

# THE MYANMAR AQUACULTURE-AGRICULTURE SURVEY 2016

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## INTRODUCTION

This research highlight is the first in a series of publications designed to summarize and rapidly disseminate key research findings generated by the Food Security Policy Project (FSP) in Myanmar<sup>1</sup>. FSP aims to promote inclusive agricultural growth by facilitating improvements in the policy environment. Addressing critical evidence gaps by generating and distributing new knowledge on agri-food value chains and the rural economy is central to this effort.

## THE MYANMAR AGRICULTURE-AQUACULTURE SURVEY

The Myanmar Aquaculture-Agriculture Survey (MAAS) was implemented in May 2016 as part of FSP's program of policy-oriented research. The survey built on findings of an earlier scoping study conducted by FSP that identified aquaculture (fish farming) as having undergone rapid growth in Myanmar's Ayeyarwady Delta in areas close to the country's main commercial center, the city of Yangon. Ninety percent of the country's inland fish pond area is located in this zone (Belton et al. 2015).

The scoping study found that a high share of fish production was concentrated in very large farms. Research also indicated that bias in agricultural land use policies favoring rice cultivation, weak land tenure rights, and very limited access to formal sources of credit had hampered the development of a class of small- and medium-scale commercial fish producers. During the scoping phase of research, labor mobility, rising wage rates, and rapid mechanization of agriculture were all identified as symptoms of economic

transformation taking place in rural areas close to Yangon, but were not evaluated quantitatively. Basic questions about the productivity, profitability, and management of fish and paddy farms also remained unanswered.

MAAS was designed to build upon the insights and address knowledge gaps identified in earlier research, with the following objectives:

- 1) Generate baseline information on fish and paddy farm yields, size, tenure status, management practices, and profitability.
- 2) Quantify relative advantages of, and tradeoffs between, aquaculture and agriculture by estimating the size of growth linkages and employment multipliers in the local rural economy.
- 3) Compare the relative performance of large- and small-scale commercial aquaculture in terms of spillover effects, demand for labor, productivity, and returns.
- 4) Evaluate patterns of rural-rural and rural-urban migration, agricultural mechanization, and the extent and terms of access to credit in aquaculture and agriculture.

## SAMPLE DESIGN

In order to address these questions, MAAS adopted a two stage sampling strategy to facilitate comparison of the rural economy and livelihoods in groups of village tracts<sup>2</sup> with high concentrations of fish farms (referred

<sup>1</sup> FSP is a partnership between the Center for Economic and Social Development (CESD), Michigan State University (MSU) and the International Food Policy Research Institute (IFPRI).

<sup>2</sup> Village tracts are the smallest administrative units in rural Myanmar, usually comprised of around 10 villages.



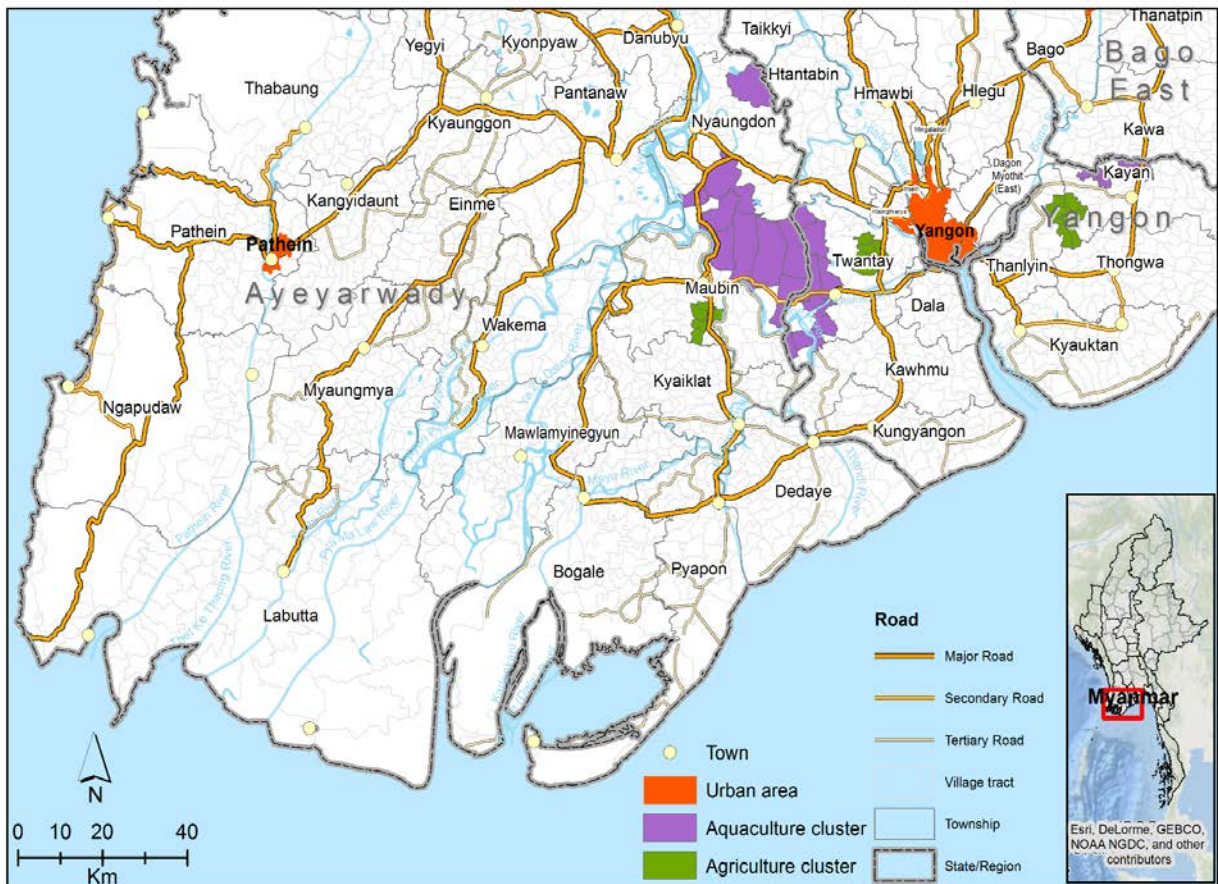
to as the *aquaculture cluster*), and in areas where paddy cultivation was the main farming activity (the *agriculture cluster*). See Figure 1.

For first stage sampling, four townships—Kayan and Twantay in Yangon Region, and Maubin and Nyaungdon in Ayeyarwady Region— were identified as the main fish farming areas using a digital database of ponds, created during the previous phase of research using satellite images and ground-truthed in the field. From these four townships, the 25 village tracts estimated to hold the highest concentrations of ponds (calculated as the ratio of pond surface area to total land area) were identified using ArcGIS software.

These were selected to form the aquaculture cluster. Fifty seven percent of the area of inland fish ponds in the delta is estimated to fall within these village tracts.

Agriculture cluster village tracts were selected based on interviews with staff of the General Administrative Department (GAD) in the same four townships. The three main agricultural crops grown in each village tract in the townships were listed and ranked in order of importance. Village tracts in which cultivation of paddy and pulses were the predominant forms of agriculture were prioritized for selection. All village tracts in Nyaungdon Township were found to contain significant areas of fish ponds and were, thus, excluded from selection.

**Figure 1. Location of Aquaculture and Agriculture Village Tracts**



A total of 15 village tracts (three separate groups of five village tracts each in Kayan, Twantay, and Maubin townships) were selected to form the agriculture cluster.

The sample was designed to represent the entire populations of both clusters, including non-farm households, to facilitate the estimation of spillover effects from aquaculture and agriculture.

Enumeration areas (EAs) were selected from within the 40 (25 + 15) aquaculture and agriculture cluster village tracts by probability proportional to size sampling, using the national population census of 2014 as the sampling frame. This procedure yielded a sample comprised of 78 EAs: 49 in the aquaculture cluster and 29 in the agriculture cluster. A *listing* (census) of households was conducted in every selected EA to serve as the final sample frame for randomized selection of respondent households.

Eight fish farming households and seven non-fish farming households were selected for interview in each EA in the aquaculture cluster. Non-fish farming households included both those engaged exclusively in non-farm work and those engaged in crop farming. Households operating fish farms of 40 acres or more were selected with 100% probability, to ensure a sufficient sample of large farms to support statistically valid analysis. In EAs in the agriculture cluster, a sample of eight agricultural households (engaged in farming paddy and/or pulses), and seven non-agricultural households were drawn at random from the listing data. Large farms were not oversampled.

## SURVEY INSTRUMENT

Respondents from 1,102 households, representing a total population of 37,390 households, were interviewed, one on one in the privacy of their own homes.

The survey instrument was comprised of three elements:

- 1) A *household* section, containing modules on household composition, migration, employment, land and asset ownership, production of non-field crops, and consumption expenditures. This was administered to all 1,102 households.
- 2) An *aquaculture* section, administered to households operating specialized nurseries (producing juvenile fish for sale to other farms), and

‘growout farms’ (producing food fish for human consumption). The survey instrument was comprised of modules on: pond acquisition and tenure status; input utilization and costs (including labor); harvesting and marketing; trends in production over the preceding 10 years; and credit utilization. This section of the questionnaire was answered by 224 households in the aquaculture cluster.

- 3) An *agriculture* section, divided into two subsections on monsoon season and dry season field crop cultivation. The instrument incorporated modules on: land ownership and tenure; irrigation; agricultural machinery and draft animal use; input application; marketing practices and costs; changes in production practices over the last decade; and access and utilization of agricultural credit from Myanmar Agricultural Development Bank (MADB) and informal sources. This section of the questionnaire was administered to 329 households (216 in the agriculture cluster and 113 in the aquaculture cluster).

In addition, a short community survey was conducted in 73 of the 78 selected EAs with small focus groups of knowledgeable long-term residents. The questionnaire was designed to generate additional data on the physical accessibility of the communities, changing village populations, historical wage data, landownership structures and historical inventories of non-farm enterprises over the period 2011-2016, including those playing a role in aquaculture and agriculture value chains.

## RESEARCH HIGHLIGHTS

Key findings from MAAS data will be published in a series of research highlights covering the following areas:

- Agricultural mechanization.
- Credit access and utilization.
- Land markets and tenure.
- Labor migration.
- Off-farm employment and the rural non-farm economy.
- Fish farm management practices and enterprise budgets.

- Crop farm management practices and enterprise budgets.

All research highlights will be available for download at <http://fsg.afre.msu.edu/fsp/burma/index.htm#rh>

## REFERENCES

Belton, B., A. Hein, K. Htoo, L.S. Kham, U. Nischan, T. Reardon, and D. Boughton. 2015. *Aquaculture in Transition: Value Chain Transformation, Fish and Food Security in Myanmar*. MSU International Development Working Paper No. 140. Michigan State University.

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