

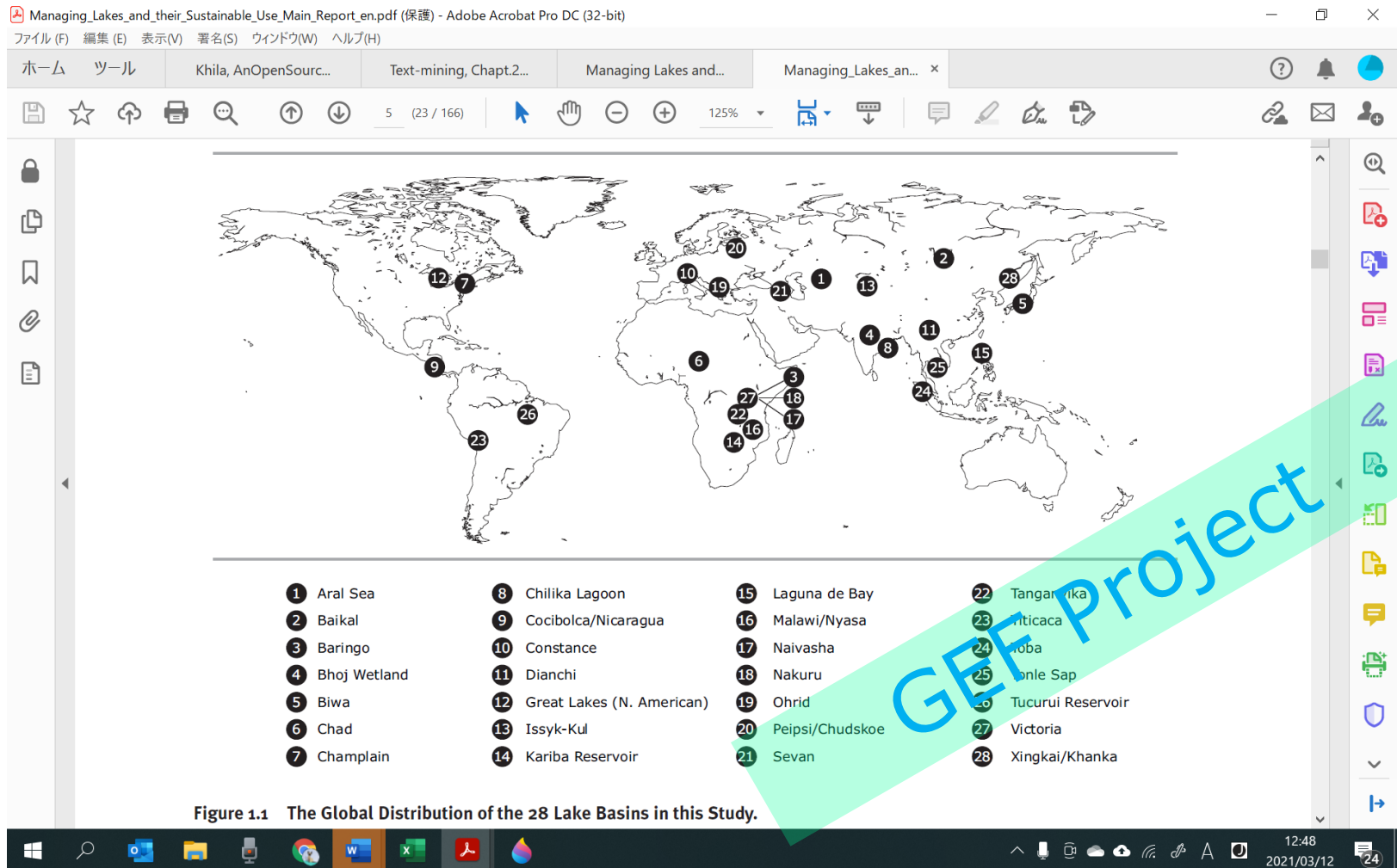
# JICA-ILEC Project on the Development of ILLBM Training Resource Materials

M. Nakamura  
9 March, 2021

1. Background
2. Training Module
3. LAKES<sup>1</sup> Knowledge Fertilization

# 1. Background

## 1.1 GEF Study 28 Global Lakes



GEF Project

## **1.2 Lake Brief**

- 1. Introduction.**
- 2. The Lake, River or Coastal zone**
  - 2.1 Overview**
  - 2.2 State of the Lake, River or Coastal zone**
- 3. Basin Management of the Lake, River and Coastal zone**
  - 3.1 Overview of Management Needs**
  - 3.2 Management Programs and Processes**
- 4. Key Challenges**
- 5. References**

**Knowledgebase Part**

**GEF Project**

## 1.3 Basin Questionnaire

1. Basic Information
2. Morphology
3. Water Balance
4. Climate
5. State of Ecosystem
6. Physical Data
7. Chemical Data
8. Biotic Data (Main species, exotics, productivity change through time)
9. State of the Basin
10. Uses of the Lake, River or Coastal Water
11. Impairments to Uses
12. Causes of Impairments
13. Structural Management Response
14. Non-structural Management Response
15. Socioeconomic Information (partial duplication of 1.5)
16. Political Situation (partial duplication of 1.2)

Database Part

GEF Project



## 1.3 GEF Report:

### Managing Lakes and their Basins for Sustainable Use



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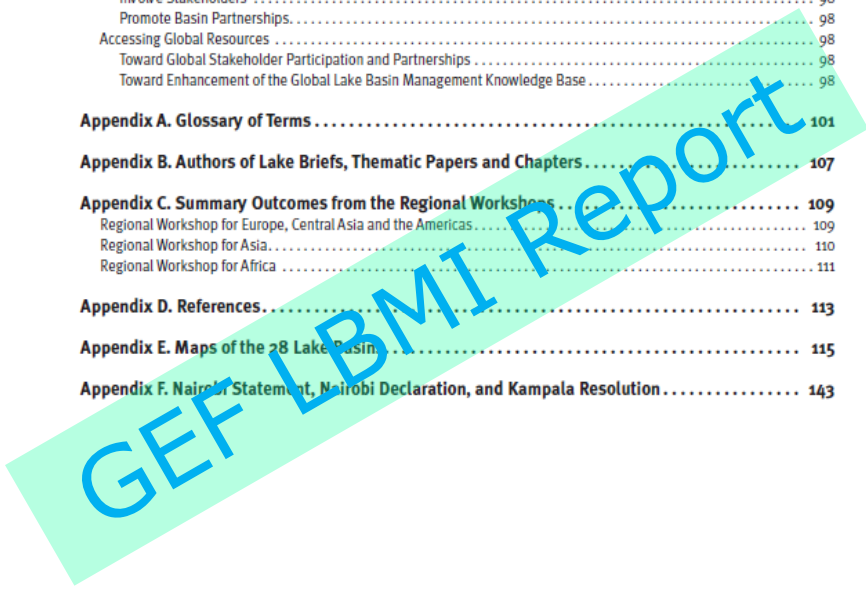
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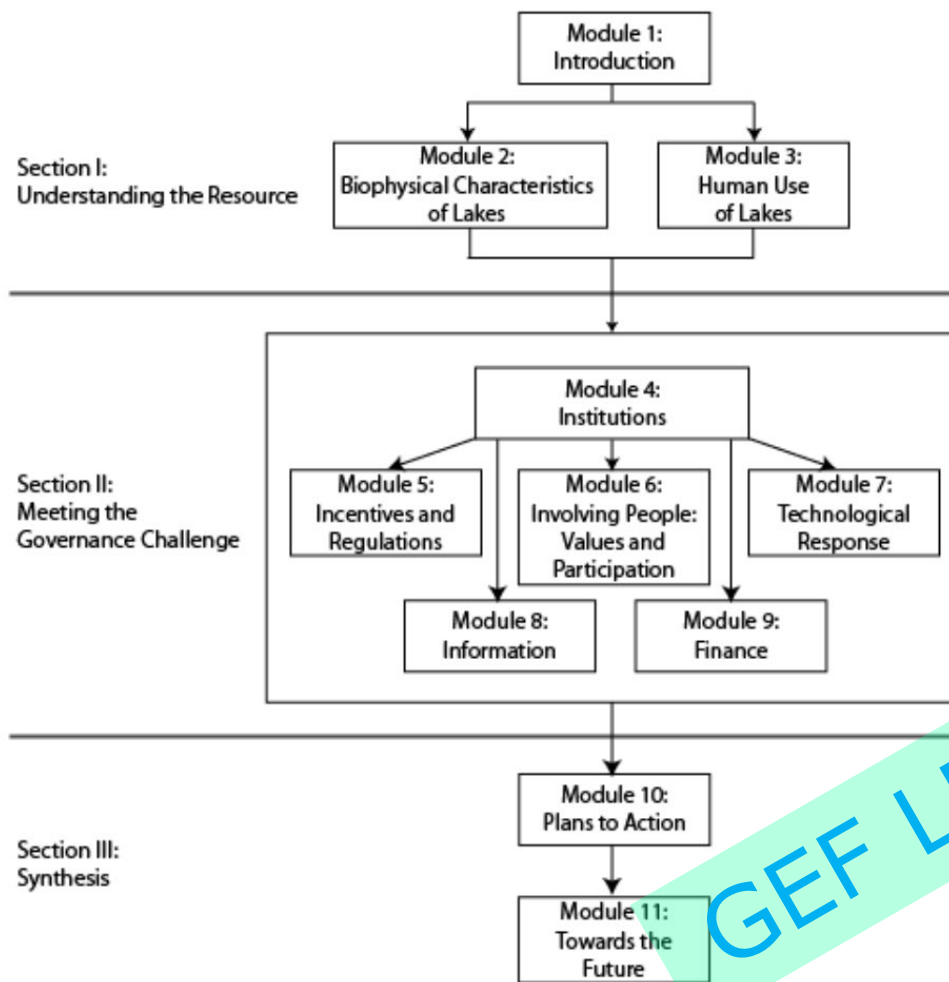
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# 1.3 From GEF Framework to ILBM Framework



GEF LBMI Report



# 1.4 GEF Lake Brief List

## Experience and Lessons Learned Brief Authors

Brief	Authors
Aral Sea	Gulnara Roll, Natalia Alexeeva, Nikolay Aladin, Igor Plotnikov, Vadim Sokolov, Tulegen Sarsembekov, Philip Micklin
Baikal	Anthony Brunello, Valery Molotov, Batbayar Dugherkhuu, Charles Goldman, Erjen Khamaganova, Tatiana Strijhova, Rachel Sigman
Baringo	Eric Odada, Japheth Onyando, Peninah Obudho
Bhoj Wetland	Mohan Kodarkar, Aniruddhe Mukerjee
Biwa	Tatuo Kira, Shinji Ide, Fumio Fukada, Masahisa Nakamura
Chad	Eric Odada, Lekan Oyebande, Johnson Oguntola
Champlain	William Howland, Barry Gruessner, Miranda Lescaze, Michaela Stickney
Chilika Lagoon	Asish Ghosh, Ajit Pattnaik
Cocibolca/Nicaragua	Salvador Montenegro-Guillen
Constance	Marion Hammerl, Udo Gattenloehner
Dianchi	Jin Xiangcan, Wang Li, He Liping
Great Lakes (North American)	Jon MacDonagh-Dumler, Victoria Pebbles, John Gannon
Issyk-Kul	Rasul Baetov
Kariba Reservoir	Christopher Magadza
Laguna de Bay	Adelina Santos-Borja, Dolora Nepomuceno
Malawi/Nyasa	Harvey Bootsma, Sven Erik Jorgensen
Naivasha	Robert Becht, Eric Odada, Sarah Higgins
Nakuru	Eric Odada, Jackson Raini, Robert Ndetei
Ohrid	Oliver Avramoski, Sandri Kycyku, Trajce Naumoski, Dejan Panovski, Veli Puka, Lirim Selfo, Mary Watzin
Peipsi/Chudskoe	Gulnara Roll, Aija Kosk, Natalia Alexeeva, Peeter Unt
Sevan	Araik Babayan, Susanna Hakobyan, Karen Jenderedjian, Siranush Muradyan, Mikhail Voskanov
Tanganyika	Sven Erik Jorgensen, Gaspard Ntakimazi, Sixtus Kayombo
Titicaca	Mario Francisco Revollo Vargas, Maximo Liberman Cruz, Alberto Lescaze, Rivero
Toba	Haryatiningsih Moedjodo, Payaman Simanjuntak, Peter Nelanussa, Lufiandi
Tonle Sap	Saburo Matsui, Marko Keskinen, Pech Sokhem, Masahisa Nakamura
Tucurui Reservoir	Jose Galizia Tundisi, Marco Aurelio Santos, Carlos Frederico Menezes
Victoria	Sixtus Kayombo, Sven Erik Jorgensen
Xingkai/Khanka	Jin Xiangcan, Zhai Pingyang

While not commissioned as a Lake Basin brief, the authors of this report have drawn on the experiences in management at Lake George, Uganda reported at the African lake basin workshop by Kule Asa Musinguzi, Fiona Nunan, and James Scullion.

GEF LBMI Report

# 1.4 GEF Thematic Paper List

## Thematic Paper Authors

Thematic Paper	Authors
African Lake Management Initiatives: The Global Connection	Robert Hecky, Harvey Bootsma and Eric Odada
The Caspian Sea	Nikolay Aladin, Igor Plotnikov
Conservation and Management Challenges of Saline Lakes: A Review of Five Experience Briefs	Robert Jellison, Yegor Zadereev, Priya Arora DasSarma, John Melack, Michael Rosen, Andrei Degermendzhy, Shiladitya DasSarma and German Zambrana
Directory of Non-Governmental Organizations (NGOs) and Inter-Governmental Organizations Working on Conservation and Management of Lakes in Africa	OSIENALA
Institutional Aspects of Asian Lake Basin Management	James Nickum
Involving the People in Lake Management: Values, Education and Participation	Oyugi Aseto
Lake Basin Management Problems in Africa: Historical and Future Perspectives.	Shem Wandiga
Management Challenges of Freshwater Fisheries in Africa	Richard Ogutu-Ohwayo and John Balirwa
Management of Lakes in India	M.S. Reddy and N.V.V. Char
Possibilities and Limitations of Environmental Infrastructure Provisions for Lake Basin Management	Shinji Ide
The Role of Communication, Education and Public Awareness (CEPA) in Lake Basin Management	Rebecca D'Cruz
The Role of Local Authorities in Lake Management	Aniruddhe Mukerjee
The Role of Protected Areas in Lake Basin Management	Rebecca D'Cruz
The Role of Public Participation and Citizen Involvement in Lake Basin Management	Oliver Avramoski
The Role of Sound Science in Lake and Reservoir Management for Sustainable Use	Walter Rast
Water Allocation and Environmental Flows in Lake Basin Management	William Young
Women's Participation in Lake Basin Management From a Gender Perspective	Sonia Davila-Poblete

GEF LBMI Report

# Fertilization

## 2.1 Accessible from ILEC Home Page

The screenshot shows the ILEC Home Page with a dark blue navigation bar containing the following menu items: 国際機関との連携, ILECについて, ILECの活動, 世界湖沼会議, 広報・出版物, and 世界湖沼DB. Below the navigation bar, there is a paragraph of Japanese text: 公益財団法人国際湖沼環境委員会 (ILEC: アイレック) は、世界の湖沼の持続可能な管理と保全を目指し、次の3つの活動を柱に取り組んでいます。 Below this text are three circular icons representing different activities. A large banner in the center features the ILEC and JICA logos and the text: Integrated Lake Basin Management Training Materials 統合的湖沼流域管理研修教材. A green diagonal banner with the text 'LAKES Knowledge Fertilization' is overlaid on the right side of the page. At the bottom, there is a news section titled 'WLC18オンラインプレ会議のお知らせ' with a sub-headline: ILECとグアナフアト大学との共催で、2020年11月にメキシコ・グアナフアトで開催を予定されておりました、第18回世界湖沼会議. The Windows taskbar at the bottom shows the date and time as 2021/03/09 21:18.

# Fertilization

Integrated Lake Basin Management  
Training Materials

HOME Tutorial Modules Authors Reports About Us

## Welcome

This website contains the training materials used in the Integrated Lake Basin Management Training Course. This "ILBM Training Course" is sponsored by the [Japan International Cooperation Agency \(JICA\)](#) and is being executed by the [International Lake Environment Committee \(ILEC\) Foundation](#).

Here you will find training [modules](#) on various topics related to [ILBM](#) and [ILLBM](#). Each of these modules contain three main parts:

- A written report and presentation on the given topic.
- Additional reports and presentations on additional topics related to the main topic.
- Some short, self-study questions.

Page Top

20:32  
2021/03/12



# 2.4 Module Resource Materials (Authors and Reports)

The screenshot shows a web browser window with the URL [ilec.or.jp/ILBMTrainingMaterials/modules](http://ilec.or.jp/ILBMTrainingMaterials/modules). The page title is "Integrated Lake Basin Management Training Materials" and features logos for ILEC and JICA. A navigation menu includes HOME, Tutorial, Modules, Authors, Reports, and About Us. The main content area is titled "Modules" and contains an "Outline" section with the following text:

Below is a schematic outline showing how each of the training modules are related. You can click a given box to take you to the relevant documents for a given module. Please also note that for each module, JICA and ILEC have worked with international experts to add new reports to complement the wide knowledge base generated during the LBMI project. These reports are available either by linking from the menu on the right or by clicking on the list of papers in the [Authors](#) at the top of this page.

The schematic outline is a flowchart showing the relationship between modules:

- Module 1: Introduction
- Module 2: Biophysical Characteristics of Lakes
- Module 3: Human Use of Lakes
- Module 4: Institutions

Section I: Understanding the Resource

The flowchart shows Module 1 at the top, with arrows pointing down to Module 2 and Module 3. A horizontal line below Module 2 and 3 is labeled "Section I: Understanding the Resource". An arrow points from this line down to Module 4. A large green diagonal watermark reading "LAKES Knowledge Fertilization" is overlaid on the right side of the page. A sidebar on the right lists "Modules" from Module 1 to Module 11. The bottom right corner shows the date "2021年3月12日 金曜日" and the time "20:33 2021/03/12".

## 2.5 Module Resource Material Development (2010)

**List of Comissioned Resource Materials for JICA-ILEC ILBM Module, 2010**

List of Comissioned Resource Materials for JICA-ILEC ILBM Module, 2010					
1	Acquisition and Management of Lake-related Water Quality Information at the Global Level	Robarts, Richard	19	Lessons from Malaysia on Developing a Nationwide Strategic Plan for the Management of Lakes and Reservoirs	Abdullah, Shahrizaila
2	An Application of GIS and Remote Sensing in the Management of Lake Kyoga, Uganda	Gyllenhammar, Andreas	20	Lessons from Nepal on Developing a Strategic Plan for the Integrated Lake Basin Management: The Case of Lakes Phewa, Bengas, and Rupa	Pokharel, Shailendra
3	Applications of Remote Sensing for Lake Basin Management	Bradt, Shane	21	Lessons on Attaining Sustainable Financing for Lake Basin Management Authorities in the Philippines	Santos-Borja, Adelina
4	Biodiversity Loss in a Saline Lake Ecosystem	Aladin, Nick	22	Lessons on Preparing and Implementing a Management Plan within an Urban Development Framework	Majizat, Akashah
5	Charging for Use of Natural Resources: Practical Lessons for Lake Basin Managers	Dixon, John	23	Lessons on Project Design and Stakeholder Engagement from the Songkhla Lake Case	Chatchai Ratanachai
6	Economic Instruments for Environmental Protection	Ballatore, Thomas	24	The Management of Hoars, Baors, and Beels in Bangladesh	Tapas Ranjan Chakraborty
7	Economic Valuation in the Lake Basin Management Decision Making Process	Verma, Madhu	25	Methodology for Learning Within and Across Lake Basins	Muhandiki, Victor
8	Ecosystem Services and Values for Stakeholders	Niren, Takaaki	26	Moving Towards Integrated Management of the Plateau Lakes in Yunnan Province, China: Lessons for Planning and Finance	Wang Li
9	Environmental User Fee System for Laguna de Bay	Santos-Borja, Adelina	27	Multi-level Water Governance for Closed and Closing Systems: The Murray-Darling Basin, Australia	Conneil, Daniel
10	Fundamentals of the Economic Approach	Kondo, Manabe	28	Participation in Japan	de, Shuji
11	Global Review of Lake and Reservoir Eutrophication and Associated Management Challenges	Mendiondo, Eduardo Mario	29	The Planning Process for Lake Basin Management: Lessons from Some North American Lakes	Holdren, Chris
12	Implementing Sewerage and Sewage Treatment Schemes in Developing Countries	Muhandiki, Victor	30	Re-Eutrophication and Pathogenic Contamination of Lake Chivero	Magadza, Chris
13	Implementing the Ecosystem Approach to Preserve the Ecological Integrity of Urban Lakes	Kodarkar, Mohan	31	Regulatory Approach For Water Quality Protection In Chile: Key Aspects to be Considered	Villa-Lobos, Sybil
14	Indigenous Peoples and Lake Basin Management	Skinner, Juan	32	Review of Technical Interventions to Restore the Northern Aral Sea	Aladin, Nick
15	Informational Requirements for a Lake Basin Management Program	Rast, Walter	33	River/Lake Basin Approaches to Water Resources Management	Oya, Kenji
16	Innovative Financing Methods for Lake Basin Management	Santos-Borja, Adelina	34	The Role of Agriculture and Irrigation in Lake Basin Management	Watanabe, Tsugihiro
17	Institutional Coordination and Policy Development in Lake Basin Management	Pattnaik, Ajit	35	The Use of Workshops as a Planning Tool in ILBM: Lessons from Lake Chapala, Mexico	Juarez, Alejandro
18	Jal Dindi, the Water Pilgrimage: How Tradition and Culture can Used to Promote ILBM	Kodarkar, Mohan			

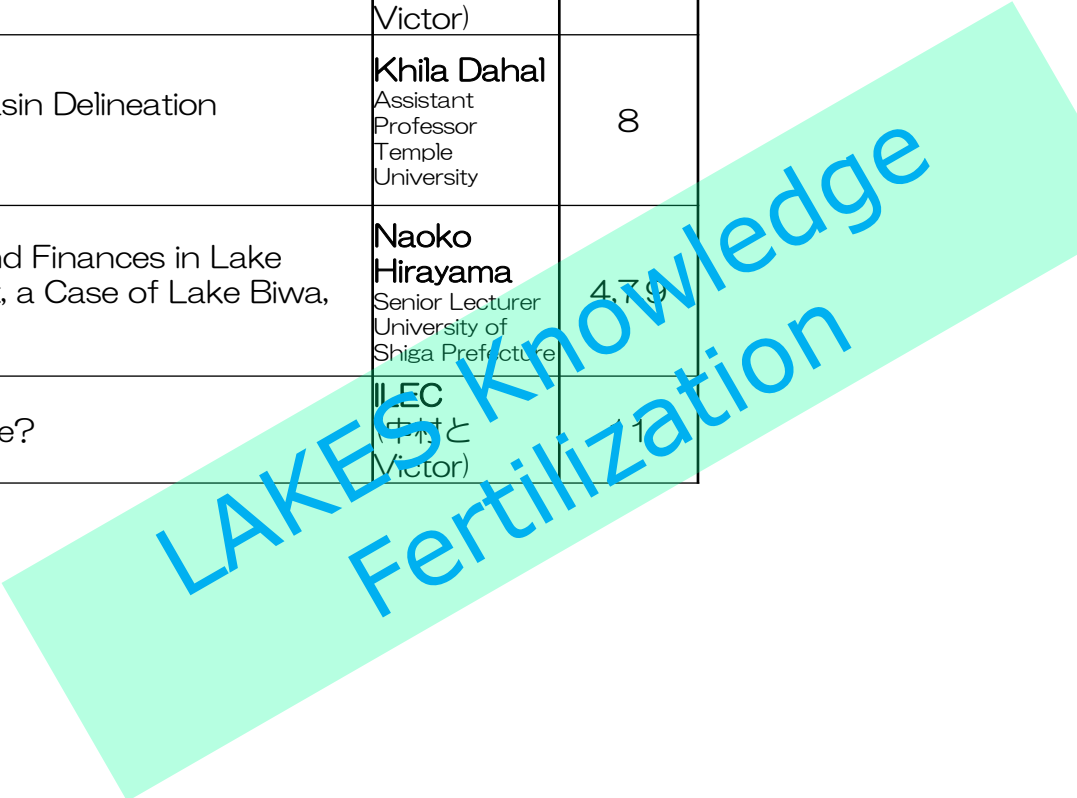
## 2.6 Module Resource Material Development (2019)

		教材名 Resource Material Title	執筆者 Author	モジュール Module	現在のモジュール内容 TM Content (Current)	JICA-ILEC研修課 講義料 KOCP Content	GEF/LMI-1 GEF LBM Thematic Paper	ツール Tools	国家戦略・計画 National ILEM Strategies and Plans	新規/地域課題 Emerging/Regional Issues
1	新規追加	African Lake Basin Management: Key Issues and Challenges	Daniel Olago Professor University of Nairobi	1						○
2	新規追加	Cyanobacterial Problems in South American Reservoirs: Historical Background, Current Status and Prospects for Countermeasures	Sandra Azevedo Professor Brazil Federal University of Rio de Janeiro	2						○
3	新規追加	Lake Baringo: A Transient Physical Chemical Environment, Diversity and Livelihoods	Jones Muli Researcher Kenya Marine and Fisheries Research Institute	3			○			
4	新規追加	Into the Golden Year of Lake Basin Management in Laguna de Bay, Philippines	Adelina Santos-Borja Vice President ILEC Scientific Committee Member	4			○			
5	新規追加	Role of District-level Organization in Decentralized Arrangement of Irrigation Management: Lessons from Water Users Association of Farmers in Japan and Egypt	Tsugihiko Watanabe Professor Kumamoto University	4		○				
6	新規追加	Water Resources Management within the Climate Change Context in Africa	Salif Diop Professor University of Cheikh Anta Diop	5						○
7	新規追加	Climate Change Adaptation and Mitigation Measures in the EU Water Environments	Tina Noges Professor Estonian University of Life Sciences	5						○
8	改訂	Participation in Japan	Shinji Ide Professor University of Shiga Prefecture	6	○					
9	改訂	Chilika Lake: Restoring Ecological Balance and Livelihoods through Re-Salinization	Ajit K. Pattnaik Vice President Wetlands International South Asia	7	○		○			
10	新規追加	Assessment of Pollution Load on the Kenyan Catchment of Lake Victoria Basin using GIS Tools	Charles Kipkoech Lecturer Jomo Kenyatta University of Agriculture and Technology	8						
11	新規追加	GIS-based Lake Basin Delineation and Computation of Risk Indicators as part of the TWAP Project	Khila Dahal Professor Temple University	8						○
12	新規追加	Application of Remote Sensing to Generate Historical Water Quality Data to Support Lake Management in Indonesia	Luki Subehi Senior Researcher Indonesian Institute of Sciences	8						○
13	新規追加	Environmental Education: Its Evolution, ESD, Participation and Governance	Masahisa Sato Professor Tokyo City University	8						○
14	新規追加	Monitoring and Evaluation of Water Quality and Ecosystem in Lakes, Rivers and Coastal Zones in Japan	Shigekazu Ichiki Secretary General ILEC Secretariat	8			○			○
15	新規追加	Introduction to Lake Modeling	Shinji Ide Professor University of Shiga Prefecture	8						○
16	新規追加	Assessment of Management of Lake Malawi Basin through Application of ILBM-Based Tools	Clara L. Chidammodzi Environmental Consultant	10				○		
17	新規追加	The Lake Cluster Pokhara Valley: An Overview of Lake Basin Environment and Governance Improvement	Shaiendra Kumar Pokharel Coordinator Conservation Development Foundation, Nepal	10		○			○	
18	新規追加	Strengthening Integrated Lake Basin Management Implementation in Malaysia through Research Framework	Zati Sharip Senior Researcher National Hydraulic Research Institute of Malaysia	10		○			○	

LAKES Knowledge Fertilization

## 2.7 Module Resource Material Development (2020)

		教材名 Resource Material Title	執筆者 Author	モジュール Module
		Reports and PPTs		
新規追加	1	Summary and Key Messages from Resource Materials	ILEC (中村とVictor)	1,2,3
新規追加	2	GIS-based Lake Basin Delineation Procedure	Khila Dahal Assistant Professor Temple University	8
新規追加	3	Sewerage Policy and Finances in Lake Basin Management, a Case of Lake Biwa, Japan	Naoko Hirayama Senior Lecturer University of Shiga Prefecture	4,7,9
改訂	4	Towards the Future?	ILEC (中村とVictor)	1



## 2.7 The GEF Lakes Cited in the 2010/2020-2021 Reports

The List of “GEF-LBMI Lake Brief” Lakes Referred to In the 2010 Reports and in the 2020-2021 Reports

28 “Lake Brief” Lakes in the LBMI Report	In the Module Chapter	In the 2010 Reports (by Author)	In the 2020-21 Reports (by Author)	28 “Lake Brief” Lakes in the LBMI Report	In the Module Chapter	In the 2010 Reports (by Author)	In the 2020-21 Reports (by Author)
<b>Aral Sea</b>	2, 3, 6, 7, 8, 9, 10	Aladin		<b>Laguna de Bay</b>	2, 3, 4, 5, 6, 7, 8, 9, 10	Santos-Borja, Dixon, Oya, Skinner, Muhandiki, Rast	Santos-Borja, Muhandiki, Olago
<b>Baikal</b>	2, 6, 7, 8, 9	Dixon, Rast	Pattnaik	<b>Malawi/Nyasa</b>	2, 3, 4, 6, 7, 8, 9, 10		Chidammodzi, Olago, Muhandiki, Muli
<b>Baringo</b>	2, 3, 4, 6, 7, 8, 9	Dixon, Rast	Olago, Muli	<b>Naivasha</b>	2, 3, 4, 5, 6, 7, 8, 9, 10	Muhandiki	Muli, Olago
<b>Bhoj Wetland (Bhopal)</b>	10	Muhandiki, Verma		<b>Ohrid</b>	2, 3, 6, 7, 8, 10		
<b>Biwa</b>	2, 3, 4, 5, 6, 7, 8, 9, 10	Ide, Watanabe, Rast, Dixon, Muhandiki, Oya	Hirayama, Ide, Chidammodzi, Olago	<b>Peipsi/Chudskoe</b>	2, 3, 6, 7, 9	Rast	
<b>Chad</b>	2, 3, 4, 6, 7, 8, 10		Chidammodzi	<b>Sevan</b>	2, 3, 5, 6, 7, 8	Dixon, Roberts	
<b>Champlain</b>	6, 7, 8, 10	Rast		<b>Tanganyika</b>	2, 6, 7, 8, 10	Rast	Olago
<b>Chilika Lagoon</b>	2, 4, 6, 7, 8, 10	Pattnaik, Rast, Verma	Pattnaik, Olago	<b>Titicaca</b>	2, 7, 8, 10	Rast	K. Dahal
<b>Constance</b>	2, 4, 5, 6, 7, 8, 9, 10			<b>Toba</b>	2, 3, 4, 5, 6, 7, 8, 9		L. Subehi
<b>Dianchi</b>	2, 3, 4, 5, 6, 8, 9, 10	Li, Oya, Dixon		<b>Tonle Sap</b>	2, 3, 4, 6, 7, 10, 11		L. Subehi
<b>Great Lakes (N. America)</b>	2, 3, 4, 5, 6, 7, 8, 9, 10	Rast, Muhandiki, Li, Gyllenhammar, Shahrizailla, Skinner, Roberts, Pokharel	Olago, Chidammodzi, Muli	<b>Tucuruí Reservoir</b>	2, 7		
<b>Issyk-Kul</b>	2, 6, 7, 9, 10	Aladin		<b>Victoria</b>	2, 3, 4, 5, 6, 7, 8, 9, 10	Gyllenhammar, Rast, Connell, Oya, Kondo, Dixon	Cheruiyot, Olago, Muli, K. Dahal, Chidammodzi
<b>Kariba Reservoir</b>	2, 3, 4, 7, 8	Magadza, Rast	Olago	<b>Xingkai/Khanka</b>	2, 7, 8		

# 2.8 Tutorials (Lake Biwa and ILBM)

The screenshot shows a web browser window with the URL [ilec.or.jp/ILBMTrainingMaterials/tutorial](http://ilec.or.jp/ILBMTrainingMaterials/tutorial). The page title is "Integrated Lake Basin Management Training Materials". The navigation menu includes: HOME, Tutorial, Modules, Authors, Reports, and About Us. The main content area is titled "Tutorial" and contains four thumbnail images:

- GIS-based Lake Basin Delineation Procedure:** A flowchart starting with "DEM" leading to "Fill Sink", "Flow Direction", and "Flow Accumulation". Below this, it shows "Drainage Network Extraction", "Drainage Network Ordering", "Catchment Extraction", and "Catchment Merge". The final step is "Area Query Location", which leads to "OUTPUTS".
- What is ILBM?:** A slide titled "What is ILBM?" with the subtitle "Integrated Lake Basin Management (ILBM)". It lists several key aspects: Conceptual framework, Gradual, continuous and holistic management process, Integration of the governance elements, Policy structure, Institutional arrangements, Stakeholder participation, Specific identifier and traditional knowledge, Technological possibilities, and National research and centers.
- Everyone Lives in the Basin of some Lentic System, and ILBM helps them Live Happily:** An illustration showing a group of diverse people standing around a central point labeled "L B M" on a map, with a globe in the background.
- ILBM:** An illustration of a group of people standing under a large umbrella-like structure labeled "L B M" over a lake.

A large green diagonal watermark with the text "LAKES Knowledge Fertilization" is overlaid on the right side of the page. The Windows taskbar at the bottom shows the date as 2021/03/12 and the time as 21:06.

# 3. LAKES Knowledge Fertilization

## 3.1 KCCP Resources Serve as ILBM Core Knowledge

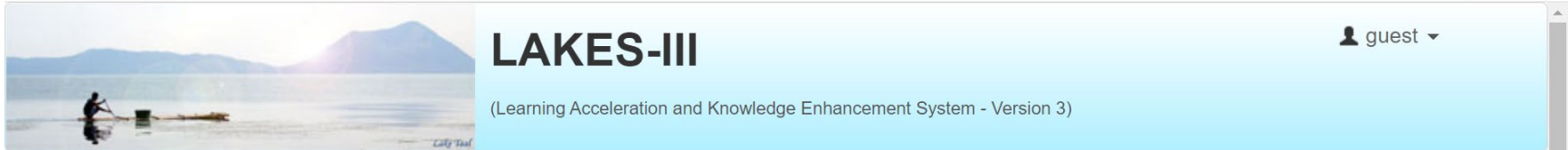
The screenshot displays the LAKES-III web application interface. The browser address bar shows the URL `lakes-sys.com`. The page header includes the title "LAKES-III" and the subtitle "(Learning Acceleration and Knowledge Enhancement System - Version 3)".

The main content area is divided into several sections:

- Thesaurus Word List:** Shows 392 related words across 480 documents. The list is ordered by count, with "table" having the highest count (3427, 0.5%) and "abstract" having the lowest (621, 0.1%).
- Browse Document Titles:** A "Display" button is visible.
- Filtering Actions:** Includes an "All Clear" button.
- By "Subset Name" of document groups compiled:** A list of document titles is shown, with two items highlighted by a red box:
  - JICA-ILEC KCCP Module Reports 2010
  - JICA-ILEC KCCP Module Reports 2020-21
- LAKES Search:** Provides two search methods: "Click Thesaurus word on the left" and "Provide a Free Word". A search input field and a "Search" button are present.
- To "World Lake Database":** Includes a field to "Enter Lake Name".

A large green diagonal watermark reading "LAKES Knowledge Fertilization" is overlaid on the right side of the screenshot.





### Thesaurus Word List

345 words are related.  
In 36 documents.

- Order by  
ABC..Z COUNT ↑ ID ↑
- WORD (Count of Sentences)(%)
- conclusion (26) (0.1%)
  - chapter (16) (0.1%)
  - fig. (65) (0.2%)
  - figure (162) (0.6%)
  - introduction (50) (0.2%)
  - key word (2) (0.0%)
  - recommendation (16) (0.1%)
  - section (40) (0.1%)
  - summary (29) (0.1%)
  - table (144) (0.5%)
  - table of contents (2) (0.0%)
  - accept (17) (0.1%)
  - acceptable (4) (0.0%)
  - accomplish (10) (0.0%)

Browse Document Titles

Filtering Actions

#### By "Subset Name" of document groups compiled

\*Click the subset folder box (boxes) you wish to search documents for.

- JICA-ILEC KCCP Module Reports 2010
- JICA-ILEC KCCP Module Reports 2020-21
- A: ILEC (ILBM publication) A: ILEC-UNEP Guidelines
- B: Lake Briefs (GEF Project, 2003-2005)
- B: WLC Proceedings (prodocs)
- B: World Lake Vision (prodocs)

### LAKES Search

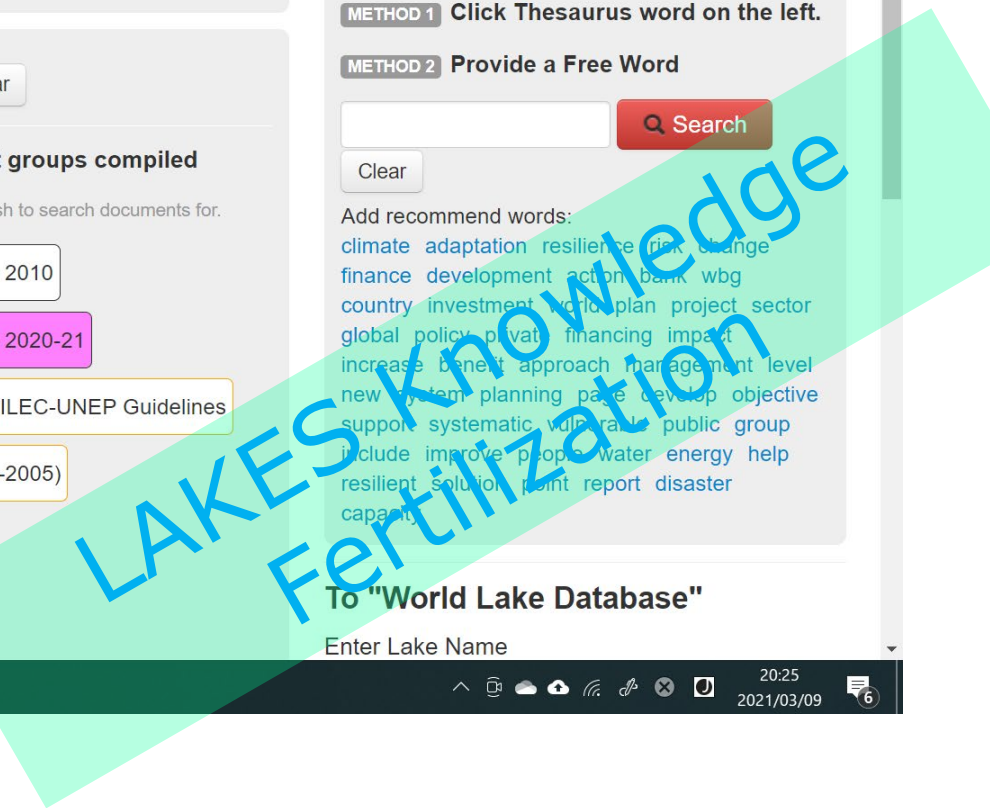
METHOD 1 Click Thesaurus word on the left.

METHOD 2 Provide a Free Word

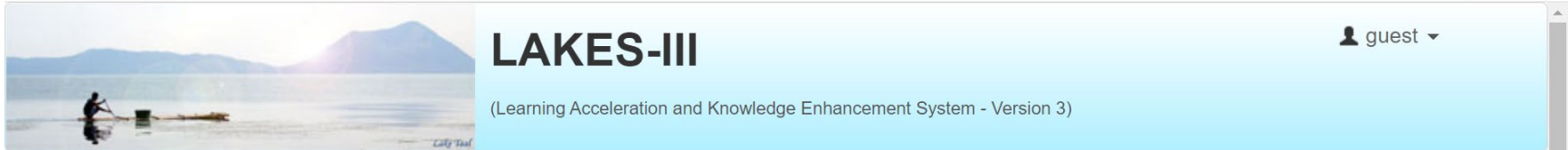
- Add recommend words:
- climate adaptation resilience risk change
  - finance development action bank wbg
  - country investment world plan project sector
  - global policy privat financing impact
  - increase benefit approach management level
  - new system planning page develop objective
  - support systematic vuln rank public group
  - include improve people water energy help
  - resilient solution point report disaster
  - capacity

### To "World Lake Database"

Enter Lake Name







### Thesaurus Word List

345 words are related.  
In 36 documents.

- Order by  
ABC..Z COUNT ↑ ID ↑
- WORD (Count of Sentences)(%)
- conclusion (26) (0.1%)
  - chapter (16) (0.1%)
  - fig. (65) (0.2%)
  - figure (162) (0.6%)
  - introduction (50) (0.2%)
  - key word (2) (0.0%)
  - recommendation (16) (0.1%)
  - section (40) (0.1%)
  - summary (29) (0.1%)
  - table (144) (0.5%)
  - table of contents (2) (0.0%)
  - accept (17) (0.1%)
  - acceptable (4) (0.0%)
  - accomplish (10) (0.0%)

Browse Document Titles

Filtering Actions

- By "Subset Name" of document groups compiled
- \*Click the subset folder box (boxes) you wish to search documents for.
- JICA-ILEC KCCP Module Reports 2010
  - JICA-ILEC KCCP Module Reports 2020-21
  - A: ILEC (ILBM publication) A: ILEC-UNEP Guidelines
  - B: Lake Briefs (GEF Project, 2003-2005)
  - B: WLC Proceedings (prodocs)
  - B: World Lake Vision (prodocs)

### LAKES Search

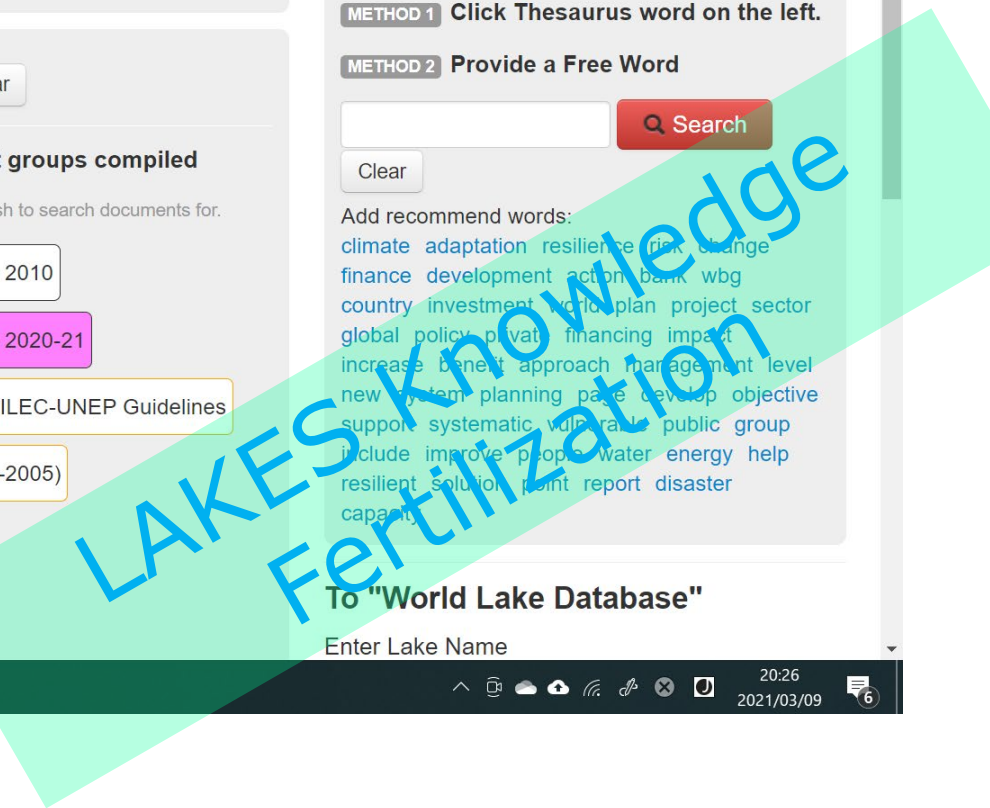
METHOD 1 Click Thesaurus word on the left.

METHOD 2 Provide a Free Word

Add recommend words:  
climate adaptation resilience risk change  
finance development action bank wbg  
country investment world plan project sector  
global policy privat financing impact  
increase benefit approach management level  
new system planning page develop objective  
support systematic vuln rank public group  
include improve people water energy help  
resilient solution point report disaster  
capacity

### To "World Lake Database"

Enter Lake Name



Document List

Select the sub(s) to Document Set [Add or Delete](#)

Select by providing the "Title keyword"  [Submit](#)

Submit a filter year/month for document filtering       [Submit](#) [Clear Year Month](#)

0 items found [Switch to List Layout](#)

1 2 3 4 5

1 2 3 4 5

LAKES Knowledge Fertilization

### Thesaurus Word List

345 words are related.

In 36 documents.

Order by

ABC..Z COUNT ↑ ID ↑

WORD (Count of Sentences)(%)

- conclusion (26) (0.1%)
- chapter (16) (0.1%)
- fig. (65) (0.2%)
- figure (162) (0.6%)
- introduction (50) (0.2%)
- key word (2) (0.0%)
- recommendation (16) (0.1%)
- section (40) (0.1%)
- summary (29) (0.1%)
- table (144) (0.5%)
- table of contents (2) (0.0%)
- accept (17) (0.1%)
- acceptable (4) (0.0%)
- accomplish (10) (0.0%)
- approach (165) (0.6%)
- attractive (3) (0.0%)
- desirable (5) (0.0%)
- difficult (26) (0.1%)
- distinguished (2) (0.0%)
- effective (69) (0.3%)
- efficient (14) (0.1%)
- equitable (10) (0.0%)

### Browse Document Titles

Display

### Filtering Actions

All Clear

#### By "Subset Name" of document groups compiled

\*Click the subset folder box (boxes) you wish to search documents for.

JICA-ILEC KCCP Module Reports 2010

JICA-ILEC KCCP Module Reports 2020-21

A: ILEC (ILBM publication)

A: ILEC-UNEP Guidelines

B: Lake Briefs (GEF Project, 2003-2005)

B: WLC Proceedings (prodocs)

B: World Lake Vision (prodocs)

C: ILBM Lake Briefs (prodocs)

C: ILBM South Asia (thematic)

C: ILEC Newsletters

#### By specified any "Word" in the "Title" of documents

Muli

Submit Clear

For example: [lake water] means "lake" and "water"

### LAKES Search

METHOD 1 Click Thesaurus word on the left.

METHOD 2 Provide a Free Word

Search Clear

Add recommend words:

- climate adaptation resilience risk change finance
- development action bank wbg country investment
- world plan project sector global policy private
- financing impact increase benefit approach
- management level new system planning page
- develop objective support systematic vulnerable
- public group include improve people water energy
- help resilient solution point report disaster capacity

### To "World Lake Database"

Enter Lake Name

GO

- Search from List of Lakes
- Search from List of Countries
- Go to Data Lists



LAKES Knowledge Fertilization

### Thesaurus Word List

256 words are related.

In 2 documents.

Order by

ABC.Z COUNT ↑ ID ↑

WORD (Count of Sentences)(%)

- conclusion (3) (0.1%)
- chapter (9) (0.2%)
- fig. (50) (1.1%)
- figure (5) (0.1%)
- introduction (9) (0.2%)
- key word (1) (0.0%)
- recommendation (2) (0.0%)
- section (10) (0.2%)
- summary (3) (0.1%)
- table (39) (0.9%)
- table of contents (2) (0.0%)
- accept (5) (0.1%)
- acceptable (1) (0.0%)
- approach (5) (0.1%)
- attractive (1) (0.0%)
- difficult (5) (0.1%)
- effective (9) (0.2%)
- efficient (2) (0.0%)
- facilitate (1) (0.0%)
- failure (3) (0.1%)
- first (22) (0.5%)
- gap (4) (0.1%)
- good (10) (0.2%)
- healthy (1) (0.0%)
- important (6) (0.1%)

Browse Document Titles

Display

### Filtering Actions

All Clear

#### By "Subset Name" of document groups compiled

\*Click the subset folder box (boxes) you wish to search documents for.

JICA-ILEC KCCP Module Reports 2010

JICA-ILEC KCCP Module Reports 2020-21

A: ILEC (ILBM publication)

A: ILEC-UNEP Guidelines

B: Lake Briefs (GEF Project, 2003-2005)

B: WLC Proceedings (prodocs)

B: World Lake Vision (prodocs)

C: ILBM Lake Briefs (prodocs)

C: ILBM South Asia (thematic)

C: ILEC Newsletters

#### By specified any "Word" in the "Title" of documents.

For example: [lake water] means "lake" and "water"

Now, Filtered by **Muli**

#### By "Year/Month" of publications

--- / --- ~ --- / ---

### LAKES Search

METHOD 1 Click Thesaurus word on the left.

METHOD 2 Provide a Free Word

Add recommend words:

climate adaptation resilience risk change finance development action bank wbg country investment world plan project sector global policy private financing impact increase benefit approach management level new system planning page develop objective support systematic vulnerable public group include improve people water energy help resilient solution point report disaster capacity

### To "World Lake Database"

Enter Lake Name

- Search from List of Lakes
- Search from List of Countries
- Go to Data Lists



LAKES Knowledge Fertilization



# LAKES-III

(Learning Acceleration and Knowledge Enhancement System - Version 3)

guest

## Thesaurus Word List

256 words are related.  
In 2 documents.

Order by  
ABC..Z COUNT ID

WORD (Count of Sentences)(%)

- conclusion (3) (0.1%)
- chapter (9) (0.2%)
- fig. (50) (1.1%)
- figure (5) (0.1%)
- introduction (9) (0.2%)
- key word (1) (0.0%)
- recommendation (2) (0.0%)
- section (10) (0.2%)
- summary (3) (0.1%)
- table (39) (0.9%)
- table of contents (2) (0.0%)
- accept (5) (0.1%)
- acceptable (1) (0.0%)
- approach (5) (0.1%)
- attractive (1) (0.0%)
- difficult (5) (0.1%)
- effective (9) (0.2%)
- efficient (2) (0.0%)
- facilitate (1) (0.0%)
- failure (3) (0.1%)
- first (22) (0.5%)

Browse Document Titles

Filtering Actions

### By "Subset Name" of document groups compiled

\*Click the subset folder box (boxes) you wish to search documents for.

JICA-ILEC KCCP Module Reports 2010

**JICA-ILEC KCCP Module Reports 2020-21** A: ILEC (ILBM publication)

A: ILEC-UNEP Guidelines B: Lake Briefs (GEF Project, 2003-2005)

B: WLC Proceedings (prodocs) B: World Lake Vision (prodocs)

C: ILBM Lake Briefs (prodocs) C: ILBM South Asia (thematic)

C: ILEC Newsletters

### By specified any "Word" in the "Title" of documents.

For example: [lake water] means "lake" and "water"

Now, Filtered by **Muli**

## LAKES Search

METHOD 1 Click Thesaurus word on the left.

METHOD 2 Provide a Free Word

climate

Add recommend words:

- adaptation resilience risk change finance development
- action bank wbg country investment world plan project
- sector global policy private financing impact increase
- benefit approach management level new system planning
- page develop objective support systematic vulnerable
- public group include improve people water energy help
- resilient solution point report disaster capacity

## To "World Lake Database"

Enter Lake Name

- Search from List of Lakes
- Search from List of Countries
- Go to Data Lists



LAKES Knowledge Fertilization



**Thesaurus Word List**  
73 words are related.

Order by  
ABC.Z COUNT ID

WORD (Count of Sentences)(%)

- key word (1) (0.3%)
- section (1) (0.3%)
- table (1) (0.3%)
- good (1) (0.3%)
- adapt (8) (2.8%)
- adaptation (8) (2.8%)
- conflict (1) (0.3%)
- cultural (1) (0.3%)
- data (5) (1.7%)
- depend (1) (0.3%)
- development (2) (0.7%)
- economy (1) (0.3%)
- ecosystem (1) (0.3%)
- environment (1) (0.3%)
- financial (1) (0.3%)
- information (2) (0.7%)
- institute (2) (0.7%)
- knowledge (3) (1.0%)
- management (2) (0.7%)
- measure (1) (0.3%)
- method (3) (1.0%)
- people (2) (0.7%)
- policy (1) (0.3%)
- pollution (1) (0.3%)
- predict (2) (0.7%)
- public (1) (0.3%)

Search Word  All Clear

Choose a "thesaurus" word on the left, or enter any word.  Search

Add recommend words:  
adaptation resilience risk change finance development action bank wbg country investment world plan project sector global policy private financing impact increase benefit approach management level new system planning page develop objective support systematic vulnerable public group include improve people water energy help resilient solution point report disaster capacity

Input a "lake name" without "Lake" in front.  on World Wide  Search

**CHECK "DOCUMENT FOLDERS" CURRENTLY SEARCHED.** Unfold the Folder Panel

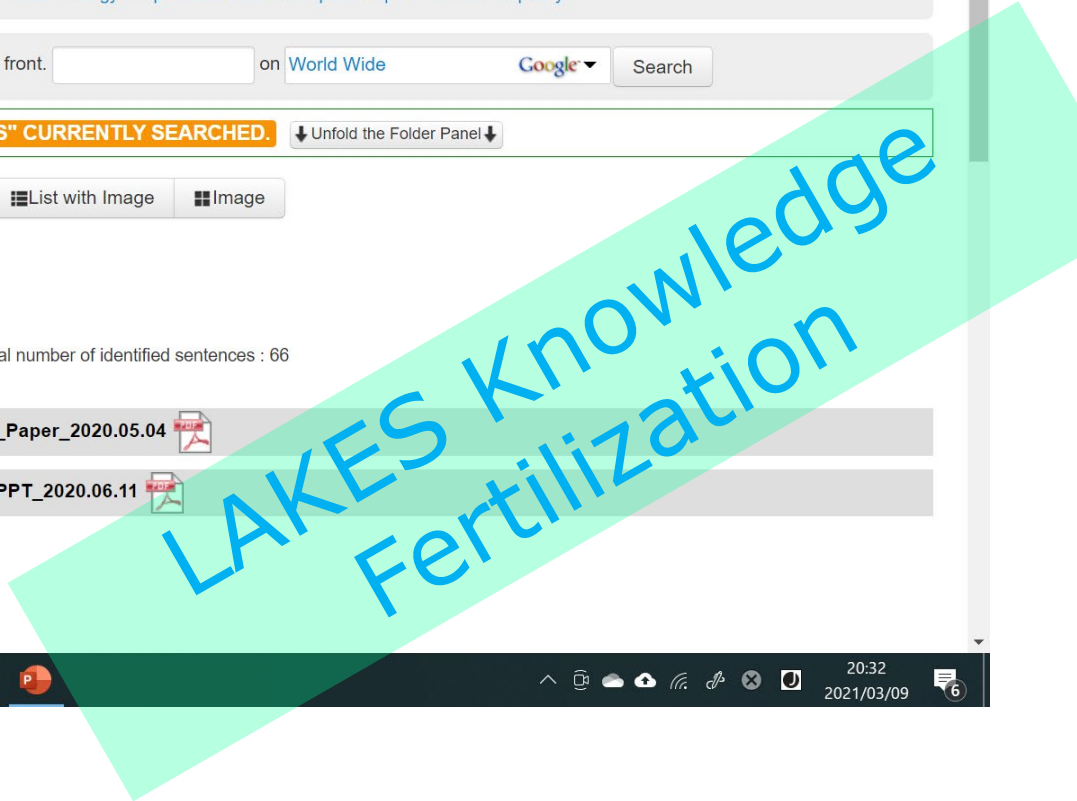
Identified : 2 documents List List with Image Image

< 1 >

All documents below. Total number of identified sentences : 66

- (61) Jones Muli\_Lake Baringo\_Paper\_2020.05.04
- (5) Jones Muli\_Lake Baringo\_PPT\_2020.06.11

< 1 >



### Thesaurus Word List

73 words are related.

Order by  
ABC.Z ↑ COUNT ↑ ID

WORD (Count of Sentences)(%)

- clima (66) (22.9%)
- climate change (45) (15.6%)
- lake (22) (7.6%)
- adapt (8) (2.8%)
- catchment (8) (2.8%)
- adaptation (8) (2.8%)
- water (8) (2.8%)
- catch (8) (2.8%)
- data (5) (1.7%)
- quality (5) (1.7%)
- use (5) (1.7%)
- area (5) (1.7%)
- level (4) (1.4%)
- land (4) (1.4%)
- knowledge (3) (1.0%)
- sediment (3) (1.0%)
- flood (3) (1.0%)
- method (3) (1.0%)
- agri (3) (1.0%)
- past (3) (1.0%)
- seasonal (2) (0.7%)
- increase (2) (0.7%)
- physical (2) (0.7%)
- mitigation (2) (0.7%)
- people (2) (0.7%)
- trend (2) (0.7%)

Search Word  All Clear

Choose a "thesaurus" word on the left, or enter any word.  Search

Add recommend words:  
adaptation resilience risk change finance development action bank wbg country investment world plan project sector global policy private financing impact increase benefit approach management level new system planning page develop objective support systematic vulnerable public group include improve people water energy help resilient solution point report disaster capacity

Input a "lake name" without "Lake" in front.  on   Search

**CHECK "DOCUMENT FOLDERS" CURRENTLY SEARCHED.** ↓ Unfold the Folder Panel ↓

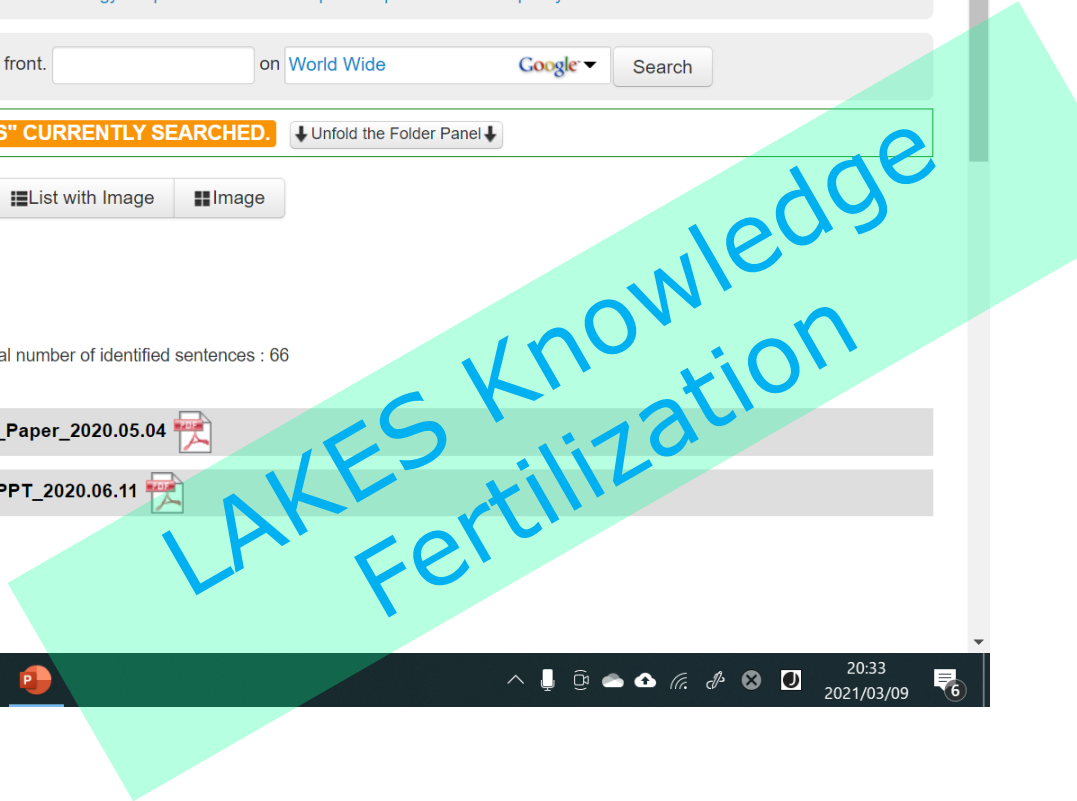
Identified : 2 documents

< 1 >

All documents below. Total number of identified sentences : 66

- (61) Jones Muli\_Lake Baringo\_Paper\_2020.05.04
- (5) Jones Muli\_Lake Baringo\_PPT\_2020.06.11

< 1 >



**Thesaurus Word List**  
73 words are related.

Order by  
ABC.Z ↑ COUNT ↑ ID

WORD (Count) Search by this word.

- clima (66) (22.9%)
- climate change (45) (15.6%)
- lake (22) (7.6%)
- adapt (8) (2.8%)
- catchment (8) (2.8%)
- adaptation (8) (2.8%)
- water (8) (2.8%)
- catch (8) (2.8%)
- data (5) (1.7%)
- quality (5) (1.7%)
- use (5) (1.7%)
- area (5) (1.7%)
- level (4) (1.4%)
- land (4) (1.4%)
- knowledge (3) (1.0%)
- sediment (3) (1.0%)
- flood (3) (1.0%)
- method (3) (1.0%)
- agri (3) (1.0%)
- past (3) (1.0%)
- seasonal (2) (0.7%)
- increase (2) (0.7%)
- physical (2) (0.7%)
- mitigation (2) (0.7%)
- people (2) (0.7%)

Search Word  All Clear

Choose a "thesaurus" word on the left, or enter any word.  Search

Add recommend words:  
adaptation resilience risk change finance development action bank wbg country investment world plan project sector global policy private financing impact increase benefit approach management level new system planning page develop objective support systematic vulnerable public group include improve people water energy help resilient solution point report disaster capacity

Input a "lake name" without "Lake" in front.  on   Search

**CHECK "DOCUMENT FOLDERS" CURRENTLY SEARCHED.** ↓ Unfold the Folder Panel ↓

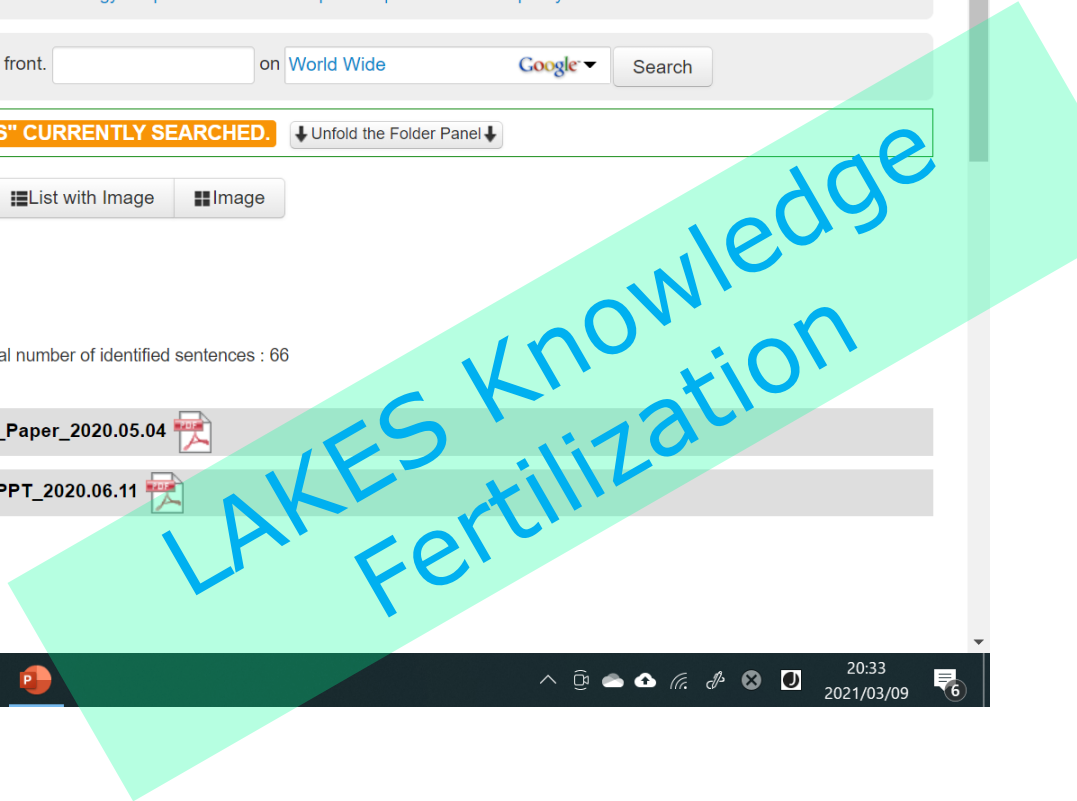
Identified : 2 documents

< 1 >

All documents below. Total number of identified sentences : 66

- (61) Jones Muli\_Lake Baringo\_Paper\_2020.05.04
- (5) Jones Muli\_Lake Baringo\_PPT\_2020.06.11

< 1 >





**Thesaurus Word List**

64 words are related.

Order by  
 ABC.Z ↑ COUNT ↑ ID

WORD (Count of Sentences)(%)

- clima (45) (19.8%)
- climate change (45) (19.8%)
- lake (17) (7.5%)
- adapt (7) (3.1%)
- adaptation (7) (3.1%)
- water (7) (3.1%)
- catchment (6) (2.6%)
- catch (6) (2.6%)
- quality (4) (1.8%)
- level (4) (1.8%)
- data (3) (1.3%)
- sediment (3) (1.3%)
- use (3) (1.3%)
- land (3) (1.3%)
- area (3) (1.3%)
- seasonal (2) (0.9%)
- increase (2) (0.9%)
- physical (2) (0.9%)
- mitigation (2) (0.9%)
- trend (2) (0.9%)
- flood (2) (0.9%)
- development (2) (0.9%)
- main (2) (0.9%)
- fish (2) (0.9%)
- basin (2) (0.9%)
- past (2) (0.9%)

Search Word   All Clear

Choose a "thesaurus" word on the left, or enter any word.  Search

Add recommend words:  
 adaptation resilience risk finance development action bank wbg country investment world plan project sector global policy private financing impact increase benefit approach management level new system planning page develop objective support systematic vulnerable public group include improve people water energy help resilient solution point report disaster capacity

Input a "lake name" without "Lake" in front.  on   Search

**CHECK "DOCUMENT FOLDERS" CURRENTLY SEARCHED.** Unfold the Folder Panel

Identified : 2 documents

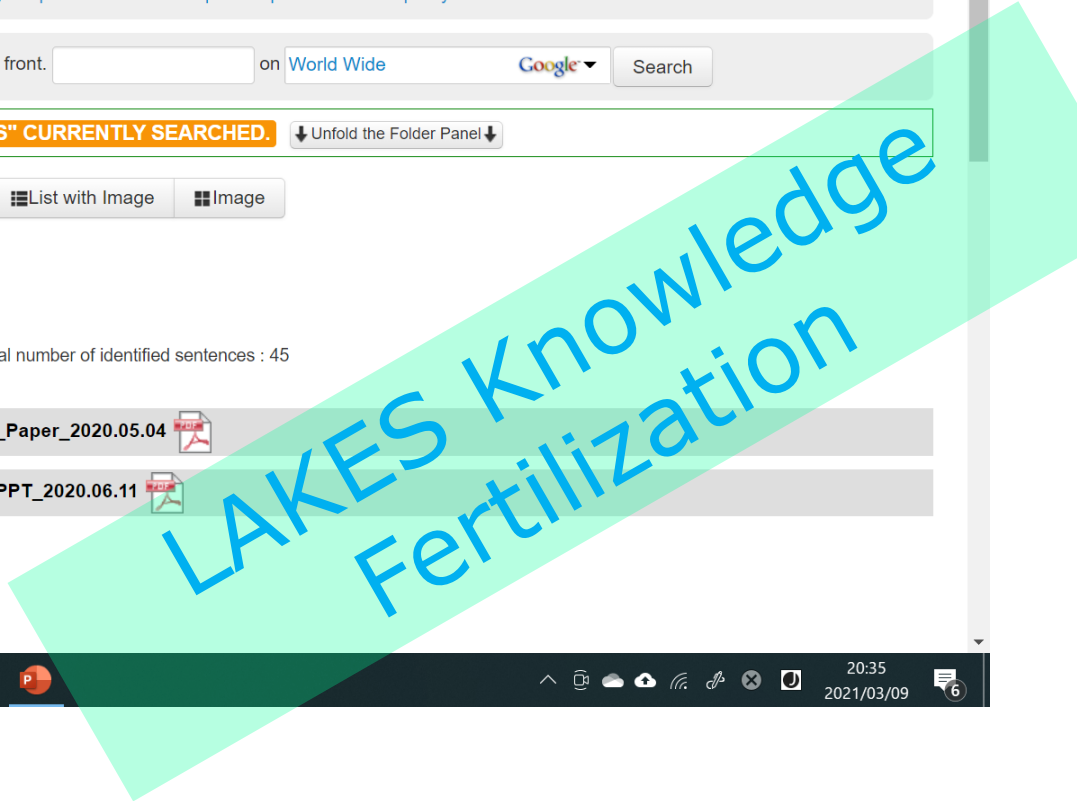
List List with Image Image

< 1 >

All documents below. Total number of identified sentences : 45

- (41) Jones Muli\_Lake Baringo\_Paper\_2020.05.04
- (4) Jones Muli\_Lake Baringo\_PPT\_2020.06.11

< 1 >



### Thesaurus Word List

64 words are related.

Order by  
ABC.Z ↑ COUNT ↑ ID

WORD (Count of Sentences)(%)

- clima (45) (19.8%)
- climate change (45) (19.8%)
- lake (17) (7.5%)
- adapt (7) (3.1%)
- adaptation (7) (3.1%)
- water (7) (3.1%)
- catchment (6) (2.6%)
- catch (6) (2.6%)
- quality (4) (1.8%)
- level (4) (1.8%)
- data (3) (1.3%)
- sediment (3) (1.3%)
- use (3) (1.3%)
- land (3) (1.3%)
- area (3) (1.3%)
- seasonal (2) (0.9%)
- increase (2) (0.9%)
- physical (2) (0.9%)
- mitigation (2) (0.9%)
- trend (2) (0.9%)
- flood (2) (0.9%)
- development (2) (0.9%)
- main (2) (0.9%)
- fish (2) (0.9%)
- basin (2) (0.9%)

Search Word   All Clear

Choose a "thesaurus" word on the left, or enter any word.  Search

Add recommend words:  
adaptation resilience risk finance development action bank wbg country investment world plan project sector global policy private financing impact increase benefit approach management level new system planning page develop objective support systematic vulnerable public group include improve people water energy help resilient solution point report disaster capacity

Input a "lake name" without "Lake" in front.  on   Search

CHECK "DOCUMENT FOLDERS" CURRENTLY SEARCHED. Unfold the Folder Panel

Identified : 2 documents

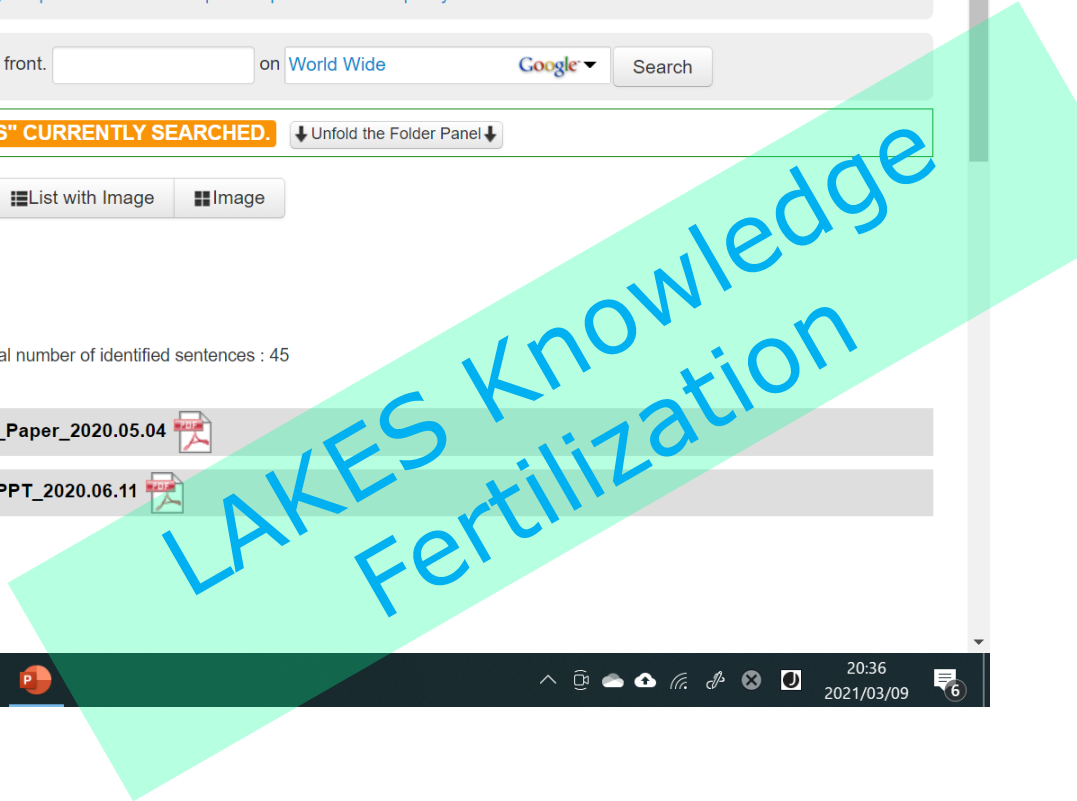
List List with Image Image

< 1 >

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### Thesaurus Word List

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- climate change (7) (17.9%)
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- study (1) (2.6%)
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Search Word

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Input a "lake name" without "Lake" in front.  on

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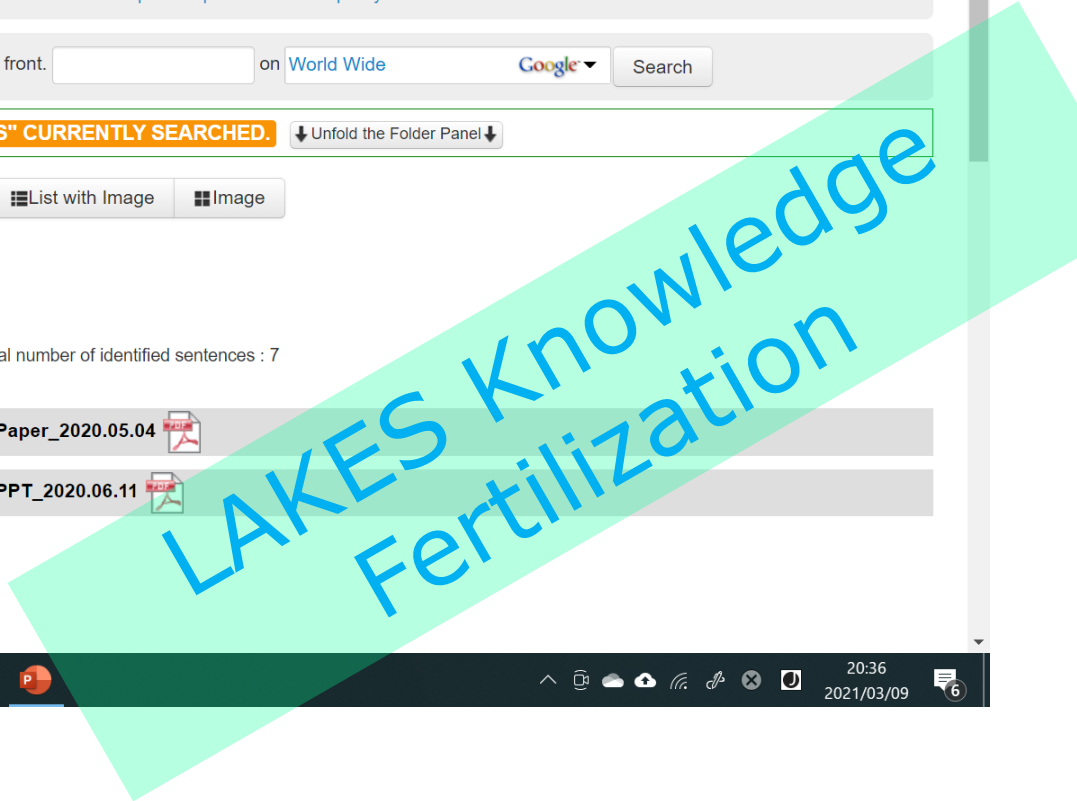
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Page.1  
 Institute of **Climate Change and Adaptation** (ICCA), College of Physical and Biological Sciences (CPBS) (Chiromo), University of Nairobi, POB 30197, Nairobi.

Page.17  
 And also have weak capacity in **climate change adaptation** and mitigation.

Page.19  
 Incidentally these are the same areas that are subject to vagaries of high **climate change** and weather information is crucial for **adaptation** and mitigation (Shilenje and Ogwang 2015).

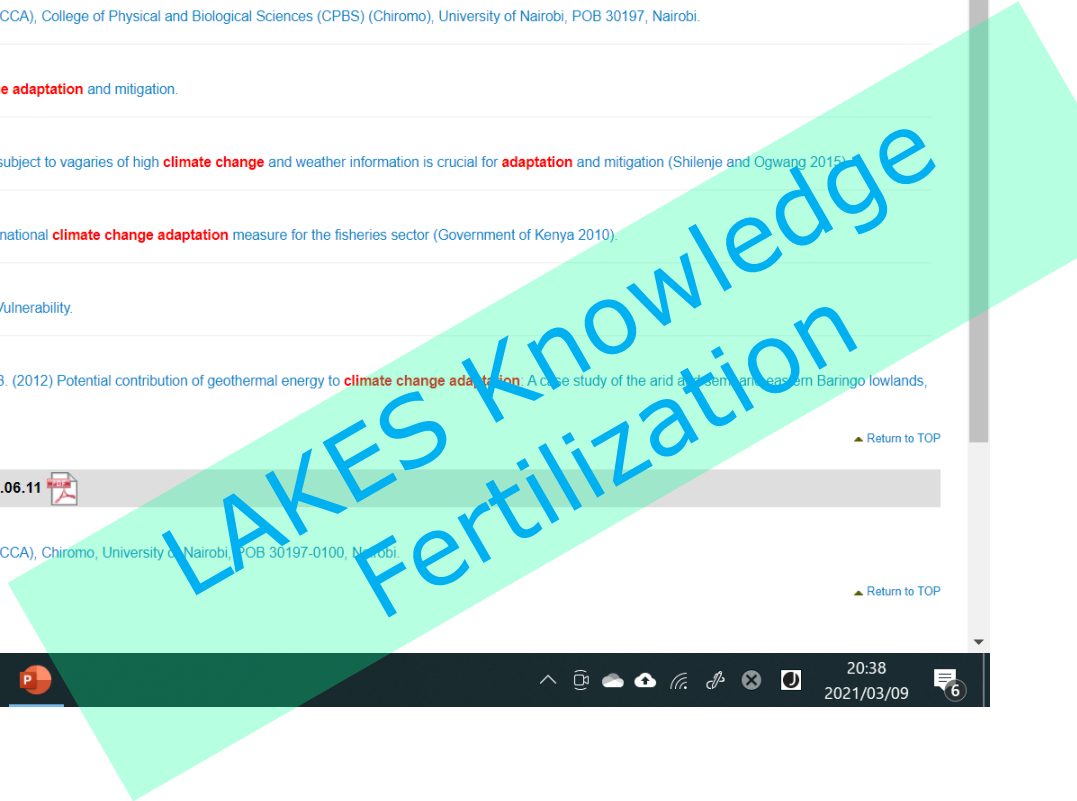
Page.58  
 Development of fisheries maps was one of the national **climate change adaptation** measure for the fisheries sector (Government of Kenya 2010).

Page.77  
 **Climate Change 2007: Impacts, Adaptation, Vulnerability**.

Page.79  
 Ogola P. F. A., Davidsdottir B. & Fridleifsson I. B. (2012) Potential contribution of geothermal energy to **climate change adaptation**: A case study of the arid and semi-arid lowlands, Kenya

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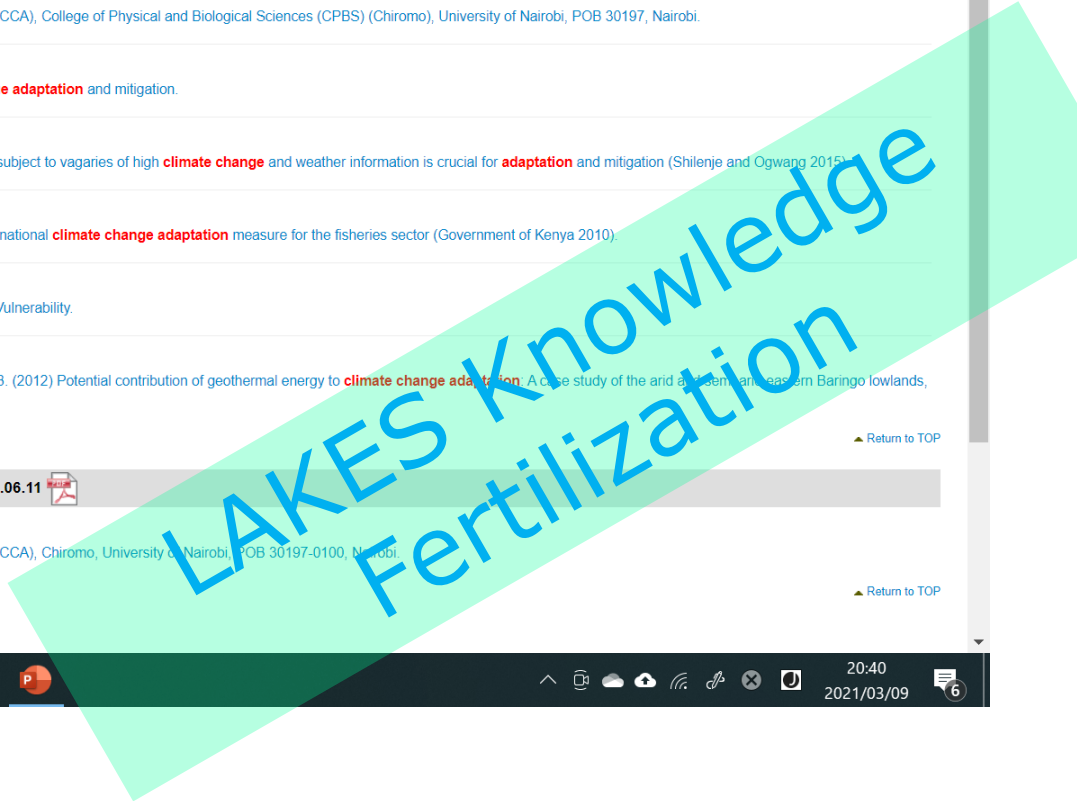
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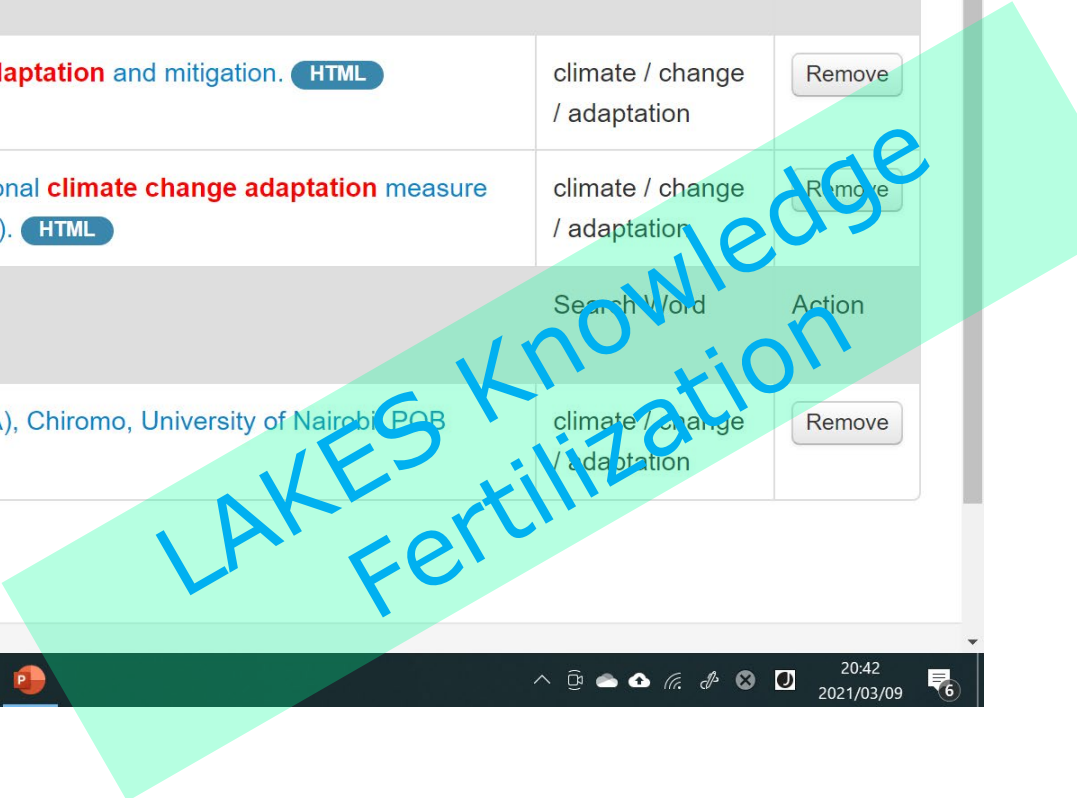
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P.58	Development of fisheries maps was one of the national <b>climate change adaptation</b> measure for the fisheries sector (Government of Kenya 2010). <a href="#">HTML</a>	climate / change / adaptation	<a href="#">Remove</a>
Jones Muli_Lake Baringo_PPT_2020.06.11		Search Word	Action
JONES			
P.1	Institute of <b>Climate Change and Adaptation</b> (ICCA), Chiromo, University of Nairobi, POB 30197-0100, Nairobi. <a href="#">HTML</a>	climate / change / adaptation	<a href="#">Remove</a>

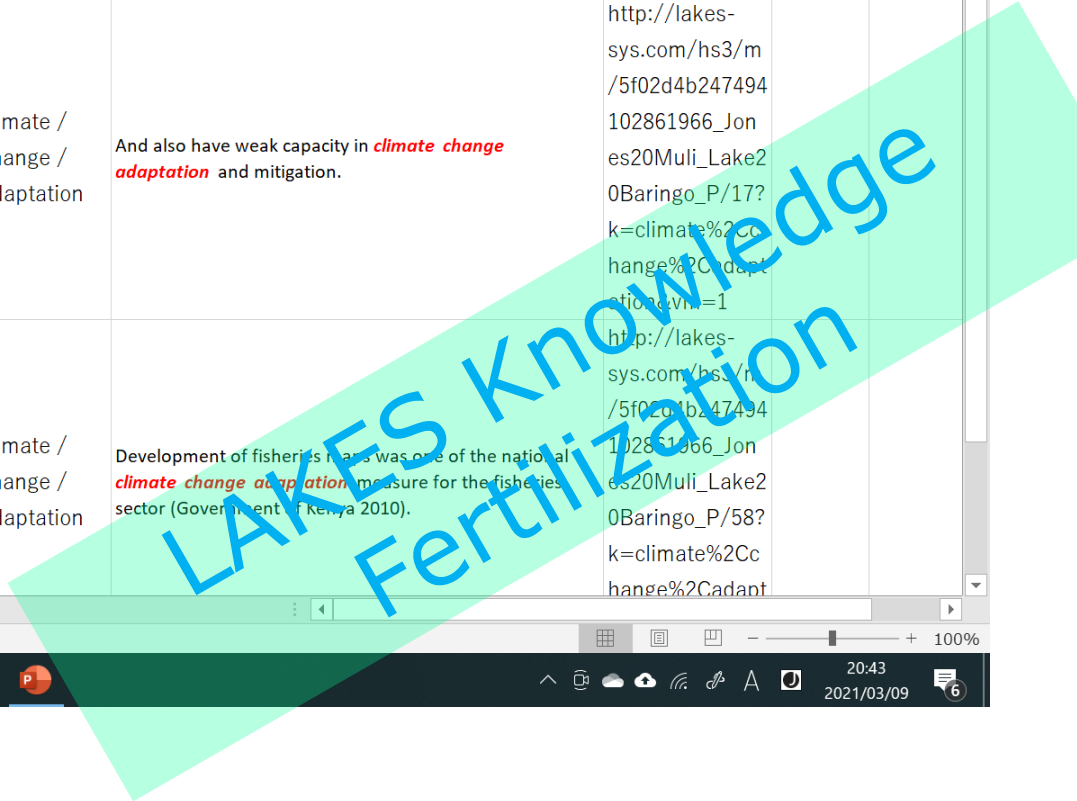
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2		Total Count of All documents : 480									
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		Jones Muli_Lake Baringo_PPT_2020.06.11	muli	58	Muli	JICA-ILEC KCCP Module Reports 2020-21	climate / change / adaptation	Development of fisheries maps was one of the national <i>climate change adaptation</i> measure for the fisheries sector (Government of Kenya 2010).	http://lakes-sys.com/hs3/m/5f02d4b247494102861966_Jones20Muli_Lake20Baringo_P/58?k=climate%2Cchange%2Cadapt		





### Search word

- climate
- change
- adaptation

### Result

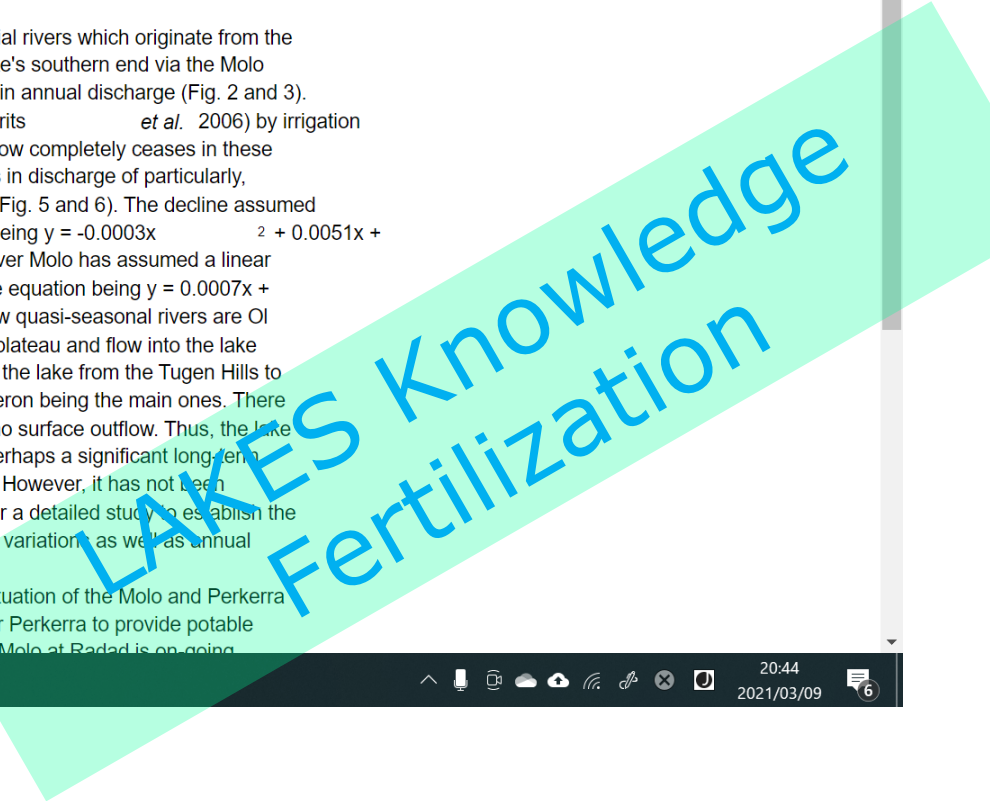
- Page 1 (1)
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- Page 19 (1)
- Page 58 (1)
- Page 77 (1)
- Page 79 (1)

agriculture, apary, pastoralism, fisheries and tourism. And also have weak capacity in climate change adaptation and mitigation.

#### 4.3. Rivers

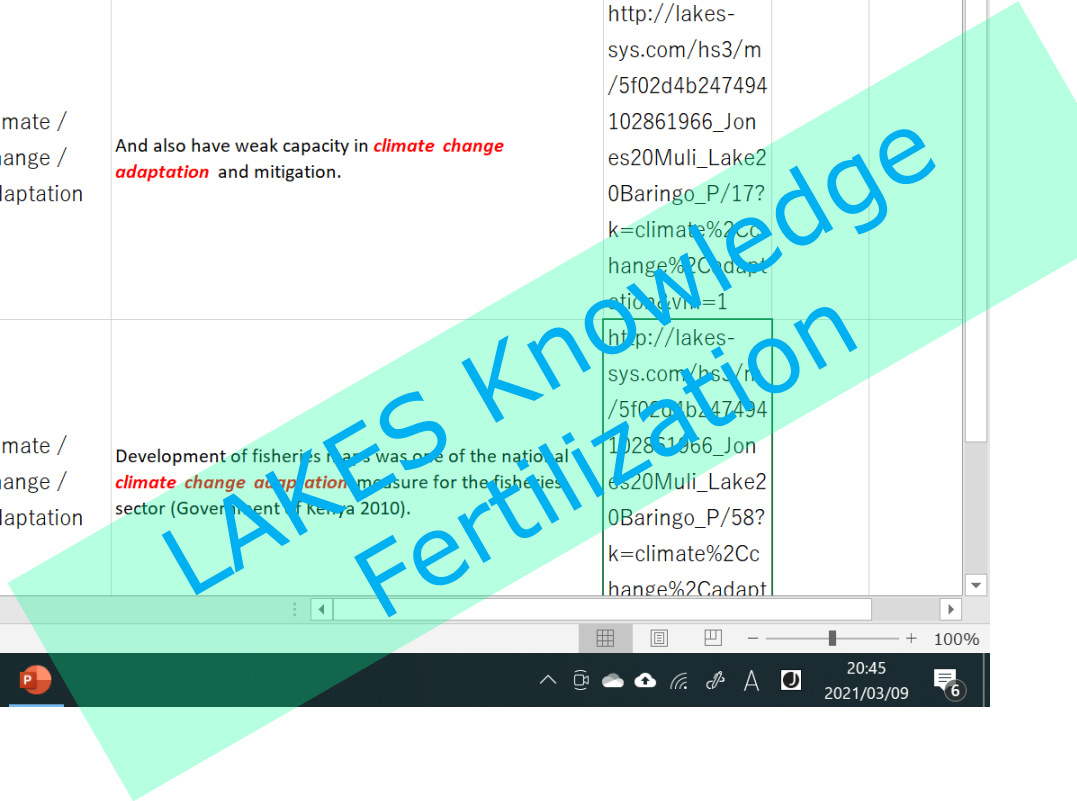
Rivers Molo and Perkerra are the main perennial rivers which originate from the Mau highlands in the south and discharge into the lake's southern end via the Molo delta. These rivers are characterized by high variation in annual discharge (Fig. 2 and 3). In very dry years discharge is significantly reduced (Tarits *et al.* 2006) by irrigation withdrawals south of the lake, and sometimes, water flow completely ceases in these rivers in the lowlands. Furthermore, long-term declines in discharge of particularly, River Perkerra, has been observed since about 1970 (Fig. 5 and 6). The decline assumed a polynomial trend with calculated trendline equation being  $y = -0.0003x^2 + 0.0051x + 0.8108$ ,  $R^2 = 0.6042$ . Conversely, the discharge of River Molo has assumed a linear increasing trend albeit slightly. The calculated trendline equation being  $y = 0.0007x + 0.3336$ ,  $R^2 = 0.0181$ . Other formerly perennial but now quasi-seasonal rivers are Ol Arabel and Mukutan which originate from the Laikipia plateau and flow into the lake on the east. Several large seasonal streams drain into the lake from the Tugen Hills to the west, with the Rivers Endao, Kapthurin and Chemeron being the main ones. There is little inflow along the steep northern shoreline, and no surface outflow. Thus, the lake is a topographically closed basin. Climate change is perhaps a significant long-term cause of decline in discharge of rivers afferent to lake. However, it has not been established scientifically and therefore there is need for a detailed study to establish the role of climate change in influencing not only seasonal variation, as well as annual discharge trends.

Dams have been proposed to regulate the fluctuation of the Molo and Perkerra rivers. So far, Chemasusu dam has been built on River Perkerra to provide potable water and the process of constructing a dam on River Molo at Badad is on-going.



15 http://lakes-sys.com/hs3/m/5f02d4b247494102861966\_Jones20Muli\_Lake20Baringo\_P/58?k=climate%2Cchange%2Cadaptation&vm=1

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4		Jones Muli_Lake Baringo_Paper_2020.05.04	muli	17	Muli	JICA-ILEC KCCP Module Reports 2020-21	climate / change / adaptation	And also have weak capacity in <i>climate change adaptation</i> and mitigation.	http://lakes-sys.com/hs3/m/5f02d4b247494102861966_Jones20Muli_Lake20Baringo_P/17?k=climate%2Cchange%2Cadaptation&vm=1		
		Jones Muli_Lake Baringo_PPT_2020.06.11	muli	58	Muli	JICA-ILEC KCCP Module Reports 2020-21	climate / change / adaptation	Development of fisheries maps was one of the national <i>climate change adaptation</i> measure for the fisheries sector (Government of Kenya 2010).	http://lakes-sys.com/hs3/m/5f02d4b247494102861966_Jones20Muli_Lake20Baringo_P/58?k=climate%2Cchange%2Cadaptation&vm=1		



### Search word

- climate
- change
- adaptation

### Result

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- Page 17 (1)
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- Page 58 (1)
- Page 77 (1)
- Page 79 (1)

## 8. Major "Impact Stories" Regarding the Lake

### 8.1. Water Hyacinth invasion

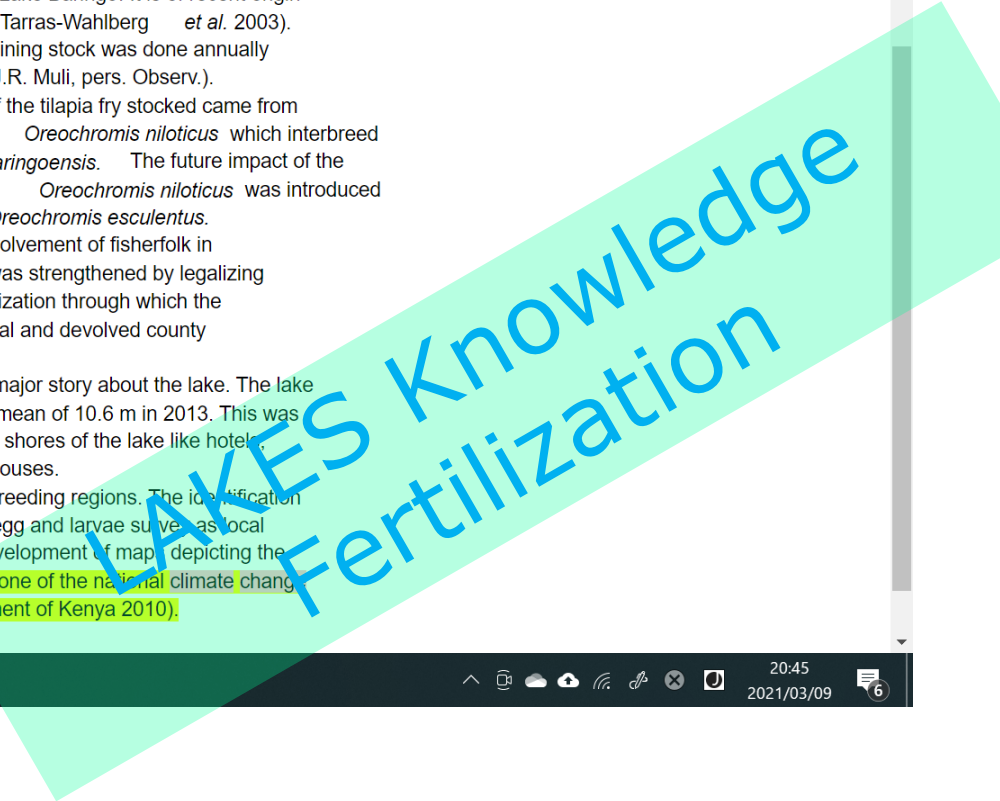
The latest major impact thing which has happened to the lake is the invasion of lake by Water Hyacinth (*Eichhornia crassipes* (Mart.) Solms-Labauch (Pontederiaceae) since 2016. The weed has formed large mats in southern zone but in central and northern zone it appears as single stands (plants). It is thought the weed originated from Lake Kichiritith where it was initially reported. Lake Kichiritith is an ox-bow lake in the floodplain of River Molo, located 8 km south of Lake Baringo. It is of recent origin having formed after the *El Nino* rains of 1997-98 (Tarras-Wahlberg *et al.* 2003).

Stocking of the lake with tilapia fry due to declining stock was done annually from 2011 to 2016 to restore the dwelling fish stock (J.R. Muli, pers. Observ.). Unfortunately, the fishery has not recovered. Some of the tilapia fry stocked came from Lake Victoria basin are most probably the species *Oreochromis niloticus* which interbreed with the local endemic *Oreochromis niloticus baringoensis*. The future impact of the interbreeding is not known. In Lake Victoria where *Oreochromis niloticus* was introduced in early 1960s, it out competed the indigenous *Oreochromis esculentus*.

There has been improvement in the public involvement of fisherfolk in management of the fishery. Fishermen involvement was strengthened by legalizing Beach Management Units (BMUs). BMU is the organization through which the fishermen co-manage the fishery with the both national and devolved county government (FA 2012).

Increase in lake depth since last lake brief is major story about the lake. The lake depth level increased from a mean of 3 m in 2003 to mean of 10.6 m in 2013. This was accompanied by submergence of building around the shores of the lake like hotel, hospital, fish landing 'bandas' and even residential houses.

Research was conducted to identify the fish breeding regions. The identification was research based on both scientific survey of fish egg and larvae survey as local fishermen indigenous knowledge. This resulted in development of maps depicting the breeding zones. Development of fisheries maps was one of the national climate change adaptation measure for the fisheries sector (Government of Kenya 2010).



http://lakes-sys.com/hs3/m/5f02d4b247494102861966\_Jones20Muli\_Lake20Baringo\_P/58?k=climate%2Cchange%2Cadaptation&vm=1

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4			JONES	1	Muli	JICA-ILEC KCCP Module Reports 2020-21	climate / change / adaptation	Institute of <i>Climate Change</i> and <i>Adaptation</i> (ICCA), Chiromo, University of Nairobi, POB 30197-0100, Nairobi.	http://lakes- sys.com/hs3/m /5f02d517276f2 133104938_Jon es20Muli_Lake2 0Baringo_P/1?k =climate%2Cch ange%2Cadapta tion&vm=1		
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14											



# 4. Training Module, LAKES-Knowledgebase and World Lake Database

## Search word

- climate
- change
- adaptation

## Result

Page 1 (1)



Jones R. Muli

1. Kenya Marine and Fisheries Research Institute (KMFRI), Baringo Station, POB 243, Marigat. Kenya.
2. Institute of Climate Change and Adaptation (ICCA), Chiromo, University of Nairobi, POB 30197-0100, Nairobi. Kenya.

LAKES Knowledge  
Fertilization