

Research Application Summary

Economic benefits associated with restoration of fish stocks of Lake Malombe in Malawi

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Abstract

This paper provides an overview of the research to be conducted in Lake Malombe in Malawi. The changes that have taken place in Lake Malombe fishery have had major social and economic consequences on communities around the lake. In Malawi, the Department of Fisheries recognizes that many fish stocks are overfished, and therefore specifically calls for the restoration efforts of depleted fish stocks in Malawi waters. The main objective of this study is to analyse the potential net benefits associated with restoration of overfished fish stocks in Lake Malombe. The study will evaluate a subset of overfished stocks based on their landed values. The present value of benefits generated by the sector under the recent catch scenario will be computed and compared with the present value of benefits that would be generated under the restoration scenario. An intertemporal preference analysis will be done to assess how fishing communities want to utilize fisheries resources in different time periods. The study will also construct a fisheries account to help in monitoring fish stocks and wealth generated by fishery resources.

Key words: Fisheries, Malawi, net benefits

Résumé

Cet article fournit une vue d'ensemble de la recherche devant être conduite dans le lac Malombe au Malawi. Les changements qui sont intervenus dans la pêche du lac Malombe ont eu des conséquences sociales et économiques majeures sur les communautés vivant aux alentours du lac. Au Malawi, le département de la pêche identifie que beaucoup de stocks des poissons sont surexploités et de ce fait, appelle spécifiquement aux efforts de restauration des stocks des poissons épuisés dans les eaux du Malawi. L'objectif principal de cette étude est d'analyser les nets avantages potentiels liés à la restauration des stocks halieutiques surexploités dans le lac Malombe. L'étude évaluera un sous-ensemble des stocks surexploités basés sur leurs valeurs foncières. La valeur actuelle des bénéfices produits par le secteur sous le scénario récent de

capture sera calculée et comparée à la valeur actuelle des bénéfices qui seraient produits sous le scénario de restauration. Une analyse intertemporelle de préférence sera faite pour évaluer comment les communautés de pêcheurs veulent utiliser des ressources des pêcheres dans différentes périodes de temps. L'étude construira également un compte des pêcheries pour aider dans la surveillance des stocks halieutiques et la richesse produite par des ressources de pêche.

Mots clés: Pêcheries, Malawi, bénéfices nets

Background

Most fish stocks in Malawi are either fully or over exploited. Coupled with the highest population growth rate in Southern Africa (2.8 % annually, according to results from the 2008 census), this has reduced per capita consumption of fish from 14 kg per person per year in the 1970s, to less than 4 kg by 2008 (Jamu and Chimatiro, 2005; FAO, 2008). These declining trends in fish catches and per capita availability of fish are reflected across Africa (Brummett *et al.*, 2008). Additionally, Malawian fish catches are increasingly dominated by commercially-less valuable fish such as usipa (*Engraulicypris sardella*) and utaka (*Copadichromis* spp.), while harvests of the commercially important chambo (*Oreochromis* spp.) have declined from 23,000 tones in 1984 to 7000 tones in 2001 (NASP, 2004).

The economic value of Lake Malombe that was at MK42million (US\$0.396 million) in 1988 was reduced to about MK4 million (US\$37,735) in 1996 (Fisheries Department, 1999). This entails loss in revenue consequently affecting living standards of most people. Over 80% of the people get their income from fisheries.

Considerable attention has been paid to the scientific issues relating to the status of stocks and the rebuilding of overfished species. But there has been less emphasis, however, on assessing the bioeconomic aspects associated with fisheries management. This study seeks to expand the knowledge of the economics of restoration of depleted fish stocks.

Literature Summary

Prior to 1993, the Fisheries Management approach in Malawi has mainly been influenced by the principles of the conservation paradigm, i.e., a biologically centralized-led approach. As such one of its sectoral policy objectives is to maximize the sustainable yield from fish stocks was that can economically be exploited from the natural waters. The conceptual background to this

Study Description

approach is based on the theories of Maximum Sustainable Yield (MSY) (FAO, 2005).

Discounting has been identified in the environmental economics literature as a source of problems when assessing the costs and benefits of projects and policies with long-term benefits but short-term costs (Heal, 1998). It has been argued that discounting future flows of benefits from marine ecosystems affects the ability to manage these resources sustainably for the benefits of both current and future generations (Weitzman, 2001; Sumaila, 2004; Sumaila and Walters, 2005).

The study will evaluate a subset of overfished stocks based on their landed values. From the list, the study will generate harvest data and landed value data of the stocks from the Department of Fisheries or published recent stock assessments reports.

The present value of benefits generated by the sector under the recent catch scenario will be computed and compared with the present value of benefits that would be generated under the restoration scenario. The present value of revenues in a time interval (0, T) will be estimated as follows:

$$PV_{\pi}(t) = \int_0^T \pi(t) e^{-\delta t} dt$$

Using the change in Biomass over time, the present value will be analysed using long term functions of TR and TC as

$$TR = prB \left(1 - \frac{B}{K} \right) \text{ and } TC = cr \left(\frac{1 - \frac{B}{K}}{q} \right) \text{ respectively, where}$$

TR is the total revenue, TC is the total cost, p is the price, r is the intrinsic rate of growth, B is the biomass, k is the carrying capacity and q is the catchability coefficient.

The proposed research will involve an intertemporal preference analysis to determine how fishing communities want to utilize fisheries resources in different time periods by administering a questionnaire to sampled fishermen at Lake Malombe. A stratified random sampling technique will be employed to put fishermen with similar gear, gender and age on the same group to ensure that they are homogenous.

The research will construct a fisheries account to help in monitoring fish stocks and wealth generated by fishery resources. The account will comprise of three categories, i.e., asset accounts, environmental protection and resource management expenditure accounts, and will also include items

such as taxes and property income received from the sale of, for example, fishing licenses or purchase of the right to fish.

Research Application

The Economic benefits associated with restoration of fish stocks of Lake Malombe will greatly contribute towards bioeconomic management of dwindling fisheries resources of Lake Malombe. The study will contribute towards the development of a model that will help in the management of fish stocks of Lake Malombe. In Malawi, the Department of Fisheries recognizes that many fish stocks in Malawi lakes are overfished, and therefore specifically calls for the restoration efforts of depleted fish stocks in Malawi waters. This is important for future generations.

Restoration of Lake Malombe will be economically, socially and culturally important to Malawi and fishers around Lake Malombe as most of the revenue, nutritional sources that were lost will be regained. Malawi's development policy expresses the need for reduction of poverty, ignorance and disease by the achievement of rapid and sustainable economic growth and an improvement in income distribution. The fisheries sector has a key role to play in poverty.

Acknowledgement

We thank the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) for the financial support towards this study. Special thanks go to the Malawi Department of Fisheries for the provision of necessary data for this study.

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