

報告番 -	※ -	第
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主 論 文 の 要 旨

論文題目: **Assessment of the Management of Lake Malawi Basin through**

**Application of Integrated Lake Basin Management (ILBM)-Based Tools**

統合的湖沼流域管理手法を適用したマラウイ湖流域の管理評価

氏 名 : CHIDAMMODZI Clara Limbitso

論 文 内 容 の 要 旨

Malawi has a relatively rich water resource in which lakes feature highly. Despite the relatively abundant water resources, the country is water stressed. Lake Malawi forms the most important single water resource in the country. The lake basin is a shared resource among Malawi, Mozambique and Tanzania, with the largest portions of both the basin and the water surface area in Malawi. The lake basin is a valuable resource to the riparian countries. The major environmental issues affecting the lake and its basin include deforestation, soil erosion, overexploitation of some fish species, pollution, and excessive extraction of water from some rivers. Emerging threats include increasing mineral resource extraction, industrialization and climate change. A comprehensive approach to the management of the lake and its basin is therefore necessary especially considering the significance of the lake basin to the riparian countries.

The Lake Malawi Basin is not monitored and managed as a whole system, despite the serious threats. Current management is fragmented across the riparian countries and across sectors within the countries. It is thus difficult to monitor the trends of the changes taking place and undertake appropriate management actions. Monitoring is also essential to determine the efficacy of any management strategies that are implemented. Policymakers, managers and other stakeholders need guidance to make sound decisions and take sound actions that ensure better management for sustainable utilization of the lake basin. This thesis intends to contribute towards achieving a comprehensive understanding of the governance of the lake basin system by integrating various disciplinary perspectives. A comprehensive assessment and analysis of the issues, needs and challenges in the management of the Lake Malawi Basin is conducted.

Focusing on the Malawian side of the lake and basin, the study generally applies a systems thinking approach and utilizes mixed methods research design. The lake basin system is looked at in two dimensions: the socio-economic subsystem and the ecological subsystem. Data and information were obtained from both primary and secondary sources. These include a wide range of literature, questionnaire survey in the lake basin, key informant interviews at lake related institutions in Malawi and site observations. To effectively conduct the assessment, an indicator-based tool was developed through application of Integrated Lake Basin Management (ILBM). Then, the status of current management of the Lake Malawi Basin was determined through pilot application of the developed indicator-based tool. A further analysis was carried out, applying the strengths, weaknesses, opportunities and threats (SWOT) technique and causal loop diagram to better understand the issues in the lake basin.

Analysis of the situation revealed some strengths within the lake basin system that can

be utilized for better lake basin management. These are especially in the aspects of policies, institutions and stakeholder participation. Considerable weaknesses were also identified that threaten the sustainability of the system. These are in the aspects of information and science, technology and finance. Several opportunities were identified, including the existence of stakeholder interest (NGOs, civil society, etc) in lake basin related issues. Climate change is an important threat to the system considering that the lake is especially sensitive to climatic changes due to its large surface area. The causal loop diagram developed to illustrate the linkages between the socio-economic and the ecological subsystems demonstrated the complex nature of the lake basin system. This highlighted the difficulty of predicting the behavior of the system and underscored the importance of taking a holistic approach to management and application of the precautionary principle in management interventions.

Since this kind of holistic assessment of governance in the Lake Malawi Basin is the first, the findings provide useful baseline data/information on the status of the management of the lake basin. The knowledge accumulated can be a reference point for future studies and management interventions. The developed indicator framework can guide the collection of relevant data and information that is useful to lake managers, policy-makers, researchers and interested parties regarding the management of the lake basin system. The developed indicator framework, with its long-term focus, multi-perspective approach, and flexibility that allows modifications as necessary makes it an adaptive management tool.