 32 km. In the south-west, the Semliki River brings into the lake the waters of Lake Edward and at its north-eastern side corner just below Murchison Falls; it receives the Victoria Nile from Lake Kyoga. The southern part of Lake Albert is shallower possibly due to to silting. This part of the lake is the breeding area for fish.

There is evidence from the landsat TM image of 2000, spot image of 1980 and MSS image of 1973 that the shoreline is shifting southwards. The delta at the mouth of the river is due to siltation and it is expanding at a rate of 3.5 km/yr into the lake.

Semliki National Park

Semliki River Delta


**A herd of cattle grazing and watering at the banks of River Semliki**

## Changing river course of the River Semliki

Increased river bank erosion due to overgrazing, melting of ice on the Mount Rwenzori and degradation of the water catchments has resulted in siltation changing the river course significantly over the years as it enters Lake Albert.

The Semliki River is in its old stage, and like any aging river, it has characteristic meanders and forms oxbow lakes in some places. In spite of its old stage, it still has enormous erosive power which is realized when it emerges from the forested Semliki National Park onto the Semliki flats in Rwebisengo sub-county, Bundibugyo District. This approximately 100 km long section of the river in the Semliki flats has seriously eroded its banks. The local communities along the river are cattle keepers who graze along and collect water from the same river. On the Uganda side, the town of Rwebisengo is only 1.5 km away from the river and there are numerous other homesteads along it. The human and livestock activities have greatly affected the natural vegetation along its course, thus leading to river bank breakage. Over 10 m of the river bank on Uganda's territory is eroded annually at various points and as a result, it seems to have doubled its width within the last ten years.


Looking up the North escarpment along Lake Albert


Oil exploration in the Albertine Graben


Oil eploration in the Albertine Graben

Since 1925 the area of Lake Albert commonly referred to as the Albertine Graben, has been known to possess potential for petroleum. Presently, it is confirmed that the Albertine Graben that is a biodiversity hot spot is now a petroleum zone. The area stretches from the West Nile region downwards to Kasese District.


# Kagera River

## Siltation of Lake Victoria from River Kagera; uncontrolled agricultural practices and pollution

Lake Victoria, the second largest freshwater body in the world (area 68,800 km$^2$), is generally shallow (max. depth 84 m; mean depth 40 m), and has an irregular shoreline of about 3,440 km in length. The lake lies astride the Equator between latitude 2.50 S and 1.50 N, and longitude 320 and 350 E; shared by three riparian states (Kenya 6%, Tanzania 51%, and Uganda 43%, by area). Lake Victoria catchments are constituted by five countries (Kenya, Tanzania, Uganda, Burundi, and Rwanda) and drained by a number of large rivers as well as many small rivers and streams. River Nile is the single outlet and 82% of the water input in the lake comes directly from rainfall.


The Kagera River which originates from Burundi, and forms the Rwanda-Tanzania, Tanzania-Uganda borders is the largest contributor of water from the catchments. The satellite images of 1987 and 2008 show high reflectance of water from the Kagera River due to silt. Silt and suspended solids impact on water bodies by loading nutrients into the lake. Nutrients stimulate algae growth which reduces oxygen leading to eutrophication and reduction in fish. Siltation is mostly associated with agricultural activities. The delta at the mouth of the river has shifted more into the lake and it is likely to join with the small island below the mouth of the river (circled).


# Lake Victoria

Green algae bloom,
Water hyancith

**Green algae bloom on Lake Victoria in Entebbe on the 17th December 2007**

Water quality in Lake Victoria has declined greatly in the past few decades, owing chiefly to eutrophication arising from increased inflow of nutrients into the lake. Nutrient inputs have increased two to three-fold since the turn of the century, mostly since 1950. Concentrations of phosphorus have risen markedly in the deeper lake waters, and so has nitrogen around the edges. Stimulated by these and other nutrients, the five-fold increase in algae growth since 1960, and the shift in its composition towards domination by blue-green algae, are causing deoxygenation of the water,


*The Kaawa* **ship docks on the Green** algae bloom contaminated waters of **Lake Victoria at the Port Bell port, near Kampala.**


**Water hyacinth at the shores of Lake Kyoga, Zengebe, Nakasongola District. The plant has devastating impacts on water bodies, aquatice biodiversity and people's livelihoods.**


**Restoration of Kagera River Basin: NEMA team and the Wetlands Management Department staff led by the Executive Director, Dr. Aryamanya-Mugisha (pointing at the silted river in background) conducted consultations with stakeholders from Isingiro and Rwanda on management and restoration of the river basin bordering Uganda, Rwanda and Tanzania (2006)**

increased sickness to humans and animals drawing water from the lake, clogging of water intake filters, and increased chemical treatment costs for urban centers. Aside from the near-total loss of the deepwater species, the deoxygenating of the lake's bottom waters now poses a constant threat, even to fish in shallower portions of the lake, as periodic upwelling of hypoxic water causes massive fish kills. The increased nutrient loads have also spurred the water hyacinth infestations. In addition, massive blooms of algae have developed, and come increasingly to be dominated by the potentially toxic blue-green variety. The distance at which a white disc is visible from the surface, (a transparency index measuring alga abundance), has declined from 5 meters in the early 1930s to one meter or less for most of the year in the early 1990s. Water-borne diseases have increased in frequency. Water hyacinth, absent as late as 1989, has begun to choke important waterways and landings, especially in Uganda.


# Lake Kyoga

**Shallow lake, unstable water levels and water surface areas, sudds, changes in catchments flora and fauna**

Lake Kyoga is a shallow lake with a surface area of 4000 km$^2$. Half a million people live on its shores and some on the floating sudds, relying on the lake for their livelihood. The Kyoga system is characterised by high hydrological variability leading to large fluctuations in lake levels, water surface areas, shoreline lengths and associated changes in flora and fauna. During the early part of the last century, Kyoga and Kwania were shallow swamps with little open water. The most important hydrological event in recent history was the sudden, drastic increase in lake level following very heavy rains

APAC DISTRICT

A

Lake Kyoga

Sudds

LUWERO DISTRICT

0 5 10 Kilometres

N

13 Oct 2002

in the early 1960s that resulted in considerable expansion of open water areas of the lakes. Water levels and lake surface area declined in a fluctuating manner during the next two decades until a second major flood event occurred as a result of El Niño rains in 1997/98. The satellite images of 1986 and 2002 show the floating sudds on the lake. By 2002 the outlet of the Nile had been blocked leading to flooding on some of the shore lines. Evidence of flooding can be seen at point A of 1986 and 2002 images respectively.


**NEMA staff and Lira District officials in a follow-up meeting on enforcement of illegal settlements on sudds (2006). The meeting took place inside a 'Disco/Film' make shift structure.**

## Sudds and blockage of the River Nile on Lake Kyoga

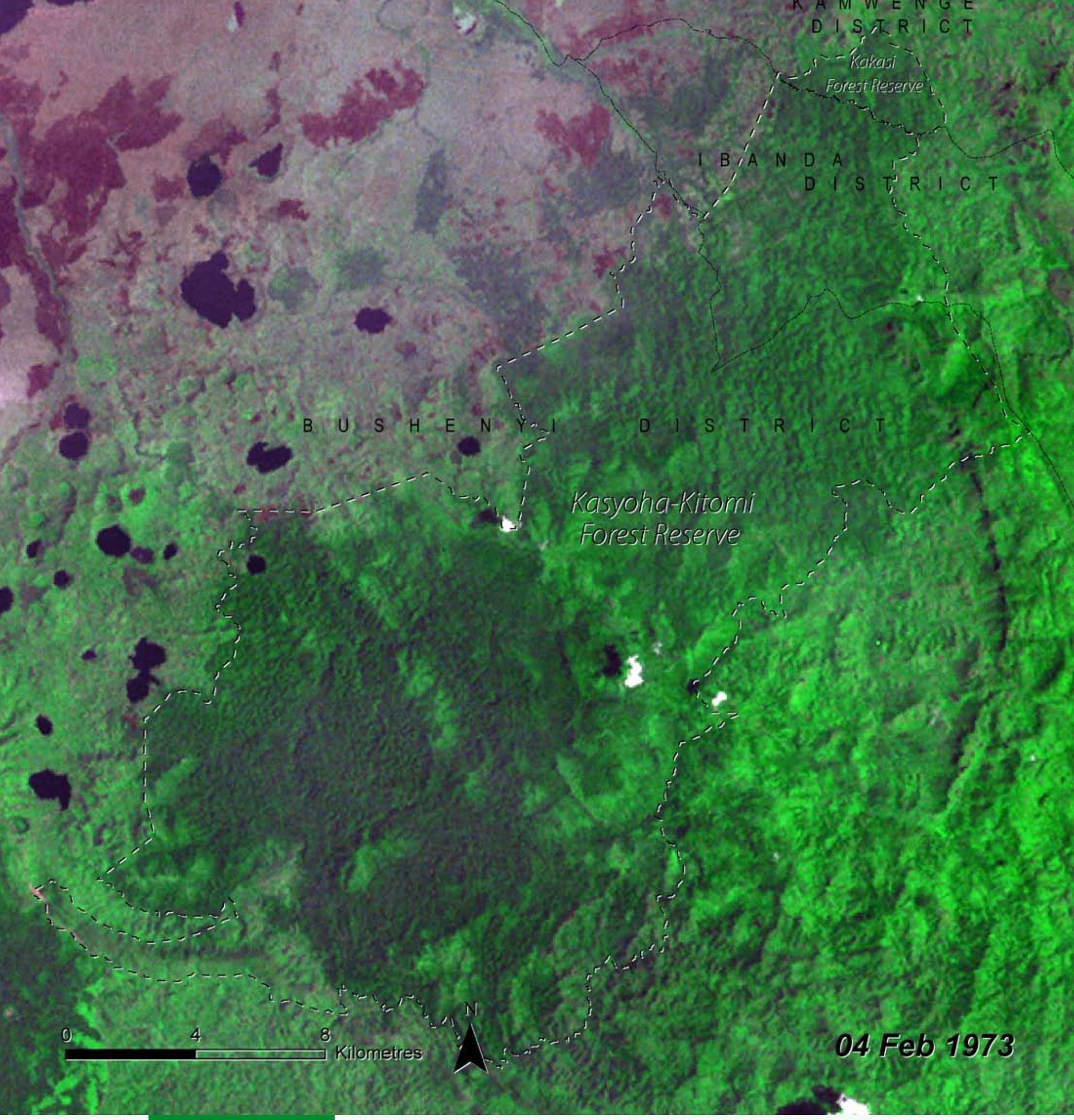
Sudds occur as floating land masses on the lake and they are as old as the lake. The Nile River is the effective creator of these sudds. As it progresses it drags the papyrus and mud along and in the long run sudds form and drift off into the centre of the lake where they continue to grow into large masses. The satellite image of 1986 shows sudds floating on the lake. However, the flood event of 1997/1998 caused a large number of papyrus sudds to be released from the shoreline and to float downstream towards the Nile outlet of the lake. At the point the outlet is narrow and this caused the sudds to jam and form a blockage in early 1998. As more floating sudds continued to drift downstream, they added to the bottleneck, forming a papyrus blockage 16 km long and over 80 $km^2$ in area (satellite image of 2002). This vegetative blockage slowed water flow from the Nile outlet and raised water levels by 2m in 1999-2000. Two channels were opened by the Directorate of Water Development (DWD) in 2001-2002 and later on a team from Egypt had to dredge to allow water flow downstream.



NEMA 2006

**Above: Illegal settlements on the sudds. Inset: A 'Film hall'. Communities at the sudds lead recklessles lives.**
**Below: Technical staff inspecting the sudds and catchments.**

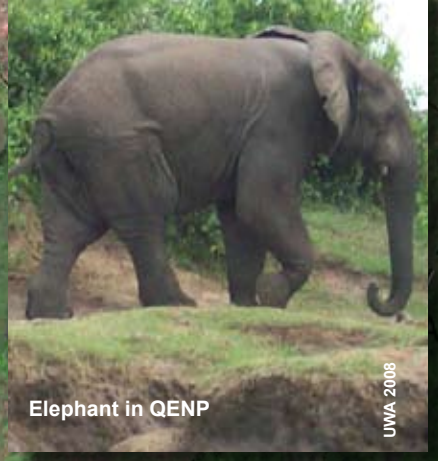
NEMA 2006



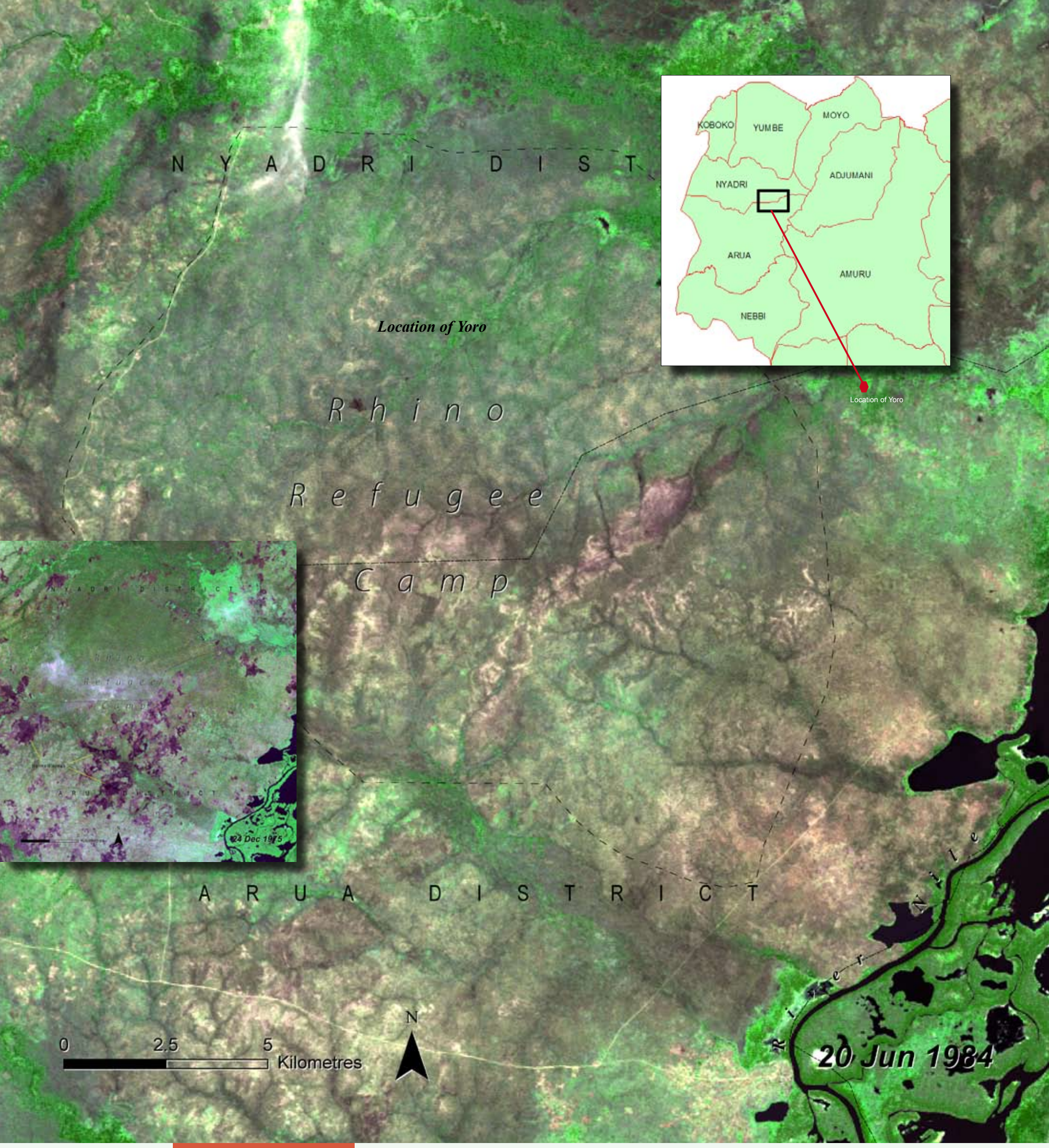

# Kasyoha-Kitomi Forest Reserve

## Deforestation, protected areas, encroachment

The Kasyoha-Kitomi Forest Reserve is part of the network of protected areas that form the largest area of protected land in the Albertine Rift. The diversity of the region is fantastic and Kitomi Forest contributes a great deal to that aspect. Kitomi provides critical habitat for over 350 chimpanzee and 300 elephants. This forest reserve is shared between the districts of Bushenyi, Ibanda and Kamwenge and the largest part of the forest falls in Bushenyi district. In the year 2000, it became apparent that encroachment and illegal logging within the thin corridor between Kitomi Forest and Kyambura Wildlife Reserve (which forms part of Queen Elizabeth National Park (QENP)) was threatening to sever this 400 km$^2$ of vital



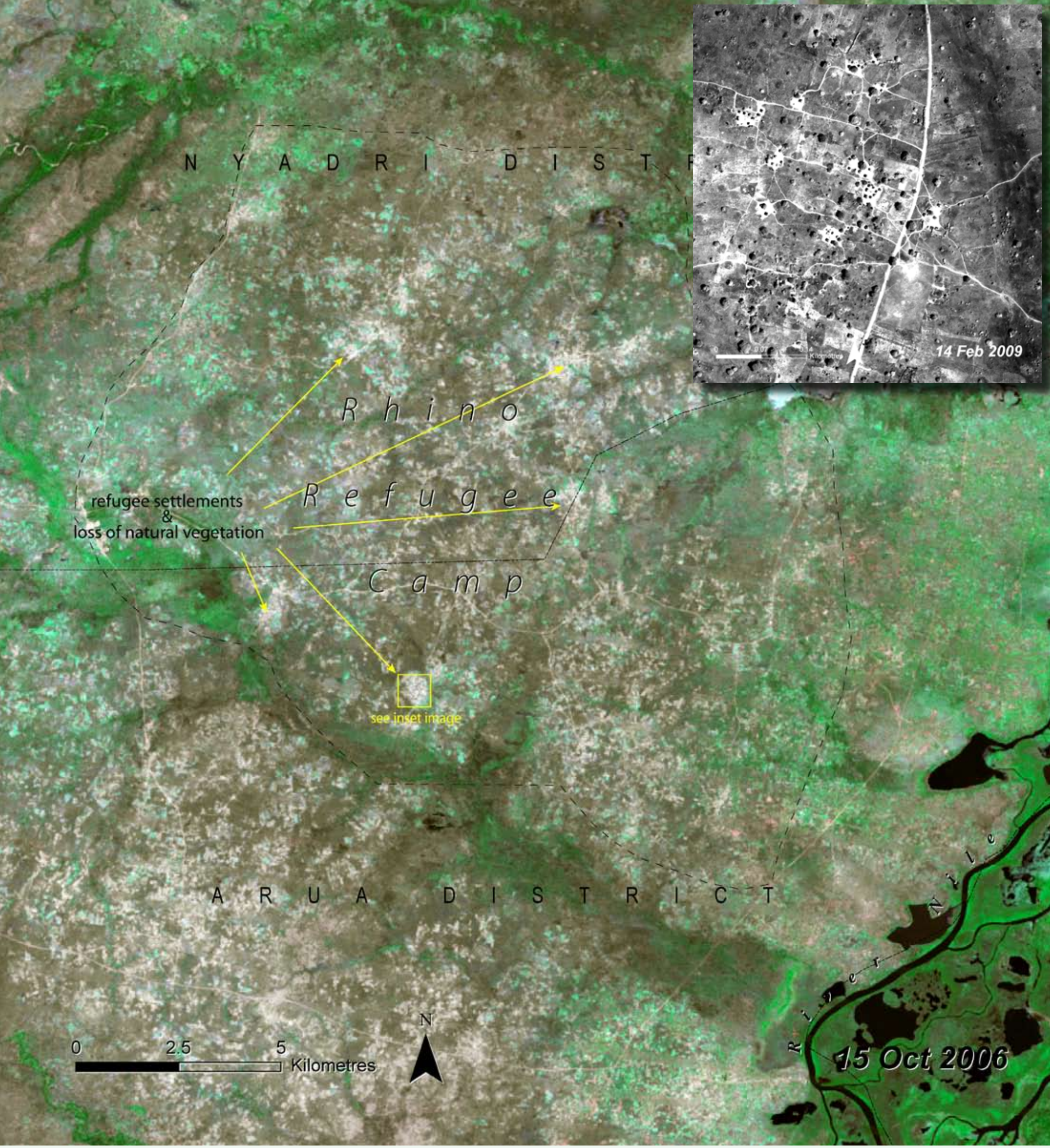

habitat from QENP. Implications of this are that the chimpanzee population of the region would become separated making two populations unviable. This area is a critical seasonal resource for the elephants of the central sector of QENP. Elephants are being forced to pass through protected area 'farmland', destroying crops as they move along, just to reach an area that they have always used (http://www.ugandacf.org/Projects/ksr_project.html). The forest area from the 1960 topographic maps was 444 km$^2$ and the same area from the Landsat TM image of 2000 is 368 km$^2$. In 2008 the boundary of the forest is very distinct as all the surrounding areas have been turned to farmland.




## Rhino Refugee camp

### Impact of refugee settlements in West Nile

The presence of refugee settlements has had an environmental impact on land in West Nile, particularly deforestation as a result of Sudanese refugees producing charcoal to sell in south Sudan. Most Sudanese refugees live in settlements and cultivate their own food on designated land. Located on the banks of the River Nile in the northwest corner of Uganda, Rhino Camp hosts approximately




26,000 refugees, the majority of whom are from southern Sudan. Rhino Camp consists of widely-scattered residential areas over an area of 225 km$^2$, interspersed with agricultural land cultivated by the refugees. In 1989 the area was covered with vegetation and wetlands. By the year 2008, the area had been turned into farmland.

Misuse of seasonal wetlands: Teso floods in 2007

NEMA 2007