FACTSHEET

EACOP IMPACTED WETLANDS IN UGANDA

JULY, 2023

1. Introduction and background

The Albertine Graben region in Uganda has major oil and gas reserves, estimated at 6.5 billion barrels[1] with over one billion being recoverable[2]. Uganda is extracting these reserves under the projects Tilenga, operated by TotalEnergies, and Kingfisher, which is operated by China National Offshore Oil Corporation (CNOOC). The oil produced from the above two fields is expected to be delivered to the Tanzanian port of Tanga by a cross-border pipeline, the East African Crude Oil Pipeline (EACOP). The pipeline will be operated by the EACOP Company Ltd, whose shareholding includes TotalEnergies (62%), CNOOC (8%) and the Ugandan as well as Tanzanian governments (15% each)[3].

The Tilenga and EACOP projects are situated in or around ecologically and environmentally sensitive contexts. Environmental and Social Impact Assessments (ESIAs) have been carried out for both projects and they recognise some of the wetland systems impacted by the projects[4].

Whereas some information on the key EACOP-affected wetland systems in Uganda exists, detailed and important information on the biodiversity and socio-economic roles played by the wetlands is limited.

The ESIA report also downplays the severity of the impacts that the EACOP project will have on the affected wetland systems and surrounding local communities who derive livelihoods from them.

This factsheet thus seeks to reduce the existing information gap on EACOP-affected wetland systems by documenting the key wetland systems affected by the project in Uganda.

The factsheet also discusses the flora and fauna of the EACOP-impacted wetlands, as well as the wetland goods and services provided by the EACOP-affected wetlands. This factsheet limits itself to EACOP-impacted wetlands in Uganda. Another factsheet will discuss the Tilenga oil project-affected wetlands.

This factsheet was authored by a consultant procured by AFIEGO. The consultant is a wetlands expert.

2. Summary of key information

- **The EACOP is set to affect over 158 wetland sections in Uganda** with the pipeline affecting wetlands in all the ten districts it is set to cross in the country.
- **Notably, the EACOP is set to affect over 17 wetlands** draining into Lake Victoria, eight wetlands draining into the Victoria Nile and four wetlands draining into the Lake Albert basin.
- **Of concern is the fact that if constructed, the EACOP** will affect the Kibale/ Bukoora Wetland System in Rakai and Kyotera districts in Southern Uganda. The wetland is connected to River Rwizi, which is important for the survival of the Lake Mburo-Nakivale Ramsar site.

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1 Biryabarema, E. (2014); Uganda ups oil reserves estimate by 85 pct, finds natural gas: https://www.reuters.com/article/uganda-oil-idUSL5N0QZ1EW20140829

2 Petroleum Authority of Uganda; Frequently Asked Questions: https://pau.go.ug/faqs-2/

3 EACOP Company; Overview of the EACOP Project: https://eacop.com/overview/#:~:text=The%20shareholders%20in%20EACOP%20are,the%20Tanzania%20Petroleum%20Development%20Corporation.

4 TotalEnergies (2019); EACOP ESIA report: https://eacop.com/wp-content/uploads/2022/07/08-impact-assessment-uganda.pdf

- **The Kibale/Bukoora wetland system is also the most important** in the Sango Bay-Musambwa Island-Kagera (SAMUKA) Wetland System, a Ramsar Site with an economic value of USD 117 million per year (Sango Bay only).

- **Additionally, the EACOP is set to affect the Katonga wetland system**, which is one of the key systems in the Lake Victoria drainage basin. Lake Victoria is Africa's largest freshwater lake on which up to 40 million people rely.

- **Further, the EACOP is set to affect the Nabakazi wetland system** in the Greater Mubende sub-region. The wetland is the main tributary to the Katonga wetland system and a source of raw materials such as backcloth, the traditional cloth for the Baganda people of central Uganda. The wetland is also home to biodiversity such as Sitatunga/marshbuck antelope (*Njobe*) that form part of the Baganda's clan system, thereby constituting an important socio-cultural resource. The wetland also has a high presence of peat soils, making it key for climate stabilisation.

- **While the EACOP is affecting important wetland systems, the project's** ESIA downplayed[5] the potential impact that the project would have on the wetlands, noting that it was not significant. The project proponents also proposed the open cut construction technique, as opposed to horizontal directional drilling (HDD), for crossing the wetlands. The technique has been criticized by experts, noting that "it has the potential of significant impacts, especially in wetlands[5]."

- **This factsheet recommends that the EACOP is not constructed in the two wetlands** that are connected to Ramsar sites, namely Kibale/Bukoora and Katonga. The Ugandan government as well as development partners should also support further research into EACOP-affected wetlands. This will enable Ugandans to understand their socio-economic importance to aid their conservation.

3. Problem statement

Uganda's National Policy for the Conservation and Management of Wetland Resources defines wetlands as areas "where plants and animals have become adapted to temporary or permanent flooding." These areas include swamps, dambos, areas of marsh, peatlands, high-altitude mountain bogs, as well as flood plains and grasslands. Wetlands have both direct and indirect uses. Direct uses of wetlands include source of fish, firewood, transport, recreation and water. Indirect uses include water retention, pollution control, climate regulation and nutrient recycling. Wetlands can be thought of as "biological supermarkets" and "wealth lands"[6].

The value of Uganda's wetlands should not be underestimated as wetlands could provide an average net contribution of about US$ 10,491 per hectare per year[7], which translates to US$ 22,582,926,600 (over US$ 22.5 billion) for all intact wetlands currently standing at 2,152,600 hectares. The value of wetlands to local households was about

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5 Netherlands Commission for Environmental Assessment (2019); Advisory review for the Environmental and Social Impact Assessment for the East African Crude Oil Pipeline -Uganda: https://www.eia.nl/docs/os/i72/i7228/7228_advisory_report_eacop_uganda_27_june_2019.pdf

6 Mafabi, P. (2018). National Wetland Policy: Uganda. In:., et al. The Wetland Book. Springer, Dordrecht. https://doi.org/10.1007/978-90-481-9659-3_154

7 Kakuru, W., Turyahabwe, N., & Mugisha, J. (2013). Total economic value of wetlands products and services in Uganda. *The Scientific World Journal Studies*, 5(1), pp. 11-24.

US$ 11.4 billion/year in 2002[8]. Close to 80% of the communities that live close to the wetlands use them to enhance their livelihoods and for food security needs[9]. Uganda's wetlands are socio-economically important as they provide water for drinking, irrigation, hydropower generation, recreation, fisheries industrial use, transport, waste disposal and agriculture[10].

Despite their socio-economic importance, wetlands are under immense pressure. Consequently, Uganda's wetland cover declined from 15.6% in 1994 to 8.9% in 2015. If the factors leading to wetland loss are not halted, Uganda risks losing all its wetlands by 2040[11].

That the EACOP will affect approximately 2,000 sq.km of protected habitats, including wetlands, is grim news for wetland conservation[12]. Stakeholder awareness of the EACOP-affected wetlands in Uganda, their economic value and the socio-economic roles they play is also limited. This could undermine stakeholder vigilance to enable conservation of the wetlands.

4. Objectives

4.1 Main objective

The main objective of this factsheet is to strengthen conservation of the EACOP-affected wetlands through increased stakeholder awareness and vigilance.

4.2 Specific objectives

The specific objectives of this factsheet are:

- To document the wetlands affected by the EACOP project in Uganda;
- To discuss the ecosystem services provided and socio-economic roles played by the EACOP-impacted wetlands; and
- To make recommendations to promote conservation of the EACOP-impacted and other wetlands in Uganda.

5. Methodology

5.1 Approach and data collection methods

Information in this factsheet was generated mainly through document review. The EACOP ESIA report, published books, journals, district wetland inventory reports, research reports and published factsheets were the main sources of information. The Ramsar Convention, EACOP, Petroleum Authority of Uganda (PAU) as well as the Ministry of Water and Environment websites were also visited. The wetlands data that is used in this factsheet was acquired using academically proven Geographical Information Systems (GIS) and Remote Sensing techniques coupled with Open Street Maps.

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[8] Moyini, Y., Muramira, E., Emerton, L., & Shechambo, F. (2002). The costs of environmental degradation and loss to Uganda's economy with particular reference to poverty eradication. Policy Brief, 3.

[9] Turyahabwe, N., Kakuru, W., Tweheyo, M., and Tumusiime, D. (2013). Contribution of wetland resources to household food security in Uganda. *Agriculture and Food Security Journal*. 2. p. 5.

[10] Barakagira, A & de Wit, A. (2019). The role of wetland management agencies within the local community in the Conservation of wetlands in Uganda. *Environment and Socio –economic Studies*. 7(1). pp. 59-74

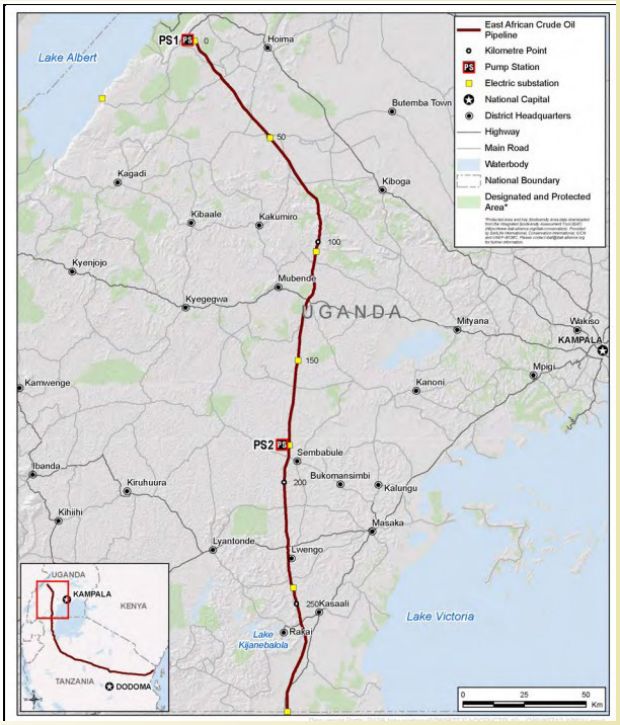
[11] Ministry of Water and Environment, MWE, (2019). State of wetlands report. Wetlands Management Department.

[12] Map for environment. (2023). The East African Crude Oil Pipeline – EACOP a spatial risk perspective. https://mapforenvironment.org/story/The-East-African-Crude-Oil-Pipeline-EACOP-a-spatial-risk-perspective/111

5.2 Study area

Only the EACOP-affected wetlands in Uganda are discussed in this factsheet. The EACOP project covers the districts of Hoima, Kikuube, Kakumiro, Kyankwanzi, Gomba, Mubende, Lwengo, Sembabule, Kyotera and Rakai in Uganda. The EACOP project is partly located in the Albertine Graben of Uganda. The Albertine Graben is identified by Birdlife International as an Endemic Bird Area13, by WWF as an Ecoregion14 and by Conservation International as a biodiversity hotspot15 containing some of the richest areas in Africa for mammal and bird species.

Map showing the EACOP route



Source: EACOP ESIA report

6. Factsheet findings

6.1 EACOP–impacted wetlands in Uganda

Geographical Information System (GIS) analyses show that the EACOP crosses more than 158 wetland sections in Uganda. The EACOP ESIA report however highlights only four major wetland systems of Kafu, Nabakazi, Katonga and Kibale[4] as being impacted by the project. The wetland systems crossed by the EACOP are key to the livelihoods of the communities especially those along the cattle corridor in Sembabule, Lwengo, Gomba and Kyankwanzi districts that are already experiencing adverse impacts of climate change characterised by prolonged droughts as well as low and unreliable rainfall[16] . This leaves wetlands as one of the only sources of water for domestic and

[13] International Council for Bird Preservation (1992). Putting Biodiversity on the Map: Global Priorities for Conservation, Cambridge, International Council for Bird Preservation.

[14] Olson, D.M. & Dinerstein, E. (1998). The Global 200: A Representation Approach to Conserving the Earth's Most Biologically Valuable Ecoregions. Conservation Biology, 12, 502-515.

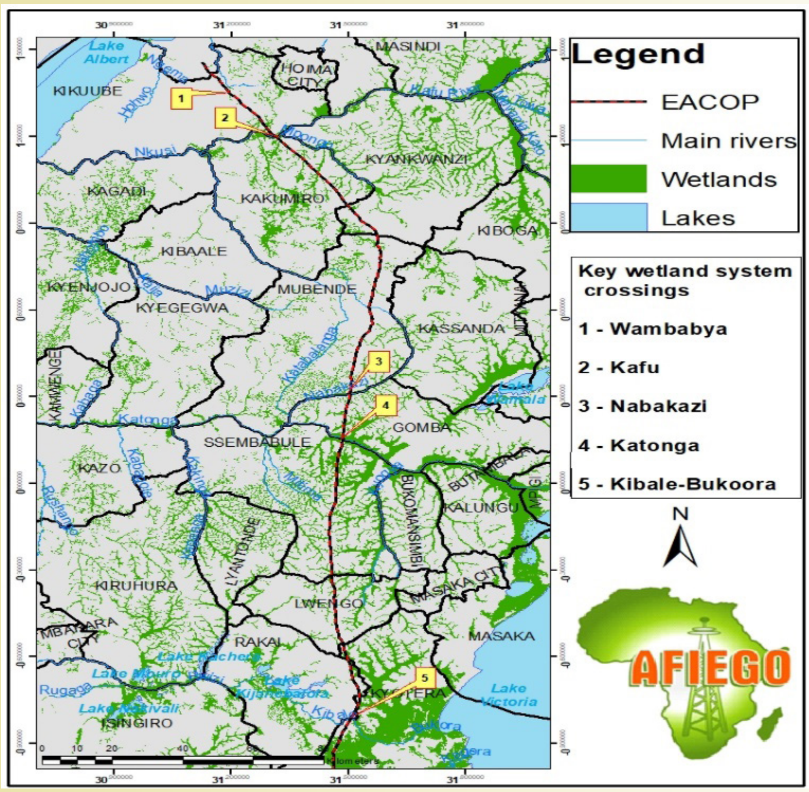
[15] Conservation International (2011). Biodiversity Hotspots: Eastern Afromontane. Available at: http://www.biodiversityhotspots.org/xp/hotspots/afromontane/pages/default.aspx#indept

[16] Nimusiima et al. (2013). Nature and dynamics of climate variability in the Uganda cattle corridor. *African Journal of Environmental Science and Technology*.

livestock use in these harsh climatic conditions. The table below highlights the key wetlands crossed by the EACOP in each district.

No.	District	Key wetlands crossed by EACOP	Drainage Basin
1.	Hoima	Wambabya	Lake Albert
2.	Kikuube	Kafu, Kanywabarogo, Wambabya	Lake Albert
3.	Kakumiro	Mpongo, Rumina, Rwebikere, Kanywabarogo, Kafu	Victoria Nile
4.	Kyankwazi	Kanangalo, Lugolima, Nakasasa	Victoria Nile
5.	Mubende	Nakirunga, Nabakazi, Kyabutuzi (Katabalanga)	Lake Victoria
6.	Gomba	Nabuguyo, Nabakazi, Katonga	Lake Victoria
7.	Sembabule	Kisekera, Katonga, Bisange (Kakinga)	Lake Victoria
8.	Lwengo	Bisange, Lwenswera all draining into Kakinga	Lake Victoria
9.	Rakai	Salongo, Kabale, Katungulu, Kibale-Bukoora (Kibale/Bukoora is the most important in the Sango Bay Ramsar Wetland System).	Lake Victoria
10.	Kyotera	Kisoma, Kasemugiri, Jemakunya, Kibale-Bukora (All part of the Sango Bay Ramsar wetland system and draining into Lake Victoria)	Lake Victoria

Map showing the wetlands in Uganda crossed by the EACOP



6.2 Biological diversity of key EACOP impacted wetlands

Because the EACOP-impacted wetland sections are many (158), this factsheet discusses the impacted wetlands at a system level. Wetlands in Uganda are clustered into systems, which feed into each other until the main one drains into a basin. Uganda's wetlands all finally flow into seven major basins including the Lake Victoria Basin, Lake Kyoga Basin, Lake Edward Basin, Lake Albert Basin, Albert Nile Basin, Victoria Nile and Achwa[17]. Below is more information on the biological diversity of key EACOP-impacted wetland systems.

a) Wambabya wetland system

The EACOP crosses the Wambabya wetland system at latitude 1.347 and longitude 31.163.

Wambabya is one of the largest wetlands in the Bunyoro sub-region, covering a stretch of 58 km, with high biodiversity, ecological and economic values within the Albertine Graben. The wetland is a source of water for over 50,000 people in Hoima city and currently faces threats due to anthropogenic activities[18].

The Wambabya wetland system covers the districts of Hoima and Kikuube and drains into Lake Albert. It has several tributaries such as Jumangabo, Kanywabarongo, Rwamutonga and many others[19].

The Wambabya wetland system has predominantly peaty and silty soils that differ along its course, ranging from loamy–clayey and sandy near to its mouth. Because of its peaty nature, the wetland is important in climate regulation as it stores carbon.

The wetland has woodlands, grasslands, palms, with occasional swamp forest, sedges/reeds, open waters, and converted farmlands. It is also rich in biodiversity with plant species varying along its course including swamp forests with various timber trees such as *misusa, misanda*, ferns, reeds, Phoenix, *embira*, *mugambanimpyata* and *omunyara*.

The wetland is a habitat for mammals, birds, reptiles, fish, amphibians, and insects. Mudfish (*ensonzi*) is common and so are a few butterflies. The mammals that are found in the wetland include monkeys, frogs, mangoose, bushback and sitatunga. Birds include crowned crane, grey heron, saddle bill stock, shoebill, yellow-billed stork, African marsh, blue-headed coucal, green barken heron and yellow billed egrets.

b) Kafu wetland system

The EACOP crosses the Kafu wetland system at latitude 1.199 and longitude 31.279 bordering Kikuube and Kakumiro districts. In the EACOP ESIA, the Kafu crossing is said to be at Kilometre Point (KP) 36–37[4].

The river Kafu wetland system is a predominantly permanent wetland draining into the Victoria Nile. Major tributaries of the river Kafu wetland system include Nkusi, Mpongo and Mayanja. The system originates from Kakumiro district where it separates with River Nkusi that flows to Lake Albert westwards. The river Kafu wetland system then moves eastwards traversing or forming borders of the districts of Kakumiro, Kikuube,

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17 United Nations Environment Programme, & United Nations Development Programme (2016). Uganda Wetlands Atlas - Volume II. https://wedocs.unep.org/20.500.11822/17430.

18 Byaruhanga, B., P. (2010). Public Awareness and Participation in the Conservation of Wambabya Wetland/River in Hoima District. https://www.rufford.org/projects/patrick-byamukama-byaruhanga/public-awareness-and-participation-in-the-conservation-of-wambabya-wetlandriver-in-hoima-district/

19 Ministry of Water, Lands and Environment. (2001). Hoima District Wetland Inventory report. Wetland Inspection Division.

Kyankwazi, Hoima, Masindi, Nakaseke and Nakasongola as it drains into Victoria Nile [20].

The wetland is home to plant species that include papyrus (*Kitoogo*), reeds, water lily (*Kitengeja*), bull rush, humble plant, ferns and others. The wetland is also home to animals including monitor lizards (*enswaswa*), hippos (*envubu*) and fish such as Tilapia (*engege*) as well as Cat fish (*emmale*). The avifauna found in the wetland include birds such as the Common sand piper.

The landscape in Kafu consists mainly of papyrus swamps and dense bush thickets making it a prime ground for the Sitatunga (*enjobe*), Duiker (*entalaganya*) Reedbuck (*Enjaza*), Nile Bushbuck (*Engabi*), Ugandan Defassa Waterbuck, Leopard (*Engo*), Common Oribi (*empeewo*) and Bush Pig. The Kafu wetland system is also a paradise for birdwatchers with 420 different bird species[21].

c) **Katonga wetland system**

The EACOP crosses the Katonga wetland system at latitude 0.156 and longitude 31.449 bordering Gomba and Sembabule districts. The EACOP ESIA notes that the Katonga crossing is at KP 165[4].

The wetland creates boundaries for the following Ugandan districts: Kamwenge, Kazo, Kyegegwa, Sembabule, Mubende, Gomba, Bukomansimbi, Kalungu, Butambala, Masaka and Mpigi. It drains into Lake Victoria.

Apart from creating boundaries for the said districts, the wetland system has other secondary big systems that feed into it key among which are Kyogya, Nakayiba, Nabajjuzi Ramsar site, Kakinga, Kabagole, Katabalanga, Nabakazi, Kibimba and Nabugabo Ramsar site meaning the Katonga wetland system covers Masaka city, Lwengo, Kyotera, Lyantonde, Kiruhura, Kassanda and Mityana[22].

The wetland is an important part of the drainage system for Lake Victoria, Africa's largest freshwater lake on which up to 40 million[23] people in East Africa rely to meet their water and other needs. The Katonga wetland system is also interlinked with the Nile system forming an important wetland system for human survival[24].

In addition, the Katonga wetland system is part of the Katonga Wildlife reserve that is home to 150 bird species[25], 40 animal species[26] including the Sitatunga and various plant species. The reserve is marketed for tourism, a billion-dollar industry[27] in Uganda hat supported over 1.5 million jobs (14.7% of employment) in 2019[28].

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[20] Ministry of Water, Lands and Environment. (2001). Hoima District Wetland Inventory report. Wetland Inspection Division.

[21] Chapungu-Kambako 2023, Kafu river basin. Accesed from: https://chapungu-kambako.com/camps-and-lodges/uganda/kafu-river-basin/

[22] Makerere University; Contribution of wetland resources to household incomes of Riparian communities: A case study of Katonga wetland in Mpigi District: http://makir.mak.ac.ug/handle/10570/4854

[23] Nyamweya, C.S., et al. (2022); *Lake Victoria's bounty: A case for riparian countries' blue economy investment*: https://www.frontiersin.org/articles/10.3389/fenvs.2022.952654/full

[24] UWA; Katonga: https://ugandawildlife.org/wildlifereserves/katonga/

[25] UWA; Katonga: https://ugandawildlife.org/wildlifereserves/katonga/

[26] Uganda Safari; Katonga Wildlife Reserve: https://www.ugandasafari.com/destinations/uganda-forest-reserves/katonga-wildlife-reserve.html

[27] Uganda Bureau of Statistics (2023); *Uganda Tourism: Satellite account*: https://www.ubos.org/wp-content/uploads/publications/03_2023Uganda_Tourism_Satelitte_Account_-_Popular_Version_2023_Web.pdf

[28] Uganda Bureau of Statistics (2023); *Uganda Tourism Satellite Account: Measuring the contribution of tourism to the economy of Uganda*: https://www.ubos.org/wp-content/uploads/publications/03_2023Uganda_Tourism_Satelitte_Account_-_Popular_Version_2023_Web.pdf

The wetland also greatly contributes to the incomes of surrounding communities with 74.2% earning income from the wetland. Fisheries provides the highest gross incomes[29].

d) **Nabakazi wetland system**

The EACOP crosses the Nabakazi wetland system at two sections, first at latitude 0.609 and longitude 31.518 within Mubende district. The affected sub-counties are Madudu and Kitenga. Thereafter, the EACOP crosses Nabakazi at latitude 0.312 and longitude 31.466 bordering Mubende and Gomba districts. The EACOP ESIA notes that the pipeline crosses Nabakazi River at KP141–148[4].

The Nabakazi wetland system covers the districts of Kasanda, Gomba and Mubende. It originates from the sub-counties of Madudu and Butologo in Mubende district before draining into the Katonga wetland system in Kitenga sub-county, Mubende district[30].

Nabakazi is a key wetland system located in a very wide valley through which rivers Bwala, Katabalanga, Mpologoma, Kiye, Kabale, Nabigoga, Kakwale, Kabalokola, Lwamagembe and Kachwamango flow, draining into Katonga and later Lake Victoria. The wetland also has a high presence of peat soils, making the wetland key for climate stabilisation.

Ecologically, the wetland is dominated by papyrus, swamp forest and palms with reeds/sedges, natural grass and bush lands being dominant. The wetland is home to plant species including: papyrus (*ekitoogo*), ferns (*kitengejja*), *matovu*, *busekende*, *musizi* (M. Eminii), *omutuba* (Ficus natalensis), and *musambya* (Markhamia lutea) among others. These plants for instance *musizi* and *musambya* provide timber that is good for construction[31] and furniture making[32] respectively. Parts from plants such as *omutuba* are used for medicinal purposes such as treating blood related diseases and to make backcloth[33], the traditional cloth for the Baganda people of central Uganda.

The wetland is also home to animal species including sitatunga, otters, monkeys, antelopes, wild pigs, frogs, snakes, squirrels, pythons (*timba*). Fish species such as catfish (*emmale*), ocellated labyrinth fish, lung fish (*emmamba*)[34] and mud fish (*ensonzi*) are also found in the wetland. The river supports fisheries, a sector which directly and indirectly employs 5 million people in Uganda[35] and is among the country's biggest foreign exchange earners.

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29 Kateyo et al. 2014. Contribution of Wetland Resources to Household Incomes of Riparian Communities of Katonga Wetland in Mpigi District, Uganda. *International Journal of Sciences: Basic and Applied Research (IJSBAR)*. 13(1), pp 274-286

30 Ministry of Water, Lands and Environment. (2001). Mubende District Wetland Inventory report. Wetland Inspection Division.

31 Plant use. *Maesopsis eminii*: https://uses.plantnet-project.org/en/Maesopsis_eminii_(PROSEA)#:~:text=Musizi%20is%20a%20good%20general,decoction%20is%20diuretic%20and%20purgative).

32 Nassuna, S. *Not all wood is good for furniture making*: https://www.newvision.co.ug/news/1291578/wood-furniture

33 Kakembo, T. *How to make use of those herbs in your backyard*: https://www.newvision.co.ug/news/1497132/herbs-backyard

34 National Agricultural Research Organisation; *River Nabakazi species*: https://freshwaterbiodiversity.go.ug/water_body/?name=River%20Nabakazi%202

35 Economic Policy Research Centre (2020); Industrial linkages and employment opportunities in the fish value chain: https://eprcug.org/publication/industrial-linkages-and-employment-opportunities-in-the-fish-value-chain/

Nabakazi wetland is also home to birds including the grey-crowned crane (*Ngaali*) (Uganda's national bird), hammerkop, grebe, African marsh hunter, saddle and open bill stork. Others include egrets (*ennyange*), guinea fowls (*enkofu*) and African spine, making it important for biodiversity conservation[36].

e) **Kibale/Bukoora wetland system**

The EACOP crosses the Kibale/Bukoora wetland system at latitude 0.813 and longitude 31.471 bordering Rakai and Kyotera districts. The river is called Rwizi in South-western Uganda originating from the hills of Buhweju district. River Rwizi traverses the districts of Bushenyi, Sheema, Ntungamo, Rwampara and Mbarara. It is a lifeline for Mbarara city residents.

As it joins Rakai, River Rwizi's name changes to Kibale then to Bukoora in Kyotera district before draining into Lake Victoria[37]. Bukoora is the main wetland system in the Sango-Bay landscape. It is also a key river in the Sango Bay-Musambwa Island-Kagera (SAMUKA) Ramsar site.

Because Kibale/Bukoora wetland is key to conservation of the SAMUKA Ramsar site, this factsheet discusses the socio-economic importance of the Ramsar site. The economic value of the Sango Bay Forest swamps is USD 117 million per year[38]. This value includes the provision of water for people and livestock, provision of fuelwood, provision of grass for grazing as well as water for farming and irrigation. Other services include the provision of honey, ants and grasshoppers among others[39].

The Ramsar site is also important for biodiversity conservation as it is home to 16.5% of the population of Grey-headed Gulls (Larus cirrocephalus), and hosts globally endangered mammals such as Elephant, Black and White Colobus Monkey and a subspecies of the Blue Monkey[40]. Musambwa island, the world's largest breeding colony for grey-headed gulls[41] and a culturally rich landscape[42], is important for biodiversity conservation and tourism.

On its part, the Kibale/Bukoora wetland system is a generally permanent wetland with a few seasonal parts. Dominant vegetation varies from place to place. Some parts are dominated by papyrus, swamp forest, reeds, sedges, and natural grassland. A relatively big part of the wetland has been converted to farmland. The plants species of the wetland include Vossia, Miscanthus, papyrus, Sesbania, Afromomum, Pistia, Phragmites, Cyperus articulata, Phoenix, several crops and Acacia. The fauna species include bushbuck, catfish, herons, ibis, crested cranes and egrets[43].

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36 Ministry of Water, Lands and Environment. (2001). Mubende District Wetland Inventory report. Wetland Inspection Division.

37 River Rwizi. https://web.archive.org/web/20140803221711/http://mbarara.go.ug/Rivers.html

38 Ministry of Water and Environment (2016): *Conservation investment plan for Sango Bay*: https://www.climatelinks.org/sites/default/files/asset/document/2016_USAID-PREPARED_Conservation-Investment-Plan-Sango-Bay.pdf

39 USAD (2016); Economic value of Sango Bay-Minziro Ecosystem: https://www.climatelinks.org/sites/default/files/asset/document/2016_USAID-PREPAPRED_Economic-Valuation-of-Sango-Bay.pdf

40 Ramsar Site Information Service; *SAMUKA*: https://rsis.ramsar.org/ris/1641

41 Buyondo, D. (2021); Uganda's Musambwa Island, the World's Largest Breeding Colony for Grey-headed Gulls, Devastated by Floods amid Coronavirus Pandemic: https://infonile.org/en/2021/02/musambwa-island-the-worlds-largest-breeding-colony-for-grey-headed-gulls-devastated-by-floods-amid-coronavirus-pandemic/

42 Musambwa Island on Lake Victoria Uganda. https://www.gorillasafariexperts.com/musambwa-island-on-lake-victoria-uganda/

43 Ministry of Water, Lands and Environment. (2001). Rakai District Wetland Inventory report. Wetland Inspection Division.

Kibale-Bukora wetland system in Kyotera

Local fish traps in Bukoora wetland system

7. Significance of the EACOP affected wetlands

The EACOP-affected wetland systems play important roles. Some are shown in the table below.

PROVISIONING	
Food	Production of fish, wild game, fruits and grains
Freshwater	Storage and retention of water for domestic, industrial, and agricultural use
Fibre and fuel	Production of logs, fuelwood, peat, fodder
Biochemical	Extraction of medicines and other materials
Genetic materials	Genes for resistance to plant pathogens, ornamental species, and so on
REGULATING	
Climate regulation	Source of and sink for greenhouse gases; influences local and regional temperature, precipitation, and other climatic processes
Water regulation (hydrological flows)	Groundwater recharge/discharge
Water purification and waste treatment	Retention, recovery, and removal of excess nutrients and other pollutants
Erosion regulation	Retention of soils and sediments
Natural hazard regulation	Flood control, storm protection
Pollination	Habitat for pollinators

CULTURAL	
Spiritual and inspirational	Source of inspiration; many religions attach spiritual and religious values to aspects of wetland ecosystems
Recreational	Opportunities for recreational activities
Aesthetic	Many people find beauty or aesthetic value in aspects of wetland ecosystems
Educational	Opportunities for formal and informal education
SUPPORTING	
Soil formation	Sediment retention and accumulation of organic matter
Nutrient cycling	Storage, recycling, processing, and acquisition of nutrients

Source: State of wetlands in Uganda 2019, Ministry of Water and Environment

8. Conclusion and recommendations

It is important to conserve the EACOP-affected and other wetlands in Uganda as it would be expensive or impossible in some instances to replace the roles they play if the wetlands are destroyed.

The following recommendations are therefore made to support the conservation of wetlands within the EACOP project areas and Uganda at large:

i. The EACOP Company should stop any oil sector infrastructural developments in wetlands, especially those that are linked to Ramsar sites.
ii. The Ugandan government together with the Ramsar Committee should designate wetlands such as Kafu and Katonga as Ramsar sites (wetlands of international importance) due to their significance in supporting surrounding communities' livelihoods, tourism and being Key Biodiversity Areas.
iii. In addition, the Ugandan government and development partners should support academic institutions to conduct further research especially on the wetlands affected by oil sector projects such as the EACOP, Tilenga, oil roads, and Kingfisher to close the existing information gaps on the economic value of the wetlands. This will perhaps highlight the importance of conserving the wetlands over construction of the EACOP and other oil developments.
iv. The Ugandan government should develop and implement community-based wetland management plans to enhance community will to conserve wetlands;
v. Further, the Ugandan government and development partners should provide alternative sources of livelihood to wetland dependent communities.
vi. Civil society should advocate and support the review of the National Wetlands policy which is old (1995) and drafting of a wetlands specific law that shall encompass emerging issues such as the oil developments and rapid population growth.
vii. Finally, the Ugandan government should improve the technical and financial support to wetlands management. Government needs to improve

funding and technical support to the institutions mandated with wetlands management such as the wetlands management department of the Ministry of water and environment, National Environment Management Authority (NEMA) and all district local governments.

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