

FOOD SECURITY POLICY PROJECT

**Associate Award No. AID-482-LA-14-00003
Under LWA Cooperative Agreement No. AID-OAA-L-13-00001**

ANNUAL REPORT

October 1, 2017 to September 30, 2018

Submitted by

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November 8, 2018

List of Acronyms

ACIAR	Australian Centre for International Agricultural Research
ADS	Agricultural Development Strategy
AFVCs	Agri-food value chains
APU	Agricultural Policy Now
CESD	Centre for Economic and Social Development
DAR	Department of Agricultural Research
DG	Deputy General
DOA	Department of Agriculture
DOP	Department of Planning
EA	Enumeration Area
FSP	Food Security Policy
FSPP	Food Security Policy Project (Burma)
GAD	General Administration Department
IFDC	International Fertilizer Development Center
IFPRI	International Food Policy Research Institute
ISSD	Wageningen University Integrated Seed System Development
JICA	Japan International Cooperation Agency
KOICA	Korea International Cooperation Agency
LIFT	Livelihoods and Food Security Trust Fund
MDI	Myanmar Development Institute
MMRD	Myanmar Market Research and Development
MOALI	Ministry of Agriculture Livestock and Irrigation
MSU	Michigan State University
READZ	Rural Economy and Agriculture Dry Zone survey
Re-SAKSS	Regional Strategic Analysis and Knowledge Support System
SHARES	Shan Agriculture and Rural Economy Survey
SME	Small or Medium Enterprise
USAID GLEE	Global Learning and Engagement Event
YAU	Yezin Agricultural University

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Executive Summary

The overall goal of the Food Security Policy (FSP) project is to promote inclusive agricultural productivity growth, improved nutritional outcomes, and enhanced livelihood resilience for men and women through an improved policy enabling environment. This goal is pursued by addressing critical evidence gaps for informed policy debate and formulation and fostering credible, inclusive, transparent, and sustainable policy processes. The project is comprised of four components, which include policy/strategy advising, agrifood value chains research, household and community livelihoods research, and capacity and network building. The main beneficiaries are rural households in Myanmar earning income from farming and/or rural Small or Medium Enterprises (SMEs), and urban and rural consumers benefitting from improved food and nutrition security. FSP is led by Michigan State University (MSU), in partnership with the Centre for Economic and Social Development (CESD), and the International Food Policy Research Institute (IFPRI).

Significant 2018 project results

A key watershed event in 2018 was the launch of the Ministry of Agriculture, Livestock and Irrigation (MOALI) Agricultural Development Strategy (ADS) in June. The strategy builds on an earlier discussion paper “From Rice Bowl to Food Basket” published in 2016, and to which the project made important technical contributions. During the reporting period the project made three major contributions to facilitate implementation of the ADS. The first addresses a key knowledge gap related to the productivity pillar of the ADS, the second to a knowledge gap for a major agricultural region (Shan State), and the third an in-depth diagnostic review of the crop research system and extension linkages.

1) Dry Zone Variety Adoption and Seed Demand survey.

A survey of 1,400 households in 6 townships was undertaken by FSPP partners MSU and IFPRI, in collaboration with Department of Agricultural Research and the Seed Division of the Department of Agriculture of MOALI, and the Integrated Seed Sector Development project implemented by Wageningen University. The survey was implemented by a local contracted survey company, MMRD, using SurveyCTO tablet software with technical support from IFPRI and additional field supervision from CESD staff. Results of the survey reveal very limited penetration of the seed market by either government or traders. Nearly all seed sourced by farmers comes from other farmers without any formal sector intervention. Farmer-reported adoption of improved varieties is low, even for rice, and especially low for oilseeds. The average age of variety used by farmers is approaching 15 years, and average age of seed planted is approaching 10 years. These results suggest the potential for considerable increases in productivity if improved varieties and quality seed are made accessible to farmers and perform as expected under farmers’ management conditions.

2) Shan Household Agriculture and Rural Economy Survey (SHARES).

To address a shortage of information on Myanmar’s most diverse and dynamic agricultural zone, Southern Shan State, FSPP launched the Shan Household Agriculture and Rural Economy Survey (SHARES). The survey included questions on agriculture (focusing especially on corn and pigeon pea), non-farm employment, agricultural mechanization, credit, migration, and consumption, among others. Data collection was designed to enable results disaggregated by sex and age in order to inform how different groups are affected by changes taking place in agriculture and the rural economy. As the government’s Agricultural Development Strategy seeks to implement a decentralized approach, analysis of this data will help policy makers and donors

to understand rapid changes taking place in agriculture and the non-farm economy in Shan State, to identify bottlenecks and problems that can be addressed through development interventions and market based solutions, as well as potential lessons for stimulating commercial smallholder agriculture in other areas of Myanmar.

3) “Harvesting the Future”: Agricultural crops research system review.

A review of the agricultural research system was completed in collaboration with a 20 member task force of the Department of Agricultural Research. The review found that the system has critical shortages of research staff and funding, and limited engagement with farmers, extension or the private sector. The report estimates that correcting weaknesses in the research system could increase agricultural sector growth by at least 1% and generate an additional \$2 billion of GDP, much of which would benefit farmers and the rural economy. Failure to correct the problem will undermine the objectives of the Agricultural Development Strategy. Results of the study have been shared at several high level meetings and strengthening of the research system and its linkages to extension and the private sector has been made an early action priority of the Ministry of Agriculture, Livestock and Irrigation.

Key lessons learned by the project during 2017-2018 in relation to each of the three major accomplishments above are:

1) Dry Zone Variety Adoption and Seed Demand survey.

The Dry Zone Variety Adoption and Seed Demand survey was innovative in several ways. It was the first FSPP survey which engaged MOALI staff from research and extension departments in the earliest design phase of formulating research questions. It was the first household survey to be completed entirely on tablet. It was a combined effort with a World Bank funded European University and USAID funded FSPP partners. And it was the first survey where the project hired a private company for the data collection phase. Results were shared at the national seed sector platform meeting with private sector and government officials, and clearly show the need for research, extension and seed companies to work together across all stages in the crop variety adoption process.

2) Shan Household Agriculture and Rural Economy Survey (SHARES).

SHARES was implemented successfully, covering 1562 households 320 communities. Digital data collection platforms dramatically improved data quality and reduced lag time between survey completion and completion of initial data analysis to just one month. A team of 22 researchers, including three analysts from the Agricultural Policy Unit of the Ministry of Agriculture Livestock and Irrigation, analyzed results during an intensive two week data analysis workshop. Participation in all stages of the survey design and analysis process strengthened the technical and analytical skills of the Myanmar analysts involved. Human capital and skills development of this type is essential for supporting Myanmar’s government to fully embrace rigorous evidence-based approaches to policy making.

3) “Harvesting the Future”: Agricultural crops research system review.

The agricultural research system review was a success because it was conducted in a highly participatory manner that respected the expertise and dedication of research staff working under very difficult conditions. The review was also conducted in an “action research” mode that allowed for solutions to be designed and piloted in the course of the review. For example, a pilot regional program was launched using government

resources to permit farmers, extension workers and researchers to jointly identify research problems of importance to communities and design trials and demonstrations to address those concerns. While addressing the problems of the research system and its extension linkages will take time, the diagnosis is owned by the Ministry which is taking action using its own resources.

The main challenges to project effectiveness during the period were:

- 1) Procedures for obtaining survey authorization and statistical sampling frames for household and community research are time consuming and unpredictable, limiting the amount of research that can be undertaken and causing unpredictable delays:
- 2) Human resources are critically lacking in policy analysis, especially in government, and salary levels for qualified analysts are extremely low.

Project Overview

The USAID Burma Food Security Policy Project (FSPP) was signed September 23, 2015 and began operations immediately. The project is implemented by MSU together with the CESD in Myanmar and IFPRI based in Washington DC. The project has two full-time MSU faculty in-country supported by a full-time MSU survey management specialist based in Manila.

The overall goal of the Project is to promote inclusive agricultural productivity growth, improved nutritional outcomes, and enhanced livelihood resilience for men and women through an improved policy enabling environment. Taking a broad view of agriculture, including the farm and off-farm parts of the food system, this goal will be achieved through increased capacity to generate policy-relevant evidence and gender-sensitive analysis that is used by stakeholders throughout the food system to improve policy formulation and implementation. This goal is to be achieved by two integrated objectives:

Objective 1: To address critical evidence gaps for informed policy debate and formulation. The Project will generate, synthesize, and disseminate new knowledge on targeted policy issues for which the current evidence base is insufficient, and thus facilitate and encourage reforms.

Objective 2: To foster credible, inclusive, transparent, and sustainable policy processes in Burma. The Project will strengthen the building blocks for Burmese national and state/region policy systems, promote inclusion of and dialogue among all stakeholders around critical policy issues, and disseminate globally sourced examples of successful innovation and best practice in policy system capacity building.

The project is comprised of an integrated set of four components that feed into these two objectives:

Component 1: Policy/strategy advising. This component is responsible for consulting with stakeholders and getting a sense of policy issues, doing outreach from research results to policy audiences, and conducting policy analysis.

Component 2: Agrifood value chains (AFVCs). This component is responsible for learning about AFVCs and the specific issues faced by each one in terms of the field research and analysis, outreach of the study results, policy advising from the results, and capacity building for doing similar work.

Component 3: Household and communities livelihoods. This has the same set of responsibilities as the second component, but for its study area.

Component 4: Capacity and network building. This component funnels, cross-fertilizes, documents, and organizes the capacity building actions of the other three components. This is so other institutions interface with the project in a continuous way and builds to a body of imparted method and approach.

Overview by FY 2017-2018 Quarter

Quarter 1 (October 1, 2017-December 31, 2017)

- Four off-farm value chain surveys were rolled out in the Central Dry Zone. 1) Agricultural machinery suppliers; 2) Agricultural machinery rental service providers; 3) Oil mills; 4) Pulses & oilseed traders. More than 700 interviews were completed.
- The project pushed forward with a pilot program for decentralization of research at regional level through a joint research-extension initiative.
- The project participated in several subsector strategy reviews, including fertilizer, pulses and coffee.
- An agricultural policy course for Ministry of Agriculture Livestock and Irrigation (MOALI) staff was implemented jointly with Yezin Agricultural University, and 8 Myanmar nationals were sponsored to attend the USAID funded Asia Regional Strategic Analysis and Knowledge Support System (Re-SAKSS) regional policy workshop in Bangkok.
- The project participated actively in outreach activities in Myanmar and the region. A draft FY18 workplan was submitted and revised.

Quarter 2 (January 1, 2018-March 31, 2018)

- Data collection and preliminary analysis of four off-farm value chain surveys in the Central Dry Zone were completed. The four surveys are as follows: 1) Agricultural machinery suppliers; 2) Agricultural machinery rental service providers; 3) Oil mills; 4) Pulses & oilseed traders. More than 700 interviews were completed.
- A survey of variety adoption and seed demand for the Dry Zone was designed and tested.
- The project supported MOALI with the launch of the first pilot program for decentralization of research at regional level through the Sagaing Regional Research Center – a joint research-extension initiative. A second agricultural policy course for MOALI staff was implemented jointly with Yezin Agricultural University, focusing on the preparation of policy briefs. The project also prepared a policy note for the MOALI on options for responding to low pulse prices as a result of the India pulse import restrictions, and also provided advice to Myanmar Rice Federation and advisors on rice price policy.
- The project participated actively in outreach activities in Myanmar, including a keynote presentation on reform of the research system at Yezin Agricultural University (YAU), a presentation on irrigation strategy hosted by MOALI in NayPyiTaw, and a set of three presentations at the World Bank Myanmar Food System Modernization workshop. The project also reviewed and provided feedback on the draft fertilizer strategy prepared by USAID implementing partner International Fertilizer Development Center (IFDC).
- At the request of the Livelihoods and Food Security Trust Fund (LIFT) Fund Management Office Director Katy Webley, the project prepared a background briefing paper on changes in Myanmar's rural economy and implications for a future phase of LIFT programming.

- Finally the project organized an internal review of research and policy activities with a view to maximizing impact before its planned closeout in September 2019. The review served as an opportunity to welcome Dr. Isabel Lambrecht, a fulltime-IFPRI researcher funded by the LIFT costed extension approved in late 2018.

Quarter 3 (April 1, 2018-June 31, 2018)

- This quarter saw the completion of 90% of data collection for this year’s major household survey, the Shan Agriculture and Rural Economy Survey (SHARES). Close to 1400 households were interviewed, using a tablet based survey instrument. Full completion of the household component of the survey was delayed due to refusal of township authorities to allow access to 10 village tracts in Southeast Shan.
- The Dry Zone Seed Demand Survey was completed and initial analysis took place, indicating very, limited penetration of improved seed varieties. Preparations to undertake DNA fingerprinting analysis to compare seed of varieties in use by farmers with released varieties were initiated.
- Analysis of the off-farm value chain components of the Rural Economy and Agriculture Dry Zone survey continued and is now well advanced. Published outputs are expected next quarter.
- FSP team member Boughton participated in an April 5 briefing for Ambassador Scott Marciel at the US Embassy on what the project has learned about agriculture and the rural economy in Myanmar, and implications for the new Agricultural
- Development Strategy, and presented similar findings at a meeting of USAID Economic Growth office implementing partners on June 1 hosted by Matt Curtis.
- Several policy relevant written research outputs based on the Rural Economy and Agriculture Dry Zone survey (READZ) household survey component were finalized, ready for publication early in quarter 4.

Quarter 4 (July 1, 2018-September 31, 2018)

- Completion of SHARES household surveys with 1564 households in 99 enumeration areas (EAs) in 9 townships of southern Shan State, including 11 replacement EAs. Completion of first phase of community survey with 99 communities in 99 EAs
- Cleaning of data from SHARES household survey and first phase of SHARES community survey.
- SHARES data analysis retreat, Pyin Oo Lwin, September 9-23.
- Participation in International Conference of Agricultural Economists (ICAE), Vancouver July 28-August 2. Completion of draft diagnostic review of crops research system and extension linkages.

Detailed Activities and Accomplishments by Component

Component 1: Policy/strategy advising.

Quarter 1 (October 1, 2017-December 31, 2017)

The project was engaged in the Agricultural Development Strategy of MOALI, Pillar 2 – increasing farm productivity and incomes. A key recommendation was decentralization of research and a pilot proposal for Sagaing Region was developed and submitted to the Minister for approval. The project Department of Agricultural Research (DAR), Department of Agriculture (DOA) and the Ministry of Education.

The project participated in a review of the pulses strategy developed by DAR, in collaboration with Australian Centre for International Agricultural Research (ACIAR). The pulse sector has been challenged by the Indian import ban on pulses. Pigeon peas and black gram prices have been especially severely affected. The project developed a policy note for the Minister in preparation for a visit to India in early January. The project also participated in strategy reviews led by other USAID IPs – fertilizer strategy led by IFDC, and coffee strategy led by Winrock.

To strengthen linkages between the Agricultural Policy Now (APU) policy agenda and the FSPP research agenda a 2-day joint research planning workshop was organized to design a variety adoption and seed demand survey. Access to quality seed of improved varieties is a key constraint identified by the Agricultural Development Strategy (ADS). Participants came from APU, DOA, DAR, the Wageningen University implemented (ISSD) project and MSU. Following a day of brainstorming to define study objectives, crop and geographical coverage, methods and timeline, researchers presented them to DOA managers. Following further survey instrument development and testing the survey will be implemented in the first half of calendar 2018.

At the request of Permanent Secretary Tin Htut, the project worked with Dr Theingi Myint, (YAU), and Dr Thanda Kyi, Department of Planning (DOP) to prepare a background paper on the role of rice in Myanmar's economy for an IIRRI symposium as part of the 100th anniversary of the India Economics Association. The paper provided an opportunity to highlight policy challenges facing the sector and will complement work by IFPRI on an irrigation strategy for Myanmar.

Quarter 2 (January 1, 2018-March 31, 2018)

The project is actively engaged in supporting the Agricultural Development Strategy of MOALI. Although still in draft form the project is heavily engaged in Pillar 2 – increasing farm productivity and incomes:

- APU supported DAR in its reform process to increase effectiveness in terms of technology adoption. A policy brief was submitted to the Permanent Secretary, Dr. Tin Htut, and the Deputy General (DG) of DAR in February. A key recommendation was the decentralization of research to regional level and the first pilot program in was launched in Sagaing Region in February in Monywa. Consultations with farmers in three townships were undertaken by joint teams of research and extension workers to ascertain their needs for improved technology. Following presentation of the findings at a “town hall” meeting with the Sagaing regional minister of Agriculture and farmers’ representatives, a workplan was presented at the national agricultural research and extension meetings in May.
- Also in support of the ADS Pillar 2, FSPP staffed worked jointly with MOALI's Seed Division, IFPRI and the ISSD project to design and test a study of variety adoption and seed demand covering eight crops in the Dry Zone. The survey was undertaken in the second quarter with a target of 1,700 households from 140 villages in six townships (two each in the regions of Magway, Mandalay and Sagaing) through a subcontract with a private sector survey company, Myanmar Market Research and Development (MMRD). Former CESD research associate Myat Thida Win, currently undertaking MS studies in Agricultural Economics at MSU, returned to Myanmar to undertake thesis research on this topic over the summer.
- Irrigation strategy, like reforms of the agricultural research and seed supply systems, is a critical element of ADS Pillar 2. MOALI hosted a policy forum on March 20 in NayPyiTaw where IFPRI researchers Dr. Mark Rosegrant and Ms. Rowena Valmonte-Santos presented the results of a geo-spatial analysis of Myanmar's technical and economically feasible irrigation development, including

the impact of trade policies. The forum was opened by Dr. Tin Htut, Permanent Secretary and attended by Mr. U Zaw Min Htut, Director, Irrigation Department, MOALI as well as directors from other government institutions. Experts from the government offices such as from the Department of Agriculture and Irrigation Department among others, and academe including Yezin University also participated as well as development partners like Japan International Cooperation Agency (JICA), Korea International Cooperation Agency (KOICA), International Water Management Institute (IWMI) and donor agencies consisting of World Bank and USAID. A follow up meeting was also held in Yangon for USAID and LIFT, as well as in-country researchers.

- At the request of the IFDC country Director, FSPP staff undertook a review of the draft fertilizer strategy and provided comments.

Quarter 3 (April 1, 2018-June 31, 2018)

Three members of the FSPP team (Boughton, Lambrecht and Nilar Aung) participated in an April 5 briefing for Ambassador Scott Marciel at the US Embassy on what the project has learned about agriculture and the rural economy in Myanmar, and implications for the new Agricultural Development Strategy. Also participating in the briefing were DCM George Sibley, USAID Mission Director Teresa McGhie, members of the USAID Economic Growth Team and USDA representative Nelson.

FSPP team member Boughton presented similar findings at a meeting of USAID economic Growth office Implementing Partners on June 1 hosted by Matt Curtis.

FSPP continued to support reform preparations of DAR through the Sagaing Regional Research Centre pilot program, also supported by USAID funded Developing Local Extension Capacity and the Farm Business Advisory Services unit of Proximity Designs. The first program for this nationally funded initiative was presented at the national research and extension meetings in May. The project also updated its policy brief on DAR reform in response to comments received.

FSPP team member Boughton served as a facilitator for the crop subsector working group meeting following the launch of the Agricultural Development Strategy meeting in NayPyiTaw on June 7. Prior to the launch consultations were held with Tin Htut Oo and the Department of Planning to develop an agenda for the working group consultation.

FSPP provided context information and catering support for the Enabling Business in Agriculture training for the Department of Planning implemented by Amy Chambers on behalf of Fintrac. This is the second time the two organizations have teamed up, the previous occasion being a USAID Global Learning and Engagement Event (GLEE) in Bangkok in April 2017.

A number of policy relevant written research outputs were finalized. As of the end of the quarter they were undergoing proofing and branding, ready for publication early in quarter 4. These are listed below as follows:

- A research report and research highlight on “Impacts of Mechanized Land Preparation and Harvesting on Crop Production in Myanmar’s Dry Zone”. Derived from data from the household component of the READZ, these examine the relationship between mechanized land preparation and mechanized threshing and harvesting, and crop yields, profitability, and demand for labor in paddy, sesame and groundnut cultivation.

- A research report on “Crop Production and Profitability in the Dry Zone” summarizing key findings from READZ on paddy, sesame, groundnut, and pulses production, with respect to irrigation access, cropping patterns and intensity, marketing, crop losses, gross margins, yields, and technological change. The study finds that, due to changing weather patterns, crop losses from flooding and drought are now the major contributing factor to low and variable returns, discouraging farmer investment in improved technologies.
- A research report on “Myanmar’s Rural Economy: A Case Study in Delayed Transformation” was finalized. The study is based on results from the Delta and Dry Zone surveys, building on an earlier briefing note prepared for the LIFT fund in January, finds that agricultural productivity and profitability is very low, undermining its potential contribution to rural economic growth over the longer term.
- An updated report on the Myanmar pulses sector, originally published in 2014, with a focus on the India trade embargo that resulted in major negative price shocks for black gram and pigeon pea. The motivation for updating the 2014 report was the submission of a policy memo to H.E. Union Minister of Agriculture, Livestock and Irrigation on short and long-term options for responding to the situation.
- A paper titled “Give a Man a Fishpond: Modeling the Impacts of Aquaculture in the Rural Economy” was published by Filipski and Belton in the journal *World Development*, based on FSP survey work in the Delta. The paper finds that: (1) aquaculture generates much higher incomes per-acre than agriculture; (2) aquaculture generates larger income spillovers than agriculture for non-farm households by way of retail and labor markets; (3) small commercial fish farms generate greater spillovers than large fish farms. These results bolster the notion that fish-farming, and in particular small-scale commercial aquaculture, may have a significant role to play in rural development and poverty reduction, and thus has significant policy implications for Myanmar.

Quarter 4 (July 1, 2018-September 31, 2018)

The following policy relevant written research outputs were published:

- A report on agricultural mechanization outsourcing in the Dry Zone (*Mechanization Outsourcing Services in Myanmar’s Dry Zone*). Outsourcing of CH and 4WT services is a recent phenomenon, and has expanded extremely rapidly and has been vital to facilitating rapid agricultural mechanization in Myanmar over the past five years. The report presents results from the first ever study of agricultural machinery outsourcers in Myanmar.
- (2) Publication of paper in *Marine Policy* journal on priorities for policy reform in fisheries and aquaculture (*Myanmar’s Fisheries in Transition: Current status and opportunities for policy reform*). This article presents an overview of the current state of knowledge on governance, livelihoods, production and supply chains across Myanmar’s three main fishery sub-sectors (marine capture, inland capture, and aquaculture). The analysis is contextualized with a review of major changes in the country’s policy history affecting fisheries. It is argued that Myanmar’s fisheries sit at a potential cross-road in terms of their governance. The article draws parallels with regional experiences to outline sectoral recommendations for policy reform.

Components 2 & 3: Agrifood Value Chains & Household and Communities Livelihoods.

In the following we combine outputs under components 2 and 3 as they are achieved through the same integrated sets of survey based activities.

Quarter 1

Research under project components 2 and 3 during Quarter 1 focused intensively on preparations for, and rollout of the non-farm enterprise components of the READZ. Four off-farm value chain surveys were implemented during this period: 1) Agricultural machinery suppliers; 2) Agricultural machinery rental service providers; 3) Oil mills; 4) Pulses & oilseed traders.

These surveys aimed to establish a baseline of data on upstream (machinery supply and rental) and downstream (oilseed and pulse trading, and oilseed milling) segments of key Dry Zone agricultural value chains. This will provide as a basis for understanding the performance of smallholders and small and medium enterprise in terms of productivity, profitability, employment generation, and identifying technical and institutional bottlenecks and other entry points for improving agriculture and the rural non-farm economy.

All four questionnaires were implemented by tablet, using the World Bank's Survey Solutions software. Digital data collection using tablets enhanced the accuracy of data collection. Training of 20 enumerators took place from November 15-24 in Sagaing. Additional support for survey rollout and data cleaning and management was provided by Percy Fang, a research assistant from IFPRI.

Sampling was conducted using lists of enterprises in the categories of interest in the Dry Zone. This was compiled using data provided by traders' and millers' associations and commodity exchange centers in all major urban areas and commercial centers of the Dry Zone (Mandalay, Magway, Monywa, Shwebo, and Pakkoku), and the listing of rural oil mills and rental service providers in villages covered by earlier rounds of the Rural Economy and Agriculture Dry Zone community survey. Enterprises were selected from these lists at random for interview (or, in the case of machinery dealerships and urban oil mills, were selected with 100% probability).

The total number of interviews conducted was 742, comprised of: 182 oil mills (of which 38 rural, 144 urban); 376 traders; 123 machine rental service providers (including 43 combine harvester owners and 92 four-wheel tractor owners); 60 machinery dealerships.

Each of the four questionnaires included questions on asset ownership and acquisition, human capital, business history, source of investment capital, employment, seasonality, costs and returns, product and service assortment, historical trade volumes, and location of customers and suppliers. Most interviews were completed by the end of the quarter, leaving only a small number of 'mop up' interviews to be completed in early Q2 of 2018.

Quarter 2

Research under project components 2 and 3 focused on completion of data collection and preliminary analysis for the non-farm enterprise components of the READZ, and completion of scoping and household and community questionnaire design for the SHARES.

The four off-farm value chain surveys that complete the READZ include: 1) Agricultural machinery suppliers; 2) Agricultural machinery rental service providers; 3) Oil mills; 4) Pulses & oilseed traders.

These surveys will establish a baseline of data on upstream (machinery supply and rental) and downstream (oilseed and pulse trading, and oilseed milling) segments of key Dry Zone agricultural value chains as a basis for understanding the performance of smallholders and small and medium enterprise in terms of productivity, profitability, employment generation, and identifying technical and institutional bottlenecks and other entry points for improving agriculture and the rural non-farm economy. Each of the four questionnaires included questions on asset ownership and acquisition, human capital, business history, source of investment capital, employment, seasonality, costs and returns, product and service assortment, historical trade volumes, and location of customers and suppliers.

Preliminary analysis of the data on oilseed traders and pulse traders was completed during this period. This work will continue in Q3, along with further analysis of farming systems and impacts of mechanization on farm profitability, realized crop yields and demand for labor.

The major thrust of research undertaken during Q3 was preparation for the SHARES. Intensive scoping activities initiated in Q1 were expanded. Scoping interviews were conducted with more than 80 maize and pigeon pea farmers, maize traders, and government officials in a total of 21 townships in South and North Shan.

At the same time, village tract level data on the area under cultivation of maize, pigeon pea and other crops was collected from township offices of the Department of Agricultural Land Management and Statistics to provide the basis for household survey sample frame development. Maize traders, machinery supply businesses and agricultural input supply businesses were also identified and listed to provide a sample frame for subsequent surveys on off-farm value chain segments.

Household and community questionnaires were designed on the basis of these scoping activities, and intensive pre-testing was undertaken prior to the Thingyan holiday season. For the first time, the household survey will be implemented entirely by tablet, using Survey Solutions software. Given security concerns in North Shan, it was eventually decided to limit survey activities to South Shan. The household survey will be rolled out in the following townships: Lawsawk, Pindaya, Thauγγgyi, Hopong, Hsiseng, Pekon, Pinlaung, Namsang, Mongnai and Langkho. The community survey will be implemented in all 10 townships where the household survey takes place, as well as in Laikha, Loilem, Kalaw and Nyangshwe.

The project undertook an internal review of research findings and methods to date on February 21 and 22, with consideration of implications for future work until September 2019. The meeting was attended by all CESD, MSU and IFPRI research staff involved in the project and was extremely helpful in identifying what had worked well in the past, as well as past mistakes. This learning enabled planning for more efficient and impactful further research, capacity building and policy activities.

The project was invited by Katy Webley (LIFT) to prepare a briefing document for LIFT Fund Board as an input into the design of the next phase of LIFT investments in Myanmar. The document (included as Annex 2) synthesized key findings from FSP research on Myanmar's transforming rural economy over the period 2014-2018, to provide context for the Fund Board's planning activities.

Quarter 3

Three major pieces of research work took place during this quarter. (1) Preparations for and rollout of the SHARES; (2) Completion of the Dry Zone Seed Demand Survey fieldwork; (2) Completion of the Dry Zone

Seed Demand Survey fieldwork; (3) ongoing analysis of the off-farm components of the Rural Economy and Agriculture Dry Zone survey (READZ). These are addressed in more detail, in sequence below:

Shan State Agriculture and Rural Economy Survey (SHARES): Preparations for and implementation of SHARES occupied the most of the research team for the whole of this calendar quarter. This was comprised of the following elements:

- 1) Extensive pre-testing and finalization of 2 digital survey instruments (a household survey and a community survey) using the World Bank's Survey Solutions Application).

The **household survey** contains module on the following areas: Household composition, Housing characteristics, Household history, Migration, Non-farm employment, Ownership of productive assets, Land ownership, History of agricultural parcels, Cropping patterns, Use of seed, inputs, labor, machinery, draft animals and credit in the production of maize and pigeon pea, maize and pigeon pea marketing behavior, Subjective perceptions of maize cultivation, History of technological change in maize and paddy cultivation, History of agricultural asset ownership, Shifting cultivation, Sources of investment in agriculture, Utilization of agricultural and non-agricultural credit, Livestock, Food and non-food consumption expenditure.

The **community survey** contained modules on: Access to schools, healthcare, electricity, mobile networks, markets, development projects, irrigation and credit; Crop cultivation patterns; Agricultural wages; Inward migrants; Inventories of agricultural and non-farm businesses; Land use; Membership of farmers' associations; Environmental change; Conflict. Most of these are recall questions, which ask respondents to compare current conditions to those five years and ten years ago, allowing for changes to be identified.

SHARES is the most comprehensive and ambitious fielded by FSP to date, building on experience of previous survey implementation and extensive scoping work. Implementation of both surveys using tablets required substantial efforts upfront, but is expected to pay off in the form of a more quickly accessible, cleaner dataset.

- 2) Finalization of sample frame. Finalization of sampling frame. The sample was designed to represent the rural populations of Lawsawk (Yatsauk), Pindaya, Taunggyi, Hopong, Hsi Hseng, Pekon, Pinlaung, Namsang (Namhsan South), Mongnai (Moe Nae) and Langkho (Linkhae) townships growing maize or pigeon pea. These townships after scoping work indicated that they had high levels of maize and/or pigeon pea cultivation. Village tracts in these townships were stratified into twelve strata based on location (north, south/west and east) and production (high maize, high pigeon pea; high maize low pigeon pea; high pigeon pea, low maize; and low maize, low pigeon pea). The strata were merged into the census frame. A predetermined number of enumeration areas per stratum were selected at random from the frame of the national household census, based on probability proportional to size

Sample selection was done in collaboration of the Department of Population of the Ministry of Labour, Immigration and Population who selected the sample of EAs from the census sampling frame on behalf of FSP, and with the support of the Department of Planning of MOALI who request this assistance on behalf of the project. Unfortunately, except for a few roadside villages, access to Namsang township was denied by the township authorities on the basis of security concerns. Access to two selected village tracts in Langkho was also denied for the same reason. It was therefore necessary to drop Namsang

from the sample altogether, and select EAs from 12 alternate village tracts in Mongnai and Langkho. These will be surveyed early in the fourth calendar quarter.

- 3) Recruitment and training of local enumerators. This was essential due to the linguistic and ethnic diversity found in Shan. 56 enumerators were recruited in Shan State and trained for three weeks in classroom and field based settings prior to survey implementation.
- 4) Rollout of SHARES household and community surveys. This proceeded to plan, from June 2 to July 8, with the exception of difficulties in obtaining permission to conduct the survey in Southeast Shan, as noted above. As of July 6, a total of 1395 households and 88 community surveys were completed.
- 5) Conducting the surveys using tablets. This made it possible develop a system to rapidly check data for outliers and inconsistent answers, by downloading the data as soon as interviews were completed and running code that flagged possible issues based on parameter ranges. Questionnaires with flagged questions were automatically returned to survey supervisors for resolution.

Dry Zone Seed Demand Survey: The Dry Zone seed demand survey was completed on April 10. The survey was undertaken by FSPP partners MSU and IFPRI, in collaboration with Department of Agricultural Research and the Seed

Division of the Department of Agriculture of MOALI, and the Integrated Seed Sector Development project implemented by Wageningen University. The survey was implemented by a local contracted survey company, MMRD, using SurveyCTO tablet software with technical support from IFPRI and additional field supervision from CESD staff. As in the case of SHARES, the sample was selected by the Department of Population of the Ministry of Labor Immigration and Population at the request of the Department of Population of MOALI.

Preliminary results of the survey, analyzed in early May and shared with the mission, reveal very limited penetration of the seed market by either government or traders. Nearly all seed sourced by farmers comes from other farmers without any formal sector intervention. Farmer-reported adoption of improved varieties is low, even for rice, and especially low for oilseeds. The average age of variety used by farmers is approaching 15 years, and average age of seed planted is approaching 10 years. These results suggest the potential for considerable increases in productivity if improved varieties and quality seed are made accessible to farmers and perform as expected under farmers' management conditions.

The full survey data set collected on tablets was made available to analysts only at the end of June as the FSPP survey management specialist was fully occupied with field work challenges related to the roll out of SHARES. With the benefit of perfect hindsight we should have provided additional post-data collection data management support for the seed survey, but no-one anticipated the scale of the logistical challenges of implementing SHARES, aggravated by unanticipated changes in township level authorization for sampled EAs. Researchers used the intervening period to develop a data analysis plan using the resources of all three partner organizations to be able to report on the study at the next national seed sector platform meeting scheduled for September 25.

Project-funded MSU graduate research assistant Myat Thida Win is spending the summer in Myanmar to conduct additional research on farmer willingness-to-pay with support from MSU Professors Mywish Maredia and David Ortega. Myat Thida Win is also part of the seed household survey data analysis team.

As many farmers are not sure of the origin of their seed, the project plans to undertake DNA fingerprinting analysis to compare seed of varieties in use by farmers with released varieties. Preparation of farmer and breeder seeds samples is underway by the DAR Seed Bank. One unexpected finding of this exercise is that the DAR Seed Bank does not maintain germplasm of all the released crop varieties or the parent lines used to develop them. The Seed Bank focuses primarily on the storage of indigenous accessions. To include released varieties for comparison with farmers' seed in the planned DNA finger printing research, the Seed Bank has begun a collection of released varieties from the DAR units responsible for breeding them. In some cases it appears that there is no longer any seed of released varieties in the country. In the case of rice the project is working with the IFPRI gene bank in Los Banos to obtain samples. The DG of DAR plans to correct this gap in variety conservation by the Seed Bank going forward and it may turn out to be an important, if unexpected, contribution of the study.

READZ off-farm value chain survey: Generation of detailed results tables from all survey modules of agricultural machinery rental service providers was completed during this period. Analysis of data from the READZ agricultural machinery dealership survey was also initiated. These results will be written up for publication in Q4, along with analysis (already completed) from the READZ pulse and oilseed traders and oil mills surveys.

Quarter 4

Major work under this component during quarter four comprised the following:

- Rollout and completion of SHARES household surveys with 1564 households in 99 enumeration areas (EAs) in 9 townships of southern Shan State. This including 11 replacement EAs in Southeastern Shan, selected following refusal by township GAD office to allow access to communities in Namsang due to security concerns. The need for staff of the Department of Population to draw a sample of replacement EAs and for travel authorizations to be granted by Shan GAD led to a hiatus in the survey of more than 6 weeks.
- Cleaning of all data associated with SHARES household survey and first phase of SHARES community survey complete. This took place mainly while the survey was in the field and during the hiatus in the survey while permission was sought to work in replacement EAs. A set of automated checks were developed that allowed for the data to be downloaded from the field, checked, and returned to field teams with issues flagged the following day for resolution. This approach greatly improved data quality and minimized lead times for cleaning post-survey.
- SHARES data analysis retreat, Pyin Oo Lwin, September 9-23, including 13 CESD staff, 3 MOALI agricultural policy unit staff, 5 MSU and 2 IFPRI staff. This annual event was held to ensure speedy analysis of survey data and generate a series of quick outputs that could be shared with donors in written and oral presentation form. In addition to ensuring rapid development of policy relevant research outputs, the retreat offered an opportunity to develop the capacity of staff of CESD and members of the MOALI Agricultural Policy Unit in data analysis using STATA software, and in the identification of significant results and their presentation in written, graphical and oral formats. The intensive 2 week retreat allowed all those involved to substantially improve their skills in all these areas.
- Rollout and completion of SHARES community survey to 99 enumeration areas (EA) in 9 townships of southern Shan State during the implementation of the SHARES household survey (a community survey was conducted in all household survey villages). A contract was completed with a private

company - Myanmar Marketing Research and Development (MMRD) - for an extended survey of an additional 225 communities across 12 townships (total 325 communities in 9 original plus 3 additional townships). Two CESD and one MSU staff led training for 22 MMRD enumerators (recruited from the pool of enumerators used in the SHARES household survey) from September 24-26.

- During this quarter preparations for the off-farm value chain segment phase of the SHARES survey were initiated, with the drafting of a questionnaire for maize traders and agricultural input suppliers, for pre-test in Q1 of year 5.

Component 4: Capacity and Network Building.

Quarter 1

The first of a two-part agricultural policy course was conducted at Yezin Agricultural University for 30 participants from MOALI, YAU, CESD and LIFT. The course was developed jointly by Dr Theingi Myint (YAU), Dr Thanda Kyi (DOP) and Dr Suresh Babu (IFPRI), and opened by Permanent Secretary Dr Tin Htut and Travis Guymon of USAID. The next part of the course will be offered in March 2018. In the intervening period seven groups of students will work on specific policy case studies. A detailed report on the workshop can be found in Annex 1.

This quarter saw a large number of outreach, and network and capacity building activities. These are summarized below:

- October 2: Presentation on “Myanmar’s Changing Rural Economy: Evidence from the Delta & Dry Zone” to the LIFT fund board, at the LIFT donor retreat. Australian Club, Yangon.
<https://www.canr.msu.edu/resources/myanmar-s-changing-rural-economy-evidence-from-the-delta-dry-zone>
- November 1: Paper on “The Rapid Rise of Agricultural Mechanization in Myanmar”, presented at IFPRI & CIMMYT conference on *South-South Knowledge Sharing on Agricultural Mechanization*. Addis Ababa, Ethiopia. <https://www.canr.msu.edu/resources/the-rapid-rise-of-agricultural-mechanization-in-myanmar>
- November 9: disseminated 2 draft research highlights on agricultural land and agricultural credit to USAID & LIFT fund board members.
<https://www.canr.msu.edu/resources/agricultural-land-in-myanmar-s-dry-zone>,
<https://www.canr.msu.edu/resources/agricultural-credit-access-and-utilization-in-myanmar-s-dry-zone>
- November 13: disseminated 1 draft research highlight on climate change in the Dry Zone to USAID & LIFT fund board members.
- November 16: Keynote speech at the *Myanmar Fisheries and Aquaculture Research Symposium*. Novotel, Yangon. (Organized by WorldFish), titled “The Emerging Quiet Revolution in Myanmar’s Aquaculture Value Chain”. <https://www.canr.msu.edu/resources/agricultural-credit-access-and-utilization-in-myanmar-s-dry-zone>. The research on which the presentation was based was subsequently featured in a full page article in *Myanmar Times*. <https://www.mmtimes.com/news/new-aquaculture-economy-emerged-rising-fish-demand.html#.Wg8b5WsyVLo.email>

- December 5: Jointly organized and led double session on “Reimagining Rural Myanmar” at the *Agrifood XXIV Conference*, Bandung Institute of Technology, Bandung, Indonesia. Featuring 10 presentations on social and economic change in rural Myanmar, including three papers from FSP on: 1) Rural transformation; 2) Migration; 3) Capture fisheries. Papers presented will feature in a journal special issue on the same topic.
- December 13: Attended IFPRI workshop on *Agriculture and Rural Transformation in Asia: Past Experiences and Future Opportunities*. Bangkok, with delegation of eight staff from MOALI, YAU, CESD and Myanmar Development Institute (MDI). FSP staff presented four papers of research findings from Myanmar, covering: mechanization, pulses, migration, and aquaculture value chains.
<https://www.resakss-asia.org/2017-resakss-asia-conference-agriculture-and-rural-transformation-in-asia-2/>
- December 15: Disseminated 2 draft research highlights on agricultural technology change and off-farm employment to USAID & LIFT fund board members. <https://www.canr.msu.edu/resources/ten-years-of-technological-change-in-dry-zone-agriculture> ; <https://www.canr.msu.edu/resources/rural-off-farm-incomes-in-myanmar-s-dry-zone>

Quarter 2

The second part of a two-part agricultural policy course was conducted at MOALI for 30 participants from MOALI and YAU. The course was developed jointly by Dr Theingi Myint (YAU), Dr Thanda Kyi (DOP) and Dr Suresh Babu (IFPRI), and opened by Permanent Secretary Dr Tin Htut. This part of the course focused on the preparation of policy briefs on specific topics.

This quarter saw several important outreach and network and capacity building activities. They included:

- Boughton (MSU) gave keynote presentation on reform of Myanmar’s agricultural research system at the 11th Annual Research Conference of Yezin Agricultural University, January 17, 2018;
- Belton (MSU), Filipski (IFPRI) and Aye Cho (CESD) gave a set of three presentations on transformation of Myanmar’s rural economy at the World Bank workshop on Modernising Myanmar’s Food System in Yangon on February 22, 2018. The presentations covered recent trends in migration, rural wages, mechanization, land access and farm productivity and profitability;
- Dorosh (IFPRI) gave a presentation on Myanmar rice markets and price policy to the Myanmar Rice Federation in Yangon on February 23, 2018;
- Rosegrant (IFPRI) presented geo-spatial analysis of technical and economically feasible irrigation development at a policy forum on irrigation strategy in NayPyiTaw on March 20;
- Boughton (MSU) gave presentations on the role of regional research centers in Monywa on March 14 (research and extension staff) and March 24 (Sagaing regional government and farmers’ representatives);
- Belton participated in a workshop on identifying promising technologies and approaches to promote the sustainable intensification of aquaculture and estimating the likely impacts of their adoption on February 13-15, in Penang, Malaysia. The workshop, organized by Stockholm

Resilience Center and WorldFish was the first step toward development of a paper for a high impact policy relevant journal (e.g. Nature) and recommendations

Quarter 3

In addition to the presentation of findings from FSPP surveys in the Delta and Dry Zone to US Embassy and IPs, a presentation was also made to final year YAU students interning with DAR. The majority of students plan to spend their careers in the private sector and very few in research. It turns out that the criterion for selecting students to intern with DAR was whether they have access to accommodation rather than whether they are interested in research. The presentation gave an opportunity for the YAU final year students to see their future career options in a food system perspective. For example, when you go to a restaurant you don't have options on the menu for chilli sauce with or without aflatoxin. It has to be eliminated before it gets to the restaurant. How will that happen?

Belton gave a presentation titled: "Deltas and Clusters: Explaining the economic geography of Asian aquaculture" at a workshop on Comparative Assessment of Transformations in Livelihoods in the Ayeyarwady, Ganges and Mekong Deltas, hosted by the Institute of Geography, University of Cologne, Germany, on April 6, 2018.

Quarter 4

The major outreach and networking event during this quarter was the International Conference of Agricultural Economists (ICAE), Vancouver July 28-August 2, attended by 3 MSU and 2 IFPRI staff. The International Association of Agricultural Economists meeting is held once every three years to review trends and future outlook in the global food economy and its drivers. Project team members Nilar Aung (funded by CGIAR global program on Policies, Institutions and Markets), Belton, Boughton, Lambrecht and Filipski attended this year's triennial meeting in Vancouver July 28 – August 2. They participated in the following activities:

- Nilar Aung presented the team's paper on Myanmar's rural transformation at one day special session on challenges for late transforming countries organized by CGIAR Policies, Institutions and Markets global research program. The paper presented will be included in a publication based on the session.
- Learned from presenters from leading development institutions of experiences from other developing regions, including several overviews of global trends including urbanization, gender, incomes, rural population growth, demographic change, infrastructure, climate change and the future of work.
- Several planning meetings between MSU and IFPRI staff (Boughton, Maredia, Crawford, Awokuse, Reardon, Belton; Dorosh, Lambrecht, Filipski) to discuss project collaboration in Myanmar.
- Several meetings with Belton, Reardon, Boughton (MSU) and Lambrecht, Filipski (IFPRI) to discuss and plan for written research outputs for Y5 of project. To include: 1) comparative paper on Myanmar's rural transformation in regional context (based on Delta and Dry Zone surveys); 2) report and paper on mechanization outsourcing services (based on Dry Zone off-farm surveys); 3) report and paper on credit in maize value chains (based in Shan HH and off-farm surveys); 4) paper on relationship between non-farm employment, domestic and international migration and agricultural investments.

- Planning meeting with Boughton and Maredia on next stages in Dry Zone seed survey data analysis in preparation for Myanmar national seed sector platform.
- All team members met with researchers from Institute for Development Studies (UK) conducting research on swine value chains in Myanmar and researchers from Chiang Mai University (Thailand) conducting research on cattle exports from Myanmar to China. Discussed possibilities for future collaboration.
- Belton & Filipski met with senior IFPRI researcher Arndt Channing with access to World Bank MLCS 2017 dataset and discussed possibilities for obtaining permission to conduct analysis.
- Filipski presented paper on growth linkages and economic multipliers associated with small and larger scale commercial aquaculture and paddy farming in Myanmar

Belton attended the World Aquaculture Society Conference in Montpellier, France from August 26-28, at which he organized a session on *The Future of Aquaculture Value Chains*, gave two presentations, and participated in a panel discussion on the sustainable intensification of aquaculture. Details of the presentations are given below.

- “The Quiet Revolution in Aquaculture Value Chains” *World Aquaculture Society* conference. Montpellier, France, August 27, 2018.
- “Economic and Social Dimensions of Aquaculture Growth: Implications for Sustainability”. *World Aquaculture Society* conference. Montpellier, France, August 28, 2018.

Appendix A: Project Presentations

(<http://www.canr.msu.edu/fsp/countries/myanmar/presentations>)

[Economic and Social Dimensions of Aquaculture Growth: Implications for Sustainability](#)

Ben Belton, World Aquaculture Society, Montpellier, France, August 28, 2018

[The “Quiet Revolution” in Aquaculture Value Chains](#)

Ben Belton, World Aquaculture Society, Montpellier, France, August 27, 2018

[USAID Burma Food Security Policy Project: Supporting Agricultural Transformation in Myanmar.](#)

Presentation made at USAID Burma, Yangon, July 25, 2018.

[From Aspiration to Transformation: Myanmar Agriculture and the Rural Economy](#)

Duncan Boughton and Ben Belton, Yangon, Myanmar, June 1, 2018

[Strategic Planning for Irrigation Development in Myanmar](#)

Mark W. Rosegrant, NayPyiTaw, Myanmar, March 20, 2018

[Myanmar Migration in a Time of Transformation](#)

Mateusz Filipski, Ben Belton, Sithu Kyaw, and Eaindra Theint Thu, Yangon, Myanmar, February 22, 2018

[Conference Agriculture and Rural Transformation in Asia: Past Experiences and Future Opportunities](#), 12-

13 December, 2011, Dusit Thani International Hotel, Bangkok

- [The rapid rise of agricultural mechanization in Myanmar](#). Ame Cho, Research Associate, CESD.
- [Myanmar Migration in a Time of Transformation](#). Mateusz Filipski, Research Fellow, IFPRI.
- [The Emerging ‘Quiet Revolution’ in Myanmar’s Aquaculture Value Chain](#). Ben Belton, Assistant Professor, Michigan State University-Myanmar
- [Assessing Myanmar’s Agri-food Trade Comparative Advantages](#). Kevin Chen, Senior Research Fellow and Head of East Asia and Central Asia Office, IFPRI-Beijing
- [Myanmar - India Pulses Trade](#). Duncan Boughton (MSU-Myanmar) and Cho Cho San (MOALI/DOP)

[Myanmar’s Rapid Rural Transformation: Evidence from the Delta & Dry Zone](#)

Ben Belton, Mateusz Filipski, Aung Tun Oo, Aung Tun, Bandung, Indonesia, December 5, 2017

[Geographies of Labor on Myanmar’s Marine Resource Frontier](#)

Ben Belton, Melissa Marschke, and Peter Vandergeest, Bandung, Indonesia, December 5, 2017

[Domestic and International Migration in Myanmar: Determinants and Consequences](#)

Mateusz Filipski, Ben Belton, Sithu Kyaw, and Eaindra Theint Thu, Bandung, Indonesia, December 3-5, 2017

[The Emerging ‘Quiet Revolution’ in Myanmar’s Aquaculture Value Chain](#)

Myanmar Fisheries and Aquaculture Research Symposium, Novotel, Yangon, November 16, 2017

[The Rapid Rise of Agricultural Mechanization in Myanmar](#)

Benjamin Belton, Mateusz Filipski, Myat Thida Win, Xiaobo Zhang, South-South Knowledge Sharing on Agricultural Mechanization, IFPRI, CIMMYT, Ethiopian Agricultural Mechanization Forum. Addis Ababa, Ethiopia, November 1, 2017

[Myanmar's Changing Rural Economy: Evidence from the Delta & Dry Zone](#)

Benjamin Belton, LIFT Donor Retreat, Yangon, October 2, 2017

Appendix B: Papers

(<http://www.canr.msu.edu/fsp/countries/myanmar/publications>)

[Myanmar's Fisheries in Transition: Current Status and Opportunities for Policy Reform](#)

Xavier Tezzo, Ben Belton, Gareth Johnstone, Martin Callow, 2018. Myanmar's fisheries in transition: Current status and opportunities for policy reform, *Marine Policy* 97 (2018) 91-100

[Resilience through Risk Management: Cooperative Insurance in Small-holder Aquaculture Systems](#)

James R. Watson, Fredrik Armerin, Dane H.Klinger, Ben Belton, 2018. *Heliyon*

[Mechanization Outsourcing Services in Myanmar's Dry Zone](#)

Ben Belton, Peixun Fang, and Thomas Reardon, 2018. Mechanization Outsourcing Services in Myanmar's Dry Zone, Feed the Future Innovation Lab for Food Security Policy Research Paper 110. East Lansing: Michigan State University

[Emerging Trends in Aquaculture Value Chain Research](#)

Simon R. Busha, Ben Belton, David C. Little, Md Saidul Islam, 2018. Emerging Trends in Aquaculture Value Chain Research, *Aquaculture* 498 (2019) 428–434

[The Challenge of Export-led Agricultural Growth with Monopsonistic Markets](#)

Duncan Boughton, Steven Haggblade, and Paul Dorosh, 2018. Feed the Future Innovation Lab for Food Security Policy Research Paper 105. East Lansing: Michigan State University

[Myanmar's Rural Economy: A Case Study in Delayed Transformation](#)

D. Boughton, N. Aung, B. Belton, M. Filipski, D. Mather, E. Payongayong, 2018. Feed the Future Innovation Lab for Food Security Policy Research Paper 104. East Lansing: Michigan State University

[Mechanization and Crop Productivity, Profitability and Labor Use in Myanmar's Dry Zone - RP103](#)

David Mather and Ben Belton, 2018. Mechanization and Crop Productivity, Profitability and Labor Use in Myanmar's Dry Zone, Feed the Future Innovation Lab for Food Security Policy Research Paper 103. East Lansing: Michigan State University

[Crop Production and Profitability in Myanmar's Dry Zone](#)

David Mather, Nilar Aung, Ame Cho, Zaw Min Naing, Duncan Boughton, Ben Belton, Kyan Htoo, and Ellen Payongayong, 2018. Crop Production and Profitability in Myanmar's Dry Zone. Feed the Future Innovation Lab for Food Security Policy Research Paper 102

[Give a Man a Fishpond: Modeling the Impacts of Aquaculture in the Rural Economy](#)

Mateusz Filipski (IFPRI) and Ben Belton (MSU), 2018. Give a Man a Fishpond: Modeling the Impacts of Aquaculture in the Rural Economy, *World Development* 110 (2018) 205–223

[Fish Farms and Land Confiscation in the Ayeyarwady Delta: History, Impact and Prospects for Restitution](#)

SiuSue Mark. 2017. Feed the Future Innovation Lab for Food Security Policy Research Brief 44.

Appendix C: FTFMS Submission

Indicator / Disaggregation	Baseline Year	Baseline Value	2018		2019	Comments	Deviation Narrative
			Target	Actual	Target		
EG.3.2-1: Number of individuals who have received USG-supported short-term agricultural sector productivity or food security training [IM-level]		0	115	138	110	REVISED 2019 TARGET	
Type of Individual		0	115	138	110		
Producers				0			
Male							
Female							
Disaggregates Not Available							
People in government		0	30	41	30	No change	Strong interest in policy training participation for government
Male	2014	0	10	13	10	No change	1 is donor staff (FAO)
Female	2014	0	20	28	20	No change	4 are donor staff or consultants (FAO, LIFT)
Disaggregates Not Available	2014	0		0			
People in private sector firms				49		16	Unanticipated opportunity as a result of decision to field two major surveys and hire private sector data collection company
Male				24		8	
Female				25		8	
Disaggregates Not Available				0			
People in civil society		0	85	48	80	20	Shift in focus from civil society to government in preparation for Agricultural Development Strategy
Male	2014	0	30	10	40	10	
Female	2014	0	55	38	40	10	
Disaggregates Not Available	2014	0		0			
Disaggregates Not Available				0			
Male							
Female							

