





MULTINATIONAL LAKES EDWARD AND ALBERT INTEGRATED FISHERIES AND WATER RESOURCES MANAGEMENT (LEAF II) PROJECT

REGIONAL REPORT OF THE FRAME SURVEY 2021 ON LAKES EDWARD AND ALBERT

BY

REGIONAL WORKING GROUP MEMBERS

Nakiyende Herbert, Alain B.K. Mahunina, Basoma Anthony, Mongolu Mathew, Bakunda Aventino, Rugadya Richard, Nkalubo Winnie, Joseph M. Matunguru, Jacques Kapagama Mulakilwa, Justin Kalibu Mino Kahozi, Luhata K. Daniel, and Scholastique Mosato Ngbelenge

NOVEMBER 2021

© Copyright: NELSAP 2021

Citation: NELSAP (2021). Regional Technical Report of the Second Frame Survey conducted on the Uganda and Democratic Republic of Congo (DRC) sides of lakes Edward and Albert in September 2021 by NaFIRRI and SENADEP.

Regional Working Group contributors to the report

Uganda	Democratic Republic of Congo (DRC)
1. Mr. Nakiyende Herbert, Fisheries Stock Assessment Scientist and Team Leader, National Fisheries Resources Research Institute (NaFIRRI), P.O. Box 343, Jinja. nakiyende@yahoo.ie; nakiherbert@gmail.com	**1. Mr. Alain Basile Mahunina Kitswaka,** National Coordinator of *Service National de Promotion et de Développement de la Pêche* (SENADEP), and Team Leader, Kinshasa. alainmahunina@gmail.com
2. Dr. Nkalubo Winnie, Director of Research, NaFIRRI, P.O. Box 343, Jinja. wnkalubo@yahoo.com	**2. Mr. Justin Kalibu Mino Kahozi,** National Director of Fisheries Resources Ministry of Fisheries and Livestock, Kinshasa. kalibujustin53@gmail.com
3. Mr. Anthony Basooma, Research Assistant, NaFIRRI, P.O. Box 343, Jinja. anthonybasooma@gmail.com	**3. Mme. Scholastique Mosato Ngbelenge** In charge of fisheries data collection SENADEP, Kinshasa. scholastiquengbelenge@gmail.com
4. Mr. Aventino Bakunda, Principal Fisheries Officer, Directorate of Fisheries Resources (DiFR), Ministry of Agriculture Animal Industry and Fisheries (MAAIF), P.O. Box 4, Entebbe. aventino_b@yahoo.com	**4. Mr. Jacques Kapagama Mulakilwa,** In charge of data analysis and treatment. SENADEP, Kinshasa. jacqueskapagama@gmail.com
5. Mr. Richard Rugadya, National Fisheries Expert of LEAF II Project, Uganda Fort Portal. rugadyarichard@gmail.com	**5. Mr. Masirika MatunguruJoseph**, National Coordinator & Fisheries Expert, LEAF II Project, DRC Bunia. ucleaf.rdc@gmail.com, josephmatunguru@gmail.com
	6. Mr. Daniel Kongolo Luhata National Director for Rural Fisheries, Ministry of Rural Development, Kinshasa, DRC danieluhata@gmail.com

NELSAP LEAF II Project

Mr. Matthieu Mongolu Bongu,
Regional Fisheries Expert, LEAF II Project
NELSAP
P.O. Box 6759, Kigali. mmongolu@nilebasin.org

TABLE OF CONTENTS

TABLE OF CONTENTS ii
ACKNOWLEDGEMENTS iv
ACRONYMS v
EXECUTIVE SUMMARY 1
1.0 INTRODUCTION 4
1.1. Background 4
1.2. Frame surveys and their relevance to fisheries management 4
1.3. History of Frame Surveys on Lakes Edward and Albert 5
1.4. Description of the lakes 5
1.4.1 Lake Albert 5
1.4.2 Lake Edward 5
1.5 Objective of FS 8
1.6 Expected results of the FS 8
2.0. METHODOLOGY 9
2.1. Regional harmonization and planning 9
2.2. National planning and resource mobilization 9
2.3. Selection and Training of FS enumerators and Supervisors 9
2.4. National Data Collection 10
2.5. National data analysis and draft report preparation 10
2.6. National report validation 10
2.7. Regional synthesis and final report preparation 10
4.0. KEY RESULTS AND OBSERVATIONS 11
4.1. Lake Albert 11
Landing sites (LS) 11
Landing site facilities and infrastructure 12
Key indicators of fishing effort 12
4.2. Lake Edward 15
Landing sites 15
Landing site facilities and infrastructure 16
DISCUSSION OF RESULTS 22
CHALLENGES AND DATA LIMITATIONS 25

5.0 MAIN CONCLUSIONS 25
5.1. Lake Albert 25
5.2 Lake Edward 26
6.0 RECOMMENDATIONS 26
6.1 Lake Albert 26
6.2. Lake Edward 26
6.3. General recommendations 26

ACKNOWLEDGEMENTS

The Regional Working Group (RWG) on Frame surveys appreciates NELSAP and through them the African Development Bank (AfDB) and the Global Environmental Facility (GEF) for funding this survey and coordinating regional synthesis of the report. The contribution towards FS planning and implementation by the LEAF II national coordination offices in both DRC and Uganda is also acknowledged.

The district, territorial and provincial fisheries staff are equally appreciated for their contributions in planning and mobilization of enumerators and riparian communities. The field enumerators who undertook the actual field data collection are highly appreciated for the job well done. The fisher communities, particularly the fishers at all landing sites on the two lakes are recognized for the good cooperation during the field data collection exercise. Sincere appreciations go to the landing site management and administrative committees for publicizing the Frame Survey activity and encouraging active participation of the respective communities. The media is appreciated for the publicity role, their services created mass awareness and publicity of the 2018 FS exercise that resulted into a successful implementation.

Lastly, the technical and administrative staffs of fisheries directorates in Uganda and DRC, NaFIRRI, and SENADEPA (formerly SENADEP) are sincerely appreciated for the various contributions (planning, coordination, and implementation) made towards the successful implementation of the 2021 FS.

ACRONYMS

AfDB	African Development Bank
BMUs	Beach Management Units
CAS	Catch Assessment Surveys
CBOs	Community Based Organizations
DFO	District Fisheries Officer
DiFR	Directorate of Fisheries Resources
DLG	District Local Government
DRC	Democratic Republic of Congo
FO	Fisheries Officer
FPU	Fisheries protection Unit
FS	Frame Surveys
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GPS	Geographical Positioning System
ICCN	Institut Congolais pour la Conservation de la Nature
IUU	Illegal, Unrecorded and Unregulated fishing
LSC	Landing Site Committee
LEAF II	Lakes Edward Albert Integrated Fisheries and Water Resources Management Project
LS	Landing site/s
LVFO	Lake Victoria Fisheries Organization
MCS	Monitoring, Control and Surveillance
NaFIRRI	National Fisheries Resources Research Institute
NARO	National Agricultural Research Organization
NBI	Nile Basin Initiative
NELSAP	Nile Equatorial Lakes Subsidiary Action Program
NEMA	National Environment Management Authority
NWGs	National Working Groups
OfD	Oil for Development
QENP	Queen Elizabeth National Park
RWG	Regional Working Group
SENADEP	*Service National de Développement et de Promotion de la pêche*
SENADEPA	*Put details*
SOPs	Standard Operating Procedures
UBOS	Uganda Bureau of Statistics

EXECUTIVE SUMMARY

The fisheries of lakes Edward and Albert contribute substantially to the livelihoods (food, employment, and income) of the dependent lakeside communities and the economic development in Uganda and the Democratic Republic of Congo (DRC). The riparian communities derive their livelihood through employment (e.g. fishing, boat/net repairs, retail shops around the beaches, fish trade, fish processing, transport, food stalls) and food nutrition provided by the commercial fisheries. These contributions justify the importance of the fisheries in these lakes, hence the need to sustainably develop and manage them.

In this regard, information for science led fisheries management of the two lakes is needed and must be obtained through the fishery dependent studies (e.g. Frame Surveys-FS and Catch Assessment Surveys-CASs) and Fishery independent data generation techniques (e.g. Trawl Surveys, Hydro-acoustic Survey, and other experimental fishing methods). For a long, fisheries management on lakes Edward and Albert has been largely guided by information from Frame and Catch Assessment Surveys. However, due to logistical constraints, specifically inadequate funding and limited technical capacity, these surveys have been limited in scope and space on the two lakes across the two riparian countries. On the Ugandan sectors of the two lakes, standardized FS and CASs have been conducted albeit on an *ad hoc* basis while on the DRC side; sporadic assessments conducted had never used similar approach as the current one.

Through the LEAF II Project whose goal is to promote the sustainable utilization and management the fisheries and allied natural resources of lakes Edward and Albert basin through harmonized legal framework and policies, FS and CASs were prioritized to provide information needed to guide fisheries management on the two lakes. Subsequently, the Nile Equatorial Lakes Subsidiary Action Program Coordination Unit (NELSAP-CU) of the Nile Basin Initiative (NBI) signed a service contract with the National Fisheries Resources Research Institute (NaFIRRI) of Uganda and the Service National de Promotion et de Developpement de la Peche (SENADEP) of the Democratic Republic of Congo (DRC) to undertake lake-wide FS and CAS on the Uganda and DRC sections of lakes Edward and Albert under the LEAF II Project.

This report presents key findings and management recommendation from the 2021 lake-wide Frame Surveys conducted on lakes Edward and Albert covering the two countries. Frame Surveys involve direct and complete enumeration of all fish landing sites, fishing effort and all other facilities supporting the fisher community on a regular or ad hoc basis. The FS information forms the basis for identifying primary and secondary sampling units, and appropriate sampling strata for the Catch Assessment Surveys (CASs). Information relating to the total numbers of sampling units is used to raise sampled catch rates in CAS estimates of total catches.

The 2021 FS was implemented at all landing sites on lakes Albert and Edward during September 2021 and was conducted in a participatory and inclusive manner, involving all the key stakeholders in the planning and implementation. Both NaFIRRI and SENADEP in collaboration with the relevant national and local fisheries agencies and authorities coordinated the FS in the respective territorial waters of the two lakes.

The 2021 Frame Survey recorded a total of 176 (73 in Uganda and 103 in DRC) landing sites on the entire Lake Albert, 8,691 fishing crafts (5,075 in Uganda and 3,616 in DRC); and 24,089 fishers (13,999 in Uganda and 10,090 in DRC). On the Uganda side of Lake Albert, landing sites decreased from 107 to 73 (32%), boats from 9,781 to 5,075 (48%) and fishers from 27,944 to 13,999 (50%) over the period 2018 – 2021. In DRC, while a decrease was observed for fishing crafts from 5,504 to 3,616 (34%) and for fishers from 20,140 to 10,090 (50%), an increase in landing sites was realised from 94 to 103 (9.6%).

On the Uganda side of the lake Albert, the multi-filament gillnets of the legal mesh size (≥ 4 inches) registered a 176% increase from 16,325 to 45,044, while the illegal ones (<4 inches) decreased by 65.6% from 57,237 to 19,716. Apart from the small seines of ≤ 5 mm which increased by 57.7% from 3.075 to 4,850, the numbers of all the other illegal gears decreased. Monofilament gillnets and boat seines registered a four-fold decrease from 22,886 to 6,098 and 338 to 83 respectively. Similarly, beach seines and cast nets decreased two-fold from 291 to 124 and 453 to 182 respectively.

In DRC, the multi-filament gillnets of the legal mesh size (≥4 inches) registered a 935% increase from 110 to 1,138, while the illegal ones (<4 inches) decreased by 59.4% from 1,544 to 626. Apart from the basket traps which increased by 125% from 1,551 to 3,496, a decline of the other illegal gears was registered. For example, monofilament gillnets decreased by 27% from 517 to 377 between 2018 and 2021. Similarly, beach seines, boat seines, small seines (<5 mm) and mosquito nets decreased in proportions of 87%, 92%, 84% and 99% respectively. The decline in the number of illegal gears could be attributed to the enforcement efforts on the lake

Additionally, the small seines increased by over 90% from 1,619 to 3,076, monofilament gillnets by > 60% from 3,774 to 6,075 while the under-size (< 4 inches) multifilament gillnets registered a 5% margin of increase from 54,350 to 57,237 and they dominated for the period under review. The other two illegal fishing gears; the beach/boat seines and cast nets increased twelve- and four-fold respectively. The multi-filament gillnets of the legal mesh size (>4 inches) and long line hooks were the only fishing gears that registered declines in proportions of 60% and 6% from 42,365 to 16,325 and 1,965,576 to 1,854,706 respectively.

The decline in numbers of legal fishing gears (large mesh sizes and long line hooks) coupled with escalation of illegal gears that target undersized fish could be an indication of decline in large sized fish. This will be ascertained when a follow-on CAS is conducted.

On the DRC side of the lakes, illegal gears (undersize gillnet <4", monofilament gillnets, cast nets, beach seines and basket traps) are seemingly high although the study did not have a similar comprehensive statistic to compare with. However, some of the fishing methods listed as illegal are not classified similarly in both DRC and Uganda, something that will require urgent harmonization as joint management sets in.

On the Lake Edward, the 2021 Frame Survey recorded a lower level of fishing effort with a total of 20 (5 in Uganda and 15 in DRC) landing sites; 2,058 fishing crafts (320 in Uganda and 1,738 in DRC); and 11,430 fishers (645 in Uganda and 10,785 in DRC). On the Uganda side of Lake Edward, the landing sites remained constant 5 as in 2018. The number of boats increased from 299 to 320 (7%), while fishers' number is reduced from 917 to 645 (29.7%) over the period 2018 – 2021. In DRC, a decrease was observed for fishing crafts from 3,236 to 1,738 (46%); for fishers from 19,558 to 10,785 (44.8%), and for landing sites from 35 to 15 (57%).

During the 2021 FS, illegal fishing gears decreased in both countries. On the DRC side of the lake Edward for example, the number of multi-filament gillnets of the legal mesh size (≥ four inches) decreased from 1,496 to 44 (97%); for monofilament gillnet from 542 to 56 (89.7%); gillnet from 1973 to 1410 (28.5%); hand-line from 419 to 43 (89.7%); beach seine from 77 to 20 (74%); boat seine from 31 to 4 (87%); mosquito from 11 to zero (100%) and small seine from 441 to 21 (95%) over the period 2018 – 2021. Except the longline size (less than 8 mm and more than 10 mm) which increased by 0.2% from 92,073 to 92,230. On the Uganda side of the lake Edward, the longline size (9 mm) is reduced by 100% from 30,450 to zero; the multi-filament of legal mesh size (< 4 inches) increased by 70% from 23,385 to 40,224, while on the DRC side, we registered

decrease of the same fishing gear by 23% from 2194 to 1683. The longline is also reduced by 64% from 639,902 to 228,570.

The wide reduction of most illegal fishing gears was particularly attributed to restrictions by management and park authorities and series of enforcement activities on the both sides of the lake. There is still persistence of some illegal gears (undersize gillnet <4", monofilament gillnets, cast nets, beach seines and basket traps from DRC portion of the lake. A greater portion of Lake Edward lies within the protected area in both Uganda and DRC; human activities in the lake are regulated by Uganda Wildlife Authority (UWA) on the Uganda side and ICCN on the DRC side, thus contributing to controlled fishing effort on the lake. The escalation of illegalities on the DRC side of the lake was more rampant in areas out of the park's jurisdiction, further underpinning the role played by park authorities.

Despite off the reduction of illegal fishing effort recorded over the period of 2018 – 2021 on both lakes, the directorates responsible for fisheries management in the two partner states should device clear mechanisms for enforcement of established rules and regulations to curb all the illegal fishing effort on the Lakes Edward and Albert. The impressive statistics of fisheries inputs within the protected areas of Lake Edward in both countries illustrates the effectiveness of fisheries management through restricted access. Partner states should therefore strengthen the capacity of lake wide fisheries authorities to improve resource protection in areas under their jurisdiction and focus traditional management efforts in areas outside the parks.

Observations from this survey show commendable development in social amenities and fishing infrastructure in some of the fishing communities around the two lakes. Strategic measures aimed at improving the basic infrastructure and sanitation amenities at landing sites by the central and local governments, the grassroots leadership and Community Based Organizations (CBOs) are appreciated where they have been improved and highly recommended in areas where they are generally lacking or poor.

1.0 INTRODUCTION

1.1. Background

The Multinational Lakes Edward and Albert Integrated Fisheries and Water Resources Management (LEAF II) Project is a transboundary project implemented by the Democratic Republic of Congo (DRC) and the Republic of Uganda, with regional coordination by the Nile Equatorial Lakes Subsidiary Action Program Coordination Unit (NELSAP-CU) of the Nile Basin Initiative (NBI). The project is financed by the African Development Bank (AfDB) through a 6 million UA grant to DR Congo and 5 million UA loan to Uganda, and a US$ 8.1 million grant from the Global Environment Facility (GEF) through the AfDB to the NELSAP-CU. The project's overall objective is to contribute to the sustainable utilization of the fisheries and allied natural resources of the Lakes Edward and Albert Basin through harmonized legal framework and policies. The project is implemented under two broad thematic components of Fisheries resources development and management, and integrated water resources management. Under the thematic area on Fisheries, the project set out to establish the overall fishing inputs, output, and facilities servicing the fisheries of lakes Edward and Albert.

NELSAP-CU signed a service contract with NaFIRRI of Uganda and SENADEP of the Democratic Republic of Congo (DRC) to undertake lake-wide Frame Surveys (FS) and Catch Assessment Surveys (CAS) on the Uganda and DRC sections of lakes Edward and Albert. The Frame surveys were implemented jointly in a harmonized and synchronized following the Standard Operating Procedures (SOPs) which were jointly harmonized and agreed in February 2017. The 2nd set for Frame Surveys was conducted simultaneously in the two countries from August to September 2021.

The contracted agencies worked with the respective Directorates responsible for fisheries, National and Local Authorities Fisheries staff, landing site management associations, LEAF II National coordination units, and selected personnel from the fisher communities to conduct the Frame Survey. The approach of involving key stakeholders and fisheries resource users in planning and implementation of the surveys is a long-term strategy to sustain the data collection beyond the life of the LEAF II project. The strategy involved building the capacity of the lower-level fisheries managers and members of the user community in the planning and implementation of Frame Surveys.

1.2. Frame surveys and their relevance to fisheries management

Frame Surveys involve direct and complete enumeration of all fish landing sites, fishing effort (Number of fishing boats by category, the composition of fishing gears by type and size, target fish species, and the number of fishers), and all other facilities supporting the fisher community on a regular or *ad hoc* basis. These Surveys are used to generate important information required for the fisheries management planning and designing of the sampling frame for CASs and other socio-economic surveys. The FS information forms the basis for identifying primary and secondary sampling unit and appropriate sampling strata for the Catch Assessment Surveys (CASs). Information relating to the total numbers of sampling units (crafts belonging to each craft-gear category) is used to raise sampled catch rates in CAS estimates of total catches.

1.3. History of Frame Surveys on Lakes Edward and Albert

On the Ugandan side of the lakes, several surveys (2000, 2007, 2012, 2016 and 2018) were conducted and implemented by NaFIRRI and DiFR, following the LVFO SOPs for Lake Victoria. The first comprehensive lake wide frame survey conducted following harmonised SOP in the two countries was realised in 2018. . The 2021 are compared to monitor the changes in the socio-economic parameter related to the fisheries activities on both lakes.

1.4. Description of the lakes

1.4.1 Lake Albert

Lake Albert (Figure 1) shared between Uganda (54%) and the Democratic Republic of Congo (46%), is the northernmost of the chain of lakes in the Albertine Rift, along the western branch of the Great East African Rift valley. The lake is located between latitude 1.683333 and longitude 30.916667 (UTM 36N 268225 186183), at an altitude of 619 m above Sea level (NEMA, 2012; Saundry & Fund, 2012), with a surface area of 5,300 km^2 and the maximum depth of 58 m (https://en.wikipedia.org/wiki/Lake_Albert_Africa). It is an elongated lake, about 160 km long and up to 35 km wide. Lake Albert is a major source of water and provides employment, food and income to communities in the two riparian counties, with fishing as the primary source of food and livelihood among the coastal villages.

Lake Albert is a habitat to multispecies commercial fishery. Of the 53 fish species known to exist in the lake, over 20 are commercially exploited using diverse array of fishing gears and methods. While many of the species seen in the past may still occur in the lake, increased harvesting and the destruction of fish habitats has reduced the numbers of some previously important commercial species, such as *Citharinus citharus*, *Alestes baremose* and *Hydrocynus forskahlii* that are currently so rare in the artisanal catches.

1.4.2 Lake Edward

Lake Edward (Figure 2) located in the Albertine Rift; the western branch of the Great East African Rift is the smallest of the African Great Lakes shared between the DRC (71%) and Uganda (29%). The lake is located at an elevation of 920 m above sea level and covers a surface area of 2,325 km^2 and maximum depths of 112 m. The maximum length and width of the lake are 90 and 40 km respectively. The Kazinga Channel connects Lake Edward to Lake George through a 32 km within the Queen Elizabeth National Park. Most of the lake is bordered by Queen Elizabeth National Park (QENP) in Uganda and Virunga National Park on the DRC side.

Lake Edward is a major source of water and provides employment, food and income to coastal communities in the two riparian counties, with fishing as the primary source of food and livelihood among the coastal villages. However, just like Lake Albert above, increased harvesting and the destruction of fish spawning and breeding areas have reduced the numbers of some of the fish species on the lake. Lake Edward is also home to many fish species with the commercial fisheries dominated by *Oreochromis niloticus* (Nile tilapia), *Bagrus docmak* (Silver catfish), *Protopterus aethiopicus* (lung fish) and *Clarias gariepinus* (African catfish). However, there are over 50 other species of fish mostly haplochromines cichlids (Nkejje/furu/) that dominate the fish biomass of the lake.

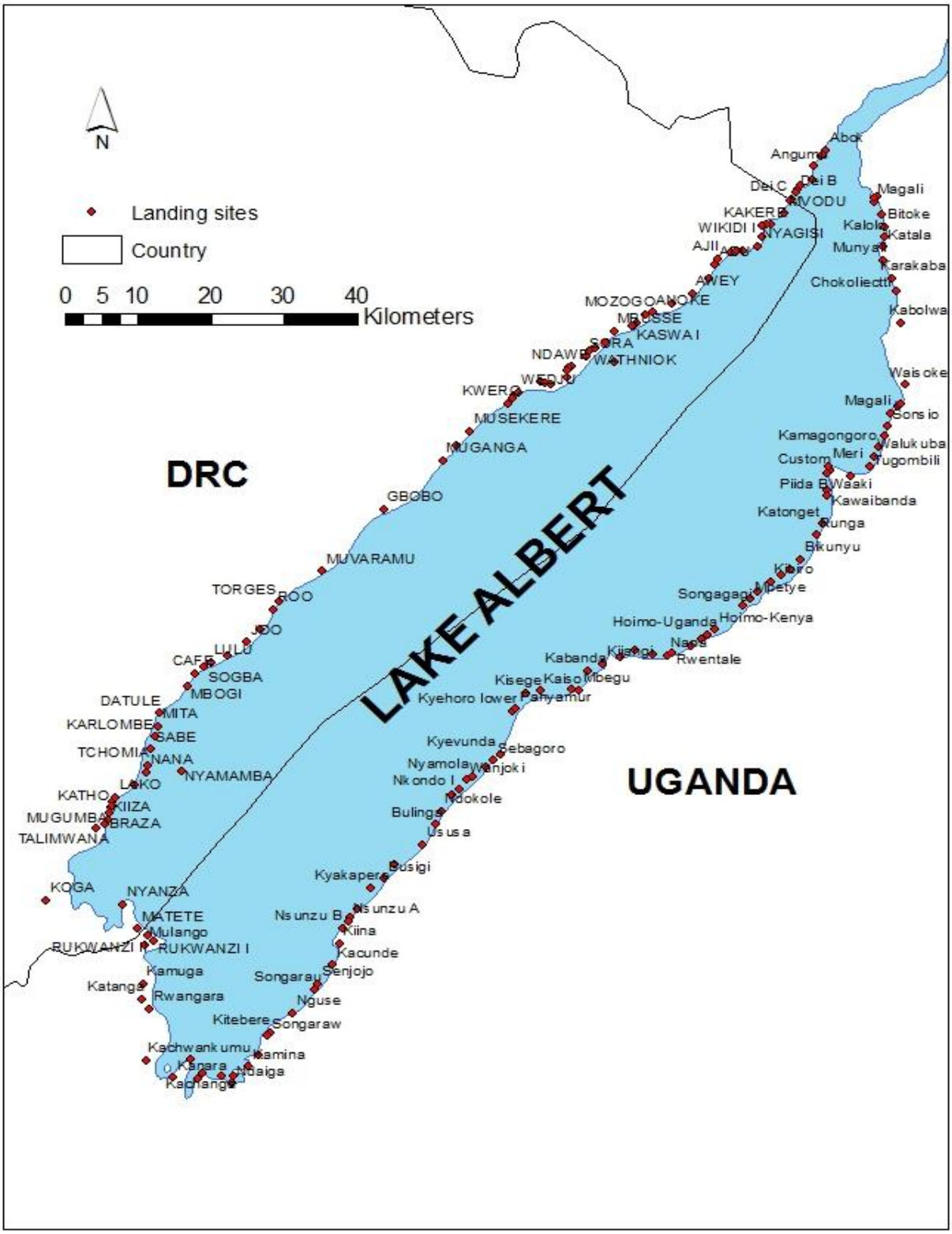
N
Landing sites
Country
0 5 10 20 30 40
Kilometers
DRC
UGANDA
LAKE ALBERT
Abok
Angum
Dei C
Dei B
MVODU
Magali
Bitoke
Kalola
Katala
Munya
Karakaba
Chokoliectti
Kabolwa
KAKERE
WIKIDI I
NYAGISI
AJII
AWEY
MOZOGO
ANOKE
MBUSSE
KASWA I
SORA
NDAWE
WATHNIOK
WEDJU
KWERO
MUSEKERE
MUGANGA
GBOBO
MUVARAMU
TORGES
ROO
JOO
LULU
CAFE
SOGBA
MBOGI
DATULE
MITA
KARLOMBE
SABE
TCHOMIA
NANA
NYAMAMBA
LAKO
KATHO
KIIZA
MUGUMBA
BRAZA
TALIMWANA
KOGA
NYANZA
MATETE
Mulango
RUKWANZI I
RUKWANZI I
Kamuga
Katanga
Rwangara
Kachwankumu
Kanara
Kachanga
Kamina
Nuaiga
Kitebere
Songaraw
Nguse
Songarau
Senjojo
Kacunde
Kiina
Nsunzu B
Nsunzu A
Kyakapere
Busigi
Ususa
Bulinga
Ndokole
Nkondo I
Nyamola
Wanjoki
Kyevunda
Sebagoro
Kyehoro lower
Panyamur
Kisege
Kaiso
Mbegu
Kabanda
Kijangi
Napa
Rwentale
Hoimo-Uganda
Hoimo-Kenya
Songagagi
Mbetye
Kibiro
Bikunyu
Runga
Katonget
Kawaibanda
Piida B
Waaki
Custom
Meri
Tugombili
Kamagongoro
Walukuba
Sonsio
Magali
Waisoke

Figure 1. Map of Lake Albert showing the locations and distribution of fish landing sites as per the 2021 Frame Surveys.

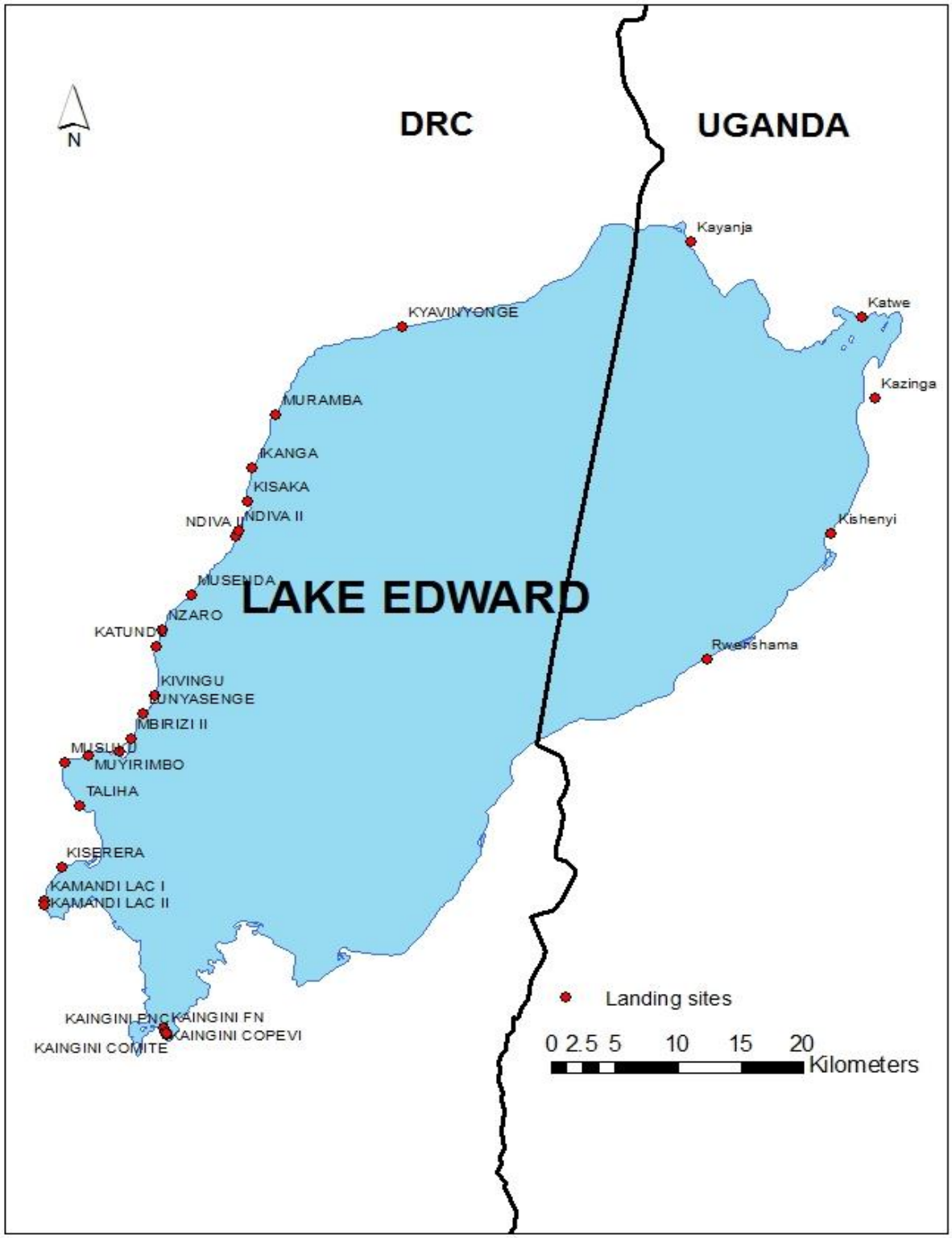

Figure 2. Map of Lake Edward showing the locations and distribution of fish landing sites as per the 2021 Frame Surveys.

1.5 Objective of FS

The overall objective of Frame Survey is to provide information on the composition, magnitude and distribution of fishing effort (inputs), facilities and services available at fish landing sites to guide fisheries planning, management and infrastructure development.

The specific objectives of the 2021 FS were to provide information on:

a. Number, location and distribution of fish landing sites;
b. Facilities available at fish landing sites to support fisheries;
c. Number and distribution of fishers;
d. Number and types of fishing crafts and their mode of propulsion;
e. Number, types and sizes of fishing gears used on the lake and their mode of operation;
f. Craft/gear combinations by target species;
g. Other support services, for example. fishery staff, fishery input vendors / traders, fish markets, landing site management committees, among others;
h. Compare the trends of the fishing effort indicators between 2018 and 2021 FS.

1.6 Expected results of the FS

The 2021 Frame Surveys were specifically designed to provide information on the following outputs: -

a) Information on the numbers and locations of fish landing sites on lakes Albert and Edward,
b) Information on the facilities and infrastructure available at the fish landing sites to service the fisheries sector on the two study lakes,
c) Information on the number of fishers on lakes Albert and Edward,
d) Information on the number and types of fishing crafts operated on lakes Albert and Edward,
e) Information on the modes of propulsion of the fishing crafts described in d above,
f) Information on the number, types and sizes of fishing gears including the illegal fishing gears in the fisheries of lakes Albert and Edward;
g) Key development and management recommendations for the fisheries of lakes Albert and Edward.
h) An analysis of the parameters by averaging, standard deviations and coefficients of variation, etc
i) Different target species of fish per fishing unit per landing site, village or locality / chiefdom or sector / territory / province.
j) Trends in fishing effort indicators

2.0. METHODOLOGY

The 2021 FS on lakes Edward and Albert was conducted according to standard operating procedures (SOPs) developed in February 2017 by both NaFIRRI and SENADEP teams through NELSAP coordination. According to the SOP (Annex 1) the process was divided into seven distinct stages namely (i) Regional harmonization and planning, (ii) National planning and resource mobilization, (iii) recruitment and training of enumerators, (iv) national data collection, (v) national data analysis and draft report preparation, (vi) national report validation, and (vii) regional synthesis and final report preparation.

2.1. Regional harmonization and planning

A regional harmonization meeting comprising members of the Regional Working Group (RWG) from the two national agencies (NaFIRRI and SENADEP) was held from 19th to 23rd April 2021 at Imperial Royale Hotel, Kampala, and Republic of Uganda. The RWG resolved to conduct the 2021 FS the SOP developed by both countries under NELSAP/LEAF II Coordination.

2.2. National planning and resource mobilization

National Working Group (NWG) meetings for the two lakes were conducted between June and August 2021 in both countries. Participation included key experts from NaFIRRI and DiFR, District Local Government fisheries staff (DFOs and FOs) from the riparian districts and LEAF II national coordination office for Uganda. In DRC NWG meetings were attended by representatives of the Provincial Inspectorates for Agriculture, Fisheries, Livestock, and Rural Development, Environment and Sustainable Development, and the managers of the Institut Congolais pour la Conservation de la Nature (ICCN) / Parc National de Virunga (PNVi), DRC, NGO partners in the development of the fishing sector and Fishermen's Committees, SENADEP experts and LEAFII project staff.

The key outcomes of the NWG meetings were:

i. National Road map for implementation of FS activities
ii. Strategic plans for resource acquisition and distribution
iii. Agreed Targets of enumerators to be recruited
iv. Plans for recruitment and training of enumerators and supervisors (collapse into a single paragraph)

2.3. Selection and Training of FS enumerators and Supervisors

In the Republic of Uganda FS field data collectors (enumerators) were identified and recruitment by the District Fisheries staff according to the criteria agreed upon at the NWG meeting. In DRC SENADEP delegated the LEAF II National Coordination Unit (NCU) to recruit suitable enumerators. In case of Uganda supervisors were selected from riparian district staff (DFOs and FOs) while in DRC they were selected from among the officers of the provincial inspectorates of agriculture, fisheries and livestock, NGOs operating in the fishing sector, Universities and Fishermen's Committees. The selected enumerators together with their field supervisors in both countries were then trained on FS data collection. The trainings followed the harmonized data collection tool from the SOP.

2.4. National Data Collection

In order to ensure complete enumeration of all the fishing factors across the two water bodies and two countries, data collection was synchronized and conducted simultaneously for each lake. The data collection exercise was preceded with mass media mobilization events that involved advertising the exercise and calling upon local authorities to support the exercise and fishers to avail themselves to be counted. Data collection was conducted at all landing sites on lakes Edward and Albert and involved recording details of all indicators of fishing efforts (fishing crafts/boats, gears, fishers) as well as the facilities and infrastructure supporting the fisheries sector at/near a given landing site.

The actual field data collection was undertaken by the trained FS enumerators assigned to specific fish landing sites, using the coded Frame Survey questionnaires (as detailed in the SOP). The enumerators were supervised and guided by supervisors who moved with extra data sheets in case of deficiencies. The field supervisors made on-spot corrections in the data collection forms before the data were forwarded to the NWG leaders in each country at NaFIRRI and SENADEP for collation, digitization and analysis. For purposes of quality assurance, personnel from the NWGs (NaFIRRI and Directorate of Fisheries in case of Uganda, and SENADEP, ICCN/PNVi and Directorate of fisheries in DRC) were deployed to oversee the work of supervisors, check on arising issues and meet enumerators, landing site committees, members at the fishing camps and fishing villages, and local authority leaders. The field supervisors were in-charge of survey logistics and coordination at their respective levels. Each supervisor was in-charge of several enumerators whose number was proportional to the number of fishing crafts / landing sites/camps/villages estimated at the NWG meeting in the administrative unit. The entire FS field data collection exercise lasted two weeks on each of the two lakes.

2.5. National data analysis and draft report preparation

Data were digitized (entered into analysis spreadsheets) at SENADEP headquarters in Kinshasa and NaFIRRI Jinja for DRC and Uganda respectively. Data entrants were trained on how to enter and clean the data and where spurious values were observed contacts were made with specific enumerators and supervisors to clean up. The training of data entry personnel was followed by data entry using the MS Excel spreadsheet, pre-designed formats based on the FS field data collection forms. After data entry and cleaning, analysis was performed in MS Excel, and draft reports were prepared according to agreed formats.

2.6. National report validation

The national reports were then presented to national stakeholder workshops for additional inputs and validation. The national stakeholder workshops comprised members from National working groups who participated in the planning workshops and other key fisheries stakeholders from the two countries. During this process, the reports were presented, discussed and validated. The national validated national reports were then submitted to the NELSAP-CU.

2.7. Regional synthesis and final report preparation

The Regional coordination unit at NELSAP convened a Regional Working group to harmonize the national reports and synthesize them to produce a final regional frame survey report for the two lakes. The workshop was attended by participants from SENADEP, NaFIRRI, Directorates of fisheries, and LEAF II National Coordination Units. . The list of participants is attached as Annex II. At the workshop, the FS national reports

(Annexes III and IV) were presented, discussed and validated before they were synthesized into this Regional lake-wide report that is presented in both English and French.

4.0. KEY RESULTS AND OBSERVATIONS

4.1. Lake Albert

Landing sites (LS)

A total of 176 landing sites (LS) were recorded on Lake Albert in 2021, of which 103 (58.5%) of the landing sites were recorded in the DRC portion of the lake (Table 1).

Table 1: Status of landing site facilities on Lake Albert in 2021 presented per country

Indicator	Uganda	DRC	Total
Landing sites	73	103	176
Landing sites with bandas (Fish sheds)	3	2	5
Landing sites with working cold rooms	1	2	3
Landing sites with non-working cold rooms	0	0	0
Landing sites with Pontoons/Jetties	4	1	5
Landing sites with fish stores	5	0	5
Landing sites with access to electricity	10	0	10
Distance to nearest electricity supply (km)			
Landing sites within <1 km	9	0	9
Landing sites within1-5 km	11	0	11
Landing sites within 6-10 km	16	0	16
Landing sites within >10 km	27	103	130
Landing sites accessible by roads	43	38	81
Landing sites accessible by all-weather roads	28	38	66
Landing sites accessible by only water**	30	65	95
Distance to the nearest all-weather road (km)			
Landing sites within <1 km	7	2	9
Landing sites within 1-5 km	6	13	19
Landing sites within 6-10 km	4	6	10
Landing sites within >10 km	13	52	65
Landing sites with public toilets	26	1	27
Landing sites with access to potable water	23	15	38
Landing sites with artisanal net repair facilities/shades	70	21	91
Number of net repairers	1073	21	1094
Landing sites with artisanal boat repair facilities/shades		23	23
Number of boat repairers	279	23	302
Number of landing sites with resident fisheries staff	29	32	61
Number of landing sites (in operation for > 5 months annually)	70	34	104
Number of landing sites with accessibility to telephone	60	42	102

Number of landing sites with accessibility to schools <2km	60	44	104
Number of landing sites with accessibility to health centers	50	35	85
Landing sites with fish drying area		14	14
Landing sites with fish smoking area		26	26
Landing sites with outboard engine repair facility	13	11	24
landing sites with shops selling fishing gears		2	2

Landing site facilities and infrastructure

The LS facilities observed during the 2021 FS included bandas (fish sheds), cold rooms, pontoon/jetties, fish stores, public toilets, potable water, designated areas for boat and net repair, accessibility to the landing site by all-weather roads, electricity supply, schools, health centres and telephone services (Table 1).

Five bandas (fish sheds) were recorded on Lake Albert, three in Uganda and two in DRC. A total of three cold rooms were recorded on the lake of which one was in Uganda and two in DRC. Five LS, all in Uganda had fish stores while another five (Uganda-4 and DRC-1) had a pontoon.

In Uganda, ten landing sites had immediate access to the main electricity supply. Sixteen LS were within a distance of 1-10 km from the nearest electricity supply, while 27 LS were >10 km. All the 103 landing sites in DRC can access electricity beyond 10 km. There were 81 LS accessible by road on the entire lake, of which 66 (81.4%) were all-weather roads. A total 95 landing sites were accessible by water only (Table 1).
There were 27 LS with public toilet facilities, 38 with portable water supply, and 61 with a resident fisheries staff. Twenty-three LS had designated artisanal net and boat repairer facilities. There were 102 landing sites with access to telephone network, while 104 and 85 landing sites were located within <2 km radius of a primary school and health centre facility respectively (Table 1).

Key indicators of fishing effort

Fishers and Fishing crafts (boats)

A total of 24,089 fishers were registered on Lake Albert in 2021, of which Uganda accounted for 58.1% (13,999) and DRC 41.9% (10,090) (Table 2). The total number of fishing crafts, including foot fishers, recorded on the entire lake was 8691, of which 58.4% (5,075) were registered on the Ugandan side of the lake and 41.6% (3,616) in DRC. The boats recorded in 2021 were dominated by the Congo barque /barque type (4354, 50.1%) and Sesse flat at one end (3068, 35.3%). Majority of the boats (4458, 51.3%) were operated using paddles, followed by outboard engines (3966, 45.6%). The main gears used in the boats were gillnets/Filet maillant (2423, 27.9%), followed by small seines (1901, 22%), long line hooks gillnets (1519, 17%), and monofilament gillnets (1078, 12%).

Table 2: Summary of the key indicators of fishing effort indicators recorded on Lake Albert during the 2021 FS

Indicator	Uganda	DRC	Total
Number of fishers	13,999	10,090	24,089
Number of fishing crafts with foot fishers	4,864	3,616	8,691
Fishing crafts and foot fishers			
Number of congo barque /barque	2,268	2,086	4,354

Number of sese-flat at one end/pointed at both ends	2,586	482	3,068
Number of parachute/petite barque	8	958	966
Number of dugout /pirogue monoxyle	-	90	90
Number of school kabarega	2	-	2
Number of rafts/ radeau			
Foot fishers	211	2	213
Fishing crafts by mode of propulsion			
Number of crafts using outboard engine	2,610	1,356	3,966
Number of crafts using paddles	2,201	2,257	4,458
Number of crafts using sails	-	3	3
Number of crafts towed	53	-	53
Fishing crafts by gear type			
Number of crafts using perforated basins	30	-	30
Number of crafts using beach seines /senne de plage	41	34	75
Number of crafts using boat seines / senne tournantes	77	46	123
Number of crafts using cast nets /Epervier	171	111	282
Number of boats using gillnets /Filet maillant	1,049	1,374	2,423
Number of crafts using hand and line hooks	91	-	91
Number of crafts using longline hooks	651	868	1,519
Number of boats using monofilament gillnets	710	368	1,078
Number of crafts using small seines	1,867	34	1,901
Number of crafts using basket traps	324	193	517
Number of boats using other gears/Moustiquaires		4	4
Number of boats with other gears	64	584	648
Fishing gears			-
Number of monofilament gillnets	6,098	355	6,453
Total number of multifilament gillnets	55,359	1,763	57,122
Number of multifilament gillnets by size (inches)			
< 2½	2,594	59	2,653
2½	4,852	40	4,892
3	5,678	444	6,122
3½	3,119	83	3,202
Total <4 inches	**16,243**	**626**	16,869
4	3,506	348	3,854
4½	3,739	67	3,806
5	9,647	130	9,777
5½	5,149	26	5,175
6	6,878	149	7,027
6½	796	26	822
7	3,354	48	3,402

7½	385	26	411
8	1,823	153	1,976
9	680	90	770
10	2,496	33	2,529
>10	664	41	705
Total >4 inches	**39,116**	**1,137**	40,253
Mode of operation for multifilament gillnets >4 inches			
Active	2,581		2,581
Drift	201		201
Passive	2,268		2,268
Total number of longline hooks			4237337
Number of longline hooks by size			
Size category <4		-	-
Size category 4 - 7		49,684	49,684
Size category 8 - 10		27,540	27,540
Size category >10		2,751,865	2,751,865
LL<=9	353,605		353,605
LL>9	1,054,643		1,054,643
Number of basket traps	6,509	3,496	10,005
Number of beach seines	124	31	155
Number of boat seines	83	46	129
Number of cast nets	182	120	302
Number of hand and line hooks	470	-	470
Number of scoop net	10	2	12
Number small seines	4,929	34	4,963
Number of small seines by size (mm)			
Size category ≤5	4,850	31	4,881
Size category 6-7	55	3	58
Size category 8-10	24	-	24
Mosquito nets	-	4	4

Fishing gears

A total of 57,122 multifilament gillnets (GN) were recorded on the entire lake, (Table 2), the majority (70.5%) being of the legal mesh size (> 4 inches) recommended for Lake Albert in both countries.

The monofilament gillnets (MF), prohibited in both Ugandan and DRC were 6453, of which the majority (6098, 94%) were found on the Uganda side of the lake (Table 2).

The total number of long line hooks (LL) recorded on Lake Albert in 2021 were 4,237,337, of which 66.8% were on the DRC sector of the lake (Table 2).

There were 4963 small Seines (SS) recorded on the entire lake, the majority (99.3%) being in Uganda (Table 2), dominated (99.5%) by the illegal mesh size (< 8 mm) in Uganda waters (The Fish (Fishing Rules) 2010).

The other fishing gears recorded on the lake in 2021 (Table 2) were; boat seines (129), beach seines (155), cast nets (302), Traps (10,005), Hand line hooks (47), and scoop nets (12). It should be noted that all these gears, except hooks (≤ 9) are illegal in both countries.

4.2. Lake Edward

Landing sites

On Lake Edward, a total of 20 LS were recorded, of which 15 (75%) were on DRC portion of the lake (Table 3).

Table 3: Status of landing site facilities on Lake Edward between 2018 and 2021 presented per country

Categories	Uganda	DRC	Total
Landing sites	5	15	20
Landing sites with bandas (Fish sheds)	5	2	7
Landing sites with working cold rooms	0	2	2
Landing sites with non-working cold rooms	0	0	0
Landing sites with Pontoons/Jetties	0	0	0
Landing sites with fish stores	0	2	2
Landing sites with access to electricity	1	0	1
Distance to nearest electricity supply (km)			
Landing sites within <1 km	1	0	1
Landing sites within1-5 km	1	0	1
Landing sites within 6-10 km	0	0	0
Landing sites within >10 km	2	15	17
Landing sites accessible by roads	5	3	8
Landing sites accessible by all-weather roads	2	3	5
Landing sites accessible by only water**	0	12	12
Distance to the nearest all-weather road (km)			0
Landing sites within <1 km	0	0	0
Landing sites within 1-5 km	0	0	0
Landing sites within 6-10 km	0	1	1
Landing sites within >10 km	0	6	6
Landing sites with public toilets	2	2	4
Landing sites with access to potable water	4	7	11
Landing sites with artisanal net repair facilities	0	3	3
Number of net repairers	80	4	84
Landing sites with artisanal boat repair facilities/shades	0	12	12
Number of boat repairers	15	12	27

Number of landing sites with resident fisheries staff	0	15	15
Number of landing sites (in operation for > 5 months annually)	5	15	20
Number of landing sites with accessibility to telephone	5	7	12
Number of landing sites with accessibility to schools <2km	5	14	19
Number of landing sites with accessibility to health centres	5	11	16
Landing sites with fish drying area	0	3	3
Landing sites with fish smoking area	0	3	3
Landing sites with outboard engine repair facility	0	11	11
landing sites with shops selling fishing gears	0	2	2

Landing site facilities and infrastructure

A total of seven bandas (fish sheds) were recorded on the entire lake, of which 5 were recorded in Ugandan (Table 3).

Two landing sites in DRC had a cold room facility and none was recorded in Uganda. Two landing sites in DRC had a fish store while Uganda had none. There was no pontoon facility on the entire lake.

Only one landing site in Ugandan had access to electricity and non in DRC. Majority of the landing sites (85%) were more than 10 km away from the nearest electricity supply.

A total of 8 landing sites (3 in DRC and 5 in Uganda) were accessible by road while 12 all in DRC were only accessible by water (Table 3).

There were 11 landing sites with access to portable water (4 in Uganda and 7 in DRC), four with public toilets (2 per country), and three (all found in DRC) with artisanal net repair facility/ shed (Table 3).

A total of 15 LS (all in DRC) had a resident fisheries staff. Twelve landing sites (5 in Uganda and 7 in DRC) had access to telephone network.

There were 19 landing sites with access to a primary school and 16 landing sites to a health facility within 2 km radius. The 11 landing sites with an outboard engine repair facility and 2 shops selling fishing gears in 2021 were recorded in DRC. Similarly, the three landing sites with fish drying and fish smoking areas in 2021 were encountered in DRC.

Key indicators of fishing effort

Fishers and fishing crafts

A total of 11,430 fishers (including foot fishers) and 2027 fishing crafts were registered on Lake Edward in 2021 (Table 4). About 70% of the fishing crafts were of the Sesse Flat at one end (SF) category and were mainly operated by outboard engines. The other fishing crafts encountered on Lake Edward were Congo barque (473; 21.2%), Parachutes (113; 5.5%), and 2 rafts (only in DRC). There were 31 foot fishers, all recorded on the Ugandan side of the lake. Majority (82.3%) of the fishing crafts on Lake Edward operated gillnets as the main fishing gear, followed by longline hooks (11%).

Table 4: Summary of the key indicators of fishing effort indicators on Lake Albert for 2021 FS

Indicator	Uganda	DRC	Total
Number of fishers	645	10,785	11,430
Number of fishing crafts	289	1,738	2,027
Fishing crafts by category			
Number of congo barque /barque	-	437	437
Number of sese-flat at one end/pointed at both ends	289	1,166	1,455
Number of parachute/petite barque		113	113
Number of dugout /pirogue monoxyle		-	-
Number of rafts/ radeau		2	2
Foot fishers	31	10	41
Fishing crafts by mode of propulsion			
Number of crafts using outboard engine	284	741	1,025
Number of crafts using paddles	5	870	875
Number of crafts using sails		125	125
Number of crafts towed		-	-
Fishing crafts by gear type			-
Number of crafts using perforated basins		-	-
Number of crafts using beach seines /senne de plage		20	20
Number of crafts using boat seines / senne tournantes		4	4
Number of crafts using cast nets /Epervier		-	-
Number of boats using gillnets /Filet maillant	284	1,410	1,694
Number of crafts using hand and line hooks	1	-	1
Number of crafts using longline hooks	4	224	228
Number of boats using monofilament gillnets		56	56
Number of crafts using small seines		21	21
Number of crafts using basket traps	30	-	30
Number of boats using other gears/Moustiquaires		-	-
Number of boats with other gears	1	-	1
Fishing gears			
Number of monofilament gillnets		56	56
Total number of multifilament gillnets	40,224	1,683	41,907
Number of multifilament gillnets by size (inches)			
< 2½		15	15
2½		4	4
3		21	21
3½		4	4
Total <4 inches		**44**	44
4		7	7

4½	38,672	114	38,786
5	1,552	77	1,629
5½		-	-
6		1	1
6½		-	-
7		9	9
7½		-	-
8		14	14
9		38	38
10		189	189
>10		1,191	1,191
Total >4 inches	**40,224**	**1,575**	**41,799**
Mode of operation for multifilament gillnets			
Active		594	594
Drift			
Passive	284	981	310
Total number of longline hooks			-
Number of longline hooks by size			
Size category <4		2,000	2,000
Size category 4 - 7		11,990	11,990
Size category 8 - 10		228,570	228,570
Size category >10		78,240	78,240
LL<=9			
LL>9	5,100		5,100
Number of basket traps	151	60	211
Number of beach seines		20	20
Number of boat seines		4	4
Number of cast nets			
Number of hand and line hooks	100	43	143
Number of scoop net			
Number small seines		21	21
Number of small seines by size (mm)			
Size category ≤5		21	21
Size category 6-7		-	-
Size category 8-10		-	-
Mosquito nets		-	-

Note: Removethe French version from this table. Add the number of foot fishers to the fishers.

Fishing gears

There were 41,907 multifilament gillnets on Lake Edward, reflecting a 63.8% increase from the 25,579 recorded in 2018, of which the majority (96%) were on the Uganda side of the lake (Table 4). Over 99% of the multifilament gillnets recorded on Lake Edward were above the legal mesh size (≥ 4.5 inches).

It should be noted that there were slight variations in quantifying the multifilament gillnets in the two countries. In Uganda, all the nets per fleet were enumerated while DRC enumerated the number of fleets per fishing gear. One average, a single fleet in Uganda constitutes of 50 nets while in DRC it is 20 nets.

Most illegal fishing gears recorded on Lake Edward were encountered in DRC and included; monofilament gill nets (56), boat seines (20), beach seines (4), and small seines (21). The number of basket traps were 211, of which 151 (71.5%) were in Uganda. There were about 325,900 long line hooks recorded, of which 320,800 (98%) were found in DRC. The longline hooks were dominated by the legal sizes within the 8-10 size categories.

General variation in the landing facilities and fishing effort on both lakes

Generally the number of landing sites, fishers, crafts, gillnets, small seines, and longlines reduced on both lakes Albert and Edward (Figure 1, 2). Similarly, the illegal gears reduced on both lakes Edward and Albert (Figure 3, Appendix 1). For Ugandan side of Lake Albert, the number of landing sites greatly reduced from 107 to 73 (31.7%) compared to a slight increase in the number of LS in DRC by 9.5%. For Lake Edward, the LS remained constant from 2018 to 2021 compared to 34.7% decrease on the side of DRC. Although the number of illegal gears generally reduced on the lakes, the number of traps increased on Lake Albert by 125.4%.

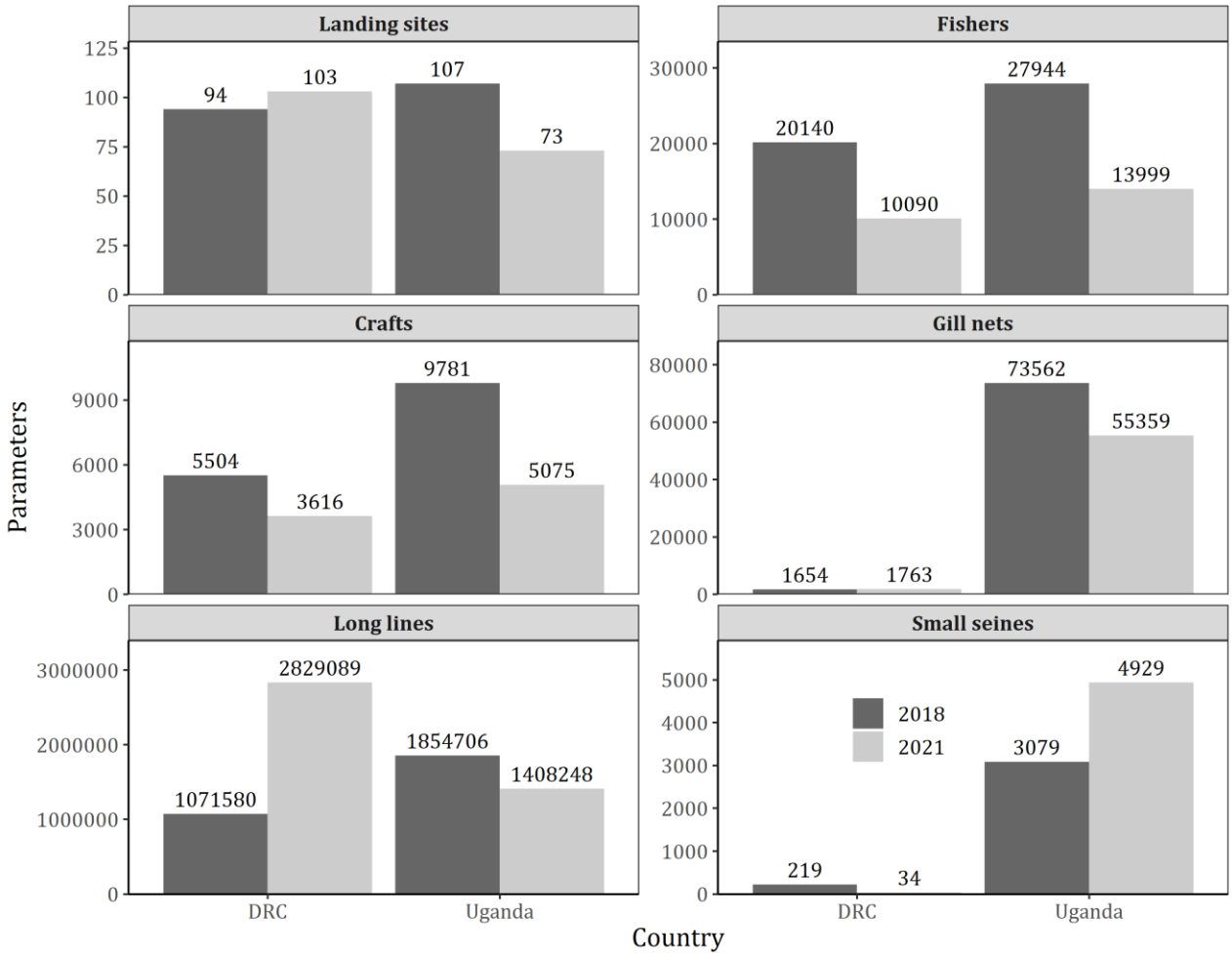

Figure 1. Trends in number of landing sites and major fishing effort indicators

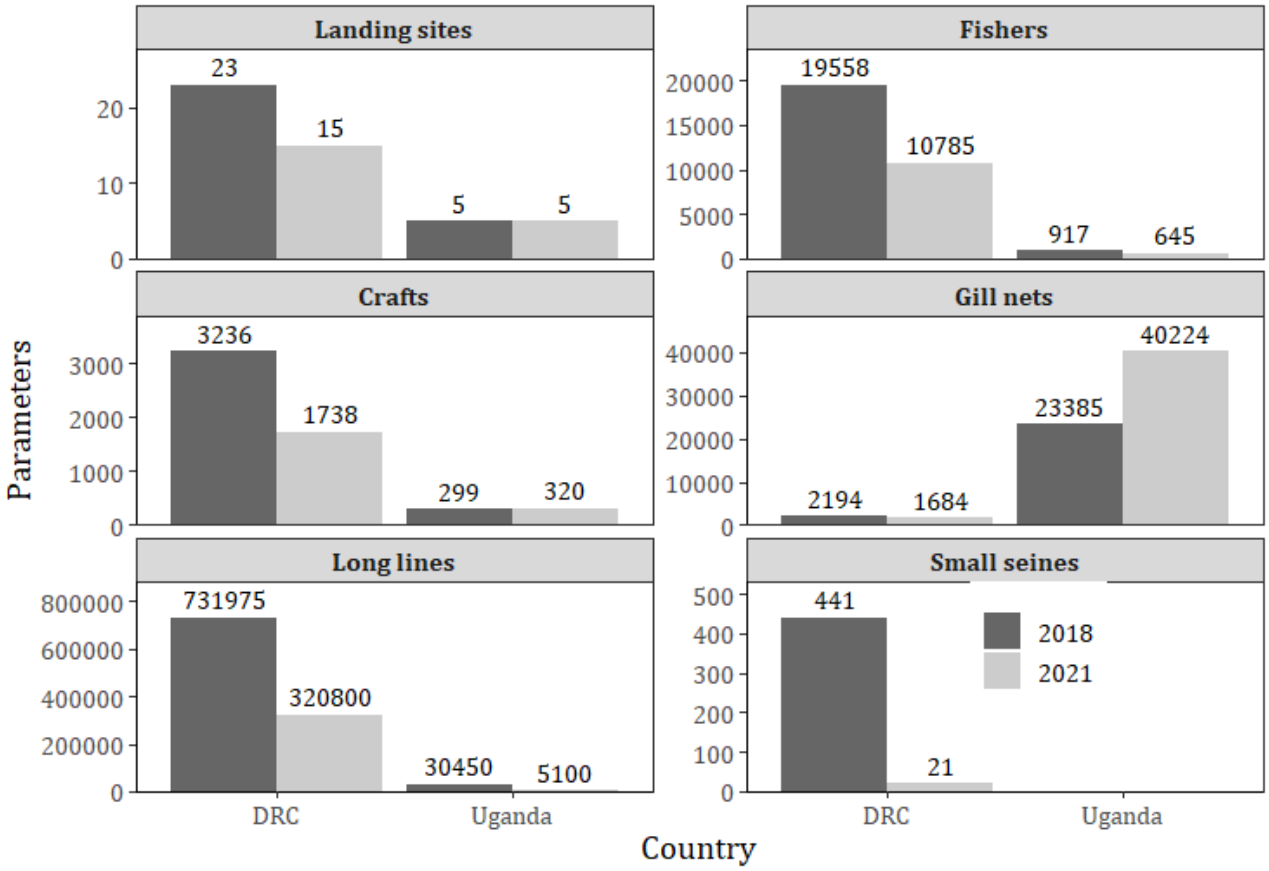

Figure 2. Number of landing sites and major fishing effort on Lake Edward

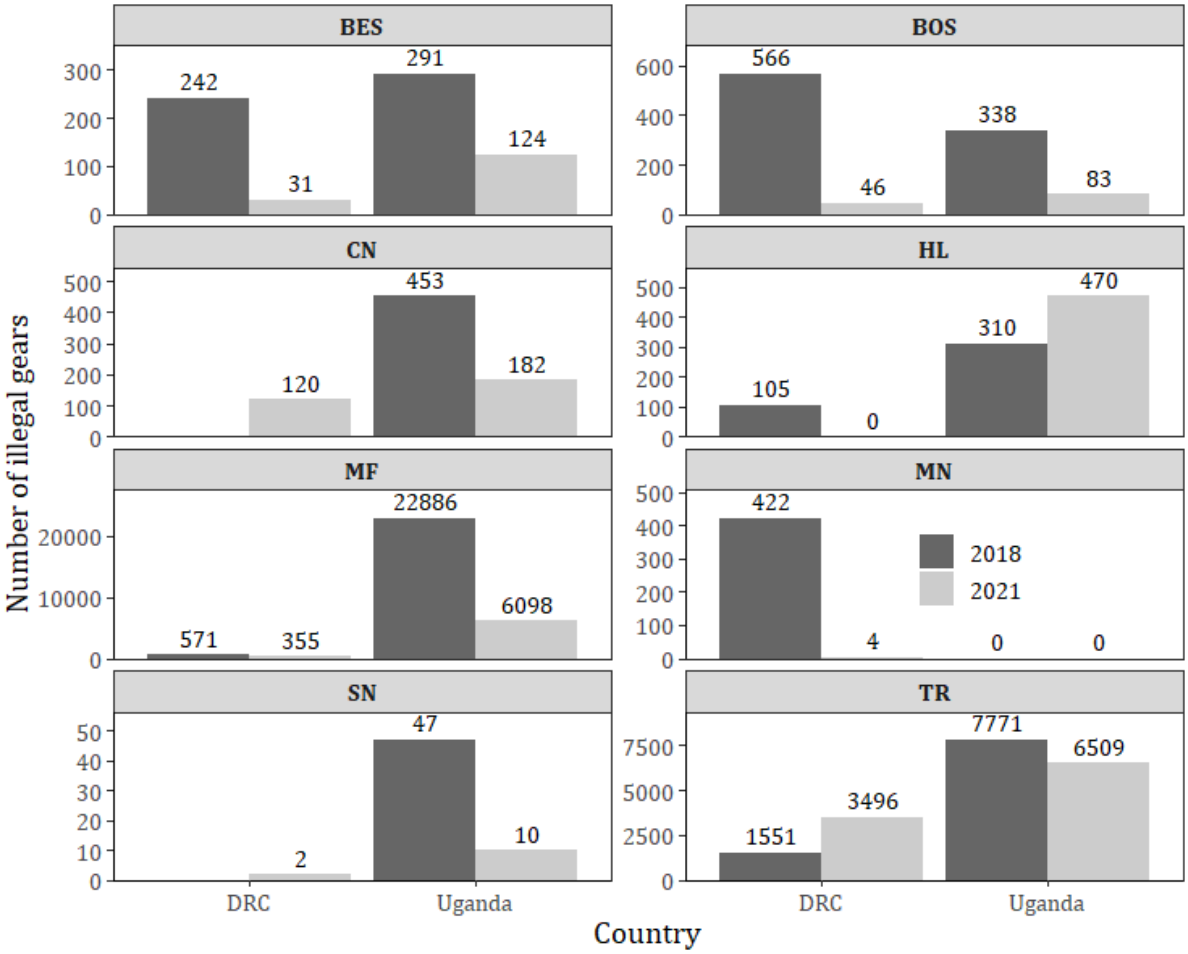

Figure 3. Number of illegal gears recorded on Lake Albert in 2018 and 2021.

DISCUSSION OF RESULTS

Landing site facilities and infrastructure

The general decrease on the number of landing sites on Lake Albert was attributed to both flooding and improved enforcement, which led to closure of illegal landing sites on the Uganda side of Lake Albert. However, the DRC side the LS slightly increased because the fishers formed illegal settlements around the lake which led to increase in the number of lading sites on the lake.

The number of landing site facilities such as post-harvest handling structures such as banda and cold room reduced on the lake. For example, the fishing bandas reduced from 9 to 5, although a major reduction was registered in Uganda. The reduction in the post-harvest handling facilities have led to increased post-harvest losses mostly for the small pelagic species. The losses have possibly led to economic losses which is exacerbated by the transport restriction caused by the COVID-19 pandemic. Some of the fish bandas recorded during the 2018 FS were submerged due to the rising water levels in the lake. The absence of fish sheds at almost all landing sites poses serious concerns as far as the quality and safety of fish handling is concerned. Cold room facilities are vital in addressing issues of post-harvest losses through improved storage

and increased shelf life, hence their inadequacy in most landing sites on both lakes is an indication of poor post-harvest handling along the value chain, especially in storage and preservative facilities for fresh fish.

The reduction in public toilet facilities at many landing sites poses a public health threat to both the fisheries and lakeside communities. Access to portable water, another critical service at landing sites was still inadequate, implying that there is no clean water to ensure safe fish handling at landing sites. The inadequacy in these facilities calls for more effort from the local governments to improve infrastructure for water and sanitation which has a bearing on the health of the fishers as well as the quality and safety of fish.

The number of landing sites accessible by road as well as those with all-weather roads reduced between 2018 and 2021. This trend, attributed to the overall reduction in number of landing sites and the recent flood events experienced on these lakes, resulted in destruction of some roads. Good road infrastructure networks are desired in the fisheries sector due to their role in improving fish marketing and reducing on the rate of fish spoilage that comes with economic losses. Efforts should therefore be directed towards improving the road networks to the fish landing sites to facilitate fish marketing and improve incomes of fisher communities.

The number of landing sites which received services of a resident fisheries staff were still few. These Technical Staff play a very critical role in provision of fisheries extension services. Absence of resident fisheries staff at landing sites weakens the monitoring, control, and surveillance (MCS) as well as and quality assurance functions, posing sustainability risk to the lake fisheries. There is therefore urgent need to ensure adequate staffing at all gazetted landing sites and revive the community based co-management structures to support the few technical staff.

Changes in key fishing effort indicators:

Generally, the number of landing sites between 2018 and 2021 reduced on both lakes (Table 1 & 3, Figure1 & 2, and Appendix 1). The reduction was mainly attributed to the increase in lake water levels that resulted into floods in some areas, submerging and displacing some of the landing sites and settlements, majority of which had been illegally established. Additional illegal landing sites on the Uganda portion of Lake Albert were closed by the covid-19 task force because they were associated with illegal practices that could jeopardize the fight against the pandemic. Prior to the 2021 FS, NELSAP funded joint enforcement patrols in both countries sharing lakes Edward and Albert that resulted in the closure of non-gazetted landing sites. Such enforcements should be sustained to maintain the number of landing sites at the current level. Majority of the newly established landing sites are usually hot spots for Illegal Unregulated and Unreported practices, whose end results are stock declines and eventual collapse of major commercial fisheries.

The total number of fishing crafts and fishers on both lakes reduced by almost a 50% margin between 2018 and 2021, the decline being a result of the joint enforcement on the lakes by FPU in Uganda and Navel Force in DRC prior and during the 2021 FS. The joint operations were aimed at removing illegal fishing activities on these lakes as per the recommendations of the 2018 FS. During the enforcement, most of the illegal boat categories including PA, DO, RA, SP, and SF below 28 feet were destroyed. However, given that 2021 FS followed the enforcement operations, it is possible that fear among fishers was still high, hence some fishers may not have freely disclosed information on the illegal fishing effort. The increase in the FF category on the

Uganda section of Lake Albert could be due to the destruction of boats which left fishers with no option but to sneak into the lake on foot using illegal gears.

On Lake Albert, the minimum mesh size of gillnets legally allowed to harvest the multispecies fisheries is 4 inches (101.6 mm) while on Edward, it is 4.5 inches (114.3 mm). In addition, beach seines, boat seines, cast nets, basket traps, monofilament gillnets, and hooks below size nine are prohibited on the two lakes. The use of such gears in harvesting the diverse exploitable species has previously been indicated to cause massive declines in the commercial species in these lakes, hence their continued poses a threat of potential collapse in stocks of the targeted fish species. Majority of the illegal fishing gears are non-selective, operated in critical fish habitats where their dragging effects disrupt and alter the entire ecosystem in areas where they are operated and beyond, thus they pose a serious threat to the recovery of most fish species hence the urgent need to cab their operations through an effective enforcement and management system. The 2021 survey saw a great improvement in compliance to the legal mesh sizes of the multi-filament gillnets on both lakes and a corresponding reduction in illegal fishing gears. The improvement is attributed to the improved enforcement activities, which were directed towards illegal fishing gears, forcing the many fishers to abandon such illegal fishing gears and sizes particularly for the multifilament gillnets. More such enforcements are encouraged in order to further reduce the remaining illegal gears/sizes. In addition, species specific management strategies, with clear guidance on the optimal effort for each target species are needed to guide sustainable fisheries management in both lakes. These management recommendations should be based on scientific evidence generated using appropriate fish stock models.

The long line hooks generally increased by 44.8% on Lake Albert between 2018 and 2021 but reduced by 57.3% on Lake Edward over a similar period. Majority of the LL hooks recorded on the two lakes were below the recommended size of nine and they targeted mainly the Nile perch on Lake Albert and *Bagrus spp* on Edward. Such hook sizes should be discouraged from the long line fishery since they crop juveniles of the target species in these lakes.

The hand line hooks, mainly operated in critical fish habitats on small canoes and by foot fishers to harvest *Tilapia species*, electric fish, *Clarias spp*, *Protopterus aethiopicus* and *Bagrus spp* registered an increase between 2018 in 2021. Their use on the lake should be monitored to ensure compliance to the size limits of ≥4≤9 and should be operated in the far offshore areas of the lake.

Small seines, commonly known as Lampara nets, were only recorded on the Uganda sector of Lake Albert, where they are commonly used in harvesting *Brycinus nurse* (locally Ragooge) and *Engraulicypris bredoi* (locally Muziri). In 2021, the number of small seines increased by 60% from the 3,079 in 2018. The use of this gear in combination with solar powered lights has been characterized by serious conflicts with the Nile perch fishers who attribute the Nile perch stock declines to the solar light fishing technologies. The small seines recorded in 2021 were dominated (98.4%) by mesh sizes below 8 mm recommended in Uganda. However, the 8 mm legal size was recommended based on Mukene, a small pelagic species (SPS) in Lake Victoria, despite the vivid variations their sizes at maturity. This disparity requires a detailed scientific study to determine the appropriate mesh size of SS for the Muziri in Lake Albert. The practice of seine paneling

(vertical joining of seine nets to increase on the fishing depth) reduced due to the enforcement operations that limited the joining to a maximum of 6 net panels as a precautionary measure in absence of adequate information on the optimal net panels. Prior, fishers could join up to 20 vertical panels from the previously 4-7 panels in the early 2000s. The effect of vertical panelling on stocks of the target and non-target species thus urgently require a detailed scientific study to guide on the maximum fishing depth and corresponding number of panels per boat that would ensure sustainable harvest of Ragoogi and Muziri stocks in Lake Albert.

CHALLENGES AND DATA LIMITATIONS

1. Overall, there were no major challenges to completely halt or greatly affect the entire FS exercise, however, the covid-19 pandemic affected in-country and cross boarder movements as well as public gathering for two months, which delayed completion of the FS exercise;
2. The 2021 FS was implemented immediately after the Lake-wide joint patrols aimed at combating illegal fishing illegalities from the two lakes. This created fear among the fishing communities, particularly those involved in illegal fishing practices who could later either under declare or refuse to avail illegal fishing effort for enumeration, however efforts were made to publicise the FS exercise and create awareness among the lakeside communities prior to the actual field data collection to enable smooth implementation of the survey;
3. For DRC lack of permanent statistical Data collection system affected the continuity of data collection on the ground;
4. Inaccessible landing sites due challenging geographical configuration of the lakeshore especially in DRC side;
5. It was costly to undertake FS on the DRC side due to the socio-economic and geographic context.

5.0 MAIN CONCLUSIONS

This report provides comprehensive results of the second lake-wide survey of fishing inputs and facilities conducted in September 2021. It details the main characteristics of artisanal fisheries in the two lakes for the period 2018 and 2021. Prior to 2018, earlier surveys were country specific, *ad hoc,* and never synchronized. The findings reveal drastic declines in fishing effort indicators and shortage of landing site facilities between the two survey periods.

The main conclusions from results of the 2021 Frame survey on lakes Albert and Edward are summarized by each of the water bodies in sections 5.1 and 5.2. Detailed lake or country specific conclusions are provided in the national reports appended to this report.

5.1. Lake Albert

Compared to 2018, the results of 2021 revealed a substantial reduction in the number of fishing effort indicators (boats, fishers, and gears) and illegal fishing inputs, which we attribute to the improved enforcement of the fisheries regulations. In Uganda, landing sites reduced by 31.8% from 107 in 2018 to 73 in 2021, while in DRC, they slightly increased from 94 to 103 over the same period. The results also reveal inadequacy in the basic landing site fisheries infrastructure and related services including fish handling sheds, cold rooms, fish stores, toilets, and access roads. There was an improvement in the number of legal mesh sizes of multifilament gill nets on both sides of the lake. A notable increase in number of small seines and a reduction in vertical joining of SS from 20 to 6 panels was observed on the Uganda side of the lake, while basket traps drastically increased on the DRC side.

5.2 Lake Edward

Overall, there was a general improvement in the status of legal fishing gears, evidenced by a reduction in illegal fishing gears in DRC and complete absence of beach seines, cast nets, and undersize gillnets (< 4.5 inches) in Uganda during the survey period (Table 4, Appendix 3 & 4). Further, an increase in composition of legal multifilament gillnets (> 4.5 inches) from 31.8% (698 nets) in 2018 to 97.3% (1575 nets) in 2021 was observed in DRC. Similarly, the number of fishers reduced in both countries. On the Uganda side, landing sites remained stable (Five) while in DRC, they reduced from 35 in 2018 to 15 in 2021 (57.1%). These observations are attributed to increased fisheries enforcement and surveillance by the national fisheries enforcement teams for both countries i.e. FPU (Uganda) and NSU (DRC).

6.0 RECOMMENDATIONS

6.1 Lake Albert

1) The partner states should sustain the ongoing fisheries enforcements on both lakes to regulate and eliminate the fishing illegalities to control the fishing effort;
2) Both countries should invest in improvement of the basic infrastructure and sanitation at landing sites by involving all stakeholders including relevant state agencies and private sector;
3) There is need for both countries to agree and remove the open access to maintain sustainable fishing capacity through species specific licensing of fishing vessels;

6.2. Lake Edward

1) There is need to sustain the ongoing enforcement of fisheries regulations in order to further regulate and eliminate the few remaining illegal fishing gears, particularly the Rafts, Traps, and undersize hooks, particularly for DRC there is need to close access to the fishery as the case in Uganda.
2) These data on fishing effort generated over time can now form a template for fish stock modelling, incorporating other data sets on catch to determine the optimal effort allowed on both lakes in ensuring stock recovery and sustainability of the fisheries;
3) Both countries should invest in improvement of the basic infrastructure and sanitation at landing sites by involving all stakeholders including relevant state agencies and private sector.

6.3. General recommendations

1) There is need for both countries to operationalize the Bilateral Fisheries agreement which was signed in 2018 to ensure sustained fisheries resources;
2) For trend analyses and effective monitoring of the dynamics of the fisheries of lakes Edward and Albert, Frame Surveys should continue to be implemented once in every two years (bi-ennually). The national fisheries lead agencies should consider including these activities in their national budgets beyond the LEAF II project.
3) There is need to open up/rehabilitate the key fisheries infrastructure and services including fish handing sheds (Bandas), access roads, schools, portable water, health centres, electricity, and public toilets to ensure fish safety and hygienic standards.
4) For effective management and monitoring of fishing effort on both lakes, lower level (community based) co-management structures should be established, their capacity developed, and integrated into fisheries management.

5) Future research should focus on three priority areas:
    a) Socio-economic study to support alternative livelihood options in order to reduce the ever increasing fishing pressure due to population increase;
    b) Quantifying the impacts of solar light attraction fishing technologies and small seine net panelling on the lake fisheries to inform management decisions;
    c) Quantifying the impact of mesh size and panels of the small nets used to target *Engraulicypris bredoi* which is now becoming the major fishery on Lake Albert.

ANNEXES

Appendix 1: Status of landing site facilities on Lake Albert in 2021 presented per country

	Uganda		DRC		Lake-wide Total	
CATEGORIES	**2018**	**2021**	**2018**	**2021**	**2018**	**2021**
Landing sites	107	73	94	103	201	176
Landing sites with bandas (Fish sheds)	9	3	0	2	9	5
Landing sites with working cold rooms	0	1	0	2	0	3
Landing sites with non-working cold rooms	2	0	0	0	2	0
Landing sites with Pontoons/Jetties	1	4	0	1	1	5
Landing sites with fish stores	11	5	0	0	11	5
Landing sites with access to electricity	16	10	0	0	16	10
Distance to nearest electricity supply (km)						
Landing sites within <1 km	19	9	0	0	19	9
Landing sites within1-5 km	13	11	0	0	13	11
Landing sites within 6-10 km	21	16	0	0	21	16
Landing sites within >10 km	38	27	94	103	132	130
Landing sites accessible by roads	73	43	17	31	90	74
Landing sites accessible by all-weather roads	33	28	17	31	50	59
Landing sites accessible by only water**	34	30	77	65	111	95
Distance to the nearest all-weather road (km)						
Landing sites within <1 km	6	7	0	2	6	9
Landing sites within 1-5 km	3	6	0	13	3	19
Landing sites within 6-10 km	3	4	0	6	3	10
Landing sites within >10 km	22	13	0	52	22	65
Landing sites with public toilets	21	26	8	1	29	27
Landing sites with access to potable water	24	23	4	15	28	38
Landing sites with artisanal net repair facilities/shades	71	70	6	21	77	91
Number of net repairers	621	1073		21	621	1094
Landing sites with artisanal boat repair facilities/shades	70		0	23	70	23
Number of boat repairers	284	279		23	284	302
Number of landing sites with resident fisheries staff	5	29	94	32	99	61
Number of landing sites (in operation for > 5 months annually)	100	70	94	34	194	104
Number of landing sites with accessibility to telephone		60	60	42	60	102
Number of landing sites with accessibility to schools <2km		60	77	44	77	104
Number of landing sites with accessibility to health centers		50	67	35	67	85
Landing sites with fish drying area			8	14	8	14
Landing sites with fish smoking area			13	26	13	26
Landing sites with outboard engine repair facility		13	3	11	3	24
landing sites with shops selling fishing gears			6	2	6	2

Appendix 2: Summary of the key indicators of fishing effort indicators recorded on Lake Albert during the 2021 FS

	Uganda		DRC		Lake-wide Total	
indicator	**2018**	**2021**	**2018**	**2021**	**2018**	**2021**
Number of fishers	27,944	13,999	20,140	10,090	48,084	24,089
Number of fishing crafts	9,781	5,075	5,504	3,616	15,285	8,691
Fishing crafts by category						
Number of congo barque /barque	7,605	2,268	3,774	2,086	11,379	4,354
Number of sese-flat at one end/pointed at both ends	2,127	2,586	330	482	2,457	3,068
Number of parachute/petite barque	2	8	1,186	958	1,188	966
Number of dugout /pirogue monoxyle	1	-	214	90	215	90
Number of school kabarega	5	2		-	5	2
Number of rafts/ radeau						
Foot fishers	41	211	-	2	41	213
Fishing crafts by mode of propulsion						
Number of crafts using outboard engine	2,734	2,610	1,200	1,356	3,934	3,966
Number of crafts using paddles	6,896	2,201		2,257	6,896	4,458
Number of crafts using sails	52	-		3	52	3
Number of crafts towed	58	53		-	58	53
Fishing crafts by gear type						
Number of crafts using perforated basins	40	30	-	-	40	30
Number of crafts using beach seines /senne de plage	228	41	205	34	433	75
Number of crafts using boat seines / senne tournantes	329	77	586	46	915	123
Number of crafts using cast nets /Epervier	354	171		111	354	282
Number of boats using gillnets /Filet maillant	2,232	1,049	2,642	1,374	4,874	2,423
Number of crafts using hand and line hooks	36	91		-	36	91
Number of crafts using longline hooks	948	651	849	868	1,797	1,519
Number of boats using monofilament gillnets	2,123	710	569	368	2,692	1,078
Number of crafts using small seines	3,069	1,867	113	34	3,182	1,901
Number of crafts using basket traps	408	324	130	193	538	517
Number of boats using other gears/Moustiquaires	14		410	4	424	4
Number of boats with other gears		64		584	-	648
Fishing gears					-	-
Number of monofilament gillnets	22,886	6,098	571	355	23,457	6,453
Total number of multifilament gillnets	73,562	55,359	1,654	1,763	75,216	57,122
Number of multifilament gillnets by size (inches)						
< 2½	16,667	2,594	1,220	59	17,887	2,653
2½	19,074	4,852		40	19,074	4,892
3	15,329	5,678	277	444	15,606	6,122
3½	6,167	3,119	47	83	6,214	3,202
Total <4 inches	**57,237**	**16,243**	**1,544**	**626**	58,781	16,869
4	6,562	3,506	100	348	6,662	3,854

	Uganda		DRC		Lake-wide Total	
4½	2,820	3,739	1	67	2,821	3,806
5	1,610	9,647		130	1,610	9,777
5½	262	5,149		26	262	5,175
6	733	6,878	9	149	742	7,027
6½	37	796		26	37	822
7	286	3,354		48	286	3,402
7½	25	385		26	25	411
8	487	1,823		153	487	1,976
9	358	680		90	358	770
10	2,004	2,496		33	2,004	2,529
>10	1,141	664		41	1,141	705
Total >4 inches	**16,325**	**39,116**	**110**	**1,137**	16,435	40,253
Mode of operation for multifilament gillnets >4 inches						
Active	1,320	2,581	518		1,838	2,581
Drift	541	201			541	201
Passive	14,464	2,268	1,220		15,684	2,268
Total number of longline hooks	1,854,706		1,071,580		2,926,286	4237337
Number of longline hooks by size						
Size category <4	45,610			-	45,610	-
Size category 4 - 7	157,610		26,688	49,684	184,298	49,684
Size category 8 - 10	514,212		6,800	27,540	521,012	27,540
Size category >10	1,137,274		1,038,092	2,751,865	2,175,366	2,751,865
LL<=9		353,605			-	353,605
LL>9		1,054,643			-	1,054,643
Number of basket traps	7,771	6,509	1,551	3,496	9,322	10,005
Number of beach seines	291	124	242	31	533	155
Number of boat seines	338	83	566	46	904	129
Number of cast nets	453	182		120	453	302
Number of hand and line hooks	310	470	105	-	415	470
Number of scoop net	47	10		2	47	12
Number small seines	3,079	4,929	219	34	3,298	4,963
Number of small seines by size (mm)						
Size category ≤5	3,075	4,850	219	31	3,294	4,881
Size category 6-7	2	55		3	2	58
Size category 8-10	2	24		-	2	24
Mosquito nets	-	-	422	4	422	4

Appendix 3: Status of landing site facilities on Lake Edward between 2018 and 2021 presented per country

	Uganda		DRC		Lake wide	
Categories	**2018**	**2021**	**2018**	**2021**	**2018**	**2021**
Landing sites	5	5	23	15	28	20
Landing sites with bandas (Fish sheds)	4	5	2	2	6	7
Landing sites with working cold rooms	0	0	0	2	0	2
Landing sites with non-working cold rooms	0	0	0	0	0	0
Landing sites with Pontoons/Jetties	0	0	1	1	1	1
Landing sites with fish stores	0	0	0	0	0	0
Landing sites with access to electricity	1	1	0	0	1	1
Distance to nearest electricity supply (km)						
Landing sites within <1 km	0	1	0	0	0	1
Landing sites within1-5 km	1	1	0	0	1	1
Landing sites within 6-10 km	1	0	0	0	1	0
Landing sites within >10 km	2	2	23	15	25	17
Landing sites accessible by roads	5	5	4	3	9	13
Landing sites accessible by all-weather roads	2	2	4	3	6	10
Landing sites accessible by only water**			19	12	19	7
Distance to the nearest all-weather road (km)					0	0
Landing sites within <1 km	1	0	0	0	1	0
Landing sites within 1-5 km	2	0	0	0	2	0
Landing sites within 6-10 km	0	0	0	1	0	1
Landing sites within >10 km	0	0	0	6	0	6
Landing sites with public toilets	3	2	2	2	5	4
Landing sites with access to potable water	3	4	4	7	7	11
Landing sites with artisanal net repair facilities	4	0	0	3	4	3
Number of net repairers	75	80		4	75	84
Landing sites with artisanal boat repair facilities/shades	4	0	0	12	4	12
Number of boat repairers	13	15	0	12	13	27
Number of landing sites with resident fisheries staff	2	0	23	15	25	15
Number of landing sites (in operation for > 5 months annually)	5	5	23	15	28	20
Number of landing sites with accessibility to telephone		5	4	7	4	12
Number of landing sites with accessibility to schools <2km		5	13	14	13	19
Number of landing sites with accessibility to health centres		5	12	11	12	16
Landing sites with fish drying area			1	3	1	3
Landing sites with fish smoking area			1	3	1	3
Landing sites with outboard engine repair facility		0	0	11	0	11
landing sites with shops selling fishing gears			0	2	0	2

Appendix 4: Summary of the key indicators of fishing effort indicators on Lake Albert for 2021 FS

	Uganda	Uganda	DRC	DRC	Total	Total
indicator	**2018**	**2021**	**2018**	**2021**	**2018**	**2021**

Number of fishers	917	645	19,558	10,785	20,475	11,430
Number of fishing crafts	299	320	3,236	1,738	3,535	2,058
Fishing crafts by category						
Number of congo barque /barque		-	1,179	437	1,179	437
Number of sese-flat at one end/pointed at both ends	279	289	1,280	1,166	1,559	1,455
Number of parachute/petite barque			480	113	480	113
Number of dugout /pirogue monoxyle			268	-	268	-
Number of school kabarega				-	-	-
Number of rafts/ radeau	10		29	2	39	2
Foot fishers	10	31	39	-	49	31
Fishing crafts by mode of propulsion					-	-
Number of crafts using outboard engine	168	284	162	741	330	1,025
Number of crafts using paddles	121	5		870	121	875
Number of crafts using sails				125	-	125
Number of crafts towed				-	-	-
Fishing crafts by gear type					-	-
Number of crafts using perforated basins			-	-	-	-
Number of crafts using beach seines /senne de plage			103	20	103	20
Number of crafts using boat seines / senne tournantes			31	4	31	4
Number of crafts using cast nets /Epervier				-	-	-
Number of boats using gillnets /Filet maillant	255	284	1,973	1,410	2,228	1,694
Number of crafts using hand and line hooks	4	1	39	-	43	1
Number of crafts using longline hooks	34	4	443	224	477	228
Number of boats using monofilament gillnets			429	56	429	56
Number of crafts using small seines			126	21	126	21
Number of crafts using basket traps	6	30	114	-	120	30
Number of boats using other gears/Moustiquaires			4	-	4	-
Number of boats with other gears		1		-	-	1
Fishing gears						
Number of monofilament gillnets			542	56	542	56
Total number of multifilament gillnets	23,385	40,224	2,194	1,683	25,579	41,907
Number of multifilament gillnets by size (inches)						
< 2½			1,453	15	1,453	15
2½				4	-	4
3			34	21	34	21
3½			9	4	9	4
Total <4 inches			**1,496**	**44**	1,496	44
4			196	7	196	7
4½	11,066	38,672	233	114	11,299	38,786
5	12,173	1,552	248	77	12,421	1,629
5½	76			-	76	-
6	68		21	1	89	1
6½				-	-	-

7	2			9	2	9
7½				-	-	-
8				14	-	14
9				38	-	38
10				189	-	189
>10				1,191	-	1,191
Total >4 inches	**23,385**	**40,224**	**698**	**1,575**	24,083	41,799
Mode of operation for multifilament gillnets >4 inches						
Active			698		698	-
Drift						
Passive	23,385		2,313	310	25,698	310
Total number of longline hooks	30,450		731,975		762,425	-
Number of longline hooks by size						
Size category <4			2,000	2,000	2,000	2,000
Size category 4 - 7			14,440	11,990	14,440	11,990
Size category 8 - 10	30,450		639,902	228,570	670,352	228,570
Size category >10			75,633	78,240	75,633	78,240
LL<=9						
LL>9		5,100			-	5,100
Number of basket traps	9	151	1,910	60	1,919	211
Number of beach seines			77	20	77	20
Number of boat seines			31	4	31	4
Number of cast nets						
Number of hand and line hooks	30	100	419	43	449	143
Number of scoop net						
Number small seines			441	21	441	21
Number of small seines by size (mm)						
Size category ≤5			441	21	441	21
Size category 6-7				-	-	-
Size category 8-10				-	-	-
Mosquito nets	-		11	-	11	-

Annex I: Standard Operating Procedures for conducting Frame Survey on Lakes Edward and Albert

Annex II: List of participants at the Regional Working group Meeting at Gisenyi Rwanda

ANNEX III: Interpretation of Basic Concepts

Concept	interpretation
Frame survey	A total enumeration of all fishing inputs and facilities on a given water body
All-weather road	A road that can be accessed by vehicles throughout the year. It could be murram or tarmac.
Banda	A permanent structure at the landing site used for handling fresh fish after landing.
Boat repair facility	Designated place for repair of boats

Cold room	A permanent insulated structure in which fresh fish can be kept chilled
Crew (fishers)	Persons who actually go to the lake to catch fish for a living or sport
Derelict boats	All fishing crafts which have been damaged and abandoned, and have been non-operational for the last one year.
Electricity Supply	Presence of electric power supply
Fish Store	A structure built to hold fish at the landing site. Does not include cold room.
Fishing gear	A device used to capture fish from the water e.g. a net, hook, cast net, etc.
Fishing vessel/craft	A device used to access the fishing ground.
Interviewer	Person asking questions and recording responses
Respondent	A person being asked questions (one who respond to questions)
Jetty	Fixed facility protruding into the lake to facilitate landing and docking of crafts.
Landing Site/beach/camp	Where there are 5 or more operational fishing vessels
Fishing village	A village along the shores of the lake where fishers reside, leave for fishing and return after fishing
Nearest market	A place Where most of the landed fish is first sold
Net repair facility	Designated place for repair of fishing nets
Non-working cold room	A non-operational cold room
Operational Fishing Vessels	Vessels that are in active fishing
Pontoon	Floating facility protruding into the lake to facilitate landing and docking of crafts.
Potable water	Good quality water from a tap or protected well fit for domestic use.
Public toilet facility	Availability of toilet at/ within the beach (pit latrines or flash toilets), which is currently in use.
Status/ Rank	Position held by a person in the community or at the landing site.
Transport Vessel (for fish):	Vessels solely for transporting fish products.
Transport Vessel (other purpose):	Vessels used for transport only (and never for fishing)

Annex IV: National report of the frame survey 2021 on the Ugandan side of lakes Edward and Albert

Annex V: National report of the Frame Survey 2021 on the Democratic Republic of Congo side of lakes Edward and Albert