

Laguna De Bay: A Case Study for Sustainable Fisheries Development

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ABSTRACT

Laguna Lake is the largest source of fish catch from all lakes in the country providing food and livelihood to millions of people. Recently, there were attempts to remove all fish pens and cages from the lake, presumably because of their adverse impact on water quality and pollution. In this paper, we provide an overview of the lake ecology and we identify ways to manage the lake sustainably. For some time, it has been clear that the lake's ecosystem is deteriorating putting at risk the food source and livelihoods of millions of people. The LLDA, the local government units, and various stakeholders have formulated concrete steps to ensure sustained fish production in the lake.

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INTRODUCTION

The 2017 NAST annual scientific conference has for its underlying premise the imperative to look more closely into how the country's vast fisheries and aquatic resources, can be harnessed more fully to support the people's food security

and economic well-being. And corollary to this, no less importantly, we need to address how we can conserve and sustainably use the oceans, seas and marine resources of which we are abundantly blessed with, for our national purposes, and as

our contribution to the attainment of the United Nations Sustainable Development Goal (SDG) No. 14 of Life under Water.

The Philippines' fisheries sector consists of three components, namely, marine fisheries, inland freshwater fisheries, and aquaculture. The country's inland waters (swamplands, lakes, rivers and reservoirs) cover approximately 500,000 hectares. The biggest fish catch by far come from lakes, among which Laguna de Bay with 90,000 hectares is the largest.

Fish production has been the dominant use of Laguna de Bay. But because of its proximity to Metro Manila and the densely populated communities in Rizal and Laguna, the lake serves other vital purposes. Its other uses are: temporary storage of floodwaters to minimize inundation of the lower sections of Manila, source of irrigation water, source of drinking water, electricity generation, water transport to and from Talim island and lakeshore towns and villages, recreation and tourism, and sadly, as sink of wastes from households, agriculture and industry.

These competing uses have led to intrasectoral and intersectoral conflicts among the lake's stakeholders. The recent order of the President of the country to dismantle all the fish pens and cages in Laguna de Bay was apparently provoked by perceptions that fish farming is contributing to the deterioration of the ecological condition of the lake as well as to the lack of equity of access to natural resources between small fisher folk and commercial fish pen operators.

This paper describes our understanding of the ecology of Laguna de Bay and its fish resources. In addition, it discusses how to move forward in sustainably managing this our vital water resources with focus on fisheries.

OVERVIEW OF THE LAKE'S ECOLOGY

The Laguna Lake is the largest inland water body in the country covering about 90,000 hectares (WAVES, 2016). It is the source of water for parts of Metro Manila, irrigates 103,000 hectares of

agricultural land, and supports a hydropower plant. About 14,000 fishers rely on the lake for livelihoods.

As a result of growing population, industrialization, watershed degradation and rapid urbanization, the lake's water quality and ecology have been declining over the years (Global Footprint Network 2013).

The lake's 24 major watersheds (or river sub-basins) have undergone massive changes, with forest cover declining while built up areas are expanding. This has led to the deterioration of water quality in rivers draining to the lake as well as increased rate of sedimentation. Numerous lake water quality parameters have already, either exceeded or fallen below the criteria for Class "C" waters indicating the worsening condition of the lake. Not surprisingly, the lake's net primary productivity (NPP) and carrying capacity are declining (Jose and Pasicolan 2013).

THE FISH RESOURCES OF THE LAKE

Fisheries is one of the most important traditional uses of Laguna Lake. Fishery activities in the lake consist of open water capture fisheries and aquaculture. The success of the early operation of fishpens was due to the abundance of natural food, the absence of true plankton feeder among the indigenous economic species of the Lake, and the favorable water quality. To address conflicts among and between stakeholders, a lake zoning map was developed with designated areas for fishpen belt, fish sanctuary, navigational lanes, and open fishing areas.

Fish production in the lake has declined over the years due to the following factors: operation of the hydraulic control structure which prevented the inflow of seawater that is vital in the natural primary productivity of the lake; decline in algal primary productivity; introduction of exotic fish species; the use of destructive fishing gears; domestic and industrial pollution that led to rapid deterioration of water quality.

Globally, fish farming (aquaculture) is the fastest growing food producing sector. According to the Fisheries code (RA 8550, 1988), 10% of the suitable

water surface of all lakes and rivers should be allotted for aquaculture purposes. Laguna Lake is the chief source of affordable animal protein supply for Metro Manila and surrounding areas. Thus, the goal should be to manage Laguna Lake for sustainable fish production and the provision of other ecosystems services.

POLICY ISSUES AND RECOMMENDATIONS

The key issues that must be addressed in the fish resources of Laguna Lake are the declining ecological condition and ecosystems services of the Lake and equity of access to fish resources.

The Philippines Millennium Ecosystems Report (MA Report) showed that in 2000, of the total input of 13,800 tons N/yr, 79% came from domestic sources, 16.5% from agricultural activities, 4.5% from industrial effluent and 0.5% from other sources (Lasco et al. 2005). The other sources which presumably include aquaculture amounted to 690 tons N/yr. In addition, a study by Santiago et al. (2005) revealed that only 38.6 tons N/yr came from aquaculture, about 0.3% of total nitrogen load. From these studies it can be concluded that fish culture has very low contribution to water pollution.

In terms equity of access to fish resources, large operators/corporations are controlling major portion of fish production. In 2010, 410 registered pen operators occupied 13% of the total lake area, or an average of 28 hectares per pen while 2,920 cage operations with an average of 0.60 hectare occupy 2% of the lake area (Saguin 2016). Thus, a key issue is how can access by smallholder fishers be increased?

The MA Report suggested the following course of action: promoting equitable access to fish resources of the lake; enhancing the effectiveness of river rehabilitation councils; implementing measures to reduce lake siltation; controlling the extent of pollution with heavy metals and other toxic substances; strengthening the role of local government units in lake resources management; and facilitating participation of local stakeholders in lake management (Lasco et al. 2005).

More recently, the LLDA has convened a panel of experts, and their recommendations are as follows:

- Distribute the allowable area within the suitable area in the West Bay, Central Bay and East Bay; observe equity with priority entitlement to fishermen (60% of 9,200 hectares or 5,520 ha shall be allocated to fishermen and 40% or 3,680 ha shall be allocated to private corporations and individuals)
- Conduct a Programmatic Environmental Impact Assessment (EIA) of aquaculture operation in Laguna de Bay;
- Revise the 1999 Laguna de Bay Fishery Zoning and Management Plan (ZOMAP) reducing allowable area for aquaculture from 15,000 to 9,200 hectares.
- Monitor regularly the heavy metal concentration in the water, sediment and fish flesh and release the information to all sectors in a regular basis.
- Develop a risk communication program in disseminating information on the potential health risks from lake products
- Monitor extensively the compliance of wastewater dischargers to the effluent criteria.
- Address the increasing eutrophication of the lake through regulation of nutrient discharge.
- Empower the fisherfolks to organize fish cooperatives with the commercial fishpen operators providing technical support.
- Explore from financial institutions such as the Development Bank of the Philippines (DBP) and Land Bank of the Philippines (LBP) to provide financial assistance to fish cooperatives.

The governance structure of the Laguna Lake remains a key challenge given the complex interaction of the LLDA, surrounding local government units (LGUs), and other stakeholders (Gomez, 2014). Several watersheds drain into the

lake and these are under the control of a number of LGUs belonging to the provinces of Laguna and Rizal.

Given its fragile ecosystem and declining productivity, regular scientific monitoring and assessment of the lake's bio-physical condition as well as the socio-economic profile of local communities is vital for sustainable management (eg Herrera et al. 2014; Jose and Pasicolan 2013; Tan et al. 2010).

CONCLUDING REMARKS

The Laguna Lake plays a critical role in the economic life as well as the ecology of Metro Manila and the provinces of Laguna and Rizal. The continued deterioration of the Lake's ecology is therefore an issue that must be addressed by concerned government agencies and the local government units around the lake. A confluence of biophysical and socioeconomic factors provides a dizzying context for policy making and program implementation. Its proximity to a mega-urban region adds another layer of complexity as disparate stakeholders seek to sway policies in their favor. The science community, such as the National Academy of Science and Technology Philippines (NAST PHL), can provide much needed evidence to support well-informed policies.

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