Assessment of the Management of Lake Malawi Basin through Application of Integrated Lake Basin Management (ILBM)-Based Tools

Clara L. Chidammodzi

Outline

1. Introduction
2. Methodology
3. Results
4. Synthesis of Findings

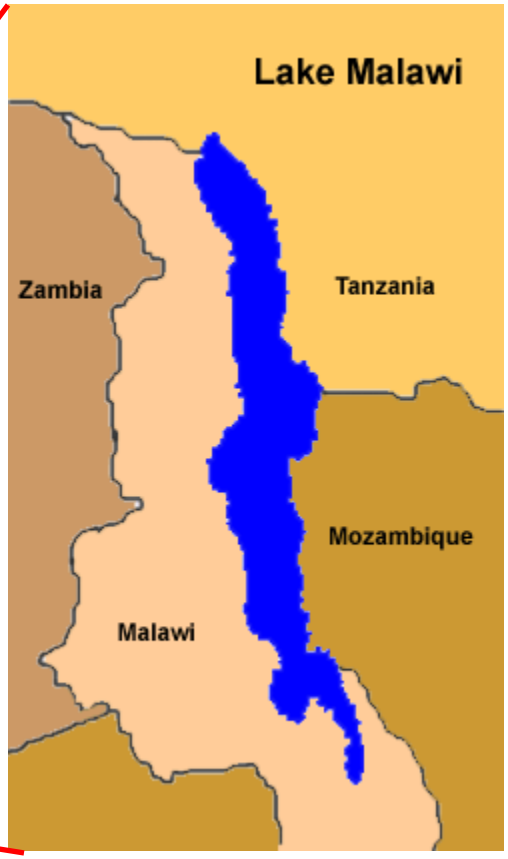
1.0 INTRODUCTION

1.1 Background

Lake Malawi Basin:

- Is shared among 3 countries (Malawi, Tanzania & Mozambique) with the largest portion of lake & basin in Malawi
- The water body is important to Malawi as a source of Hydro electric power generation, domestic, industrial & agricultural water supply, fisheries, etc.
- The basin provides land for settlement, agriculture, etc.
- Hosts the greatest freshwater fish biodiversity in the world
- Needs to be managed for sustainable use

1.2 Location of Lake Malawi



Images source: Google images

1.3 Environmental Concerns

- Soil erosion (due to deforestation, poor land husbandly, & uncontrolled bush fires)
- Overexploitation of some fish species
- Inorganic pollution (domestic & industrial wastewater, & agricultural chemicals)
- Heavy extraction of water for irrigation
- Mineral resource extraction
- Industrialization
- Invasive species
- Climate change

1.4 What is ILBM?

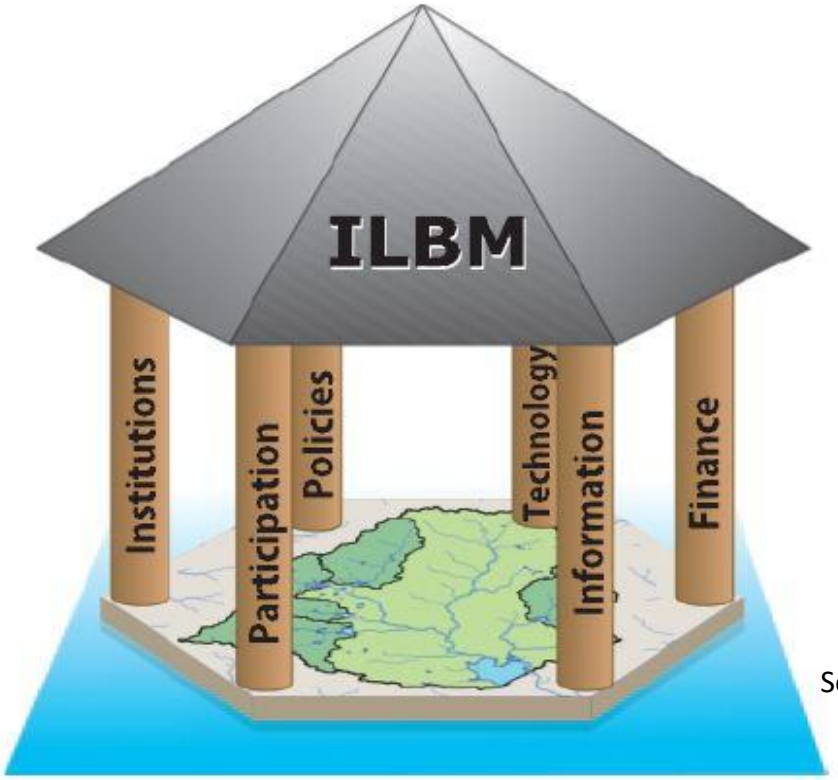
Management framework based on 3 biophysical characteristics unique to lake basin ecosystems & their interactions with humanity

Integrating nature

Long-retention time

Complex response dynamics

6 principles of governance



Source: ILEC, 2007

ILBM complements the IWRM approach & can be considered the ecosystem approach, focused on lake basins

1.5 Overall Assessment Objective

To conduct a comprehensive assessment and analysis of the issues, needs and challenges in the management of the Lake Malawi Basin

Specific Objectives

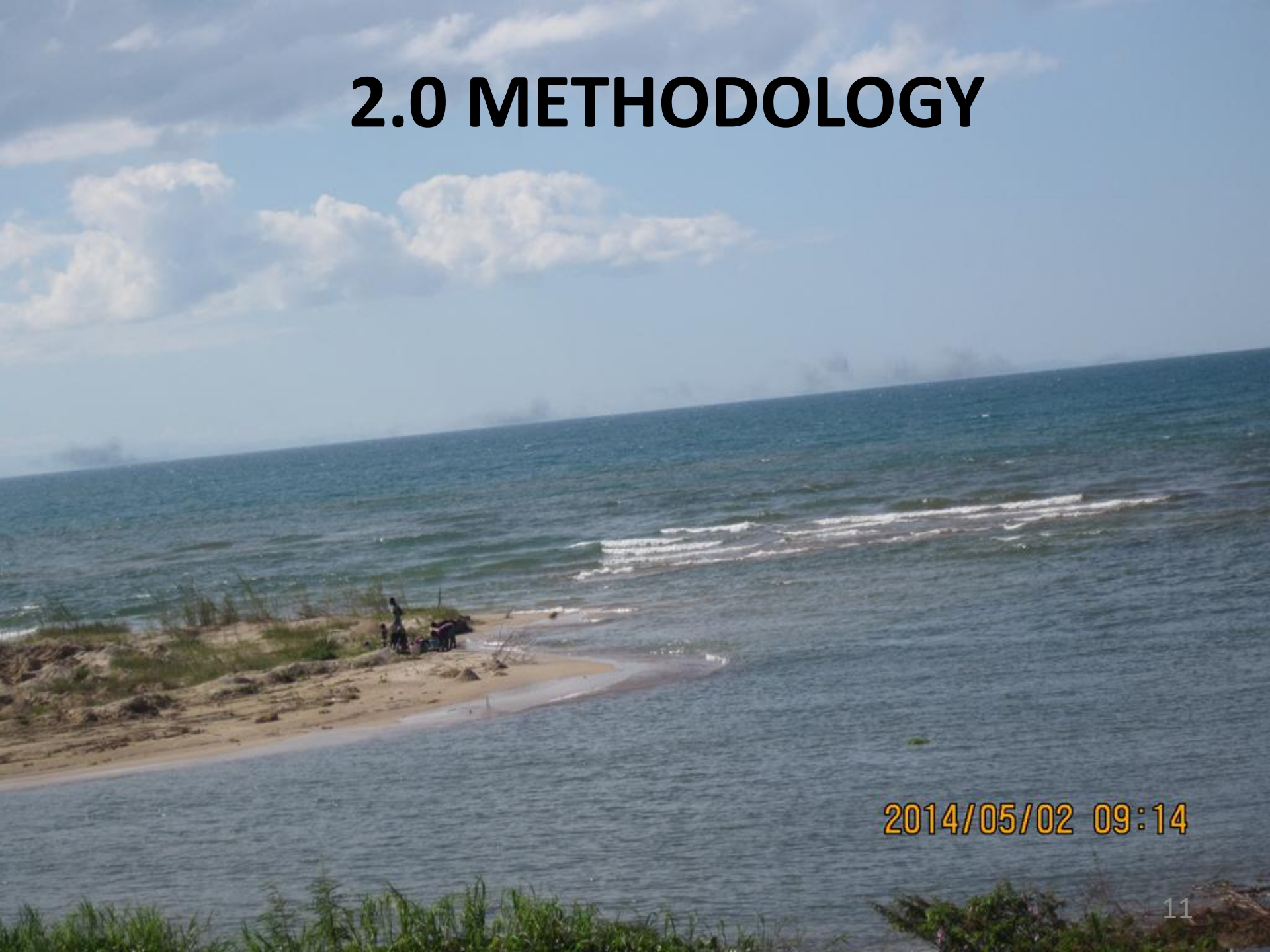
1) To develop an indicator-based tool for monitoring and assessing Integrated Lake Basin Management (ILBM) in the Lake Malawi Basin.

2) To determine the status of current management of the Lake Malawi Basin in the aspects of institutions, policies, participation, information, technology and finance through pilot application of the tool developed in specific objective (1).

3) To identify and analyze the issues, needs and challenges in the management of the Lake Malawi Basin through SWOT analysis.

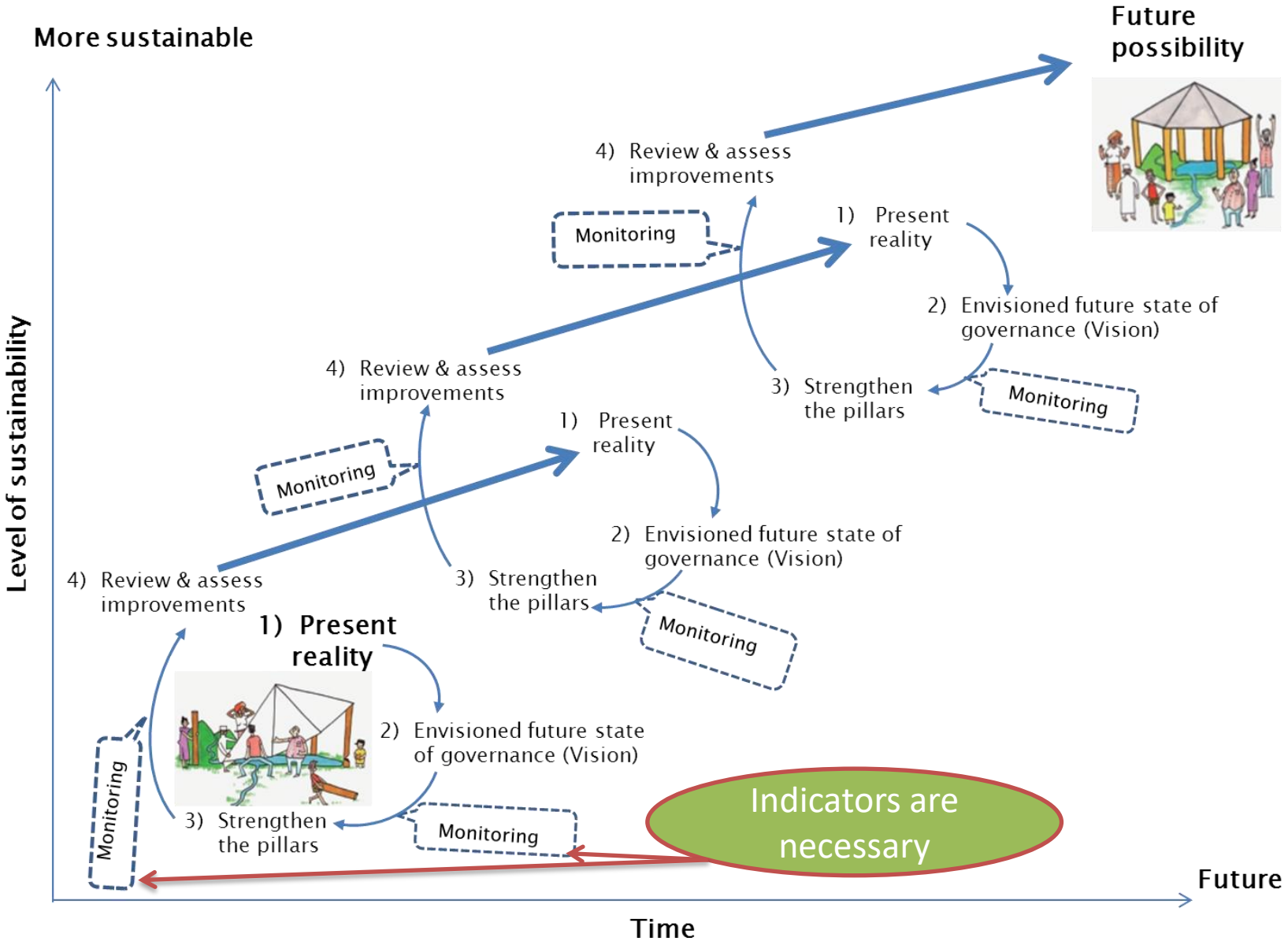
4) Based on the issues identified in objective 2 & 3, to identify critical points requiring management attention through application of systems thinking approach.

2.0 METHODOLOGY

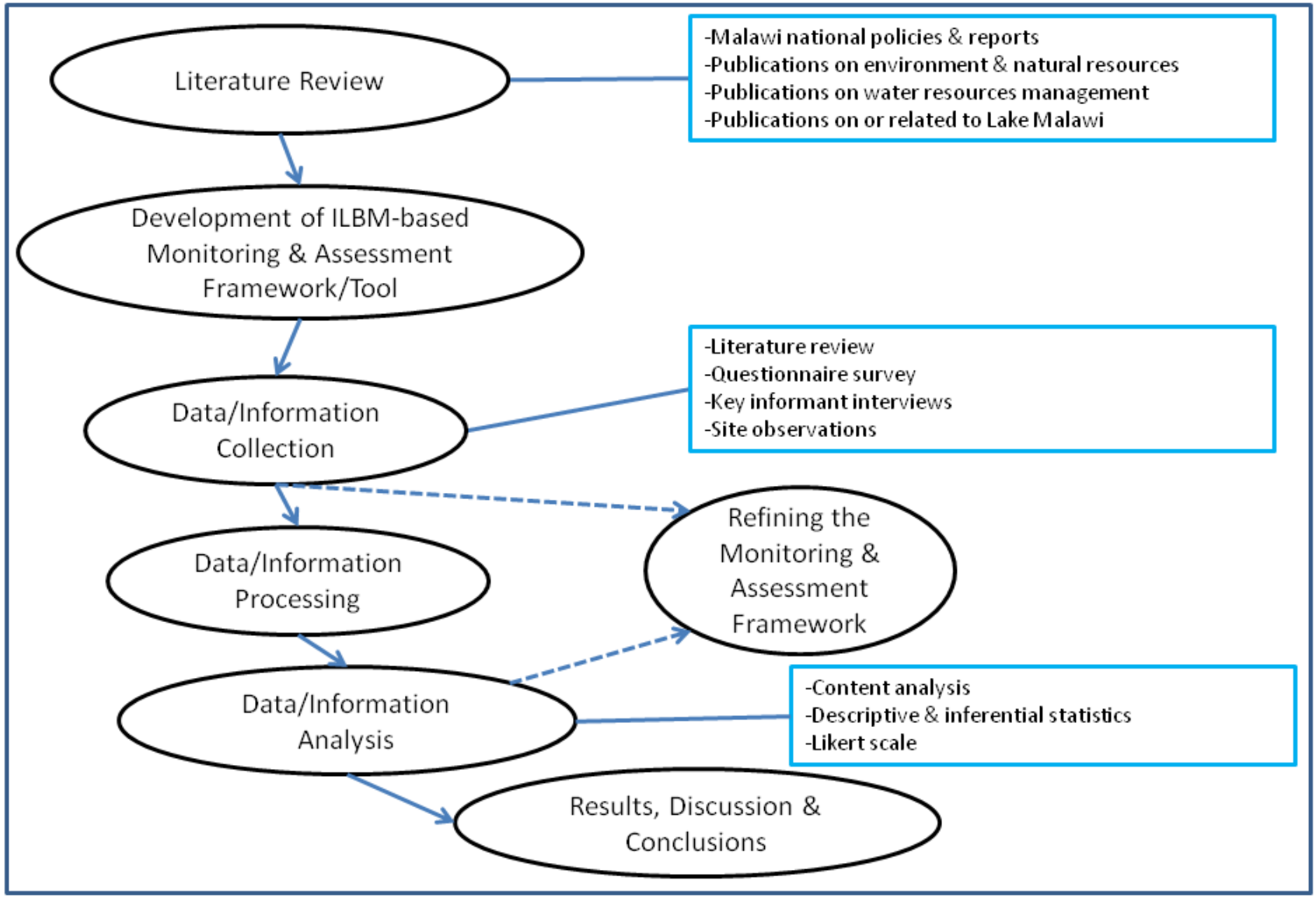


2.1 Analytical Framework

The Cyclical Process for Improving Lake Basin Governance through ILBM



2.2 Applied Methodology



2.2 Applied Research Methodology Cont …

- Generally, systems thinking approach was applied
- Lake Malawi Basin forms the system boundary
- Two main subsystems

Ecological – based on ecosystem services

Socio-economic – based on utilization & management

2.2.1 Step 1: Initial Literature Review

- To provide a theoretical background for the assessment
- Guided the first cycle in the cyclical process for improving lake basin governance through ILBM i.e. the reality of the lake basin was understood, a Lake Malawi vision was deduced, and indicators for monitoring and assessment were identified

Deduced Vision for Lake Malawi Basin

1) Every citizen is aware of the importance of the lake & basin to the nation & is motivated to protect their integrity
2) The lake basin sustainably supports human settlements & activities by providing them with the resources necessary for their well-being
3) Water quantity & quality necessary for sustaining the viability of humans & dependent ecosystems (water for all) is maintained
4) Diversity & sustainable populations of fish are maintained & dependent livelihoods are secured
5) The lake's buffering capacity is maintained
6) The nation's pride in the lake is preserved & the inheritance of future generations safeguarded

2.2.2 Step 2: Assessment of the Management of Lake Malawi Basin Using ILBM Tools

2.2.2.1 Data/Information Collection

- Utilized both primary & secondary data/information sources
- Data/information were collected through
  - -document review
  - -questionnaire survey
  - -key informant interviews
  - -site observations

Document Review

- ❑ A continuation of literature review
- ❑ At this stage, the review provided information for some of the indicators and also contextualized the findings

Questionnaire survey

- ❑Questionnaire formulation guided by the indicator framework
- ❑Conducted in 5 out of 15 districts
- ❑**Target Population:** Local community institutions (3 categories i.e. farmers, fisherfolk & forestry managers)
- ❑**Sampling:** Judgment sampling

Key Informant Interviews

- Utilized semi-structured questionnaires
- Conducted at the Departments of Environmental Affairs, Fisheries, Land Resources Conservation and Development (agriculture), Forestry, Water Resources, Irrigation, Energy, and the City Councils of Lilongwe and Mzuzu.

Site Observations

- Visits were made to 7 out of the 15 basin districts/cities.
- Field notes & pictures of the situation in the basin were taken

2.2.2.2 Data/Information Processing & Analysis

- ❑Responses to open-ended questions were manually coded
- ❑Survey data were analyzed using descriptive & inferential statistics
- ❑Some qualitative data were quantified using 5-point Likert Scale
- ❑The Likert scale was also used to score indicators

Rating		**Interpretation**
Rate	**Percentage**	
1	≤ 20%	Very low/very weak
2	21- 40%	Low/weak
3	41 – 60%	Moderate
4	61-80%	High/strong
5	≥ 81%	Very high/very strong

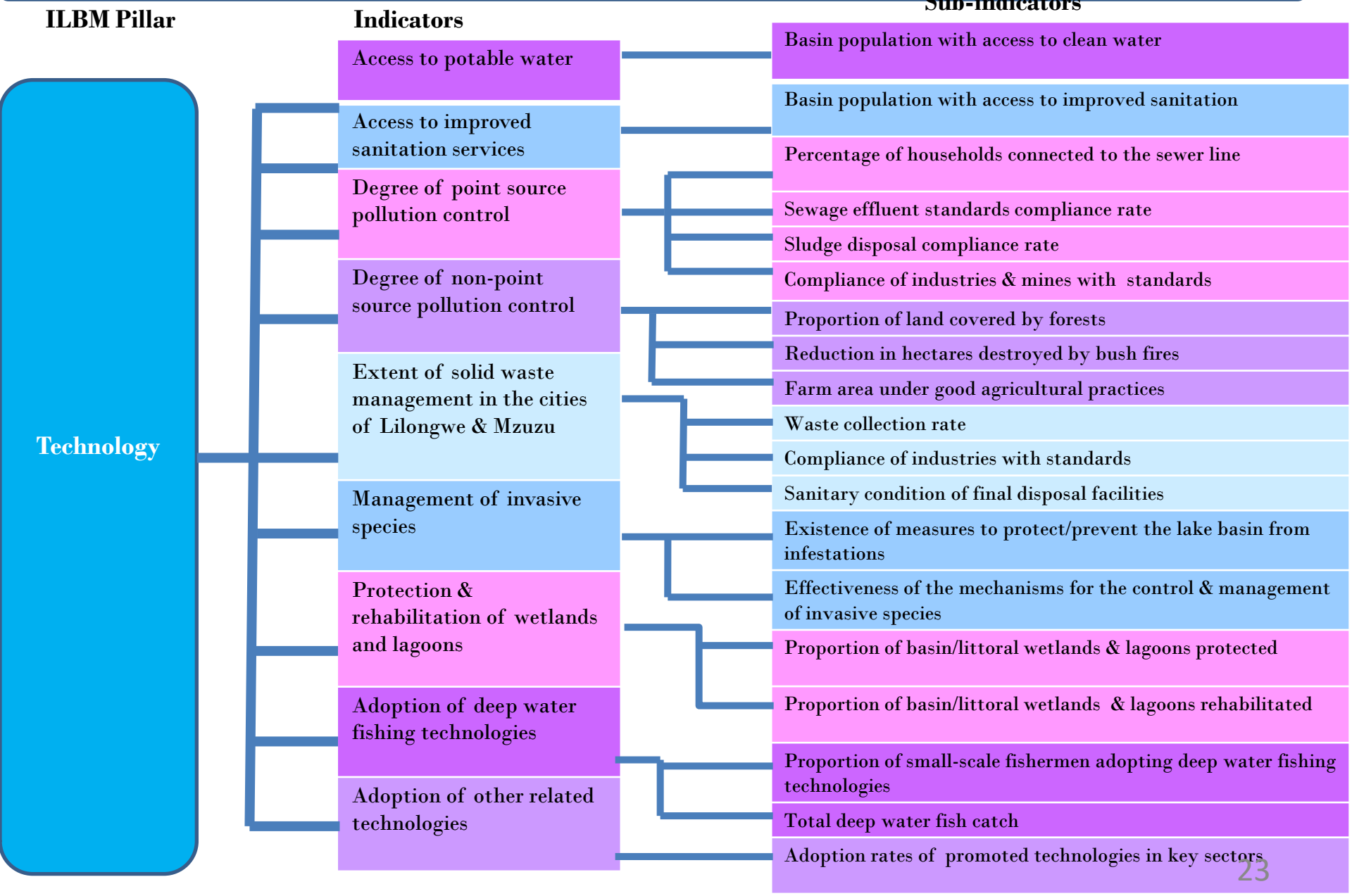

3.0 RESULTS
2014/05/05 09:14

3.1 ILBM Monitoring & Assessment Framework/Tool

- Organized according to the six governance pillars of ILBM
- An example of the indicators under the technology pillar is provided
- The framework was used to collect data/information

3.1 ILBM Monitoring & Assessment Framework/Tool Cont…

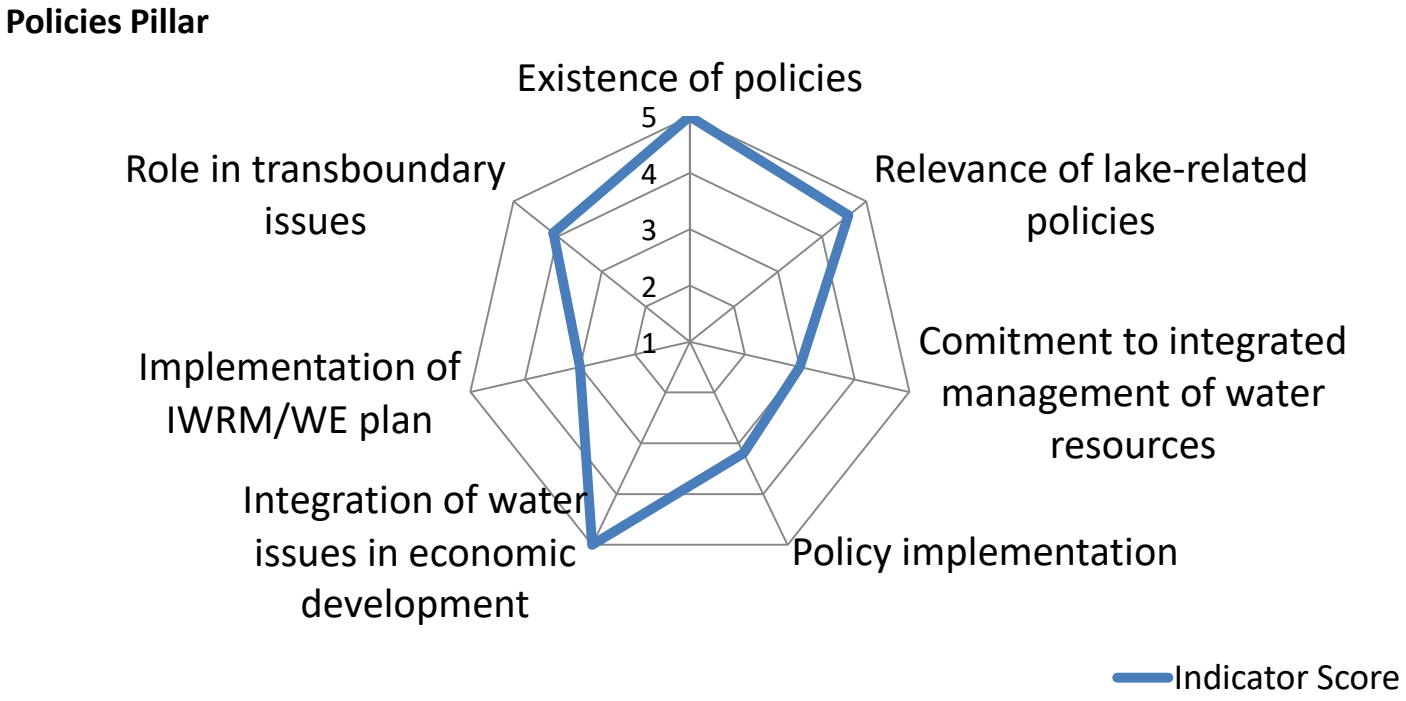
Indicators for Assessing the Technology Pillar of Integrated Lake Basin Management in Lake Malawi Basin



3.2 Status of Current Management of the Lake Malawi Basin in the aspects of the Six ILBM Pillars of Governance

Policies

Strong (4.11)



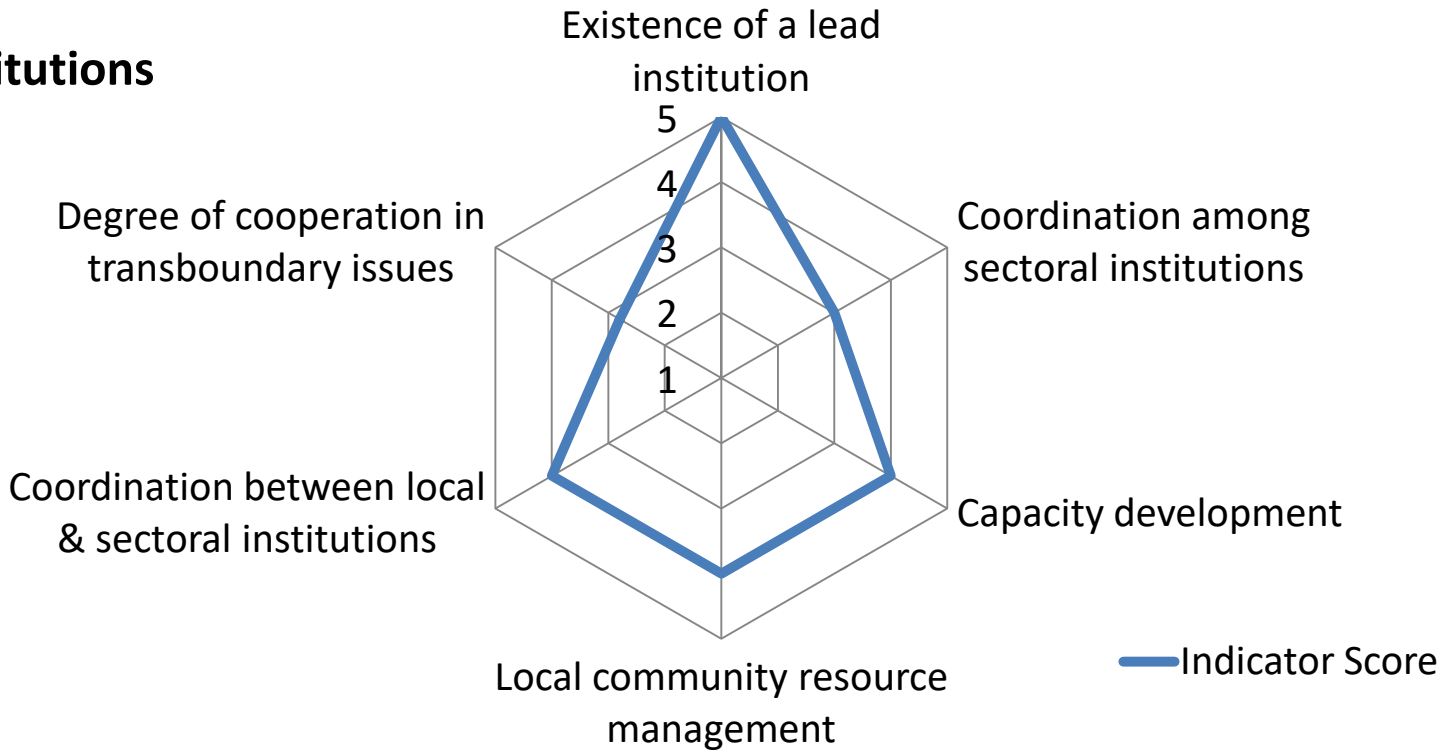
Areas Requiring Attention

- ❑Recognition of the need for lake basin management
- ❑Policy implementation (implementation of IWRM)

Institutions

Moderate to strong (3.8)

Institutions

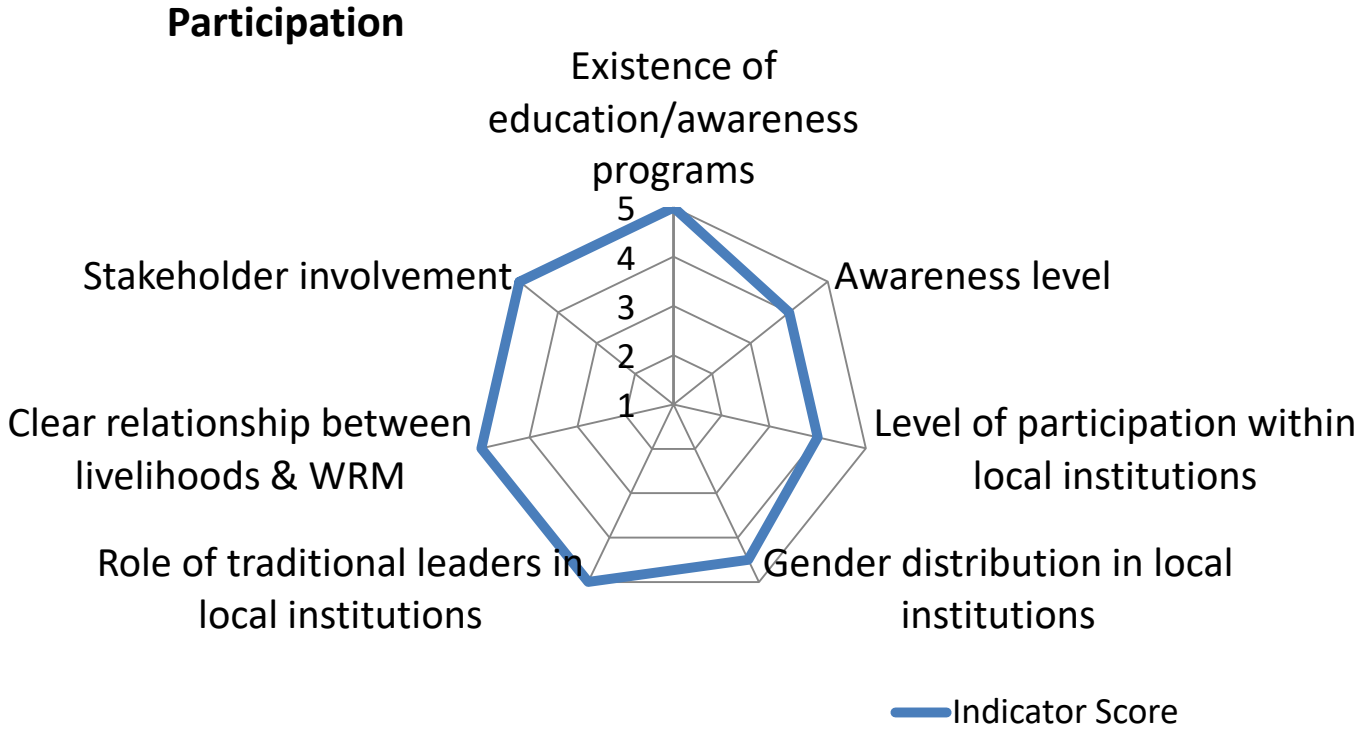


Areas Requiring Attention

- ❑Cross-sectoral coordination/cooperation at national level (lake issues are handled depending on the relevant sector)
- ❑Cross-sectoral coordination/cooperation at district level
- ❑Transboundary cooperation

Participation

Strong to very strong (4.6)

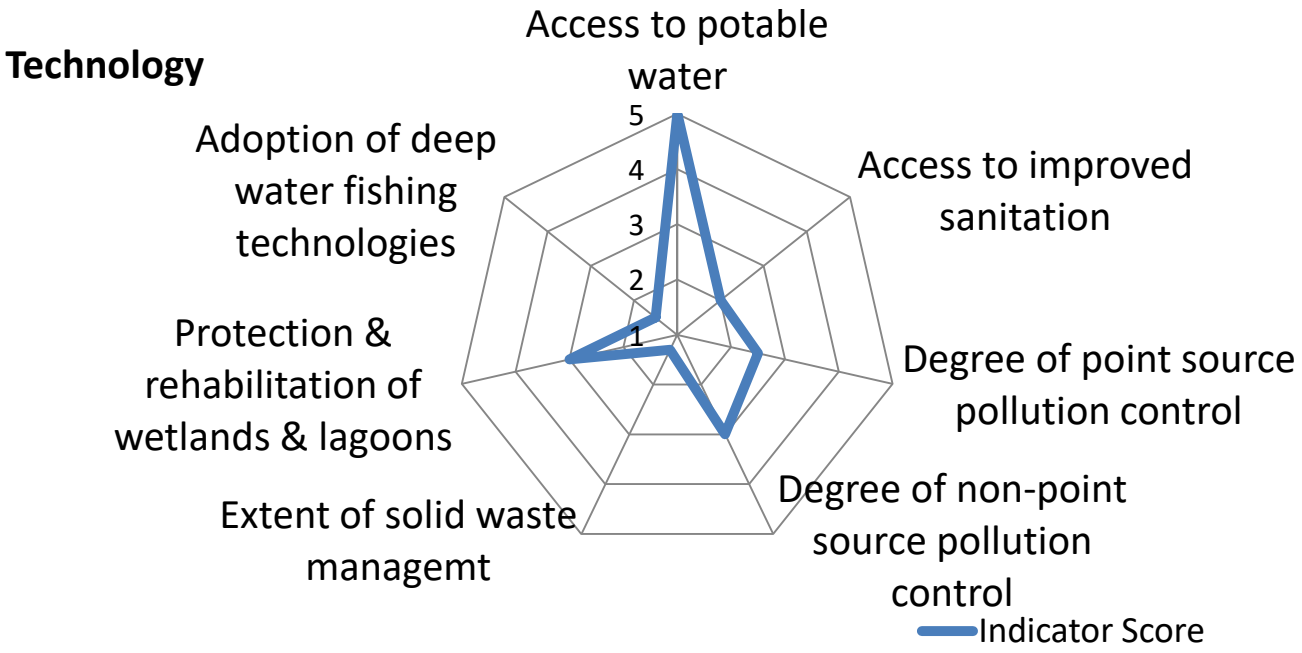


Areas Requiring Attention

- ❑Cross-sectoral coordination/cooperation among local institutions
- ❑Enhancing understanding of linkages between the water body & the basin

Technology

Weak to moderate (2.6)



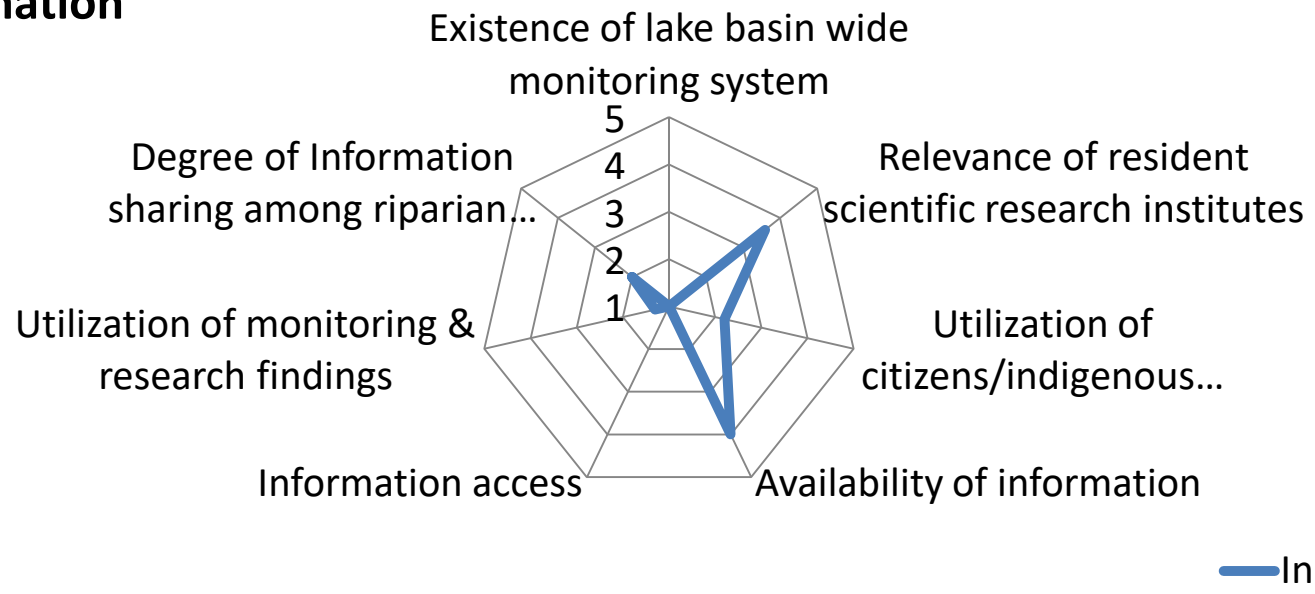
Areas Requiring Attention

- ❑ Access to improved sanitation services
- ❑ Control of pollution (point & non-point)
- ❑ Waste management
- ❑ Management of invasive species
- ❑ Adoption of deep water fishing technology

Information

Weak (2.16)

Information

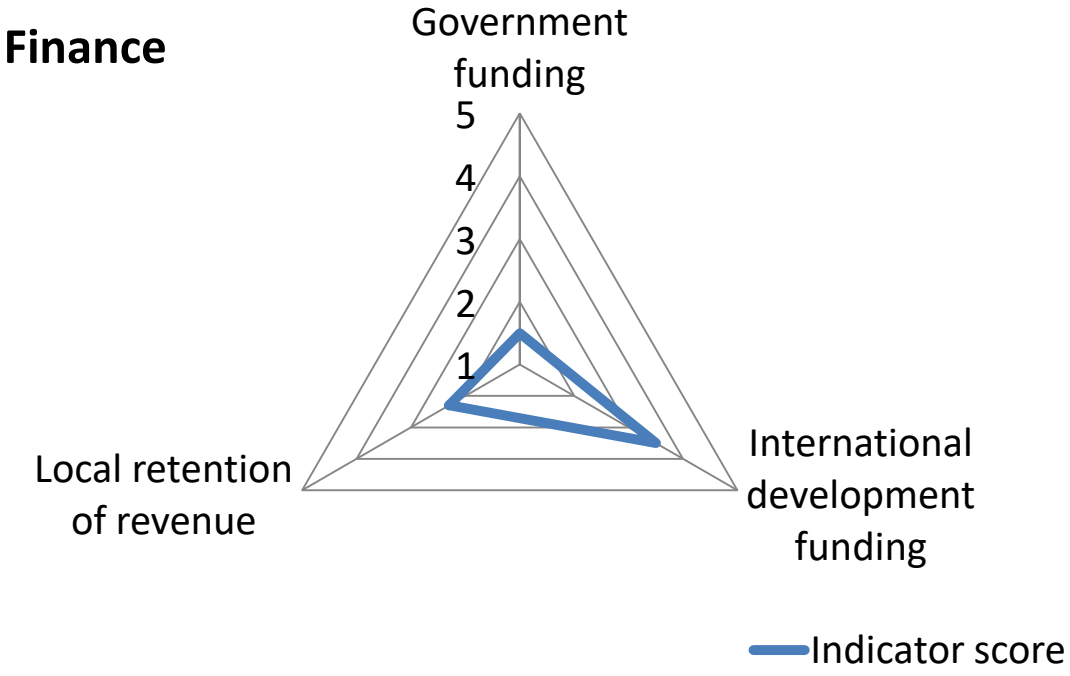


Areas Requiring Attention

- ❑Lack of a lake basin wide monitoring & information collection system
- ❑Access to information
- ❑Utilization of monitoring & research findings
- ❑Degree of information sharing among riparian countries
- ❑Utilization of citizens/indigenous knowledge

3.2.6 Finance

Weak (2.43)



Areas Requiring Attention

- ❑ Government funding
- ❑ Local retention of revenue

Overall Performance of the Lake Malawi Basin Management

(Status of the management of Lake Malawi Basin from ILBM lens)

Overall rating is moderate (3.27)

ILBM Pillar	Indicator Performance						
Policies	Lake related sectoral policies	Relevance of lake related sectoral policies	Commitment to integrated management of water resources	Policy implementation	Integration of water issues in economic development	Implementation of IWRM/WE plan	Role in trans-boundary issues
Institutions	Existence of a lead institution on lake basin management	Coordination among sectoral institutions	Capacity development in lake basin management related areas	Local community resource management	Coordination between local community institutions & relevant sectoral institutions	Degree of cooperation in trans-boundary issues	
Participation	Existence of education/awarene ss programs	Awareness level	Level of participation within local community institutions	Gender distribution in local community institutions	Role of traditional authorities/leaders in local community institutions	Clear relationship between livelihoods of local communities & water resources management	Stakeholder involvement
Technology	Access to potable water	Access to improved sanitation services	Degree of point source pollution control	Degree of non-point source pollution control	Extent of solid waste management	Protection & rehabilitation of wetlands and lagoons	Adoption of deep water fishing technology
Information	Existence of a lake basin wide monitoring & information collection system	Relevance of resident scientific research institutes	Utilization of citizens/indigenous knowledge in management approaches	Availability of information	Information access	Utilization of monitoring & research findings	Degree of information among riparian countries
Finance	Government funding for lake basin management institutions			International development funding		Local retention of revenue	

Very weak	Weak	Weak to moderate	Moderate	Moderate to strong	Strong	Strong to very strong	Very strong

4.0 Synthesis of Findings

4.1 SWOT Analysis

Strengths

1) Existence of policies
2) Relevance policies
3) Integration of water issues in economic development strategies
4) Established institutional set up
5) Capacity development
6) Existence of education/awareness programs
7) Existence of local community resource management institutions
8) High level of awareness among stakeholders
9) Stakeholder interest (e.g. NGOs & local communities)
10) High women involvement
11) Very high access to potable water
12) Explicit support of livelihoods of local communities in policies
13) High forest coverage

Weaknesses

1. Lack of recognition of the need for holistic lake basin management in water policies
2. Low access to improved sanitation services
3. Very low proportions of city population connected to the sewer line
4. Very weak solid waste management
5. Inadequate protection of wetlands & lagoons
6. Inadequate cross-sectoral coordination/cooperation & fragmented implementation of interventions (e.g. catchment management)
7. Weak trans-boundary cooperation
8. Slow adoption of good agricultural practices
9. Very low compliance rate with industrial waste disposal standards
10. Very poor condition of final solid waste disposal facilities
11. Very low adoption of deep water fishing technologies
12. Lack of lake basin wide monitoring and information collection system
13. Weak communication between sectors and scientific institutes, researchers & other stakeholders
14. Low utilization of indigenous knowledge
15. Etc.

Opportunities & Threats

Opportunities

1) Availability of information in scientific literature & in institutions
2) Harnessing NGO and civil society interest & participation
3) Donor funding potential for joint riparian projects

Threats

1) Climate change & climate variability
2) Inadequate affordable alternative energy sources

4.2 Sub-system Interactions in the Lake Malawi Basin

- Weaknesses identified through the indicator performance assessment & SWOT analysis represent the socio-economic subsystem
- 4 weaknesses were isolated as key issues considering how they are causally related to the other variables & their connection to ecosystem services in the lake basin. These are;

  Waste management

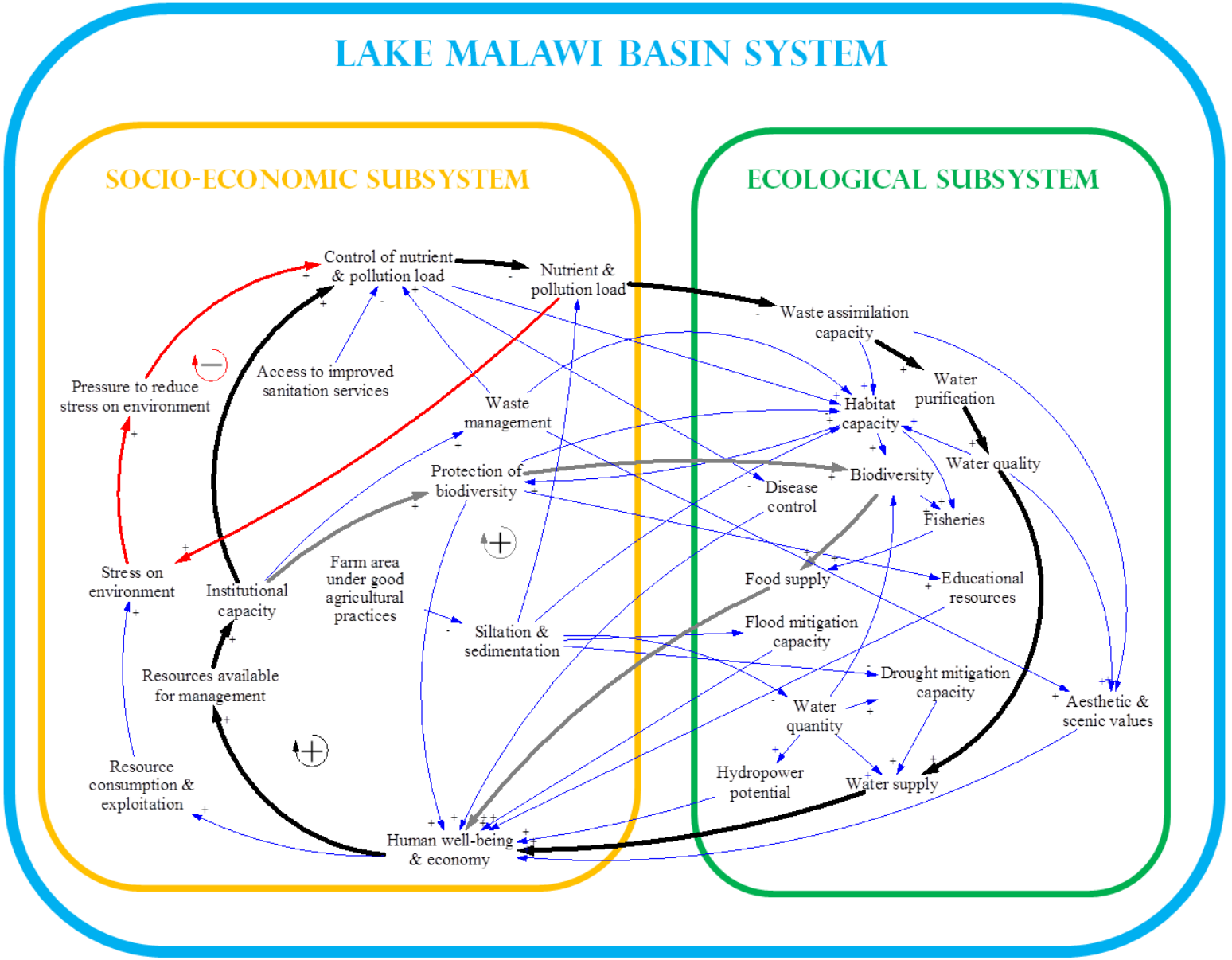
  Access to improved sanitation services

  Nutrient load & pollution control

  Protection of biodiversity

- Causal Loop diagram (CLD) was developed based on the 4 key issues to illustrate the interaction between the socio-economic & ecological subsystems and identify critical areas requiring action

Causal Loop Diagram for Lake Malawi Basin System



Critical Areas Requiring Attention

- Pollution control
- Biodiversity protection
- Promotion of scientific research
- Lake basin wide monitoring & information collection
- Institutional capacity
- Availability of adequate and stable resources.


Thank you for your time & attention!
2014/05/13 16:47