Lake Tana Biosphere Reserve (LTBR): Socioeconomic, Institutional and policy assessments

EVAMAB closing workshop

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Bahir Dar, Ethiopia

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Focus points

- The highlight about Lake Tana Biosphere Reserve (LTBR)
- LTBR : Ecosystem Services & Products
- Potentials, threats, and Challenges of LTBR
- Conservation Measures and attempts so far

1. The highlight about LTBR

Lake Tana (LTA): General highlights

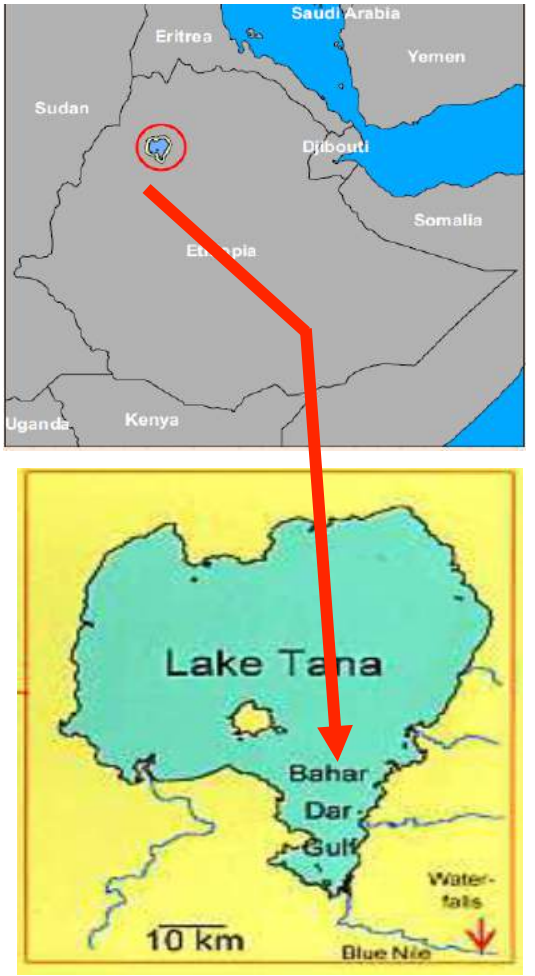
- A 2015 UNESCO registered Biosphere Reserve
- LTA emerged as one of the global top 250 lake regions (Duker and Borre, 2001)
- Largest in Ethiopia and the 3rd largest in Africa
- Source of the Blue Nile
- Paramount national and international importance
- Biosphere reserve with multiple potentials and challenges

1.The highlight about LTBR…..

Location and physical context of LTBR

- Located NW Ethiopia, Amhara RGS, and the Lake Tana watershed (LTW)
- Situated at 12° 10' 0" N, and 37° 20' 0" E
- Average elevation 1830m
- Lake surface Area 3,200 sq km
- Catchment area: 16,000 sq.km
- Stretching approximately 84 km north-south and 66 km east-west
- Depth average 8m, maximum 14m
- Volume of 28, 000 mm3
- Age 10.000 - 20 million years ago (UNESCO 2011)
- Mean temperature of 21.7°C

[IFAD, 2007; Heide , 2012]



© Eshete Dejen and Fentanesh (2017)

1. The highlight about LTBR…..

The socioeconomic and Institutional context

- Over 3 million people living in the LTW, i.e, 12.7 % of 4.9 persons per household and 158 per km²
- 89 % of them live in rural areas engaged in agriculture
- LTA & wetlands provide directly and indirectly a livelihood for more than 500,000 people
- Agri: Livestock round about 2.6 million TLU, 7.2 mil poultry and 0.2 million beehives, 1000-1400 tone fish
- Land use: 55 % of Tana Watershed (~ 15.000 km2) is under cultivation, 21.06 % is water area, 10.38 % is grassland, 1.6 % is wetland/swampy area and 0.39 % is natural forest
- Governmental, Non-Governmental, Academic and Research institutions

(IFAD/EPLAUA , 2007 ;(Vijverberg, Sibbing & Dejen, 2009, Daregot, 2015)

1. The highlight about LTBR…..

Resource base (endowment) and status

- Main source of the Blue Nile at its upper course
- Containing 50% of Ethiopia´s freshwater resources
- Contributes Over 7% of the total Blue Nile water flow with 40 tributaries (rivers and streams) (Dixon & Wood 2001)
- Contains largest areas of wetlands that are among the largest and ecologically most important ones of the country and the Horn of Africa
    - Fogera floodplain to the east
    - Dembia floodplain to the north;
    - Dangela and the surrounding wetlands
    - Bahir Dar Zuria
    - Kunzula to the southwest

I.The highlight about LTBR…..

Views of wetlands in Lake Tana

©Mundt, Getinet-2017

1.The highlight about LTBR…..

Resource base (endowment) and status ….

- Rich natural resources and great potential for regional development
  - Irrigation, hydroelectric power, high-value crops, aquatic products, livestock products, and ecological tourism
- Enormous fauna and flora with many endemic plant and animal species
  - Part of the eastern afromontane biodiversity hotspot
  - 180 woody plant species
  - Church forests as a safeguard for conservation
  - Papyrus reed
  - A large number of indigenous trees and plant species
    - *Coffea arabica, Justicia schimperiana, Syzygium, guineense, Mimusops kummel, Rothmannia urcelliformis, Juniperus procera, Ficus spp. Millettia ferruginea, Ehretia cymosa. Albizia schimperiana, Ritchiea albersii* and rare species of *Prunus Africana* and P*odocarpus falcatus*

(Bijan and Shimelis, 2011, Heide , 2012])

1. The highlight about LTBR…..

Resource base (endowment) and status ….

- Gives home to numerous birds, mammals, fish, amphibians and reptiles - several of them endemic
- **Mammals**: Hippopotamus, Black and White Colobus Monkeys, Aard Vark, Crested Procupine, Grimm's Duiker, Leopard, Ratel or honey badger, African civet cat, Bailey´s shrew
- **Reptiles**: Monitored Lizard, water snake and python
- **Birds** Internationally recognized as IBA (International Bird Area) (altogether 257 species were recorded, esp. Fogera Plains):
- **Fish** (altogether 67 species) quarter of them endemic

I. The highlight about LTBR…..

Views of fauna and flora in Lake Tana -Mammals

I. The highlight about LTBR…..

Views of fauna and flora in Lake Tana -Birds

1. The highlight about LTBR…..

Resource base (endowment) and status ….

- Home to most valuable cultural and archaeological sites
- Have 37 islands &16 peninsulas
- Home to 21 churches and monasteries with strong cultural and religious heritage
- Key cities within the region
  - Historic city of Gondar to the north of the lake
  - Bahir Dar city and regional capital, on its southern shoreline- a 2002 UNESCO awarded Cities for Peace Prize

1. The highlight about LTBR…..

Cultural and archaeological sites

2. LTBR : Ecosystem Services & Products

Ecosystem Services & Products

- Paramount national and international importance
- Critical significance to the economy and politics of Ethiopia
- Greatly influences the livelihoods of tens of millions of people in the lower Nile Basin
    - **Provisioning of socioeconomic benefits**
    - **Regulating services (ecological benefits)**
    - **Sociocultural functions**

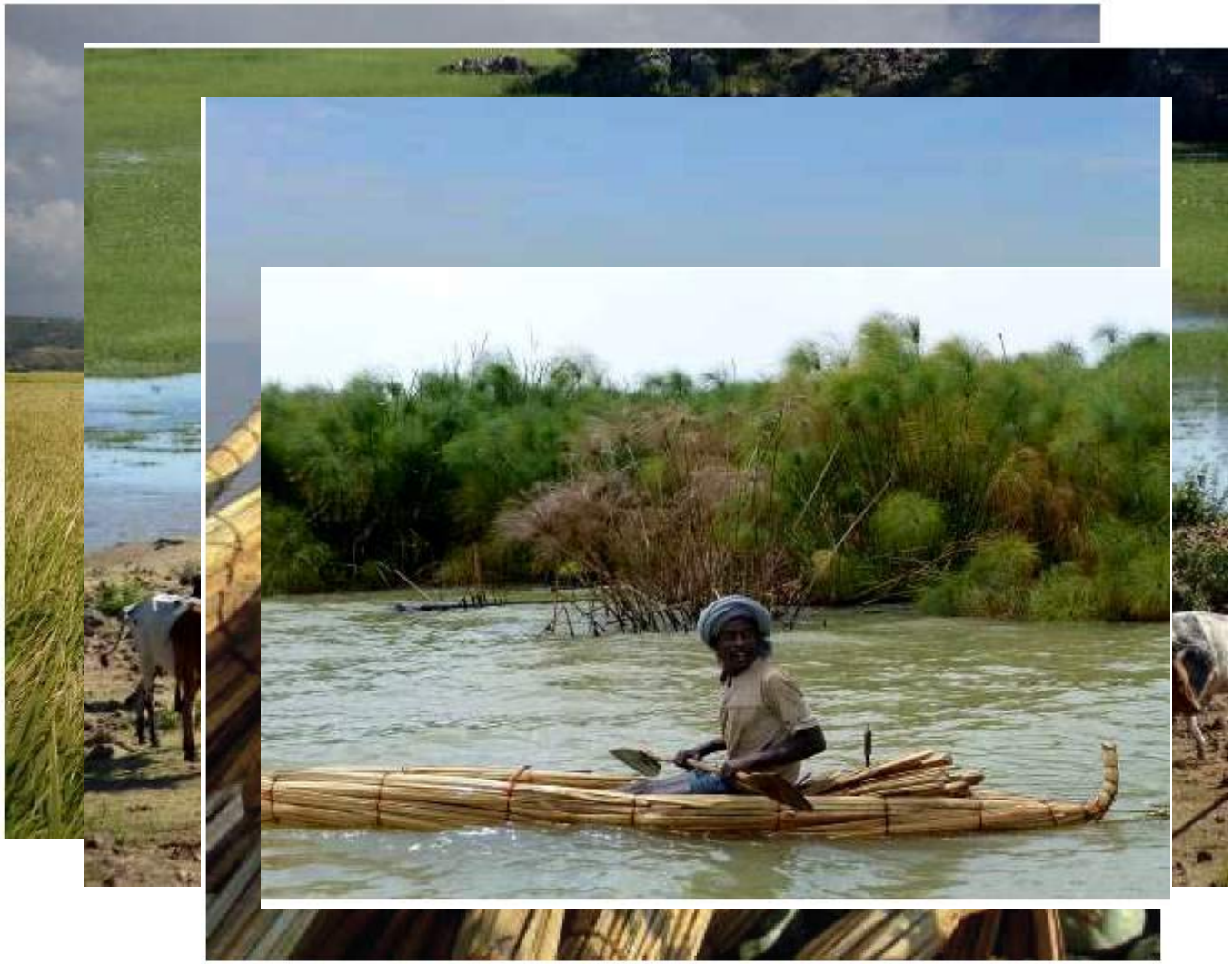
2. LTBR : Ecosystem Services & Products…

socioeconomic benefits

- **Food:** Use as grazing sites, crop production for rice, pulses, vegetables (Fogera) / Agricultural land / Irrigation area / Fish / Seedling nursery site
- Means of livelihood for poor communities particularly for (Negede-Woytos)
- **Water:** Domestic water supply- livestock and domestic consumption
- **Energy:** Protection of hydroelectric power supplies in the Tana Beles Hydropower site
- **Health:** Better health through water purification / Medicinal plants
- **Construction and material:** Thatching grass for houses / Papyrus for construction and handicraft, especially for poor / Clay for pottery
- **Transport:** local transport and recreational purposes
- Tourism and ecotourism: (e.g. the Nile falls, wetlands as bird watching areas)
- one of the leading tourist destinations in Ethiopia
- Mining such as sand

2. LTBR : Ecosystem Services & Products..

Socioeconomic benefits



2.LTBR : Ecosystem Services & Products..

Regulating services (ecological benefits)

- Water / hydrological regulation: Groundwater recharge including maintenance of springs and moderation of stream flow and floods /
- Water storage throughout the year
- Water purification: Purification of water through the functioning of reed beds / Filtration of water flow and sediment trapping
- Erosion regulation: Sediment and nutrient retention / Protection of dams from siltation
- Natural hazard protection: Flood control
- Climate regulation: Creation of unique microclimates / Wetlands are part of the carbon cycle
- Biodiversity storage: Provision of biodiversity and habitats for birds, such as roosting and feeding and breeding areas (IBA) / Habitat for pollinators

2. LTBR : Ecosystem Services & Products…

Sociocultural functions

- Heritage/religious practice
- Quality of life for Bahir Dar Residents
- Aesthetical view and recreational site

Animal paintings at a church near the Chimba wetlands (© MSF 2011)

3. Potentials, threats, and Challenges of LTBR

Potential in the Lake Tana context

- Endowed with fresh water, high number of valuable ecosystems and habitats, and social values
  - Freshwater of inter-regional importance (Blue Nile)
  - Dry evergreen montane forest and evergreen scrub ecosystem
  - Aquatic ecosystems
  - Wetland ecosystems
  - Alpine/sub-afroalpine ecosystems
  - Montane grassland ecosystem
  - Wetlands and papyrus stocks around Lake Tana
  - Remnant (church) forests as islands of biodiversity and gene pools, wild coffee
  - Vast areas of (agri)cultural landscapes
  - Indigenous knowledge

3. Potentials, threats, and Challenges of LTBR..

Threats and Challenges

- Soil erosion, land degradation and siltation
- Uncontrolled agricultural expansion to the lake's zone
- Deforestation
- Habitat destruction illegal fishing
- Habitat fragmentation-higher mammals are endangered
- Unregulated overfishing
- Extensive forms of wetland use (papyrus boats, etc.).
- Increasing rate of overgrazing in and around Lake Tana

3. Potentials, threats, and Challenges of LTBR..

Threats and Challenges

- Increasing rate of overgrazing in and around Lake Tana
- Environmental pollution due to rapid urbanization
- Expansion of various exotic/invasive weeds particularly the *water hyacinth*
- Degradation of cultural and historical resources
- Limited governmental, institutional, and legal capacity
- **Risk of eutrophication**: from an increasing use of fertilizers and pesticides in agriculture, from construction material from Bahir Dar triggering macrophyte growth and phosphorus level rise
- **Climate Change:** Some species are particularly at risk by climatic stress, like *Cordia africana, Olea europea* (olive),

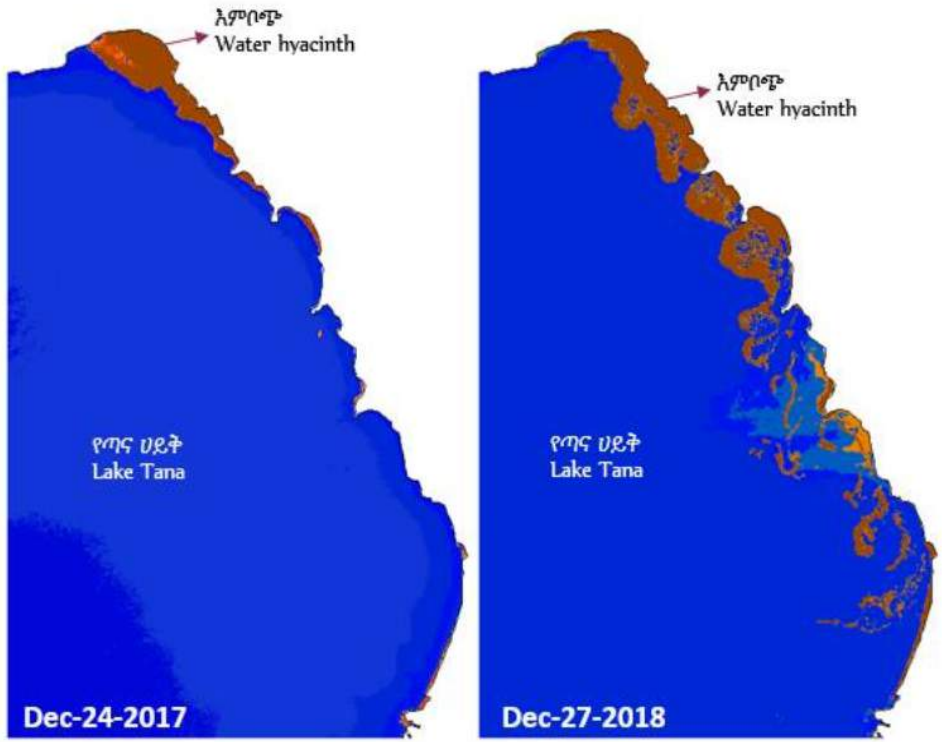
3. Potentials, threats, and Challenges of LTBR..

Challenges with water hyacinth

- Sadly, seen and officially recognized in Lake Tana in September 2011,
- According to the 2012 survey, about 20 ha of the shore on the north-eastern part of Lake Tana was infested
- In August 2014 over 50 000 ha of the shore are and about 128 km shore length was infested by this deadly weed

Wassie, 2015

Water hyacinth coverage in the northeast shore of lake tana has tripled



Abeyou Wale, 2019

3. Potentials, threats, and Challenges of LTBR..

Challenges with water hyacinth

3. Potentials, threats, and Challenges of LTBR..

The root causes of threats

- Socio-economic and environmental shortcomings such as poverty, lack of awareness, population pressure
- Shortage of agricultural land derived from increased human and livestock populations
- Low awareness of communities on ecosystem conservation
- Institutional shortcomings, i.E. Giving high priority to short term economic benefits rather than to sustainability issues
- Institutional shortcomings and poor legal enforcement
- Poor organizational and institutional linkages
- Lack of action research and knowledge building

Required Conservation Measures

- IWRM should be considered
- Watershed management rather than the lake only
- Soil conservation of the watershed area
- Moderating excessive use of papyrus
- Institutional and legal enforcement strengthening
- Optimized resource use
- Action research and community awareness

4. Required Conservation Measures and attempts so

Attempts so far in action research and community awareness

- Joint study by Bahir Dar , Antwrep University EVAMAB

Identification, Characterization and Ranking of Ecosystem Services in Lake Tana basin: An application of toolkit for Ecosystem Services site-based Assessment (TESSA)

Nega Ejigu Tefera, Jan Cools, Van Passel Steven, Daregot Berihun

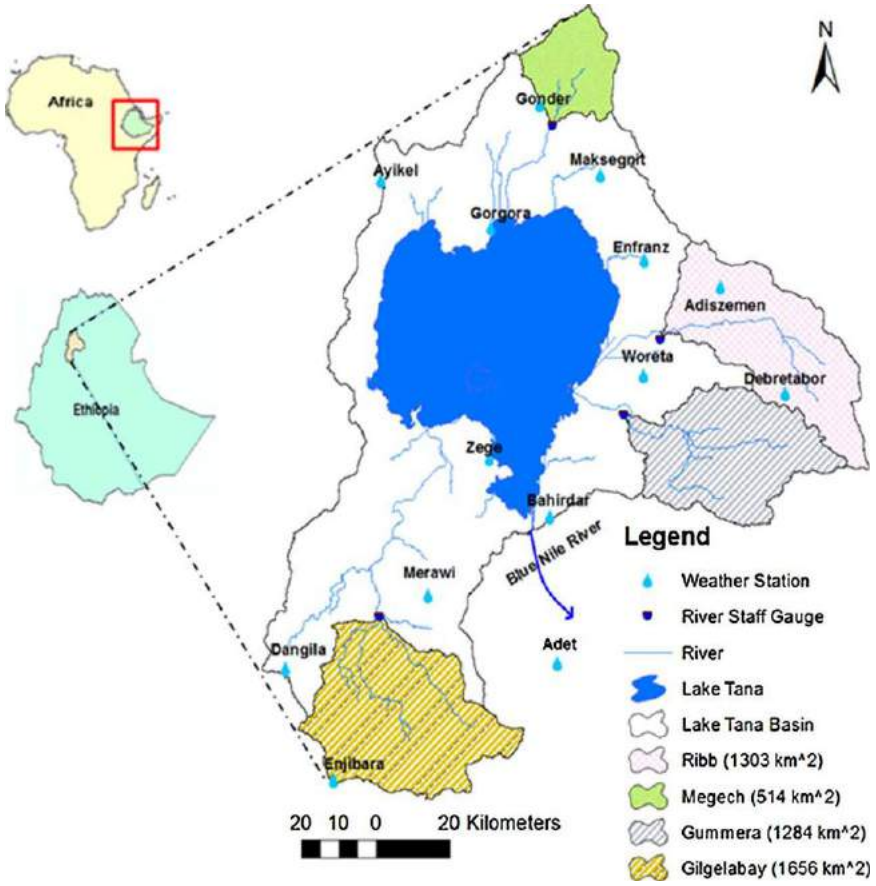
- The purpose of this study is,
  - To identify, characterize and rank ecosystem services around Lake Tana via employing a more inclusive (which assures more stakeholders engagement) and site-specific approach

4. Required Conservation Measures and attempts so

Action research Attempts and community awareness..

Methods

- The study area encompasses three kebeles near lake Tana
- A toolkit for Ecosystem services site-based assessment (TESSA) applied



4. Required Conservation Measures and attempts

Action research Attempts and community awareness..

Methods - In TESSA

- A number of interrelated and sequential activities to be done which ranges from site selection to full assessment and communicating results
  - Identify and characterize ecosystem services, stakeholders and policy institution setups

4. Required Conservation Measures and attempts

Action research Attempts and community awareness..

Preliminary results

- Workshop undertaken
- Participants mainly came from the three kebeles (Robit, Korata And Tana Mitsli) in the two woredas (Bahir Dar Zuria and Dera)
- The total participants were 40 peoples (including BDU staff members) of which only 3 are females
- Ecosystem services and TESSA were explained to stakeholders

4. Required Conservation Measures and attempts

Action research Attempts and community awareness..

- Seven stakeholders identified and participants
- Interest and influence of the stakeholders identified
- Institutional gap analysis
- Ranking of ecosystem services
- National and regional environmental policies and strategies evaluated
- Environmental laws who did not encompass ecosystem services management issues
- There are weak and lose mainstreaming practices most of which attributed to institutional capacity weaknesses

Thank you!!