

Commercial aquaculture and economic growth, poverty alleviation and food security

Assessment framework



Cover photographs:

Clockwise from top left:

A crocodile seeks haven in the waters below Murchison Falls on the Victoria Nile in northern Uganda.

Credit: © FAO/17388/K. Dunn; In-house training ensures a consistent quality tilapia product for this manufacturer. Credit: courtesy of Lake Harvest Aquaculture (Pvt) Ltd; Correct handling and processing are vital to having quality products. Here, processing of tilapia takes less than 90 minutes, from live fish to chilled and ready for packing. Credit: courtesy of Lake Harvest Aquaculture (Pvt) Ltd; Farmed tilapia. Credit: courtesy of Lake Harvest Aquaculture (Pvt) Ltd

Commercial aquaculture and economic growth, poverty alleviation and food security

FAO
FISHERIES AND
AQUACULTURE
TECHNICAL
PAPER

512

Assessment framework

by

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ISBN 978-92-5-106337-8

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Preparation of this document

Within the framework of its continued efforts to reduce food insecurity and alleviate poverty, the FAO Fisheries and Aquaculture Department encourages commercial or business-oriented aquaculture as a means of increasing food availability and accessibility, employment and income, and improving national economies, especially in developing countries. An issue for policy-makers is how to measure and compare the contribution of projects, including aquaculture, to their national economies, their poverty reduction efforts and to food security. This paper aims to help solve this problem by providing quantitative measures through an assessment framework and a useful methodology – the multiplier method. By estimating multipliers, a project's contribution to economic growth and therefore poverty alleviation can be measured; the method can also quantify all aspects of food security. It is a versatile tool and can be used with limited data. However, caution should be exercised because, as with all quantitative measures, reliability of results depends on the quality of data and underlying assumptions. Nonetheless, the multiplier is a valuable means of assessment and can be used as a first step if more sophisticated techniques are unavailable or are too costly. It is hoped that this tool will help policy-makers and development agents in their efforts to promote aquaculture. Although the focus of the document is on developing countries, where most aquaculture occurs, the analysis and methods are applicable everywhere.

This paper was jointly funded by the Development and Planning Service and the Aquaculture Management and Conservation Service of the FAO Fisheries and Aquaculture Department.

Abstract

This paper proposes some methods for quantifying the contribution of aquaculture to national economies, poverty alleviation and food security so as to improve the much needed political and financial support to the sector for its adequate development. Aquaculture's contribution to a country's economy can be measured by "aquaculture value-added multiplier", an indicator that represents the "increase in gross domestic product corresponding to a one-unit increase in aquaculture value-added. As alleviating poverty occurs by creating well paying jobs, evaluation of the contribution of aquaculture to poverty alleviation can be done through "aquaculture employment multiplier", the increase in the total employment for the entire economy corresponding to one extra job created in aquaculture. The contribution to food availability, one of the three dimensions of food security, can be assessed through the "net sum of protein-equivalent" (direct contribution) and the "ratio between the aquaculture net foreign exchange earning and the total value of food imports" (indirect contribution). "Aquaculture labour-income and employment multipliers" can be used to quantify aquaculture's contribution to food access, the second dimension of food security. Aquaculture tax multiplier and the "aquaculture ratio between the net foreign exchange earning" and the "whole economy net foreign exchange earning" can be used to estimate the sector's contribution to food utilization, the third dimension of food security.

Cai, J.; Leung, P.; Hishamunda, N.

Commercial aquaculture and economic growth, poverty alleviation and food security: assessment framework.

FAO Fisheries and Aquaculture Technical Paper. No. 512. Rome, FAO. 2009. 58p.

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Foreword

This report aims at assisting countries to identify and quantify, where possible, the contribution of commercial aquaculture to economic growth, poverty alleviation and food security. Knowledge of this information is often needed by policy-makers when defining programmes for their national development agendas. We would like to acknowledge the invaluable contribution of Dr Junning Cai and Professor PingSun Leung, consultants for this project, and Nathanael Hishamunda of the FAO Fisheries and Aquaculture Economics and Policy Division, Development and Planning Service, who prepared this report. Professor Neil Ridler and Dr Jean Calvin N’Jock reviewed the manuscript while Rolf Willmann provided useful comments on an early draft.

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1. Introduction

1.1 BACKGROUND AND PURPOSE

Aquaculture has failed to develop adequately in many parts of the developing world, producing unsatisfactory and often ephemeral results. Experts agree that limited or lacking economic incentives for aquaculture activities has been one of the major causes of its poor, sluggish and short-lived performance. The Food and Agriculture Organization of the United Nations (FAO) believes that promoting aquaculture as a business could yield adequate and solid benefits from the sector, thereby leading to its sustainable development.

In 1999-2000, the FAO's Fisheries and Aquaculture Department, through its Development and Planning Service (FIEP), initiated the promotion of aquaculture as a self-sustained business, referring to it as sustainable commercial aquaculture. The primary targets were developing countries, especially from sub-Saharan Africa. A series of studies were conducted to understand the necessary conditions for commercial aquaculture to emerge and develop in a sustainable manner. Specifically, policies for the promotion of this type of aquaculture, economic feasibility and investment conditions as well as legal, regulatory and institutional frameworks were identified and made available to the targeted audience through a number of publications.

One of the lessons learned in this process is that promoting aquaculture as a business invariably calls for political support. Governments and funding institutions' will to support aquaculture is often a function of how they value the sector in terms of its contribution, real or potential, to food security and poverty alleviation. Both government and funding agencies make decisions on what level of support is provided to a sector based on its potential contribution to a nation's economy.

Unfortunately, more often than not, objective evaluation of the impact of aquaculture in general, and commercial aquaculture in particular, on countries' economies, poverty alleviation and food security, is sorely lacking. Where available, evaluation of the impact of aquaculture on these factors remains qualitative (Kennedy, 2003). Qualitative assessments are not always viewed by policy-makers as acceptable measures of a programme's relevance to the national development agenda, which may help explain the limited support provided to aquaculture in many countries. The objective of this study is to provide policy-makers with the necessary tools for the quantitative appraisal of the impact of aquaculture.

1.2 BASIC CONJECTURES

This study relies on several assumptions, including the definition and benefits of commercial aquaculture. These benefits represent the backbone of the models developed herein.

In this report, commercial aquaculture refers to "fish farming operations whose goal is to maximize profits, where profits are defined as revenues minus costs (perhaps discounted)". The distinction between commercial and noncommercial aquaculture as used in this document does not hinge on whether fish is sold or not. It relies primarily on the existence or absence of a business orientation, and on how factors of production such as labour will be paid (Ridler and Hishamunda, 2001).

Commercial aquaculture supplies aquatic products for consumption, generates business profits, creates jobs, pays labour incomes, including wages and salaries, and provides tax revenues.

Business profits, wages, salaries and taxes, which represent different levels of income from commercial aquaculture and related industries, contribute to the gross domestic product (GDP), which is a basic measure of economic performance. Business profits from commercial aquaculture provide funds for investments and hence stimulate economic growth. So do savings from commercial aquaculture employees.

By creating jobs and providing wages and salaries, commercial aquaculture helps alleviate poverty in general. Because this income can be used to purchase food items which would otherwise be inaccessible, commercial aquaculture can improve food security in particular. A significant contribution of commercial aquaculture to food security is its supply of nutritious aquatic food products. Seafood is an excellent source of high-quality protein. A 150 g single serving of seafood provides 50–60 percent of the daily protein needs for an adult. Seafood also contains various vitamins and minerals. It is typically low in saturated fats, carbohydrates and cholesterol (with the exception of prawns and squid). Evidence indicates that the consumption of two or more servings of seafood per week is associated with a lower prevalence of heart disease. Other health benefits of seafood include lowering blood pressure, possible improvement of symptoms of rheumatoid arthritis, improvement of eczema because of fish omega-3s and decreased incidence of depression (Seafood and Health Alliance, 2008).

Through employment creation and income generation, commercial aquaculture enables more people, especially those in rural areas whose employment opportunities are generally limited, to share the benefits of growth. Therefore, it contributes to the well-being of a country by providing intra-society equity. Tax revenues from commercial aquaculture constitute resources for stimulating growth, poverty alleviation and food security.

Despite the widely accepted importance of commercial aquaculture, systematic and quantitative evaluation of the impacts of commercial aquaculture on national economies, poverty reduction and food security is poorly documented, especially in developing countries (Charles *et al.*, 1997). Insufficiency of adequate data is one major cause of the problem. The lack of conceptual and data-amenable empirical frameworks exacerbates the issue. Yet, systematic and quantitative information about the economic and other impacts of commercial aquaculture is essential for governments and development agents to appreciate its merits. A proper assessment of these impacts allows for the formulation of suitable policies to help develop the sector into a mature and sustainable contributor to the economy and societal well-being. In recognition of this need, this study attempts to develop systematic conceptual and operational empirical frameworks for the assessment of commercial aquaculture's impacts on economic growth, poverty alleviation and food security. While these frameworks have been developed with commercial aquaculture in mind, they can also be applied to other forms of aquaculture, provided that adequate records are available.

1.3 STRUCTURE OF THE REPORT

Following the introduction (Chapter 1), the report is organized into three major chapters. Chapter 2 presents conceptual and empirical frameworks for assessing the contribution of commercial aquaculture to economic growth. Chapter 3 discusses conceptual and empirical frameworks for evaluating the contribution of the sector to poverty alleviation and food security. Chapter 4 presents illustrative examples on how these frameworks can be applied to measure the contributions of commercial aquaculture to the economy, poverty alleviation and food security in several selected countries in sub-Saharan Africa and Latin America. A short section recaps the main findings of this study and concludes the report.