

Supporting Digital Financial Services in Myanmar

ASSESSMENT OF THE POTENTIAL FOR DIGITAL FINANCIAL SERVICES IN AGRICULTURE VALUE CHAINS

DECEMBER 2015

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Table of Contents

Table of Contents.....	1
List of Abbreviations and Acronyms.....	3
A. Executive Summary.....	4
B. Background and Context.....	8
C. Digital Financial Services Plus Readiness Framework.....	12
D. Access to and Reach of Mobile Infrastructure.....	13
E. Adoption and Reach of Digital Finance Infrastructure.....	16
F. Role of Government and Regulation.....	25
G. Agriculture Sector Analysis and Value Chain Transaction Flows.....	28
Rice.....	29
Sesame (Oil Seeds).....	31
Pulses (Green Gram).....	33
Aquaculture.....	36
H. Agriculture sector challenges and financial services needs.....	38
I. Potential Applications of DFS.....	41
J. Bibliography.....	55
Annex 1 Assessment Objectives and Methodology.....	58
Annex 2 List of Stakeholders Consulted.....	60
Annex 3 Summary of Rapid Value Chain Assessment.....	61
Annex 4 Locations of FGDs and KIIs.....	63
Annex 5 Additional Details on Agriculture Sector in Myanmar.....	64
Annex 6 Additional Details on the Rice Value Chain.....	68
Annex 7 Additional Details on Sesame Value Chain.....	72
Annex 8 Additional Details on the Pulses Value Chain.....	77
Annex 9 Additional Details on the Aquaculture Value Chain.....	82
Annex 10 Note on Value Chain Transaction Map Data.....	86

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The assessment was conducted by Enclude, in partnership with FHI 360 and the U.S. Agency for International Development (USAID), under an initiative to *Support the Development of Digital Financial Services in Myanmar*. The in-field focus group discussions and key informant interviews were conducted by the Myanmar Marketing Research & Development (MMRD) Co., Ltd. The authors of this report are Nicholas Evans, Ali Akram, and Tricia Cuna Weaver. Contributors to and reviewers of this report include Josh Woodard, FHI360; Santhosh Thiruthimana, Enclude; Kay McGowan, USAID; Brooke Patterson, USAID; Megan Willis, USAID/Burma; and Daniel Swift, USAID/Burma.

Note on Exchange Rate and Interpreting Transaction Data

The local currency in Myanmar is the Myanmar Kyat (MMK). The United States Dollar (USD) equivalent used throughout this study was calculated at rate of USD 1 = MMK 1115, unless otherwise noted in the report.

List of Abbreviations and Acronyms

ADB	Asian Development Bank
ATM	Automated Teller Machine
CBM	Central Bank of Myanmar
Centri	Centre for Financial Regulation and Inclusion
CEXC	Commodity Exchanges
CGAP	Consultative Group to Assist the Poor
DFS	Digital Financial Services
FGD	Focus Group Discussion
G2P	Government to Person
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit – German Society for International Cooperation
IFC	International Finance Corporation
KII	Key Informant Interview
LIFT	Livelihoods and Food Security Trust Fund
MADB	Myanmar Agricultural Development Bank
MAP	Making Access to Financial Services Possible
MFI	Microfinance Institution
MKK	Myanmar Kyat (Currency of Myanmar)
MNO	Mobile Network Operator
MPT	Myanmar Post and Telecommunications
MPU	Myanmar Payments Union
mSTAR	Mobile Solutions Technical Assistance and Research
MT	Metric Tons
OECD	Organisation for Economic Co-operation and Development
P2P	Person to Person
POS	Point of Sale
USAID	U.S. Agency for International Development
VC	Value Chain

A | Executive Summary

Growth and development of Myanmar's agriculture sector is critical to the structural transformation process that will support broader economic and social development in the country. To accelerate this process, the Government of Myanmar has committed to increasing agricultural production to improve food security and reduce poverty, and to improving rural livelihoods by helping communities harness their physical, natural, and human capital.

Digital financial services (DFS) – defined as financial services delivered and accessed through digital channels and instruments such as mobile phones, cards, point-of-sale (POS) devices, and agent outlets – can play a critical role in supporting achievement of the Government's priority objectives by economically, securely, and transparently delivering financial services that the agriculture sector requires to improve productivity and raise rural incomes. As digital channels can drastically lower the cost and improve the speed at which funds are transferred between individuals, businesses, and organizations, DFS presents an opportunity to improve the efficiency and productivity of agricultural value chains. In turn, adoption and expansion of digital payments products helps to pave the pathway to expand access to credit, savings, and insurance in rural areas, allowing financial services providers to leverage the digital payments infrastructure. As private sector players and donors invest in initiatives to take advantage of untapped opportunities in Myanmar's agriculture sector, DFS can also complement and boost the impact of these initiatives by lowering operating costs and improving the efficiency of working with rural, agricultural segments. Moreover, DFS creates opportunities for new partnerships and business models to emerge, which focus on tailored approaches for serving the agriculture sector and lower-income segments.

In this context, the purpose of this study is to assess the potential for DFS to contribute to value chain efficiency and improved agricultural productivity, and to map the payment flows in four select agriculture value chains: rice, sesame, pulses (green gram), and aquaculture. The assessment findings shed light on the challenges faced by Myanmar's agriculture sector and its readiness for DFS. Based on these findings, the report includes recommendations on ways in which DFS could contribute to greater agricultural productivity and rural development, as well as areas for stakeholder involvement to further develop DFS in Myanmar.

To frame the findings and recommendations of the assessment, the report adapts and applies CGAP's DFS Plus readiness framework for Myanmar's agriculture sector, which is organized across six main dimensions, as follows:

1 | ACCESS TO AND REACH OF MOBILE INFRASTRUCTURE

After a prolonged period of underinvestment, mobile infrastructure in Myanmar has experienced rapid developments since the licensing of two foreign mobile network operators (MNOs), Telenor and Ooredoo, in 2013. Consistent with rising mobile penetration throughout the country, the assessment revealed substantial rates of mobile phone ownership among farmers and upper value chain actors. Although usage among farmers is mainly limited to voice calls, upper value chain actors also reported using their phones for a wider-variety of activities, such as to access the internet and send SMS. Coupled with the rapid spread of mobile network coverage, these mobile adoption and usage trends suggest a potentially strong foundation for mobile-enabled DFS.

2 | ADOPTION AND REACH OF DIGITAL FINANCE INFRASTRUCTURE

To date, six mobile money services initiatives have been piloted, launched, or are gearing-up to launch in Myanmar. However, continued regulatory uncertainty (discussed in Section 3 below) has made it difficult for many of these services to move beyond the planning phase, as key regulatory aspects are still under development. Nevertheless, providers are preparing to take advantage of the market potential for DFS in Myanmar, and the opportunity that it presents to address current limitations in the financial sector.

Although Myanmar's financial sector is experiencing impressive reforms and development, the country remains one of the world's most under-banked countries. The provision of financial services in rural areas is particularly low, with only 2.5 percent of loans going to the rural sector, despite the fact the sector accounts for 30 percent of Myanmar's gross domestic product (GDP) and two-thirds of jobs.¹ The main source of financing for Myanmar's agriculture sector is the Myanmar Agricultural Development Bank (MADB), though MADB credit covers only approximately half of the cost of production and has repayment terms that are not tailored to production cycles. Although other players including MFIs, cooperatives, and input dealers are also increasingly serving rural segments, their footprint is still small. As a result, there is a large unmet demand for affordable financial services that address the needs of the agriculture sector.

DFS provides potential solutions to address cost and efficiency concerns in serving agricultural segments, creating a stronger business case for providers and other stakeholders to increase their operations in rural Myanmar. Six DFS initiatives have already launched or are planning to launch in Myanmar. To expand competition and ensure sustainable developments in the DFS sector, however, an enabling regulatory environment is critical, as described below.

¹ OECD, *Multi-dimensional Review of Myanmar*, 2015.

3 | ROLE OF GOVERNMENT AND REGULATION

The Central Bank of Myanmar (CBM) issued a Mobile Banking Directive in December 2013, which established a bank-led model for the provision of mobile banking services. In early 2014, however, the CBM released a draft of the Dedicated E-money Issuer (DEMI) directive, which permits non-bank actors to issue electronic money (e-money) and utilize agents to conduct electronic transactions. Industry stakeholders are eagerly anticipating the release of final version of the DEMI; if it does in fact enable non-bank players to offer DFS, market dynamics would change significantly as the industry opens up to a wider range of institutions, such as MNOs and third-parties.

Allowing non-bank actors to operate in the DFS space has the potential to spur competition, encourage innovation, and in turn promote greater financial inclusion. Since financial institutions have been unable to fully take advantage of the opportunity to develop digital-centric models, allowing non-banks actors to enter the space could bring in the investments, infrastructure, and capacity needed for the scale-up of DFS in the country. At the same time, a robust regulatory environment for DFS strikes the right balance between promoting innovation and ensuring the safety and efficiency of the financial sector. Key elements of building an effective regulatory system for DFS therefore also includes instituting transaction limits and know-your-customer (KYC) requirements proportionate to perceived risk; promoting interoperability between providers; providing guidelines for emerging distribution models, such as shared agent networks and agent aggregators; and ensuring a level playing field by ensuring that dominant players do not exploit their position by blocking access to agents and communication channels, such as USSD.

4 | AGRICULTURE SECTOR ANALYSIS AND VALUE CHAIN TRANSACTION FLOWS

Agriculture is a key driver of Myanmar's economy, accounting for 30 – 40 percent of the country's GDP and 66 percent of employment. The four value chains that are the focus of this study - rice, sesame, pulses, and aquaculture – capture the bulk of agricultural economic activity in the country. For each value chain, the study mapped the transaction details between each value chain actor, the volume and value of transactions, payment frequency, number of actors receiving payments, number of transactions, average transaction size, and payment methods. Cash is the predominant payment instrument across all four value chains, within which nearly 5 million cash transactions are conducted between farmers, collectors of produce, and millers / exporters per crop cycle, exceeding a value of USD 8 billion.

5 | AGRICULTURE SECTOR CHALLENGES AND FINANCIAL SERVICES NEEDS

Across the value chains, there were a number of overarching constraints identified, which impede the sector’s development and competitiveness. These challenges include insufficient access to and application of inputs, which impacts yield and quality of produce; rising labor shortages, which increases costs of production; limited access to equipment, which results in reliance on labor and impedes mechanization; and lack of access to appropriately-structured credit products, which contributes largely to the aforementioned constraints faced by farmers.

6 | POTENTIAL APPLICATIONS OF DFS

To help address these challenges, DFS can serve as an important tool to improve access to credit, savings, insurance, and payments that enhance productivity and improve efficiency along the value chains. A summary of recommendations on potential applications of DFS to address agriculture sector challenges, as well as recommendations to promote DFS ecosystem development, is included in the matrix below.

Agriculture Sector Challenges & Potential Applications of DFS				
	Transfers & Payments	Savings	Credit	Insurance
Burma's Agriculture Sector Challenges	<ul style="list-style-type: none"> • Poor Infrastructure - Expensive for FIs to serve rural areas 	<ul style="list-style-type: none"> • Market Volatility - Sustaining price/demand fluctuations 	<ul style="list-style-type: none"> • Lack of Input Financing - Fertilizer and seeds - Insecticides and sprays 	<ul style="list-style-type: none"> • Adverse Weather - Weather fluctuations - Climate change
	<ul style="list-style-type: none"> • Limited Footprint of Formal Financial Services - Traveling to branches is inconvenient and expensive 	<ul style="list-style-type: none"> • Strong Liquidity Pressures - Farmers sell produce at low rates for immediate liquidity 	<ul style="list-style-type: none"> • Lack of Asset Financing - Antiquated farming methods - Labour shortages 	<ul style="list-style-type: none"> • Natural Calamities - Floods - Cyclones
			<ul style="list-style-type: none"> • Lack of Liquidity - Land preparation - Harvest 	<ul style="list-style-type: none"> • Infestations & Diseases - Pests - Parasites
Potential DFS Applications	<ul style="list-style-type: none"> • Efficient Delivery of Formal Financial Services Through Agents and Digital Accounts 			
	<ul style="list-style-type: none"> e.g. Remote and proximity payments for inputs, receiving payment from sale of produce, etc. 	<ul style="list-style-type: none"> e.g. Account opening, deposits, and withdrawals for microsavings 	<ul style="list-style-type: none"> e.g. Disbursements and collections of Micro-Loans 	<ul style="list-style-type: none"> e.g. Premium pay-outs for micro-insurance
Areas to Support DFS Development	<ul style="list-style-type: none"> • Facilitate Product and Model Innovations 			
		<ul style="list-style-type: none"> Input financing through savings-linked wallets 	<ul style="list-style-type: none"> Expansion and development of tailored agri financing products, e.g credit from banks, MFIs, savings and credit cooperatives; input financing; and equipment leasing 	<ul style="list-style-type: none"> e.g. Weather index-based insurance products
	<ul style="list-style-type: none"> • Promote Development of a Robust DFS Ecosystem - Create an enabling regulatory environment - Develop a strong agent network - Strengthen MFIs and NGOs 			
<ul style="list-style-type: none"> • Develop Customer-Centric Products - Segmentation - Human Centered Design 				
			<ul style="list-style-type: none"> • Mechanisms to assess farmer credit worthiness 	<ul style="list-style-type: none"> • Development of indexes and monitoring techniques

B | Background and Context

Geographically positioned next to 40 percent of the world's population, well-endowed with natural resources, and currently experiencing liberalizing economic reforms, Myanmar is well-positioned to seize economic progress as it opens up to the world. After years of isolation, however, the country is characterized by high levels of poverty, ranking 150 out of 187 countries in the 2014 UNDP Human Development Index. Additionally, there are substantial disparities in living conditions between rural and urban areas, as 36 percent of the rural population lives below the poverty line (compared with the national poverty rate of 26 percent).² Financial inclusion is also low, with only 23 percent of adults with an account from a financial institution, compared with 69 percent in the East Asia and Pacific region.³



Figure 1: Map of Myanmar (source: IFAD)

Recognizing the need to overcome these challenges to realize the country's economic potential, the Government of Myanmar has established a number of national development plans, including the Poverty Alleviation and Rural Development Action Plan (PARADAP). Two of the priority outcomes from these national development plans are to increase agricultural production to improve food security and reduce poverty, and to improve rural livelihoods by helping communities harness their physical, natural, and human capital.

Access to financial services is integral to rural development and overall economic growth, directly impacting gross domestic product (GDP) and productivity through more efficient allocation of resources. Myanmar's rural economy, which is driven primarily by the agriculture sector, suffers from a severe lack of access to appropriately tailored, formal financial products and services that can increase agricultural production. Financial sector actors in Myanmar, constrained by their traditional brick and mortar branches and lack of new banking technologies, still operate predominantly in cash. This approach has restricted the expansion of services to new clients by banks and MFIs, adversely affecting agriculture-dependent households and businesses.

Digital financial services (DFS) – defined as financial services delivered and accessed

² ADB Sector Assessment (Summary): Agriculture, Natural Resources, And Rural Development

³ 2014 Financial Inclusion Data / Global Findex, World Bank

through digital channels and instruments such as mobile phones, cards, point-of-sale (POS) devices, and agent outlets – can play a critical role in supporting achievement of the Government’s priority objectives by economically, securely, and transparently delivering the financial services that the agriculture sector requires to improve productivity and raise rural incomes. As digital channels and products can drastically lower the cost for financial institutions to deliver financial services and for customers to access them, DFS provides a key opportunity to expand access to credit, savings, insurance, and payments products in rural areas. As private sector players and donors, such as those contributing to the Livelihoods and Food Security Trust Fund (LIFT), invest in initiatives to take advantage of untapped opportunities in Myanmar’s agriculture sector, DFS can also complement and boost the impact of these initiatives by lowering operating costs and improving the efficiency of working with rural, agricultural segments. Moreover, DFS creates opportunities for new partnerships and business models to emerge, which focus on tailored approaches for serving the agriculture sector and lower-income segments.

In this context, the purpose of this study is to assess the potential for DFS to contribute to value chain efficiency and improved agricultural productivity. Specifically, the main objectives of this assessment are to advance the understanding of:

- Payment flows and payment service providers in agriculture value chains
- Potential for DFS to enhance the efficiency of transactions within the value chains, thereby contributing to improved livelihoods
- Value chain actors’ familiarity with and openness to DFS, particularly mobile-based payment options

The assessment was conducted through an initial desk study, stakeholder interviews, focus group discussions (FGDs) with farmers, and key informant interviews (KIIs) with upper value chain actors. It focused on four value chains, which were selected based on their relevance to the economic activity within Myanmar’s agriculture sector and the degree to which the value chains have well-defined and accepted structures (see Annex 1 for more details on the assessment methodology; Annex 3 for a summary of the rapid value chain assessment, leading to the final selection of the value chains; and Annex 4 for a map of FGD and KII locations). The selected value chains and the geographic areas of study include:

- Rice: Delta (Ayeyarwady Region)
- Sesame (oil seeds): Dry Zone (Magway and Sagaing Regions)
- Green gram (pulses): Dry Zone (Magway and Sagaing Regions) and Yangon Region
- Aquaculture: Delta (Ayeyarwady Region)

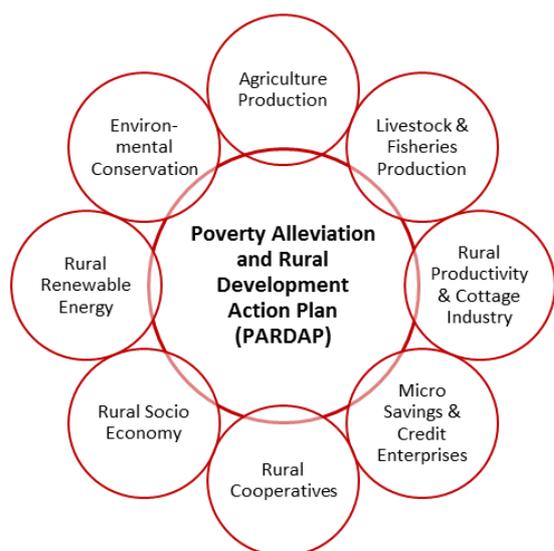


Figure 2: Pillars of the PARDAP

Through an evaluation of the potential role of DFS in supporting the development of these four value chains, the findings and recommendations of this study point to the importance of promoting financial inclusion not simply as an end, but as a means to support the achievement of key development goals, such as those that the PARDAP aims to achieve (see Figure 2). For instance, as technology facilitates the creation of new, low-cost delivery models, DFS can enable financial institutions (FIs) to expand their operating footprint, reduce costs for cash distribution and collection, collect financial and non-financial data for targeted product

design and credit decision making, and scale-up the provision of financial services to millions of new clients in the agriculture sector. In turn, improving access to finance for Myanmar's rural and agricultural segments would enhance the resilience of value chain actors by providing credit for inputs and equipment, enabling them to save and better manage expenses, and offering means to manage financial and environment shocks.

It is worth noting a few limitations associated with this assessment. The team that led this assessment was not based in Myanmar, and therefore all information is based on the findings from desk research, two short trips, and follow up with stakeholders in country via email. More specifically, there was the upfront challenge of obtaining a comprehensive understanding of the value chain maps for the four selected value chains. This is due to the fact that information on the value chain structures is unavailable or unreliable.

During the desk research, the team found substantial information gaps regarding the structure of value chains in Myanmar (sufficient information was obtained only for the rice value chain prior to the first trip by the team to Myanmar). In comparison with other countries, such as Indonesia, value chains have not been mapped to the same extent in Myanmar.

Understanding the structure of value chains was a critical component of this assignment, since it is needed in order to assess the transaction flows and potential for digitizing those flows. To address this challenge, the team focused heavily on filling-in information gaps during the stakeholder interviews. The team was able to obtain access to additional research, much of which had not yet been published, which helped to fill knowledge gaps on all the pulses and oil seeds. Although some information was obtained on the aquaculture and horticulture sectors, the level of detail was not the same as the information received on other value chains.

That being said, the following sections of this report elaborate on the assessment findings, which shed light on the challenges faced by Myanmar's agriculture sector and the readiness of the sector for DFS. Based on these findings, the report also includes recommendations on ways in which DFS could contribute to greater agricultural productivity and rural development, as well as areas for stakeholder investment and support to further develop DFS in the country.

C | Digital Financial Services Plus Readiness Framework

To frame the findings and recommendations of the assessment, the report adapts and applies CGAP’s DFS Plus readiness framework for Myanmar’s agriculture sector, as illustrated in Figure 3.⁴

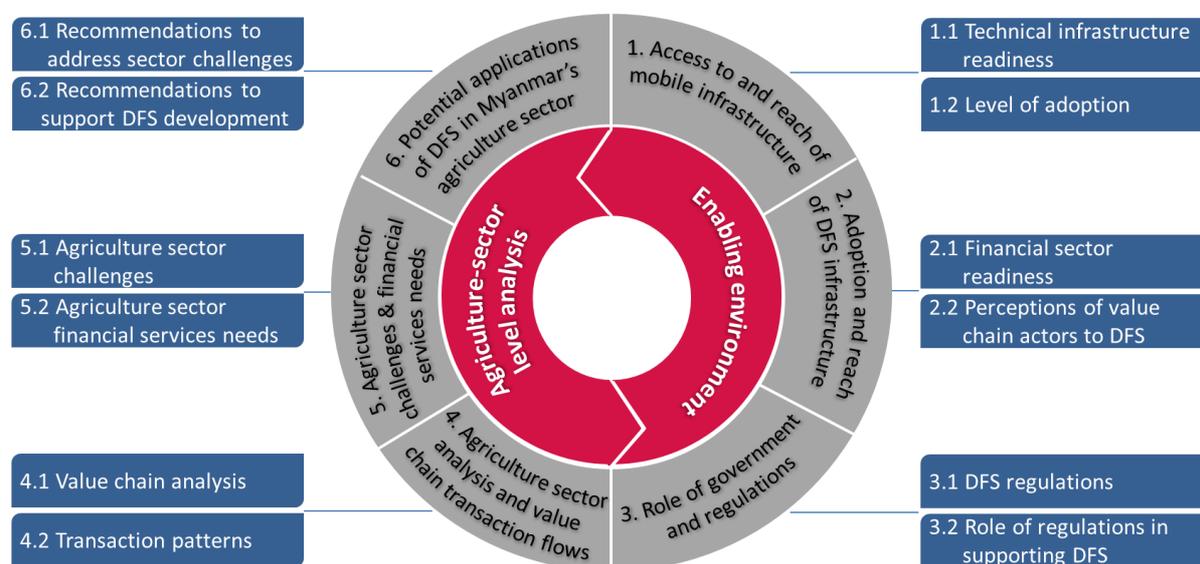


Figure 3: Digital Financial Services + Readiness Framework for Myanmar's agriculture sector

In applying the framework, the report considers six dimensions to identify the challenges faced by the agriculture sector, including:

Enabling Environment	Agriculture Sector-Level Analysis
1. Access to and reach of mobile infrastructure, including levels of coverage, adoption, and usage	4. Agriculture sector analysis and transaction flows, including an assessment of the four value chains and a mapping of transaction flows
2. Adoption and reach of DFS infrastructure, including the state of financial sector development, current access to financial services, and value chain actors’ perceptions of DFS	5. Agriculture sector challenges and financial services needs, with a particular focus on the challenges and needs in the four select value chains
3. Role of government and regulations, including an assessment of the DFS regulatory environment and the importance of regulations in enabling DFS to contribute to development goals	6. Potential applications of DFS, including recommendations in which DFS can be applied to address agriculture sector challenges and areas for support to promote DFS development

⁴ CGAP and McKinsey, *CGAP Digital Finance + Readiness Framework and Assessment for Tanzania*, May 2015.

D | Access to and Reach of Mobile Infrastructure



Until June 2013, the state-owned operator, Myanmar Posts and Telecommunications (MPT), had a monopoly on the country's telecommunications industry. Network coverage was limited to Yangon and a few other cities, leaving rural areas largely without access to mobile infrastructure. However, mobile penetration rates have increased rapidly with the licensing of Telenor and Ooredoo in 2013, providing a positive outlook for the deployment of DFS to reach rural segments. Key figures on Myanmar's mobile infrastructure are highlighted below.



* Myanmar Times (online), November 9, 2015 ; Telecompaper (online), October 28, 2015 ; Myanmar Times (online), October 14, 2015

** The Nation (Nation Multimedia), October 12, 2015

*** GSMA, *Closing the Coverage Gap – A View from Asia*, June 2015

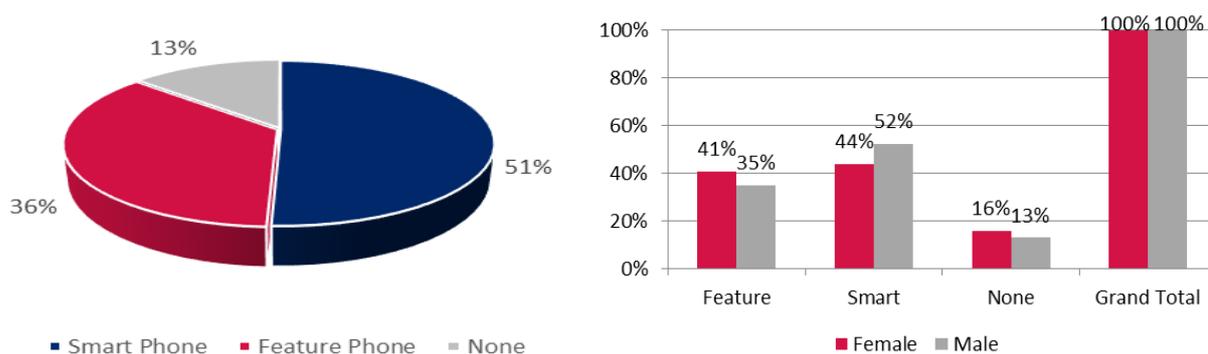
MOBILE PHONE ACCESS AND USAGE - FARMERS



“Every farmer has a phone now.... Some traders hold two mobile phones.” – Small Rice Farmer in the Delt

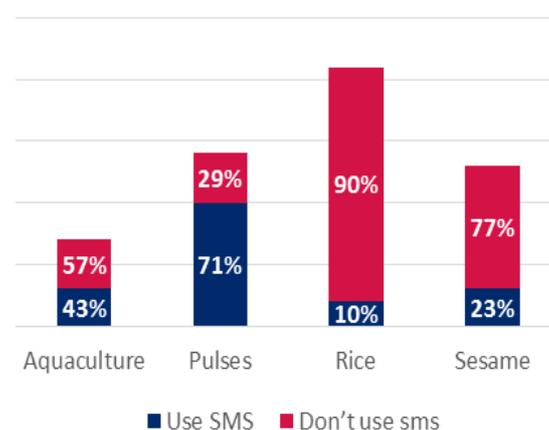
The findings of the assessment reflect the increasing mobile penetration rates in rural Myanmar. In the FGDs conducted with farmers, 87 percent of respondents reported owning a mobile phone (51 percent had smartphones and over one-third used feature phones) (Figure 6). Disaggregated by gender, phone ownership between men and women was generally comparable. However, of those farmers who owned phones, there was a slightly greater proportion of men who owned smartphones than women; 52 percent of the total number of men with phones had smartphones versus 35 percent with feature phones, compared with 44 percent and 41 percent, respectively, for women (Figure 6). As expected, there were also disparities in phone ownership patterns between age generations; 80 percent of farmers between 18 and 27 years of age reporting having smartphones, compared with 47 percent of farmers between 48 and 57 years of age.

Figure 4: Type of phone owned by FGD respondents and Type of Phone Owned by Gender (As a % of Total Gender Phone Ownership)



With respect to usage, farmers mainly use their phones for voice calls, reporting low levels of data use. Additionally, only one-third of farmers reported using their phones for SMS for communications (Figure 5). Although the rate of mobile phone penetration among respondents was high, the fact that usage among farmers is limited mainly to voice calls reflects the way in which farmers prefer to interact with their technology, and is an insight to consider in the design of DFS interfaces. For instance, DFS providers may consider the integration of functionalities such as interactive voice response (IVR) to mirror farmers' preferred interaction.

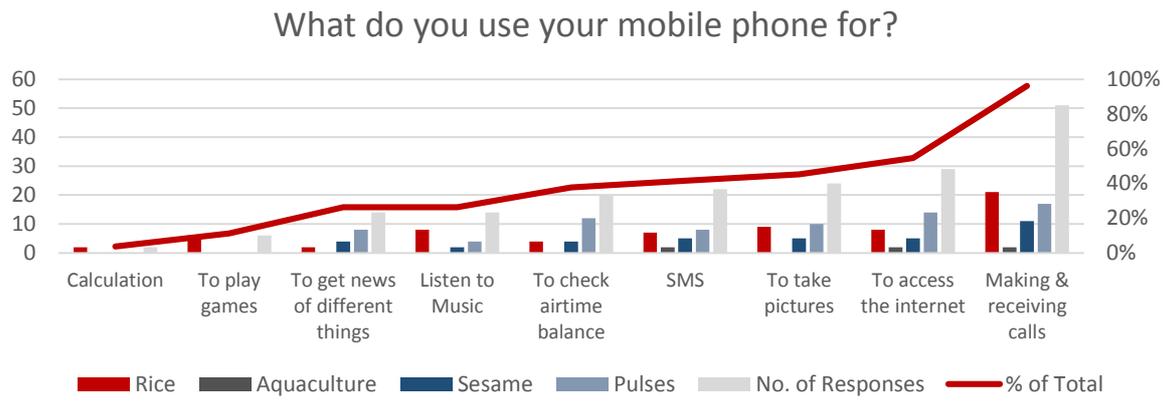
Figure 5: SMS Usage of FGD Respondents



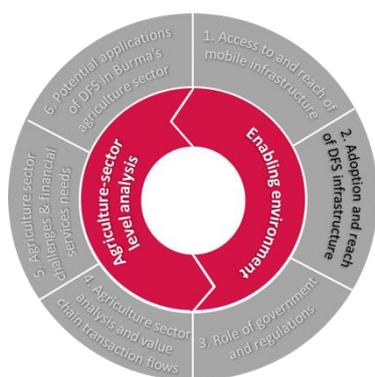
MOBILE PHONE ACCESS AND USAGE – UPPER VALUE CHAIN ACTORS

Among the upper value chain players, 92 percent of the KII respondents had mobile phones. The study reflected the growing transition to smartphones among upper value chain actors, with 25 percent of respondents reporting ownership of a basic feature phone, 42 percent with a smart phone (as their sole phone), and 25 percent with both a smartphone and feature phone. In all, 67 percent of upper value chain actors own smartphones. Additionally, in contrast with farmers who mainly used phones for calls, KII respondents used phones for a wider variety of purposes, including accessing the internet (Figure 6). Coupled with the rapid spread of mobile network coverage, these mobile phone adoption and usage rates indicate a strong potential for mobile-based DFS.

Figure 6: Uses of mobile phone by KII respondents



E | Adoption and Reach of Digital Finance Infrastructure



As summarized in Table 1, a number of providers have piloted, launched, or are gearing-up to launch mobile money services in Myanmar. However, continued regulatory uncertainty (discussed in Section F below) has made it difficult for many of these services to move beyond the planning phase, as key regulatory aspects are still under development. Beyond those initiatives listed in the table, other interested parties looking to play a role in Myanmar's DFS space include Boloro, Myanma Computer Company (MCC), Yatanarpon eBilling Services, Red Dot, and Easy Pay Company.

Table 1: Launched and Planned DFS Initiatives

Service	Launch	Partners
Myanmar Mobile Money	Launched	Innwa Bank, Oberthur Technologies & Mobilemate Telecommunications
MyKyat	Launched	Frontier Payment Technologies, First Private Bank
MYWALLET plus	Launched	CB Bank, Leo Tech, MCC Group
Wave Money	Launched	Telenor & Yoma Bank
Ooredoo	Planned	Ooredoo
Myanmar Payment Solution Services (MPSS)	Planned	Blue Ocean Operating Management, Myanmar Technologies and Investment Corporation, Myanmar Citizen Bank

In their strategies to roll-out DFS, many of these providers have indicated plans to develop services specifically for the agriculture sector. For example, MyKyat and Myanmar Mobile Money are seeking to collaborate with existing players, such as fertilizer distributors, to expand their DFS agent network in rural areas. Some distributors, notably Awba, aim to establish their own proprietary payment platforms. Ooredoo and Frog Design, with support from the GSMA, are developing mAgri services through a user-centric design approach. Ooredoo and Telenor also have plans to offer bulk payments services, including loan disbursements and collections for MFIs and cooperatives. However, the immediate priority of providers is the roll-out of DFS services in urban areas, with gradual expansion into rural areas as the GSM footprint increases.

Supporting card-based digital payments in Myanmar, the main actors in the space include:

- The Myanmar Payment Union was launched in 2011 and consists of 21 member banks. The national payment network provides interoperability of all member banks' ATMs. There are over 1,000 ATMs in Myanmar, mainly concentrated in urban areas and town centers in Yangon and Mandalay Region. However, adoption is slow, with only 1 million cardholders as of June 2015.
- Visa opened an office in Myanmar in 2015 and is working closely with permitted banks to introduce credit card products into the Myanmar market. On the acceptance side, Visa is accepted at more than 1,800 POS terminals across the country, mainly targeting hotels, restaurants, and shops serving tourists. Currently, there are 20,000 Visa cardholders in Myanmar, and Visa is working closely with banks to increase this number in the coming years.⁵
- Red Dot, an electronic point-of-sale (ePOS) provider, has established a cash acceptance network that can be accessed through ePOS terminals or through a mobile app. Red Dot agents open a merchant account, which can be used to distribute airtime top-up and eventually, accept utility bill payments via an aggregator. As of February 2015, Red Dot had 1700 retailers, with 1300 in Yangon, 300 in Mandalay, and 100 in Nay Pyi Taw. Red Dot plans to expand the network exponentially by end of 2016 and to partner with other DFS providers to offer more services.

FINANCIAL SECTOR UNDERDEVELOPMENT AND THE POTENTIAL FOR DFS TO BRIDGE THE GAP

Only 2.5% of loans in Myanmar go to the rural sector despite the fact the sector accounts for 30% of gross domestic product (GDP) and two-thirds of jobs." - OECD's Multi-dimensional Review of Burma, Jan. 2015

With these various initiatives launched or under development, providers are preparing to take advantage of the market potential for DFS in Myanmar and the opportunity that it presents to address current limitations in the financial sector. Although its financial sector has developed substantially over the past several years, Myanmar remains one of the world's most under-banked countries; fewer than 5 percent of adults have savings accounts with a formal financial institution, only 30 percent of adults claimed

to have access to any kind of financial service from a regulated financial service provider, and approximately 15 percent of the adult population (5.9 million adults) borrow from unregulated moneylenders.⁶ These figures underscore the need for additional investments to promote financial inclusion to enable growth of the economy, particularly in the agriculture sector.

⁵ <http://www.myanmarinternationaltv.com/news/u-20-visa-card-bank-launches-commemorative-travel-card>

⁶ Making Access Possible (MAP) report by UNCDF, FinMark Trust and, Cenfri

The provision of financial services in rural areas is low due to a number of factors including interest rate limits (which restrict financial institutions' profitability in working with lower-income segments),⁷ collateral requirements, and the lack of tailored products and services that meet the needs of rural populations. The limited formal financing that is available in rural areas is provided primarily by the Myanmar Agricultural Development Bank (MADB), which reaches 1.85 million households (see textbox below).

MYANMAR AGRICULTURAL DEVELOPMENT BANK (MADB)

- Rice accounts for 88 percent of the portfolio of the MADB, which offers credit of MMK 100,000 per acre (USD 89.69)
- MADB does lend to other value chains, but at much lower levels, which has led to a large proportion of the costs of production being met through alternative financing sources, namely advances against crop sales and down payment on goods
- MADB only lends to farmers and does not serve other value chain actors such as traders, exporters, transport firms, warehouses, or equipment dealers.
- MADB's credit product is limited to 10 acres and covers only approximately 50 percent of the cost of production, though it is priced at subsidized interest rates (0.4 percent per month)
- Since MADB credit covers only half of the cost of production, it is largely used as a social safety net to ensure rice production for food security and stability purposes and farmers turn to a number of additional sources of credit to fund activities

As the sector develops, however, formal channels for agricultural financing are expanding. With the passing of the Microfinance Law in 2011, an increasing number of microfinance institutions (MFIs) and NGOs are entering the market. PACT Global Microfinance Fund is currently leading the microfinance sector, with approximately 590,000 active borrowers.⁸ Proximity Design and World Vision are other microfinance providers active in the agriculture sector. The Global Treasure Bank (formerly Myanmar Livestock and Fishery Development Bank) and the Central Cooperative Society also provide assistance to small numbers of farmers in their respective areas of focus. With respect to loans issued by the Cooperative Society, the Ministry of Cooperatives has recently increased the maximum loan amount to each farmer from MMK 111,500 (USD 100) to MMK 557,500 (USD 500), enabling the cost of production to be met more effectively. Moreover, input dealers offer structured products; Awba, a major agricultural inputs importer and distributor, established a microfinance arm in 2012 to provide credit to the sector.

⁷ For banks, the minimum interest rate for deposits is 8 percent per annum and the interest rate for loans is capped at 13 percent per year; for MFIs, these figures are 15 percent and 30 percent per annum, respectively.

⁸ Stakeholder Interviews with PACT Global Microfinance Fund

Despite these developments, however, there is still a large unmet demand for financial services, which the study confirmed. Despite the dominance of the MADB in the market, the assessment also revealed gaps in MADB services, representing opportunities for financial services providers to take advantage of these market opportunities. Specific gaps include:

- Limited availability of affordable credit:** Loans provided by MADB cover only a fraction of the farmers’ total financing needs; the credit gap estimate of small-scale rice farmers calculates that 49 percent of their production costs are not met by MADB loans.⁹ MADB also does not finance larger farmers or other value chain actors, such as traders, exporters, transport firms, warehouses, or equipment dealers. As a consequence, many agriculture sector players turn to expensive, informal financing, are forced to compromise on the quantity or quality of inputs, have limited ability to shift to time- and labor-saving mechanization, and are unable to invest in growing their businesses. Based on analysis conducted during the assessment, if millers in the rice value chain are able to invest adequately in infrastructure, productivity could increase by as much as 25 percent.¹⁰

“Myanmar Agricultural Development Bank does not give loans in the time of plantation. In this period, money is borrowed from outside.” – Large Green Gram Farmer in the Dry Zone



Broken rice

- Poor structure of credit products:** Formal credit products offered by MADB are also poorly structured and are not tailored to crop cycles. Loans are typically due immediately after harvest, thus pressuring farmers to sell their crops quickly in order to repay loans. As produce floods the market, farmers must accept lower prices and therefore, lower incomes. In the case of rice, the pressure to sell quickly leads to paddy that is rushed to market without being adequately dried, resulting in large amounts of broken rice that receives a much lower price. Farmers growing pulses and rice in the dry season also noted that MADB loans are only available once they are finished planting. These farmers therefore face serious money shortages in the months before planting in October, when expenditures must be made for labor and inputs (Figure 7). In some cases, farmers finance production through informal sources, and use MADB loans to repay informal creditors. Loans from PACT Global Microfinance Fund, Proximity Design, and World Vision do offer farmers some flexibility, but their availability is limited.

“Sometimes, I have to postpone repaying my debt to my creditor by explaining to them to take their money back only when I get a loan from the Agricultural Bank.” – Small Rice Farmer in Delta

⁹ Exclude analysis

¹⁰ Exclude analysis

Figure 7: Depiction of cash shortage for dry season rice farmers



Informal actors partially fill the financing gaps in rural areas, as traders, brokers, moneylenders, pawnshops, friends, and family provide credit to farmers. These informal mechanisms have been built and refined over generations and are adapted to Myanmar’s rural dynamics. Interviewed farmers noted that loans from informal sources are available against minimal collateral. Terms are flexible, as interest rates, tenure, and payment instrument (cash versus in-kind) are negotiable. There is also little paperwork, traveling, and waiting involved. This flexibility comes at a high cost, however. For example, loans from moneylenders cost between 6 and 20 percent per month. At these rates, farmers limit the amounts borrowed to meet their bare necessities, which compromises the quality and quantity of inputs.

“What I dislike most is the long waiting time. Although we have [an appointment] at 9am, the staff arrive at 10am. Sometimes we miss lunch. If we have money, we can eat out. If we don’t have money, no lunch for that day.”
 – Small Rice Farmer in Delta, on likes and dislikes when dealing with banks

- Limited access points for deposits and digital payments:** As the financial sector infrastructure is underdeveloped, there is a dearth of access points for financial services, including savings and digital payments. As of 2013, Myanmar had 2.6 commercial bank branches and 0.6 ATMs per 100,000 adults, compared with an average of 6.5 commercial bank branches and 22.6 ATMs per 100,000 adults in other developing East Asia and Pacific countries.¹¹ As a result of this limited infrastructure, rural populations face higher costs for transportation and time spent traveling to deposit and transfer funds. A number of respondents in the assessment reported the closest bank branch to be over 20 miles away, with traveling distances of up to three hours by motorbike.

In light of these gaps, DFS provides potential solutions to address cost and efficiency concerns in serving agricultural segments, creating a stronger business case for providers and other stakeholders to increase their footprint in rural Myanmar and increase customers’ access to affordable and timely services. In Kenya, for example, the microfinance institution (MFI) Juhudi Kilimo utilized M-Pesa, a mobile money service, for loan disbursements and repayments. In doing so, Juhudi Kilimo and its clients experienced a 56 percent reduction in

¹¹ World Bank, World DataBank

net costs for disbursement and repayment. Additionally, the number of days for loan disbursement decreased from seven days to two days, and back-office processing time reduced from five days to five minutes.¹²

As demonstrated by this example, the use of digital channels would allow financial services providers to improve their operating efficiency and thereby enhance profitability, even within the constraints of interest rate caps currently in place in Myanmar. Additionally, they would be able to increase revenue potential through the development of new business models, products, and services that are specifically tailored to the needs of this market, which can enable a significant scale-up in their customer base. For example, PACT Global Microfinance Fund noted that they had 40,000 applicants waiting for loans (as of January 2015). Digitizing operations would help to significantly decrease time spent on loan processing and disbursement, allowing staff to focus attention on identification of new clients. Recommendations of more specific areas in which DFS can support agricultural development are included in Section I.

VALUE CHAIN ACTORS' USAGE AND PERCEPTIONS OF DFS

As providers prepare to launch their services, it is critical to have a strong understanding of value chain actors' current behaviors and perceptions with respect to DFS. Insights from the assessment are described below.

Reliance on cash and lack of security concerns: In the four value chains studied, the majority of transactions between actors are conducted in cash (see Section G for detailed transaction flow maps). Nearly 90 percent of transactions made by the upper value chain actors are in cash, while all farmer-level transactions are cash-based, including payment in-flows (from brokers, millers) and out-flows (labor, inputs). Additionally, all of the interviewed upper value chain actors paid their labor and staff in cash, citing that their staff's preference for cash payments.

“This is not Yangon, there is no theft....[My] only my worry is the boat may capsize.” – Large Rice Farmer in Delta

Although the heavy reliance on cash is not unexpected, providers and stakeholders should understand the core needs of rural segments and clearly articulate the value proposition of shifting from cash to digital. For instance, although improved security is often a value proposition for end-users in other markets, most farmers said they have no concerns of theft, noting that it was the least of their worries. As Myanmar develops, incidence of crime may rise; during a stakeholder interview with PACT Global Microfinance Fund, for example, it was noted that security issues were previously not a problem, but such incidents have recently increased. Nevertheless, security does not currently present a compelling value proposition for end-users to encourage uptake of DFS. On the other hand, credit is an immediate constraint for many value chain actors. Offering credit through agents and mobile wallets may therefore

¹² <http://betterthancash.org/wp-content/uploads/2012/09/USAID-Presents-Kenya-Case-Studies-in-e-Payment-.pdf>

encourage trial and adoption of DFS products.

Lack of security concerns cast doubt on the perceived value of DFS and customers' willingness to pay for such services. Demand and customer value ambiguities make it difficult to identify an anchor product for Myanmar's rural population, which in turn creates challenges for building a DFS business case and efficiently allocating resources, which necessitates further in-depth research into customer and market dynamics.

Use of informal money transfer services: Value chain actors also reported substantial usage of informal methods (Hundi and courier) for money transfer. Although a number of interviewed traders and farmers reported that they used banks for inter-city money transfers (for farmers, these were over-the-counter services and used mainly for receiving), informal methods remain the primary channels. Reasons cited included the speed with which money could be received from nearby shopkeepers and other agents. Given the degree to which these informal systems are established and trusted, providers should consider how to build on existing infrastructure to deliver their services. For example, numerous merchants, retailers, wholesalers, and distributors that constitute Myanmar's rural landscape have the potential of becoming cash-in, cash-out agents. Distributors and wholesalers (such as fertilizer dealers) can play a vital role in ensuring liquidity of village-level agents, and Hundi agents can be recruited into a formal role, benefiting the service through their established network.

“The strong point is that we don't need to go to the bank. It will be adequate if the service charge is the same as the bank service charge.” – Fish farmer in the Delta, on interest in mobile money

These negative perceptions should be explored further, as they could potentially deter adoption of other technology-enabled channels.

“We are interested in it. We will be fine [to use mobile financial services] if we are taught.”
– Sesame farmer in the Dry Zone,

how to use the service and if they can benefit from cost savings (such as transportation costs) and convenience. In response, DFS providers should carefully consider the design and delivery

“I live in Pathein town in Ayeyarwaddy division. I sold my paddy to the trader in Yangon. He did not pay me through [a] bank. Instead, he asked me to take money to one shopkeeper in Pathein...So, I just [went] to the referred shopkeeper...and took my money. This is called [the] Hundi system. We used this Hundi system because we [get] money as soon as traders receive all our paddy.”

– Urban Wholesaler in Delta

Low awareness and perceived relevance of ATMs:

Regarding card-based payments, the assessment found that usage was nearly non-existent in the agricultural sector. None of the farmers reported having a bank card and nearly 30 percent of upper value chain actors did not know where the nearest ATM was located. The field assessment also revealed a general distrust of ATMs (see text box).

High degree of openness to DFS among farmers:

The assessment also found that more than 70 percent of farmers would be interested in using a mobile phone to conduct financial transactions. Many farmers noted that they would be compelled to use DFS if they are taught



Negative perceptions of ATMs:
A view heard on multiple occasions was that ATMs were usually out-of-service and that such technologies cannot work in Myanmar’s rural areas.

of customer awareness and training programs to ensure that farmers understand and are comfortable with using new technologies, which would serve to raise market interest and uptake of their services. The majority of

farmers also noted that associated fees should be lower than what is charged by banks for transfers. This is not unexpected, since farmers have not directly used DFS products and are therefore unable to assess the value of such services except in comparison to other, seemingly similar services. Figure 8 includes a summary of the features of a DFS service that would be appealing to farmers, as well as the main concerns with DFS, which were most commonly cited by FGD respondents.

Figure 8: Perceived Benefits of and Concerns with DFS (Cited by Farmers)

Features that would appeal to farmers	Main concerns with DFS
<ul style="list-style-type: none"> • Ease of use • Training on how to use the service • Low transaction fees • Interest on deposit • 24-hour customer support • Widespread acceptability and trust of services • Convenience, availability in village 	<ul style="list-style-type: none"> • Complexity of technology • Fear of losing money if a mistake is made • Accessibility and security of money • No evidence of deposit / transaction • Phone is required • Weak mobile connectivity in rural areas • Utility – farmers do not save much and are used to transacting in cash

High degree of openness to DFS among upper value chain actors: Upper value chain actors also indicated substantial interest in using a mobile phone for financial transactions, especially for payments between various value chain actors. In the KIIs, 70 percent of respondents said they would be very interested in learning more about mobile money services and using them in the future, and an additional 19 percent noted moderate interest. These upper value chain actors (notably millers and traders) are key transaction hubs that provide critical market access to farmers. Therefore, they represent an important target market to drive uptake of DFS, both as potential high-volume users of the services and as valuable advocates who can promote the services among farmers and other trading partners.

“Business will develop because transaction is convenient. We don’t need to waste time to go to banks.” – Rural Sesame Trader in the Dry Zone, on interest in mobile money

Opportunities for DFS Plus: Infrastructure is a major challenge in Myanmar. Poor roads and access to electricity increase the cost of inputs and transportation of outputs for value chain



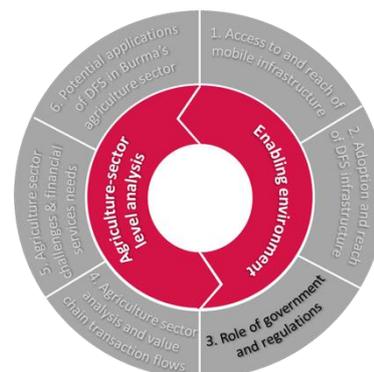
*House in rural Myanmar
equipped with solar panels*

actors, which in turn limits options for mechanizing parts of the value chain and constrains access to market options. In response to these infrastructure gaps, an increasing number of people in rural areas are investing in generators and solar panels. This represents a market opportunity to provide financing through DFS channels for off-grid solutions, such as solar panels, on a pay-as-you-go basis.

F | Role of Government and Regulation

In December 2013, the Central Bank of Myanmar (CBM) issued a Mobile Banking Directive (Directive 4-2013) to leverage technology-enabled channels to promote greater access to finance. The directive sets forth a bank-led model, permitting only banks and financial institutions to offer mobile banking services. Providers are authorized to offer the following services:

- Remittances (domestic and international)
- Cash-in and cash-out
- Payments made by individuals to a business (such as bill payments and payments for goods and services)
- Payments made by government to individuals (such as salaries and pensions)
- Payments made by individuals to the government (such as taxes)
- Payments and transfers between individuals
- Microfinance, overdraft, and other financial services payments (such as insurance premiums)



Only banks and financial institutions are currently allowed to offer mobile banking services, and where the use of agents for last-mile delivery of financial services is permitted, the directives do not mandate interoperability. The CBM has set stringent monthly reporting requirements for person-to-person (P2P) transfers that include reporting “Income Source of Payer,” “Relation to Payee,” and “Reason of Payment” for each transaction. Blanket limits prescribed for P2P transactions are as follows:

Person-to-Person (P2P) Transaction Limits	
Amount Per Transaction	MMK 500,000 (USD 388)
Amount Per Day	MMK 1,000,000 (USD 776)
Transactions Per Day	3

Although the Mobile Banking Directive has been beneficial for testing the waters and creating excitement in the industry, it has not spurred the level of activity that the CBM would have liked to see after nearly two years since its release. The Directive was quite short, leaving many questions unanswered. Coupled with industry stakeholders’ expectation of more robust regulations, the Directive created significant uncertainty that discouraged potential providers.

In early 2014, the CBM started consultations with various stakeholders such as CGAP and the World Bank on a Dedicated E-money Issuer (DEMI) directive. In contrast with the Mobile Banking Directive, the new directive may permit non-bank actors to be licensed to issue electronic money (e-money) and utilize agents to conduct electronic transactions. If the final

version of the DEMI does in fact enable non-bank players to offer DFS, market dynamics would change significantly as the industry opens up to a wider range of institutions, such as mobile network operators (MNOs) and third-parties.

In July 2015, the CBM circulated another set of draft regulations for Mobile Financial Services¹³ that aim to create an enabling regulatory environment for efficient and safe mobile financial services in Myanmar. These drafts regulations allow non-bank entities to become Mobile Financial Services Providers (MFSPs) and offer financial services through agents, including MNOs and third-party players. The draft regulations forbid agent exclusivity and mandate various levels of interoperability with other MFSPs, including agent, customer, and mobile platform interoperability. The regulations also feature tiered KYC requirements, with the opening of entry level accounts (Level 1 accounts) permitted without the presentation of an ID card, though the final details of the regulations are yet to be confirmed.

Allowing non-bank actors to compete in the DFS space has the potential to spur competition in the market, encourage innovation, and in turn promote greater financial inclusion. Financial institutions in Myanmar have been unable to take full advantage of the opportunity to develop digital-centric models due to limited internal capacity, lack of automated processes, and the need to deploy secure IT systems (core banking systems, middleware, and gateways). In light of these realities, creating a more enabling regulatory environment that opens up the digital financial services market to non-banks actors could inject the investments, infrastructure, and capacity needed for the scale-up of DFS services in Myanmar.

Policymakers in an increasing number of countries where expansion of DFS services have struggled to take-off have revised their regulations to permit a broader range of providers. Such regulatory amendments are now spurring the launch of innovative mobile money models in countries such as Ghana, India, Indonesia, and Liberia, where non-bank actors are allowed to play a role and are encouraged to invest in the development DFS services. For example, when the Reserve Bank of India allowed MNOs and third-party financial service providers to apply for payment bank licenses, 41 entities applied. Of the 11 granted licenses, three are major telecommunications providers and others are payments companies willing to invest heavily in the development of the industry. Additionally, the success of M-Shwari, a bank savings and loan product offered through a partnership between the Commercial Bank of Africa and the MNO Safaricom in Kenya, demonstrates how mobile money infrastructure (namely, Safaricom's M-Pesa infrastructure) can serve as the rails on which traditional banking products can be offered at scale.

At the same time, however, a robust regulatory environment for DFS is one that strikes the right balance between the need for competition and innovation, with the need to ensure safety,

¹³ "Mobile Financial Services" is defined as "the provision of payments and financial services through the use of mobile technology infrastructure including, electronic terminals, and credit tokens"

effectiveness, and efficiency of the financial sector. Key elements of building an effective regulatory system for DFS include:

- Creating an enabling regulatory environment to encourage entry of new players, which promotes competition and in turn spurs innovation in the DFS sector
- Instituting transaction limits and know-your-customer (KYC) requirements proportionate to perceived risk (including tiered KYC that allows small value transactions with little or no KYC)
- Encouraging interoperability and interconnection between providers to accelerate DFS ecosystem development
- Providing guidelines for emerging distribution models, such as shared agent networks and agent aggregators, that will accelerate the spread of the agent network and reduce operating costs
- Ensuring a level playing field by making sure dominant players do not exploit their position by blocking access to agents and critical communication channels, such as USSD

Donors and other stakeholders can help the CBM fill these gaps by providing technical assistance towards the creation of such enabling regulations aimed at accelerating the growth of DFS and enabling its contribution towards greater financial inclusion in Myanmar. Stakeholders can also support the industry as whole by undertaking assessments for different models, sharing global best practices, and playing the role of an honest broker to facilitate dialogue through workshops and seminars.

G | Agriculture Sector Analysis and Value Chain Transaction Flows



Turning to the sector-level analysis, the assessment focuses on agriculture because of its role as a key driver of Myanmar's economy. Agriculture accounts for 30 – 40 percent of the country's GDP, 66 percent of employment (32.5 million individuals), and 25 – 30 percent of exports by value, with pulses, rice, rubber, and fisheries being the main export commodities.¹⁴ Agriculture is therefore a critical means of livelihood throughout Myanmar. Although livelihood strategies are diverse across the country's various regions, the sale of agricultural products is consistently the most significant stream of household income nationwide, followed by casual labor in agriculture.¹⁵

The four value chains that are the focus of this study - rice, sesame, pulses, and aquaculture – represent 6.5 million of the 12.1 million farmers in Myanmar, capturing the bulk of agricultural economic activity in the country. A breakdown of the contribution of the selected value chains by number of farmers, production levels, and area of acres planted is included in Table 2.

Table 2: Breakdown of the contribution of the selected value chains to agriculture

Value Chain	Number of Farmers	Production (Metric Tons – MT)	Area Planted Acres
Rice	2.15 million	32.6 million MT of paddy (21.2 million MT of rice)	19.9 million (16.8 monsoon crop and 3.1 summer crop)
Sesame	1.3 million	890,000 MT	3.9 million acres
Pulses	3 million	5.3 million MT	9.9 million acres
Aquaculture	100,000	826,900 MT	226,954 acres
Total (4 value chains)	6.55 million	39.6 million MT	33.9 acres
Total in Myanmar	12.1 million	30 – 40 percent of GDP	55.56 million acres

For each value chain, the following sections provide a description of their contribution to Myanmar's economy; a mapping of the transaction structure, flow, and payment methods on the buyer side; and an estimate of the cost of production (comprised of expenditures on the supplier side).

¹⁴ World Bank, 2013, p. 7

¹⁵ LIFT, 2013, p. 45

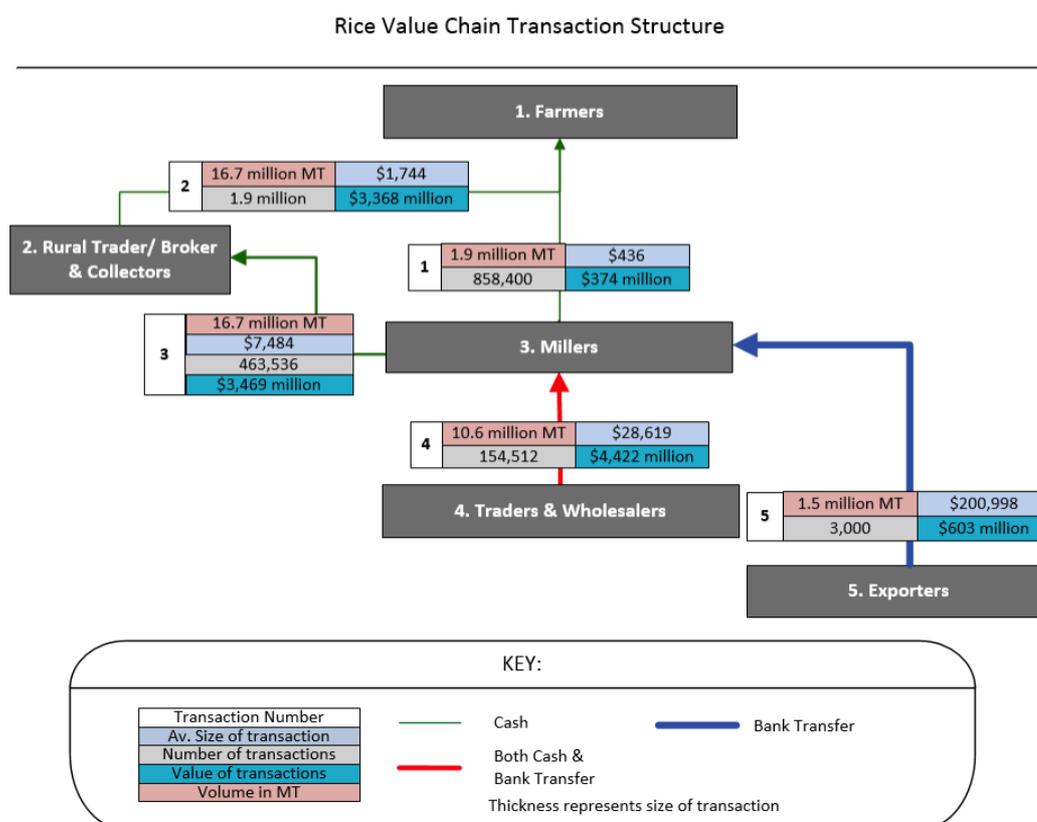
RICE

Rice is the food staple of Myanmar and is strategically important to the agricultural sector. Rice production accounts for 33 percent of all agricultural land planted each year,¹⁶ contributes three quarters of farm household income, and constitutes 73 – 80 percent of the daily dietary energy requirement.¹⁷ Rice is planted throughout the country, but is most dominant in the Ayeyarwaddy and Bago Divisions, where production is in surplus. A proportion of harvest is always consumed within the household to meet food needs and surplus is traded through wholesale markets to deficit areas. The main trading centers for rice are Patheingyi, Yangon, and Mandalay. Additional details on the rice value chain, including the Paddy Production Calendar, can be found in Annex 6.

Rice: Buyer Side

The transaction structure of the rice value chain, with a mapping of the value chain actors, transaction structure and flow, and payment methods, is depicted in Figure 9 (see Annex 6 | Additional Details on the Rice Value Chain for additional transaction details and a description of each of the value chain actors).

Figure 9: Transaction structure of the rice value chain in Myanmar (based on modeled data obtained through primary data gathering and secondary sources)



The first level of transactions on the buyer side of the rice value chain consists of the purchase

¹⁶ Wong, 2013, p. 4

¹⁷ Wong, 2013

of paddy from farmers by brokers, millers, or collectors, who work on the behalf of millers or brokers. Since all paddy produced needs to pass through this stage, millers—either directly or via collectors—are a key interaction point, as they interface directly with producers and upstream actors. Transactions with farmers and all but the largest millers are conducted using cash and can be characterized by a high volume of small value transactions. While millers occupy a key position in the value chain, collectors are also an important transaction point. Particularly in areas far from main markets and exchanges, farmers sell to collectors, who arrange the logistics and are able to bulk sufficient quantities to provide market access.

Rice: Supplier Side

Input supply requirements peak in June and January, coinciding with planting and crop development. In paddy production, peak labor demand is associated with planting and harvesting, with reduced need during the season for input applications and weeding. Expenditures, and therefore the greatest demand for credit, occur during the start of the season between May and June, as well as during harvesting between October and December.

In comparing the cost of production for small farmers (under 5 acres of production) and large farmers (over 10 acres of production), the cost of production is higher on a per acre basis for small farmers, as input prices are higher (presumably due to the smaller quantities being bought). Larger farmers spend significantly less on labor and equipment rental, as they are much more likely to own equipment. The cost of production and estimates of the credit gap of rice farmers is shown in Table 3.

Table 3: Cost of production, and estimation of credit gap of small and large rice farmers

Inputs	Small Farmers		Large Farmers	
	MMK	USD*	MMK	USD*
Seed	15,363	15.84	12,589	12.98
Fertilizer	44,977	46.37	40,470	41.72
Pesticides	2,611	2.69	555	0.57
Subtotal	62,951	64.90	41,025	42.29
Labor	68,526	70.65	41,025	42.29
Equipment rental	19,575	20.18	6,840	7.05
Fuel	17,548	18.09	6,808	7.02
Draught Oxen	13,010	13.41	1,960	2.02
Subtotal	50,133	51.68	15,608	16.09
Other	19,966	20.58	7,390	7.62
Total	196,973	203.06	110,247	113.66
Revenue from paddy sales	313,128	322.81	239,545	246.95
Gross Margin	116,155	119.75	129,298	133.30
% costs met by MADB loan	51%		91%	
Credit Gap (wet season paddy)	96,973	99.97	10,247	10.56

*Data is from a secondary source, so exchange rate between the USD and MMK differs from the USD 1 = MMK 1,115 rate

SESAME (OIL SEEDS)

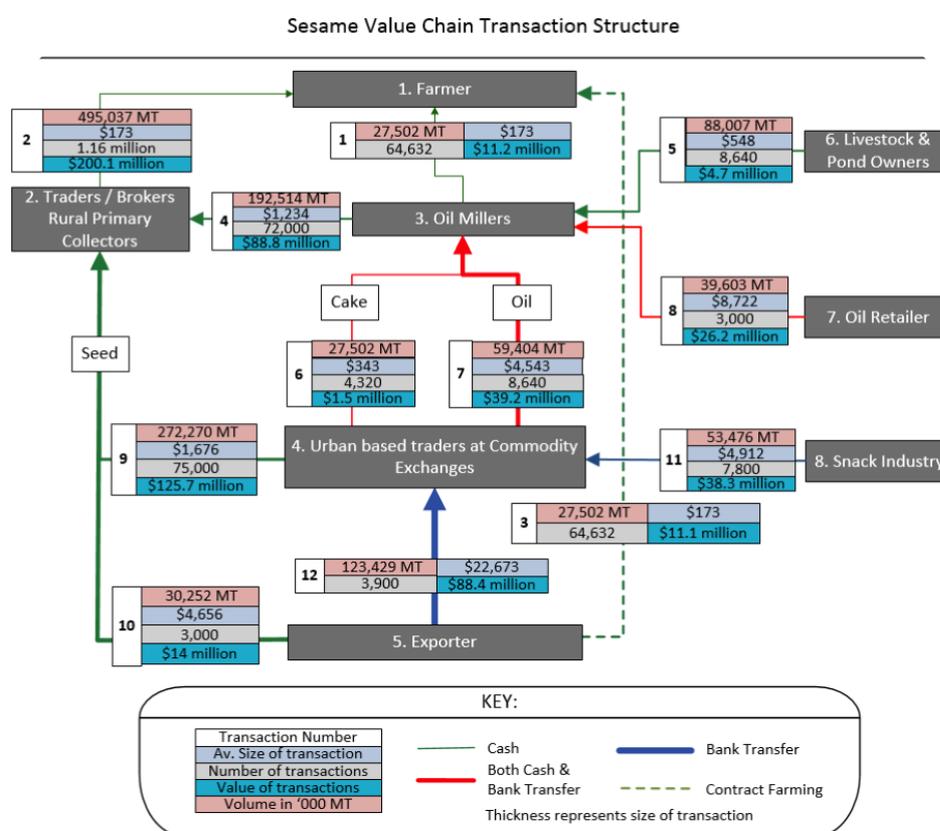
In 2011, Myanmar was the largest producer of sesame globally, producing 900,000 MT. Of Myanmar's exported commodities, sesame ranks fourth in terms of export value, accounting for 94 percent of Myanmar's oil seed exports (worth USD 54 million in 2013).¹⁸ Sesame oil also accounts for the second largest household expenditure in Myanmar after rice.¹⁹

Regarding uses and final products for sesame, the majority of sesame production is crushed for oil via millers (41 percent), exported (23 percent), or used for various applications for snacks and confectionary (7 percent). The milling process also produces a nutrient-rich cake by-product, which is used as a constituent of animal and fish feeds. Rapid growth of the poultry and aquaculture industries has led to high demand for cake by-product from the milling of oil seeds. Additional details on the sesame value chain, including the Sesame Production Calendar, can be found in Annex 7.

Sesame: Buyer Side

The transaction structure of the sesame value chain, with a mapping of the value chain actors, transaction structure and flow, and payment methods is depicted in Figure 10 (see Annex 7 for additional transaction details, along with a description of each of the value chain actors).

Figure 10: Transaction structure of the sesame value chain in Myanmar (based on modeled data obtained through primary data gathering and secondary sources)



¹⁸ International Trade Centre, 2014

¹⁹ FAO, 2015

Payments are predominantly made in cash along the whole chain, although both cash and bank transfers are used in some transactions at higher levels in the value chain. Large millers typically deal with large clients; between these actors, bank transfers are also used when the transaction size is too large for cash. Only large exporter transactions are regularly conducted using bank transfers.

The majority of sesame is moved to mills and commodity exchanges via a network of middlemen consisting of primary collectors, commissioning agents, and brokers. Contracts are used at the higher-end of the value chain to deal with larger volumes, and are commonly settled using bank transfers. All other transactions between actors are verbally agreed upon and settled in cash.

Small and medium-sized rural traders and brokers play a key role in this value chain, as they are the interface with producers and conduct business on behalf of the other major value chain actors. In this position, they handle more produce and transactions than any other group. They are also characterized by the lowest average transaction size. Larger traders who are members of commodity exchanges typically work with around 50 rural traders, and serve as the main channel for sesame exports.

Sesame: Supplier Side

Sesame is a low margin crop and the cost of production is managed by retaining seed from the previous harvest and using manure over fertilizers. Around harvest, however, there is typically a shortage of labor, which drives the cost of labor to MMK 4,000 per day, compared with MMK 1,500 during the rest of the production cycle. In some instances, an advance is paid to retain the laborer and the balance is paid upon completion. These payments are always settled in cash and usually immediately, but in some cases, laborers are asked to wait for crop sales. Labor for land preparation is also a substantial expense, though mechanized solutions are used when land must be prepared quickly.

In terms of financing, sesame farmers meet costs primarily through their own funding or with financing through informal channels involving friends, family, or money lenders. These informal channels typically charge 5 – 7 percent interest per month. Some farmers do obtain MADB loans of MMK 20,000 kyat per acre up to 10 acres over eight months (at 0.48 percent interest), but this covers barely one third of the cost of production. Group loans of MKK 100,000 are also available to members of cooperatives (through Central Cooperative Society members) with a term of six months at 1.5 percent interest.

Table 4: Cost of production monsoon sesame in MMK and USD²⁰

Inputs	Monsoon Sesame	
	MMK	USD*
Seed	9,537	9.83
Fertilizer	7,508	7.74
Pesticides	1,648	1.70
Subtotal	18,693	19.27
Labor	26,176	26.99
Subtotal	26,176	26.99
Equipment rental	567	0.58
Fuel	405	0.42
Draught Oxen	4,752	4.90
Subtotal	5,724	5.90
Other	6,452	6.65
TOTAL	60,130	61.99
Revenue	117,072	120.69
Gross Margin	56942	58.70

*Data is from a secondary source, so exchange rate between the USD and MMK differs from the USD 1 = MMK 1,115 rate.

PULSES (GREEN GRAM)

Pulses, consisting of black gram (black lentil), green gram (mung bean), chickpea, and pigeon pea, are the largest export commodities from Myanmar. In 2012, exports of pulses were valued at USD 913 million (0),²¹ making Myanmar is the third largest exporter of beans and pulses globally. Since 90 – 95 percent of green gram, black gram, and pigeon pea are exported, these figures provide a strong indication of the amount of crop sown and the transaction activity along the value chain in a given season (note: there is a large disparity between official production figures and the actual volumes exported by a factor of 2 to 3 - see Annex 8).²²

The short cropping cycles of green and black gram enable farmers to plant these crops following rice from residual soil moisture.²³ Production of green and black gram therefore supplements income from rice in the Delta, while chickpea is often planted following rice in the Dry Zone. Although pulse production has significantly contributed to livelihoods in these regions, farmers need to turn the crops around quickly to maximize the impact from residual soil moisture, which often leads to the sale of wet paddy, compromising the quality of the rice produce. Additional details on the pulses value chain, including the Pulses Production Calendar,

²⁰ Agrifood Consulting International, 2014

²¹ International Trade Centre, 2014, p. 1

²² Steven Haggblade, 2014, p. 3

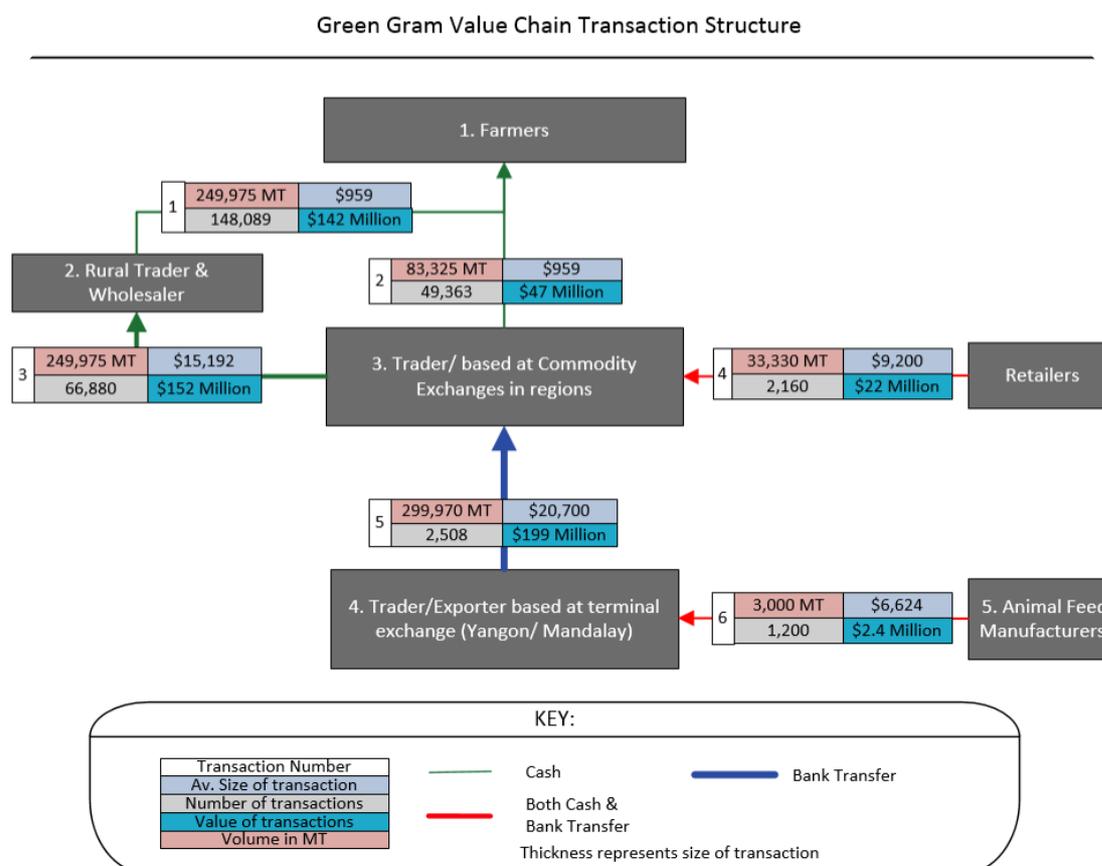
²³ Steven Haggblade, 2014, p. 6

can be found in Annex 8.

Green Gram: Buyer side

The transaction structure of the green gram value chain, with a mapping of the value chain actors, transaction structure and flow, and payment methods is depicted in Figure 11 (see Annex 8 for additional transaction details, along with a description of each of the value chain actors).

Figure 11: Transaction structure of the green gram value chain in Myanmar (based on modeled data obtained through primary data gathering and secondary sources)



At the first level of transactions, green gram is bought from farmers by rural traders, with whom they typically have long-established relationships. Cash is used for all transactions at this level. Once crop is purchased, traders often immediately store the produce in warehouses. This practice enables rural traders and wholesalers to aggregate stock to offer to the market through commodity exchanges (CEXCs). CEXCs trade daily with the large terminal market in Yangon. In cases where traders are located close to Yangon, the crop is commonly marketed directly to this large terminal market. Cash is used for transactions between CEXCs and rural traders, while both cash and bank transfers are used for transactions between CEXCs and retailers, depending on the size of the transactions. Exporters also operate in this terminal market. Between exporters and CEXC traders, bank transfers are used for transactions. Both cash and bank transfers are used for transactions between exporters and feed companies.

Pulses: Supplier Side

Like sesame, farmers retain seed for a number of years from their harvests, without significant reduction in vigor. Use of tractors for land preparation by large farmers is commonplace (80 percent of large farmer participants in the FGDs noted use of tractors).²⁴ This is a recent development, as availability of equipment has become more widespread. Tractors are rented from operators and though large farmers in the FGDs expressed desire to own, they are typically are not able to afford them.

The cost of product for green gram, both for mechanized land preparation and land preparation with the use of a draught animal, is shown in Table 5. Although the costs for mechanized land preparation are slightly higher than with the use of a draught animal, the turnaround time is substantially less. Shorter land preparation times enable farmers to plant earlier, which maximizes the utilization of residual soil moisture and reduces risk of moisture stress.

Table 5: Cost of production of green gram

Inputs	Green Gram (Mechanized Land Preparation)		Green Gram (Land Preparation with Draught Animal)	
	MKK	USD	MKK	USD
Seed	5,000	5.15	5,000	5.15
Fertilizer	25,000	25.77	25,000	25.77
Pesticides	15,000	15.46	15,000	15.46
Subtotal	45,000	46.39	45,000	46.39
Labor	129,000	132.99	129,000	132.99
Equipment rental	62,000	63.92	0	0.00
Draught Oxen	0	0.00	57,000	58.76
Subtotal	62,000	63.92	57,000	58.76
Total	241,000	248.45	236,000	243.30
Revenue	253,328	227.20	253,328	227.20
Gross Margin	12,328	12.71	17,328	17.86

²⁴ Focus Group Discussion

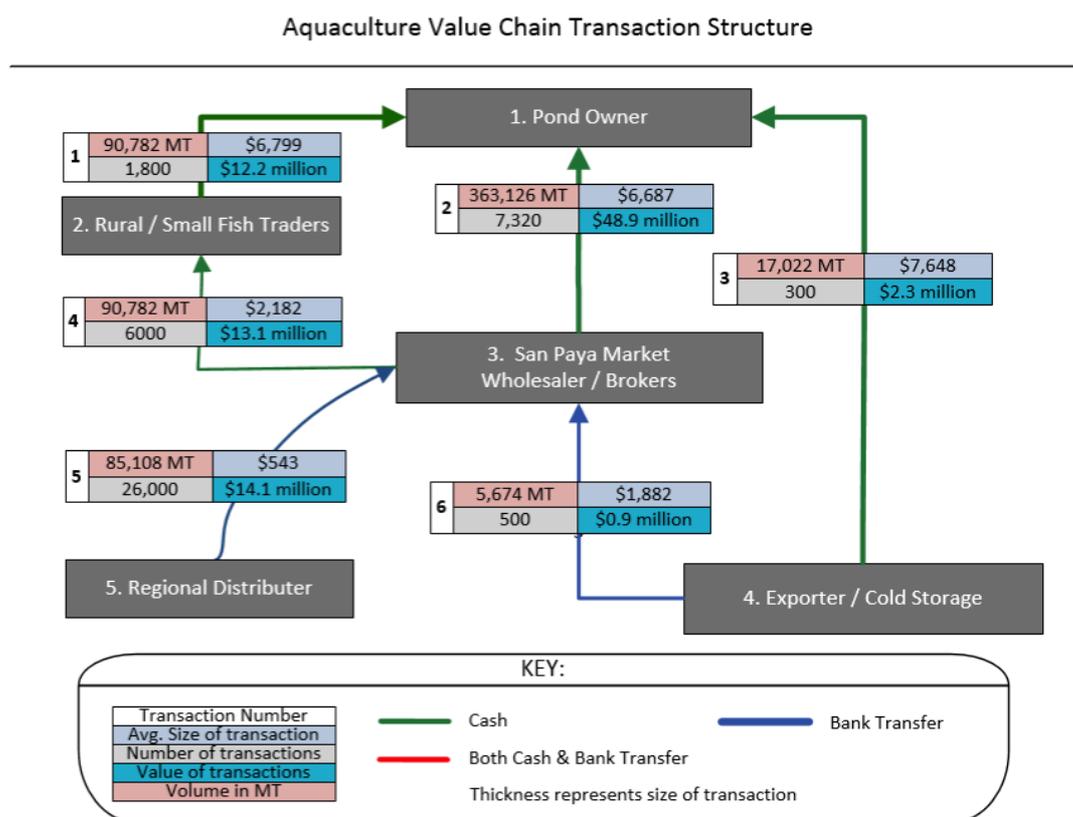
AQUACULTURE

Fish products provide 75 percent of protein intake in Myanmar and represent 10 to 15 percent of household expenditure.²⁵ Although the aquaculture export industry has declined due to steady appreciation of the kyat against the U.S. dollar since 2012, there has been increased demand from upper Myanmar for fish products. The local market has therefore driven growth of the aquaculture sector, which has also been facilitated by deregulation and improved road infrastructure.²⁶ As inland capture fisheries have declined, pond fisheries have shown the most rapid growth.²⁷ Pond fisheries also demand large amounts of feed for the fish, and therefore stimulate more transactions than capture fisheries.

Aquaculture: Buyer Side

The transaction structure of the aquaculture value chain, with a mapping of the value chain actors, transaction structure and flow, and payment methods is depicted in Figure 12 (see Annex 9 for additional transaction details, along with a description of each of the value chain actors).

Figure 12: Transaction structure of the aquaculture value chain in Myanmar (based on modeled data obtained through primary data gathering and secondary sources)



²⁵ Aung, Shein, & Soe, 2014

²⁶ MDRI/MSU, 2015

²⁷ Win, 2004

Since fresh fish needs to move quickly to market, aquaculture has the shortest and most integrated chain. Due to the need to provide feed fish throughout the production cycle, this value chain has very different transactional needs than the others in this study. Feed accounts for the bulk of production costs and traders who buy fish also play a role in financing the production by supplying credit or assisting in sourcing feed stock. A range of service providers have developed, which supply small fish to stock ponds and transport on boat and vehicles to markets. The central fish market, San Paya, is the hub for transactions and is where fish is distributed to other urban centers.

Aquaculture: Supplier Side

As shown in Table 6, the cost of production in aquaculture is estimated to be approximately USD 5,625 per acre. As such, the supply of inputs account for much higher expenditure than the other value chains, with feed alone accounting for 79 percent of the cost of production. Manufacture of aquaculture feed is increasing, though accounts for less than 20 percent of the total feed demand.²⁸ Small and medium pond owners use raw materials whereas larger operations procure manufactured feed.

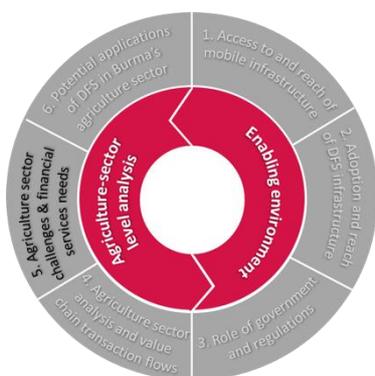
With respect to credit, money is borrowed from traders and brokers for the feed in the form of an advance against securing production. Close relations with traders in the Yangon San Paya market enable finance for inputs to be obtained. However, the need for large amounts of working capital, which are required particularly to finance the high costs of building and maintaining ponds, has typically meant that the majority of pond owners are wealthy. In the FGDs conducted in this study, pond owners highlighted the need to finance feed for the ponds. Where this cannot be obtained, sub-optimal amount of feed is provided, which has a large impact on final yield.

Table 6: Cost of production per acre of fish pond

Item	MKK	USD
Labor permanent	240,000	215.25
Nursery Fish	600000	538.12
Feed	4,959,900	4,448.34
Pumping	64,000	57.40
Other Inputs	45,800	41.08
Harvesting	360,000	322.87
Transport of production	3200	2.87
Total	6,272,900	5,625.92

²⁸ MDRI/MSU, 2015

H | Agriculture sector challenges and financial services needs



Across the value chains, there were a number of overarching constraints identified, which impede their development and competitiveness. An understanding of these challenges faced by value chain actors is critical to the development of DFS offerings in order to ensure that products are appropriately designed and tailored to address the sector's needs. These challenges include:

“As we are poor farmers with a few acres...we cannot always afford to hire the machine for the entire duration of the time that we need it. So we hire it for one day, then find the money for another day if we need it again. - Small rice farmer, Delta

Insufficient access to and application of inputs (seeds, fertilizer, pesticides):

- Limited access to quality seeds and low application rates of inputs (such as nutrients and pesticides) have contributed to the stagnation and decline of productivity in Myanmar's agriculture sector. This is due in part to issues such as shortage of supply and fluctuations in the exchange rate, which have increased costs of inputs. However, lack of financing is one of the main constraints to sufficient usage of inputs.
- In the rice value chain, farmers lack access to financing to obtain sufficient quantities of inputs, such as fertilizer, which are needed to raise production. Declining rates of fertilizer application is a major cause of the widening yield gap between Myanmar and global rice yields (see Annex 6).
- Low levels of nutrient application is also cause of low yields in the sesame value chain, as farmers often attempt double or triple cropping of land without adequate nutrient supply.
- In the pulses value chain, the green gram crop requires more intensive pest management than other pulses, resulting in significantly higher costs to purchase the inputs required to grow green gram (MMK 30 – 40,000/acre). As a result, farmers do not often take sufficient measures to reduce losses to pests (such as through application of Rhizobium, a nitrogen-fixing bacteria), which affects the quality and yield of green gram crops.
- Additionally, in the aquaculture value chain, feed accounts for the most significant component of the cost of production and dictates the productivity from ponds. However, farmers face substantial challenges in meeting feed demands, as available credit is often insufficient to provide feed in the volumes required to achieve potential yields.

Labor shortages and limited access to equipment:

- There is a rising trend in Myanmar of labor migration, as rural populations move to find higher, more stable income. This has resulted in labor shortages that impact all four value chains, driving up the cost of labor and production. Financing to support a shift towards mechanization would support farmers in reducing the need for seasonal labor, and also promote time-saving production practices.
- In the pulses value chain, many farmers elect to plant green gram immediately after rice is harvested, utilizing the residual soil moisture. Due to labor shortages for rice threshing and preparation, however, the green gram crop is frequently planted late, which results in moisture stress that increases the risk of disappointing yields and crop failure. The use of mechanized threshing would decrease the turnaround time by 7 – 14 days, saving valuable time in planting the green gram crop.
- Additionally, the aquaculture value chain utilizes permanent labor more than other value chains, and the proximity of centers of production to Yangon results in higher levels of outmigration from aquaculture producing regions. As with the other value chains, this trend has resulted in higher wages and shortages of labor for harvest and pond maintenance / construction.

“It is difficult to hire laborer[s]. The wages of labor is very high and we cannot make a lot of profit because of high wages of laborer[s].” - Large green gram farmer, Dry Zone

Low investment in technical knowledge:

- Over the past few decades, the government has sought to secure supply and stabilize the price for the domestic oil seed market. The sector has therefore been through a number of regulatory cycles, including a period during which exports were banned between 1998 and 2006.²⁹ The uncertainty created by this policy environment has restricted growth and investment in the sesame value chain. Given the poor economic environment for this crop, investment in knowledge has been weak, but significant production improvements can be achieved by improving the diffusion of best practices.³⁰
- In the aquaculture value chain, the quality of fish reared is variable, due in part to limited technical knowledge. Dissemination of best practice guidelines are required urgently to improve quality of production.

Limited availability of appropriately structured credit, insurance, and savings products:

- Improved availability and flexibility of agricultural financing for agricultural production could help to address many of the challenges above, notably access to inputs and equipment. Even in cases where credit is available, it is often not appropriately structured considering farmers’ production cycles, as noted in Section E.

²⁹ International Trade Centre, 2014

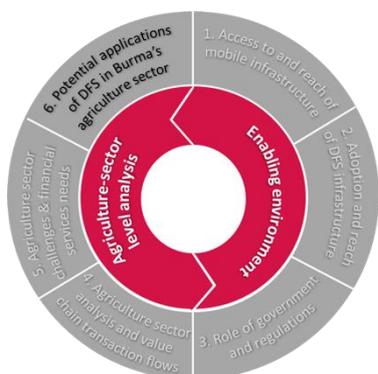
³⁰ International Trade Centre, 2014, p. 10

- Lack of insurance and savings products also increases risks for farmers, as there is no safety net to fall on in case of crop loss. This also leads to over indebtedness of farmers to moneylenders.

These challenges interact to trap farmers in a vicious cycle. Limited supply of credit results in insufficient application of inputs, leading to low yields and high post-harvest losses (particularly for rice), which in turn reduces farm income. The high degree to which Myanmar's agriculture sector is undercapitalized and the extent to which financial services for the sector is underdeveloped directly impact growth and productivity in the sector. This impact is demonstrated by the great disparity in agricultural annual income per worker, which is USD 194 / year in Myanmar, compared with USD 6,680 in Malaysia, USD 1,119 in the Philippines, USD \$706 in Thailand, and USD \$434 in Cambodia.³¹

³¹ World Bank, *Myanmar Agricultural Development Bank: Initial Assessment and Restructuring Options*, 2014.

I | Potential Applications of DFS



In light of these challenges, DFS can provide solutions by leveraging low cost channels and access points, which would help financial institutions overcome the current infrastructure and network challenges that hinder their ability to scale-up their involvement in the agriculture sector, and rural markets in general. Rural populations would benefit from increased convenience and decreased costs in terms of time and money spent accessing financial services. In this context, growth of the DFS industry in Myanmar enables the development of strategic partnerships, channels, instruments, and business models to be built, which facilitate

the design and delivery of targeted financial products and services for value chain actors. In turn, enhanced access to these financial products and services would boost productivity and improve efficiency along the value chains. Recommendations for potential applications of DFS are structured across two categories: a) applications of DFS to address agriculture sector challenges; and b) recommendations to promote DFS ecosystem development.

RECOMMENDATIONS TO ADDRESS SECTOR CHALLENGES

A matrix summarizing the key constraints to agriculture sector growth and potential applications of DFS to deliver the financial services needed to help address these challenges is illustrated in the table below.

Agriculture Sector Challenges & Potential Applications of DFS				
	Transfers & Payments	Savings	Credit	Insurance
Burma's Agriculture Sector Challenges	<ul style="list-style-type: none"> • Poor Infrastructure - Expensive for FIs to serve rural areas 	<ul style="list-style-type: none"> • Market Volatility - Sustaining price/demand fluctuations 	<ul style="list-style-type: none"> • Lack of Input Financing - Fertilizer and seeds - Insecticides and sprays 	<ul style="list-style-type: none"> • Adverse Weather - Weather fluctuations - Climate change
	<ul style="list-style-type: none"> • Limited Footprint of Formal Financial Services - Traveling to branches is inconvenient and expensive 	<ul style="list-style-type: none"> • Strong Liquidity Pressures - Farmers sell produce at low rates for immediate liquidity 	<ul style="list-style-type: none"> • Lack of Asset Financing - Antiquated farming methods - Labour shortages 	<ul style="list-style-type: none"> • Natural Calamities - Floods - Cyclones
Potential DFS Applications	<ul style="list-style-type: none"> • Efficient Delivery of Formal Financial Services Through Agents and Digital Accounts 			
	<ul style="list-style-type: none"> e.g. Remote and proximity payments for inputs, receiving payment from sale of produce, etc. 	<ul style="list-style-type: none"> e.g. Account opening, deposits, and withdrawals for microsavings 	<ul style="list-style-type: none"> e.g. Disbursements and collections of Micro-Loans 	<ul style="list-style-type: none"> e.g. Premium pay-outs for micro-insurance
Areas to Support DFS Development	<ul style="list-style-type: none"> • Facilitate Product and Model Innovations 			
	<ul style="list-style-type: none"> Input financing through savings-linked wallets 	<ul style="list-style-type: none"> Expansion and development of tailored agri financing products, e.g credit from banks, MFIs, savings and credit cooperatives; input financing; and equipment leasing 		<ul style="list-style-type: none"> e.g. Weather index-based insurance products
	<ul style="list-style-type: none"> • Promote Development of a Robust DFS Ecosystem - Create an enabling regulatory environment - Develop a strong agent network - Strengthen MFIs and NGOs 			
<ul style="list-style-type: none"> • Develop Customer-Centric Products - Segmentation - Human Centered Design 				
		<ul style="list-style-type: none"> • Mechanisms to assess farmer credit worthiness 	<ul style="list-style-type: none"> • Development of indexes and monitoring techniques 	

Efficient Delivery of Formal Financial Services through Agents and Digital Channels

DFS has the potential to accelerate agricultural growth in rural areas by enabling the delivery of financial services through agent locations and digital wallets. Agents and mobile phones provide financial institutions with the opportunity to expand their outreach and penetrate rural areas to offer a portfolio of tailored products – spanning transfers, savings, credit, and insurance – to address key challenges faced by Myanmar’s farmers.

Transfers and Payments

DFS will allow Myanmar’s value chain actors to avail of payment facilities without having to travel to bank branches. This will also enable farmers and other value chain actors to move away from cash-based payments to more efficient digital mechanisms, conveniently accessed through their mobile handsets or at a nearby agent location.

During the FGDs, the most often-cited reason for farmers’ interest in mobile financial services was the potential savings in terms of time and transportation costs by not having to travel to the bank. Transitioning to DFS would mean that value chain actors can immediately send and receive payments and make transfers for a variety of reasons that could include:

“I don’t need to go to the bank to transfer money. So, I can save the transportation charge.”- Large chickpea farmer, Dry Zone, on interest in using mobile money

- Paying inputs suppliers
- Paying labour, workers, transporters, and other service providers
- Receiving payment from buyers

Based on the mapping of transaction flows across the four value chains, nearly 5 million cash transactions are conducted between farmers, collectors of produce, and millers / exporters per crop cycle, exceeding a value of USD 8 billion. Digitizing these transactions would bring hundreds of thousands of new clients into the formal financial system and bring benefits to farmers and the entire value chain by reducing costs and increasing efficiency, allowing value chain actors to immediately send and receive payments for inputs, labor, transportation, and sale of produce. A study by Tufts University in Niger estimates that the time savings attributable to the digital transfer channel for each payment translated into an amount large enough to feed a family of five for a day.³²

One potential initiative relevant to Myanmar’s agriculture sector is the digitization of payments for inputs. For example, Red Dot, an electronic POS provider, has established a cash acceptance network that can be accessed through terminals placed in shops or through a mobile app. Red Dot agents open a merchant account, through which they can distribute airtime, accept retail payments for household goods, and eventually accept utility bill payments. Such

³² “How do Electronic Transfers Compare? Evidence from a Mobile Money Cash Transfer Experiment in Niger.” September 2013. sites.tufts.edu/jennyaker/files/2010/02/Zap-it-to-me_12Sept2013_No-Appendices.pdf

merchant payment services can be expanded to the agriculture sector, enabling farmers to make retail payments for inputs through a mobile- or card-based instrument. Red Dot has shown willingness to partner with suitable players and pilot tailored services in rural markets for assessing the segment's response.

A Pathway to Digital Financial Inclusion

A growing body of evidence suggests that poor households' connectivity to an integrated digital financial system broadly supports the achievement of direct welfare benefits. These benefits span several channels, including (i) access to a basic store-of-value account, (ii) payment connections to peers, (iii) connections to institutions (e.g. utility companies, enterprises, governments), and (iv) access to enhanced financial services (e.g. savings, credit, insurance). However, the migration from a cash environment to a digital economy is not to be envisioned as occurring in a single bound. Economies are rather likely to pass through several stages of market development along the path to an inclusive digital economy. Of course, it is to be expected that many countries may chart unique pathways which leapfrog or even reverse certain stages. A general pathway to digital financial inclusion may be hypothesized as according to the following four key stages:

- ***Stage 1. Basic Connectivity*** - Critical mass of mobile coverage and penetration among the rural poor.
- ***Stage 2. Digital Remote Payments*** - Poor people adopt and use digital channels for person-to-person transfers and government payments.
- ***Stage 3. Full Range of Digital Financial Services*** - Poor people adopt and use digital channels for savings, credits, insurance services, and other financial services
- ***Stage 4. DFS Plus*** - Poor people conduct a majority of transactions, from payments to merchants and vendors to installments for infrastructural improvements and substitutes.

Source: "A Digital Pathway to Financial Inclusion," Daniel Radcliffe and Rodger Voorhies, Bill & Melinda Gates Foundation, 2012.

Savings through DFS

Savings are especially important for the agriculture sector, which is characterized by seasonality, irregular revenues, and exogenous risks. Assessments of input-finance-linked savings accounts similar to the National Microfinance Bank's Kilimo Account³³ in Tanzania and the Commitment Savings Product offered by Opportunity Bank of Malawi,³⁴ show that farmers can be effectively encouraged to save from their earnings, and farmers that saved cultivated significantly more land and invested more in agricultural inputs.

³³ Innovative Agricultural Sme Finance Models, GPFI & IFC, 2012

³⁴ Facilitating Savings for Agriculture: Field Experimental Evidence from Malawi, 2015

DFS-based mobile wallets can offer flexible and convenient savings mechanisms for value chain actors, which would enable them to save even small amounts cost-effectively. By facilitating savings, DFS can allow Myanmar's smallholder farmers to manage liquidity between agricultural cycles, undertake investment, and use yield-enhancing inputs, reducing their dependency on external sources of finance.

Many participants in the study reported that they had very little amounts of money to save, or that they saved in non-liquid assets such as livestock, which are vulnerable to disease and natural disasters. Although encouraging savings in a formal account would require behavior change, farmer-focused DFS savings accounts – if coupled with financial literacy and client protection programs (such as those promoted in Myanmar's national financial literacy plan, which is being developed with support of the Asian Development Bank) – could encourage farmers to save through formal mechanisms. These accounts can reside on a financial institution's core banking system, but should be accessible and easy to open at agent locations, require a small (or zero) initial deposit, and have little (or no) balance requirements or administration fees. For example, the M-Shwari standard savings account does not require a minimum balance for savers to accrue interest, though M-Shwari's fixed deposit account offers the option to realize higher interest rates if a minimum balance is kept. Utilizing information from a customer's mobile phone registration and M-Pesa account, M-Shwari also enables the opening of an account in less than a minute.

This digital account or wallet could be offered by FIs, MNOs, joint-ventures (JVs) between banks and MNOs, or even companies such as RedDot (depending on the outcome of the mobile money regulations). Farmers could use this account to send or receive money, safely store money, and/or pay for inputs or receive payments from millers, collectors, and other upstream actors.

Credit Delivery through DFS

DFS can also help to bridge one of the foremost challenges faced by Myanmar's agriculture sector, which is the scarcity of finance. Adequate and timely supply of credit to Myanmar's farmers is critical so that they can cover production costs including those related to inputs, labor, equipment, and transport. Furthermore, farmers require means of investing in equipment, which is necessary for improving farming methods and coping with increasing labor shortages.

Currently, one of the key constraints that MFIs and banks in Myanmar face in increasing lending to the agriculture sector is the high cost of cash management, disbursement, and collection associated with operating in rural areas. These realities, combined with regulations that cap interest rates, make it difficult for financial institutions to administer loans efficiently. For instance, PACT Global Microfinance Fund and World Vision both cited the need to reduce the cost and risks associated with cash handling. Digital channels can expand the availability of credit to rural actors by providing a cost-effective and efficient means to expand outreach to these segments.

DFS is being used successfully in many developing countries across Asia and Africa for disbursements and collections of loans, and studies have shown that MFIs and NGOs can save up to 15 percent to 25 percent on the costs associated with delivering loans in rural areas. Donors can support uptake and instill efficiency and transparency in their programs by embedding DFS into program design, and encouraging their implementing partners (MFIs and NGOs) to use digital channels for disbursements and collections. Wallets can also be leveraged for delivering subsidies and input credit, as is being done by Cellulant Nigeria (see text box below).

Considering Myanmar's underdeveloped infrastructure, there is also an opportunity to bridge infrastructure gaps through pay-as-you-go financing, delivered through digital channels, for the use of equipment such as solar panels and solar pumps. Solutions are already being developed in Myanmar to digitize payment streams for traditional electricity bill payments. Namely, Leo Tech, a technology company based in Singapore with presence in Myanmar, has partnered with CB Bank to develop a mobile app for electricity bill payments. In addition to streamlining the payments aspect of access to energy, DFS presents an opportunity to develop new business models that solve the financing constraint that lower-income segments living off-grid face in accessing energy. A pay-as-you-go model for solar energy would enable rural households and businesses to receive a solar product and pre-pay for energy credits using a card or mobile-based instrument and channel.

Addressing the formal financing gap can serve as a potent strategy to accelerate adoption of wallets and increase financial inclusion. Benefits of leveraging wallet-based credit include:

1. *Credit will drive farmer trial:* The fact that the majority of farmers participating in the FGDs had bank books shows that they are willing to adapt for the sake of credit. Credit, provided that is flexible enough to meet the unique needs of smallholder farmers, can potentially drive behavior change and encourage trial.
2. *Enhanced agriculture production:* Provision of finance through DFS designed with a focus on increasing farming yields and income will enable farmers to use better inputs, modernize their techniques, and mechanize their operations, enabling their journey out of poverty.
3. *Assist diffusion of DFS in rural areas:* Promoting adoption of DFS by farmers through credit can also be a part of a diffusion strategy for DFS. Once farmers have active wallet accounts, they can be encouraged to use it not only for receiving credit, but also for making transfers and receiving payments, both upstream (brokers, millers) and downstream (input providers).

CELLULANT'S AGRICULTURE-FOCUSED WALLETS IN NIGERIA

Cellulant Nigeria, a mobile wallet provider, is powering the Government of Nigeria's Growth Enhancement Support Scheme (GES) by providing a secure, convenient, and affordable means of delivering credit to millions of Nigerian farmers. The Cellulant Wallet is being used to route credit and subsidies to farmers so they can purchase fertilizer, seedlings, and other inputs from agro-dealers. To enable redemption, the company has deployed appropriate technologies, including Point-of-Sale terminals (POS) at agro-dealers, which also enables these dealers to become mobile money agents and offer additional financial services in rural areas.

Launched in 2011, Cellulant's solution had been successfully leveraged to reach 10 million farmers as of May 2014. With more than 70 million transactions processed as of May 2015, delivering more than 1.3 million metric tons of fertilizer and improved seeds, the Cellulant Wallets are proving to be a potent tool for empowering farmers to increase their yields and enabling them to escape poverty.

<http://thenationonlineng.net/new/ata-cellulants-e-wallet-processes-70m-transactions/>

<http://newtelegraphonline.com/10m-farmers-captured-agric-e-wallet-scheme/>

Insurance through DFS

Managing the risks associated with agricultural production is critical for Myanmar's agriculture-based rural economy. Flooding, tropical storms, and drought are the three main agricultural risks in Myanmar. Natural calamities such as cyclone Nargis and the recent floods have damaged 8 percent (1.2 million acres) of Myanmar's rice fields (per UNDP estimates), making agriculture insurance products vital.

Globally, a variety of traditional and weather index-based agricultural insurance products³⁵ have been designed to help farmers better cope with the risk (see the table to the right). These products could substantially benefit farmers in Myanmar, providing them with the ability to manage shocks. DFS can help to effectively deliver insurance products on a large scale to

Agricultural Insurance Products

Traditional crop & livestock indemnity products

- Named-peril crop insurance (e.g. hail)
- Multiple-peril crop insurance (yield guarantee)
- Revenue insurance (yield & some price protection)
- Livestock mortality insurance

Index-based products

- Weather index products
- Area yield index products
- Livestock index products

³⁵ Agricultural Insurance: Scope and Limitations for Rural Risk Management, Worldbank, 2009

Myanmar's farmers through agents and wallets, and greatly reduce the transaction costs associated with payment of installments and claim payouts.

Agent networks and mobile channels in various initiatives around the world are proving to be efficient means of distributing micro-insurance products. Specifically, Kilimo Salama and Juhudi Kilimo in Kenya³⁶ and FarmerShield in Zambia³⁷ are examples of insurance providers leveraging mobile technologies to reach smallholder farmers. Recognizing this market need and opportunity in Myanmar, Sompo Japan Nipponkoa Group, a Japanese insurance company, has recently committed to offering weather index insurance to 30,000 small-scale farmers in Southeast Asia by 2025, including rice and sesame farmers in Myanmar. Coordination and support from industry stakeholders to ensure the development and scale-up of such initiatives will be important to accelerate the availability of such services in the country.

Natural Disasters and Mitigation in Myanmar

The damaging effects of natural disasters - most prominently floods and typhoons - on agricultural livelihoods in Myanmar would be difficult to overstate. Just this year, the commencement of Myanmar's lean season in July and August was marked by the passing of Cyclone Komen. The significant rise in monsoonal floodwaters in 12 of the country's regions and states - embodied in regular flooding and landslides - contributed to the displacement of 1.6 million people, the inundation of over 500,000 hectares of farmland, and the deaths of more than 250,000 animals. In Ayerawady state, for example, 80 percent of the cultivated flooded area was completely destroyed.¹

While mitigating risks of natural disasters is generally expensive and difficult where at all possible, immense progress has been made in the area of microinsurance, especially in weather-index insurance. When insurance payouts follow a benchmark index, benefits payments can be targeted to beneficiaries who suffer the worst losses.² Micro-premiums as low as USD 2 are made possible by the replacement of key features and transactions of a traditional insurance model with technology-based solutions, notably including the use of mobile technology to locate, register, and pay farmers. This reduces the cost of sales teams and payout distribution mechanisms.

¹ “[Agriculture and Livelihood Flood Impact Assessment in Myanmar](#).” FAO and WFP, October 2015.

² Hans Dellien (principal author), IFC, “Agricultural Lending: A How-To Guide.” Vietnam, 2015.

³⁶ Serving Smallholder Farmers: Recent Developments in Digital Finance, CGAP, 2014

³⁷ Mobile payments How Digital Finance is transforming agriculture, Centre for Agricultural and Rural Cooperation (CTA), 2015

Development of Customer-Centric Products

Where DFS is a robust channel for serving lower-income segments, particularly those living in rural areas, it is important to remember that the channel alone is not sufficient; an equally robust product portfolio has to be built around it. This is particularly important for Myanmar, where satisfaction and trust in informal mechanisms is displayed by all agriculture sector actors. Donors and other stakeholders can assist financial institutions and DFS providers create need-based products by:

- Commissioning customer segmentation and behavior studies that provide insights and perspectives for designing effective products and marketing and communications campaigns
- Providing technical support and funding to pilot new products that establish proof-of-concepts
- Providing support for the design of customer-centric DFS products based on human-centered design (HCD) principles
- Assisting the Central Bank develop policies and laws that will enable the roll-out of innovative products and financing mechanisms

The table below expounds further upon the opportunities to leverage DFS in the expansion of financial products' and services' delivery. This includes variations of the financing mechanisms presented above, as well as alternative models to address value chain actors' various financing constraints.

Product	Description	DFS Opportunity
Savings and credit from self-help groups and cooperatives	Group savings schemes and cooperatives, which can support individuals or groups for costs of production and equipment purchases	<ul style="list-style-type: none"> • Link informal savings groups to formal FIs through digital channels. Linkages between savings groups and FIs could provide enhanced security for the groups' cash deposits, encourage more effective savings mobilization, and expand the FIs' reach to rural areas • Use transaction history to support FIs' credit analysis
Bank / MFI Agricultural Credit / Overdraft Facility	Bank or MFI loan products to support costs of farming (including labor as well as input costs)	<ul style="list-style-type: none"> • Design credit products tailored for agriculture value chain actors, delivered through digital channels • An overdraft credit product with a limit that can be withdrawn and repaid within a span of one year may be suitable for digital channels. This may allow the farmer to avail of funds when needed and repay when sale of produce is done, and will help to smooth cash flows • Develop bundled products, such as a credit with insurance product or a savings-linked credit product

<p>Input financing from dealers and traders</p>	<p>Input dealers, crop buyers, and traders provide loans for production and equipment. Providing advances is a major part of the trader model in some value chains.</p>	<p>that will help in productivity enhancement, as well as risk management</p> <ul style="list-style-type: none"> • Deliver input financing through digital channels • Use transaction history from input financing to support FIs' credit analysis • Link to information / agricultural extension services to better understand input requirements • Bundle insurance with input financing
<p>Equipment leasing</p>	<p>Financial lease (lease period extends for the equipment's useful life, with the option to purchase at the end of the lease period); operating lease (does not extend for the equipment's useful life)</p>	<ul style="list-style-type: none"> • Leverage digital channels for lease payments • Develop automated customer databases and dashboards for accounts • Provide information services on what equipment is available for lease and how to lease
<p>Insurance: weather index and equipment insurance</p>	<p>Reduces financial risk for providers of agricultural credit</p>	<ul style="list-style-type: none"> • Manage policies and payouts through digital channels • Establish a claims portal where on-site inspections are registered and payout is triggered, which is communicated through mobile channels • Develop an SMS channel / app for policy holders for transactions and communications
<p>Financing for energy solutions</p>	<p>Financing for low-income segments for off-grid energy solutions</p>	<ul style="list-style-type: none"> • Develop a pay-as-you-use product for solar panels and solar pumps that farmers can use to connect to electricity and for irrigation

Potential points of interaction between farmers, upper value chain actors (namely traders and millers), and financial institutions, MNOs, and payment services providers with DFS – as well as a few of the key benefits that DFS would present for these actors – are illustrated below.

Farmers	Traders and Millers	FIs, MNOs, and Payment Services Providers
 <ul style="list-style-type: none"> •Apply for an agricultural production loan through a mobile device; save on time and transportation costs •Receive loan disbursements through a mobile wallet •Use funds in the mobile wallet to purchase inputs and rent equipment •Collect payments for crops through the mobile wallet •Repay the loan using the mobile device •Build a transaction / credit history; establish a track record to access additional credit and other financial products •Apply for weather index insurance at an agent location and pay premiums using a mobile channel •Pre-pay for solar energy using funds in a mobile account 	 <ul style="list-style-type: none"> •Access disbursements for trade finance to purchase crops through digital channels •Access a revolving credit line and disbursements for capital investment loans for storage infrastructure through digital channels •Settle transactions with commodity exchanges digitally, reducing costs and risks of cash handling •Utilize mobile banking services to check balances and make / receive transfers through current accounts •Issue payments to lower value chain actors for crops using a mobile wallet 	 <ul style="list-style-type: none"> •Reduce operational costs and enhance profitability of delivering services •Expand scale and reach of existing services to new segments •Develop new business models tailored to agricultural segments, tapping market potential to increase revenue opportunities •Improve staff effectiveness and free-up staff time to acquire new customers

RECOMMENDATIONS TO PROMOTE DFS ECOSYSTEM DEVELOPMENT

DFS in Myanmar is still in the incubation stage and providers have yet to gain a foothold in a space that offers much potential to support the agriculture sector and enhance financial inclusion in the country. However, the industry risks stalling because of regulatory restrictions, infrastructure deficiencies, and capacity limitations of authorized players. Improved strategies and coordinated efforts of all stakeholders, including policy makers, DFS providers, and development partners, are therefore needed to support the industry.

Specific recommendations to assist the growth of commercially-viable digital financial services Myanmar are described below.

Create an Enabling Regulatory Environment

The mobile banking directives signal the government's intent to leverage DFS to expand financial inclusion in Myanmar. Six DFS providers are already in the early launch stages (Myanmar Mobile Money, MyKyat, LeoTech in partnership with CB Bank and MCC Group, Ooredoo, Digital Money Myanmar, and Myanmar Payment Solution Services MPSS), and other non-bank players eyeing the sector for possible entry include Boloro, Myanma Computer Company (MCC), Yatanarpon eBilling Services, and Easy Pay Company.

Although these early initiatives are encouraging, the regulations as set-forth in the Mobile Banking Directive limit the range of DFS actors to banks. As noted in Section E and F, however, Myanmar's financial sector is underdeveloped and the country's banking system requires substantial upgrading and investment to build capacity, automate processes, and update technology systems, which are needed to manage DFS initiatives. Therefore, the CBM should consider the benefits of opening the market to a wider spectrum of players that can provide DFS, allowing for greater investment and innovation to facilitate the scale-up of DFS services in Myanmar. Where the Central Bank has issued drafts of a new set of regulations that are progressive and non-restrictive, issuance of the regulations has been delayed by more than a year, which is causing anxiety for the aspiring players and has stalled many planned roll-outs. Additional recommendations on specific regulatory considerations are included in Section F above.

Support the Development of Robust Agent Networks

Convenient availability of cash-in, cash-out, and wallet registration points are key for encouraging the transition to digital payments and building an ecosystem that can support DFS in the country. Providers should look to recruit existing actors into a formal role, including informal channels (e.g. Hundi actors of good standing), when developing their networks. As described in Section E, rural merchants, retailers, wholesalers, and distributors also have the potential of becoming agents. Using existing relationships will provide additional revenue opportunities to actors, and delivering DFS services through structures familiar to the target market will allow providers to leverage established networks to encourage uptake.

Providers should also consider sharing delivery channels and acceptance infrastructure wherever possible to accelerate agent network scale-up, reduce roll-out costs, and keep operational costs to a minimum. There is also a clear lack of know-how on how to develop and manage agent networks. Donors can encourage innovative and collaborative agent network models by:

- Providing technical advice on emerging distribution models, including shared agent networks and agent aggregators
- Set-up an agent network development training facility for the DFS industry
- Assisting the preparation of template business cases for joint investment

- Providing technical assistance (technical integration, agent network management, pricing models) and funding for development of such models

Develop Credit Assessment and Information Mechanisms

Banks and MFIs are typically cautious in lending to farmers due to lack of credit information on borrowers, lack of collateral on the part of the borrower, and the high degree of perceived risks associated with agriculture. This challenge is further exacerbated by the absence of effective collateral and bankruptcy laws³⁸, and the reluctance of banks to use farmland as collateral despite the Central Bank of Myanmar's permission.³⁹

Traditional ways of assessing risk will be insufficient for Myanmar's agricultural sector due to limited assets possessed by farmers, incomplete land records, and the high degree of information asymmetry. DFS can help to overcome this barrier by supporting the development of alternative lending methods. In this context, DFS can be a powerful tool to generate data that can be used by MFIs and banks to assess borrowers' willingness and ability to pay and underwrite risk.

In many markets, DFS providers are analyzing voice and financial transaction data, which is then used to provide loans to customers (Kopo Kopo in Kenya is an example). In Myanmar, donors and other stakeholders can play a key role in encouraging partnerships between MNOs, MFIs, banks, data analytics companies, and other actors to promote the use of data analytics to increase the flow of credit in a market with significant credit constraints in the agriculture sector. Establishment of a credit information system that can assess a credit profile (e.g. credit scoring) for a loan, monitor the loan once it is disbursed, and collect data on DFS transactions in the agriculture sector would be instrumental for Myanmar's MFIs and cooperatives in increasing supply of credit to rural areas.

To achieve the above, however, MFIs must have strong back-end technology systems that can be integrated with DFS providers and credit information systems, which are currently lacking for most MFIs in Myanmar (most of the MFIs interviewed for this assessment still use Excel for back-end calculations).

Donors can assist the creation of alternative credit assessment mechanisms and lending models by:

- Expanding farmers associations and cooperatives to support group-lending and other methodologies
- Establishing a credit guarantee scheme to stimulate lending by financial institutions to small farmers and lower-income segments

³⁸ <http://www.doingbusiness.org/data/exploreeconomies/myanmar/getting-credit>

³⁹ <http://www.mmtimes.com/index.php/business/15309-banks-unwilling-to-take-farmland-as-collateral.html>

- Promote the establishment of an open national credit bureau, which allows for the collection and dissemination of financial system information and the participation of microfinance institutions and other commercial entities
- Assist MFIs with updating their back-end technology, including consideration of a single platform that could be developed and accessed by multiple institutions, to accelerate the capacity of MFIs to deploy DFS for their customers

Develop Insurance Indexes and Monitoring Techniques

Insurance not only helps farmers cope with shocks, but also aids in the provision of finance by reducing their risk profile. The development of appropriate insurance products for Myanmar's farmers will require not only risk assessment and management skills on the part of financial institutions and insurance providers, but also the development of sophisticated insurance indexes, monitoring techniques, indemnity triggers, and thresholds. These might be too costly and unfeasible for providers to deploy alone; however, donors could assist in the development of insurance products and infrastructure. Specifically, assistance can be provided in the following areas:

- Application of actuarial methods for modelling of risks and losses
- Re-insurance in the international market
- Building capacity of insurance providers for assessment of actual losses
- Development of robust real-time measurement tools, such as weather stations and remote-sensing through satellites

Develop a Business Model for Pay-As-You-Go Products to Finance Energy Access

Considering the infrastructure challenges in Myanmar, there is a large market for solar-powered solutions to bring access to clean energy to off-grid areas throughout the country. To make these energy solutions available to rural and agricultural segments, however, financing and distribution models must be created which are tailored to the needs of these lower-income groups. Pay-as-you-go financing, delivered through digital channels, would enable access to clean energy paid through small, user-defined payment increments that reflect the economic constraints faced by lower-income populations. Activities to support development of pay-as-you-go business models for clean energy include:

- Conduct an in-depth feasibility study on the demand for alternative energy products
- Develop a pilot in partnership with a solar panel company and a financial services provider
- Develop a detailed case study for dissemination to the industry

CONCLUSION

As Myanmar continues on its path towards greater economic and social development, growth of the agriculture sector and increased rural incomes remain critical conditions for achievement of stated development objectives. While there is significant potential for improved productivity in the agriculture sector, tapping into this potential requires concerted efforts to promote greater financial inclusion in Myanmar's rural areas. DFS is key to expanding access to formal financial services in Myanmar, leveraging technology to support the creation of business models that allow expanded, sustainable outreach to rural and agricultural segments. Industry stakeholders, including the Government of Myanmar, private sector players, donors, and implementing partners, play an important role in further developing DFS. However, coordination among stakeholders is required to implement the recommendations in this report, as well as to continue dialogue on additional ways in which stakeholders could work towards their respective goals. These coordinated efforts could result in great impact, not only promoting broad-based growth that improves incomes, livelihoods, and living standards at a rural household level, but also contributing to the economic transformation of Myanmar as a whole.

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Annex 1 | Assessment Objectives and Methodology

This study builds on recent research conducted by organizations including USAID, LIFT, UNCDF, CGAP, Proximity Designs, and others, which have contributed substantially to an understanding of agriculture value chains in Myanmar, rural economies and livelihoods, and use of / need for financial products. The objective of this report is to advance the understanding of: 1) the payment flows and payment service providers in agriculture value chains; 2) the potential for DFS to enhance the efficiency of transactions within the value chains, thereby contributing to improved livelihoods; and 3) value chain actors' familiarity with and openness to mobile-based payment options.

To this end, key project activities and assessment methodology included:

- **Desk study:** The focus of the desk study was to develop an understanding of: 1) relevant trends and characteristics of Myanmar, including (but not limited to) demographics, macroeconomic conditions, and key actors (from the public sector and private sector, particularly those involved in agriculture and financial services); 2) Myanmar's agriculture sector, including key crops, crop cycles, production practices, value chain structures, and leading actors; and 3) financial services landscape, including the regulatory framework, current state of financial inclusion and telecommunications coverage, and existing or planned deployments of alternative delivery channels, electronic payments (e-payments), and mobile money.
- **Stakeholder interviews:** Stakeholder interviews were conducted to further contextualize and deepen an understanding of the information gathered during the desk study. A complete list of stakeholders conducted can be found in 0.
- **Rapid value chain assessment and selection:** Based on the desk study and stakeholder interviews, a rapid value chain assessment was conducted to select the value chains, which would comprise the focus of this study. The selection of the value chains considered the following criteria: relevance to the economic activity within Myanmar's agriculture sector; degree to which the value chains have well-defined and accepted structures (to enable a more effective study of transaction flows within the chain); and geographic centers of production, with a preference for commodities produced in locations with stronger infrastructure to support DFS initiatives. A summary of the value chain assessment is included in 0.
- **In-field assessment:** The in-field assessment was conducted through focus groups discussions (FGD) with 164 producers (farmers) in all four value chains, as well as through 53 key informant interviews (KII) with both rural and urban upper-value chain actors. Three assessment tools were developed and applied during the FGDs and KIIs with the objective of confirming the structure of the value chain, ascertaining the roles of the different actors within the chain, and obtaining insights on the relationships and

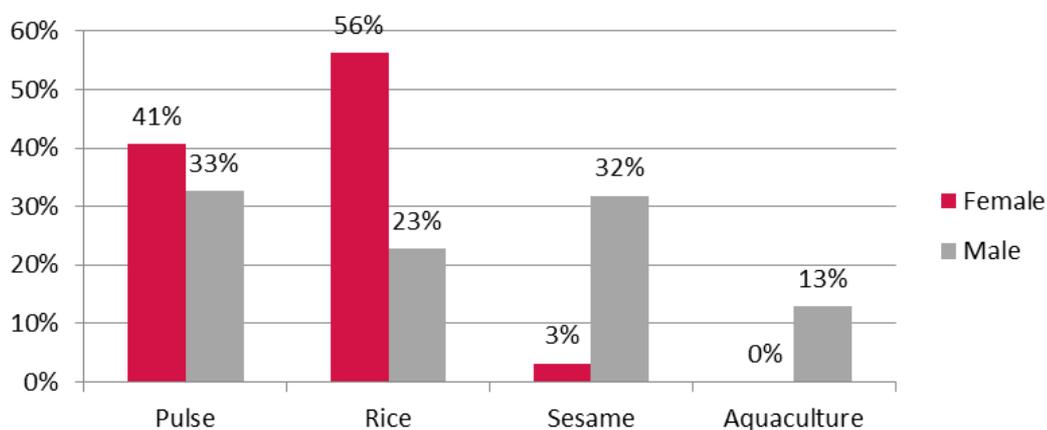
transactions that enable the value chains to function, financial services needs and preferences, and openness to / familiarity with digital financial services.

- **Key informant interviews with rural actors:** 22 interviews were conducted with rural actors in the value chains, including as millers, traders and input dealers. These KIIs explored the role of these actors and how their business was conducted.
- **Key informant interviews with upper value chain actors:** 31 interviews were conducted with urban-based value chain stakeholders, supported by 15 further interviews with organizations representing the interests of value chain actors (federations and associations).
- **Farmer focus groups:** 20 FGDs involving 164 participants were conducted, segmented by different farm sizes. These groups are representative of the agricultural economy in the area and contained 8-10 farmers per FGD. Of the FGD respondents, 19.5 percent of the sample were women, and 80.5 were men. The sessions were framed around the journey through the agricultural season, describing the inputs required at each stage, exploring constraints experienced, and how business was conducted.

The FGDs and KIIs were conducted in April – May 2015 by Myanmar Marketing Research and Development Co. Ltd. (MMRD). A map highlighting the location of all FGDs and KIIs conducted during this study is included in 0.

A breakdown of the FGD sample by gender and value chain is included in Figure 13.

Figure 13: Value Chain Distribution by Gender (As a % of Total Gender)



Annex 2 | List of Stakeholders Consulted

Stakeholder consultations were conducted between January 27 and February 6, 2015. The mission comprised of meetings with donors, implementing partners, financial institutions, mobile network operators, financial service providers, and agricultural associations. A list of stakeholders consulted is included below.

DONORS

UNCDF
IFC
LIFT
GIZ
GSMA – mAgri

IMPLEMENTING PARTNERS

PACT NGO
Winrock International
International Fertilizer Development Corporation
Michigan State University

FINANCIAL INSTITUTIONS

CB Bank
Pact Global Microfinance Fund
Proximity Finance
World Vision
Myanmar Citizens Bank Limited

MOBILE NETWORK OPERATORS

Ooredoo
Telenor

FINANCIAL SERVICE PROVIDERS

Visa
Red Dot
Frontier Technology Partners - myKyat
Myanmar Mobile Money

AGRICULTURAL ASSOCIATIONS

Myanmar Pulses and Beans Merchants Association

Annex 3 | Summary of Rapid Value Chain Assessment

To select the four value chains that would comprise the focus of this study, eleven major value chains were assessed. A summary of the analysis is presented in the below. During the desk research phase of the project, all eleven chains were identified as being significant to the agriculture of Myanmar, either as a cash crop, export, or national markets (using data from the Food and Agriculture Organization). Sufficient information was obtained only for the rice value chain prior to the first trip by the Consulting Team to Myanmar. However, during meetings with key stakeholders in the agriculture sector, the Team obtained access to additional research, much of which had not yet been published, which helped to fill knowledge gaps on pulses and oil seeds. Although some information was obtained on the aquaculture and horticulture sectors, the level of detail was not the same as the information received on other value chains.

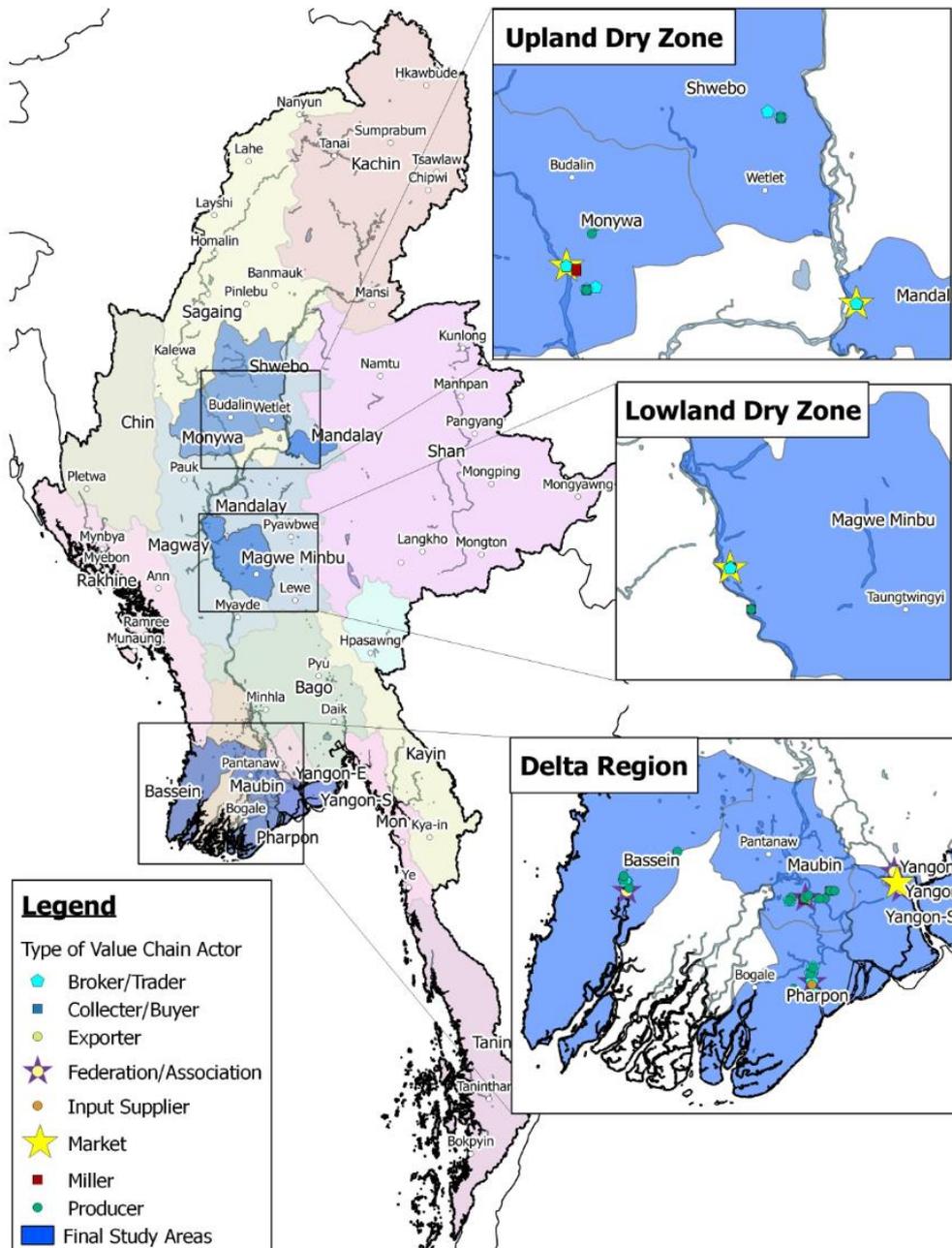
Value Chain (VC)	Understanding of VC	Domestic market	Export Market	Scale	Partnerships	Growth	Potential Study Areas
Aquaculture	Low	High	Low	Rapidly growing, mainly in the Delta and riverine	MSU, WFC, MFF, University of Arizona	Very High	Delta
Black Gram	High	Low	High	Delta and to a lesser extent, Irrawaddy Valley	MSU, MPBSA,	Medium to high	Delta
Chickpeas	Medium	Low	High	Dry zone	MSU, MPBSA,	Medium to high	Dry Zone
Coffee	Low	Low	Medium	Limited to highlands, particularly Shan	Winrock	Stable	Shan State
Green Gram	High	Low	High	Irrawaddy Valley and to a lesser extent, Delta	MSU, MPBSA,	Medium to high	Dry Zone

Maize	Medium	High	Medium	Limited to highlands, particularly Shan	Winrock	High	South Shan
Potato	Low	High	Medium	Taunggyi	Winrock	High	Shan State
Rice	High	High	Low	Throughout the country	IRI, IFDC, MSU, MRF	Low	Costal, Delta, Dry Zone
Sesame	High	Medium	High	Dry Zone & South Shan	MSU, MPBSA, Winrock	Medium	Dry Zone
Soya	Medium	Medium	Medium	Limited to highlands, particularly Shan	Winrock	Medium	Shan or Kachin States
Vegetables	Low	High	Medium	Predominantly upland or irrigated valley	Winrock, MHA	High	Shan, Sagaing, Magway, Bago

Annex 4 | Locations of FGDs and KIIs

Areas Used For The Digital Financial Services Study

Locations of Focus Group Discussions & Interviews With Value Chain Actors



Annex 5 | Additional Details on Agriculture Sector in Myanmar

OWNERSHIP OF LAND

Although the average size of land ownership varies between regions and studies, the figure is consistently less than five acres. The *Household Survey 2013* cites the average size of land owned as 3.8 acres in the Dry Zone and 4.5 acres in the Delta,⁴⁰ while a recent World Bank study reported the average land holding for rice, oil seeds, and pulses to be between 4 – 5 acres.⁴¹ Access to land is highly skewed, however; landless households constitute between 25 – 50 percent of rural households, with significant regional disparities. In the Delta, 50 – 80 percent of rural households are landless, while this figure stands at 25 – 45 percent in the Dry Zone.⁴² Since much of the agricultural production system is un-mechanized, draught animals work the land and transport crop, with landless households providing much of the seasonal labor to plant and harvest crops.

INPUT SUPPLY

Low application rates of nutrients are responsible for stagnation and decline of agricultural productivity in Myanmar's agriculture sector.⁴³ Nitrogen, phosphate, zinc, and sulfur deficiencies are experienced in all the major rice production zones. Domestic production of urea, the most widely used fertilizer, is placed at between 4,000 – 10,000 tons per year,⁴⁴ which is far below the demand. The removal of subsidies in 2002 marked the end of government involvement in the importation and distribution of fertilizers, which has led to substantial increases in the price and a decline in their use. Since 2002, fertilizer prices have been largely determined by exchange rates, which has led to large inter-seasonal variation in fertilizer prices.

Issues including poor quality, importation of banned products, poor labeling leading to inappropriate use, and shortage of supply have been reoccurring themes fertilizers and other agricultural inputs. Cross-border trade with China has addressed some of the input supply shortages and significantly contributes to meeting fertilizer demand. However, this cross-border trade from China is not well-recorded and therefore makes definitive insights in terms of type and volume of inputs difficult to obtain. Recognizing these concerns, the Government of Myanmar has made recent efforts to strengthen regulation enforcement through the fertilizer law.

Official statistics put nutrient applications at 5 kilograms / hectare (kg / ha). Although household surveys place the figure closer to 100 kg, this number is still low when compared

⁴⁰ LIFT, 2013, p. 81

⁴¹ World Bank, 2013, p. 13

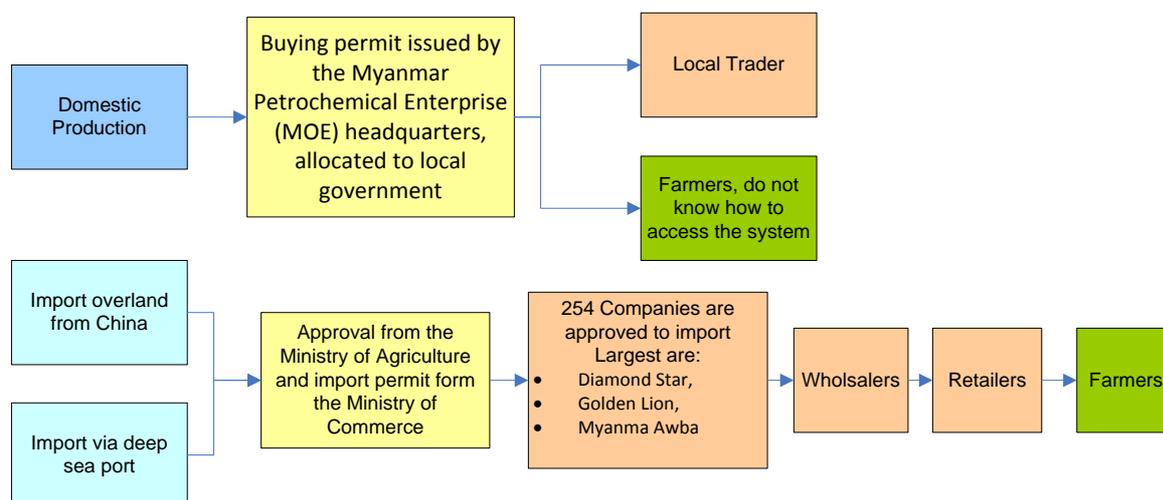
⁴² Haggblade, 2013, p. 5 p.25

⁴³ Lwin H. Y., 2014

⁴⁴ Lwin H. Y., 2014

regionally (China – 432.1 kg, India – 156.2 kg, Vietnam – 262.4 kg).⁴⁵ The gap is being filled with lower-priced and more efficient supply chains from China. For example, urea imported through the port of Yangon retails for USD 35 per 50 kg bag, whereas urea imported overland through China retails for USD 23 per 50 kg bag.⁴⁶

Figure 14: Schematic of the fertilizer supply chains in Myanmar



Wholesalers and local level retailers have limited finance options, which constrains the amount and range of agricultural inputs they are able to supply. Inefficient supply chains and high transport costs combine to make unit costs high to the farmer. Farmers frequently take inputs on credit from retailers with interest rates of approximately 5 percent per month. This situation has led to farmers applying far below the recommend rates of fertilizer to replace soil nutrition, which has depressed yields and reduced soil fertility.

Import volumes of fertilizer have been highly erratic and do not show consistent trends (Figure 15). The private sector has played an important role in increasing the supply (Figure 16) and range of fertilizer products available. Input suppliers are also involved in the training and dissemination of information on crop protection, as well as on the safe and effective use of inputs, through meetings and demonstrations, delivered through their networks of distributors. Awba employs agronomists and has a network of over 1,000 dealers supporting many retail outlets to extend the penetration of products rurally. Large importers repackage inputs into retail packaging and have the ability to blend fertilizers for a wide range of uses.

⁴⁵ Lwin H. Y., 2014

⁴⁶ Lwin H. Y., 2014

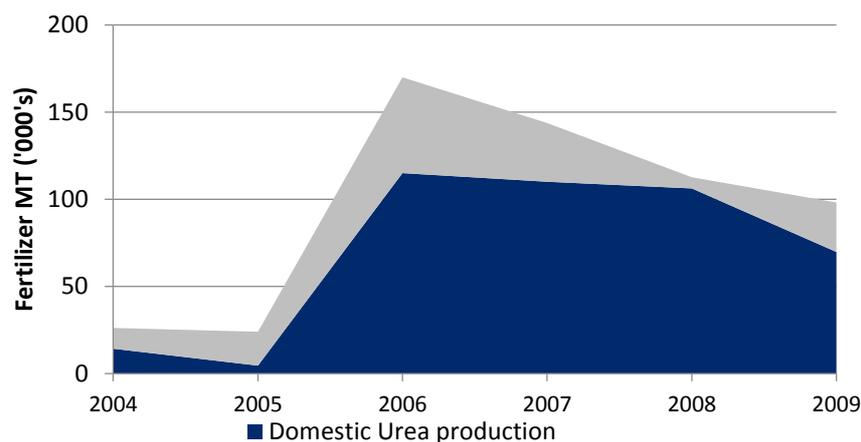


Figure 15: Trends in Urea production and Fertilizer import in Myanmar 2005-2010 (Lwin H. Y.) (FAO STAT, 2015)

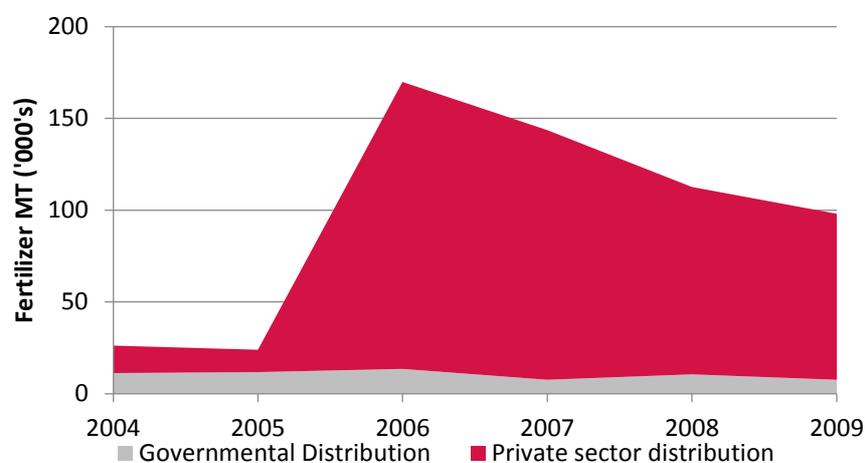


Figure 16: Role of Governmental and Private Sector Distributors in Myanmar fertilizer supply (Lwin H. Y.)

Actors in the input supply chain are broadly the same for all the value chains in this study, as outlined below.

1. Urea Manufactures in Myanmar
 - a. Five factories, of which three are operational
 - b. Production varies from between 4-10,000MT p.a. due to the reliance on natural gas used in the production process, which is imported
2. Importers (overland and sea freight)
 - a. 254 companies are licensed to import fertilizers: Diamond Star, Golden Lion, and Myanmar Awba are the largest
 - b. Import overland from China through Muse (mainly urea and compound fertilizers)
 - c. Import through port of Yangon (mainly T-super, Potash, and Compound, originating from Vietnam, Thailand and Germany)
 - d. Re-pack products into retail packages and mix fertilizers for specific uses

3. Traders in Mandalay handle overland imports from China through Muse
 - a. Imports are usually already retail-packed on arrival, leading to labelling not in Burmese language
 - b. Sell-on to wholesalers retailers and distributors
4. Ministry of Agriculture
 - a. Distribute fertilizers from domestic urea production factories
 - b. Supply state-owned enterprises operated under the Ministry of Agriculture and Irrigation
5. Wholesalers
 - a. Buy stock from importers, traders, and manufacturers in large volumes
 - b. Distribute to retailers
6. Retailers
 - a. Operate a wide-range of stores, from very small, village-level stores selling a limited range of products in small volumes, to larger stores, which are located in trading centers and can be distributors for the major input dealers
 - b. Extend credit on a short-term basis (2-3 months), which is an important part of the retailers' business model
7. Farmers
 - a. The majority of farmers obtain inputs on credit either from the store (5% per calendar month) or from a trader in the form of an advance or loan against the crop
 - b. This informal credit is repaid either with crop or cash from crop sales

COMMODITY EXCHANGES

Commodity Exchange Centers (CEXC) are where the majority of pulses and oil seeds are traded. As such, they play a highly influential role in the functioning of these value chains. There are seven (CEXC) in Myanmar, all of which are located close to centers of production and are membership driven, meaning that only members are allowed to conduct business at the centers.⁴⁷ Mandalay is main CEXC and leads the price as it is the first CEXC to open daily. Members display samples, allowing buyers to negotiate prices. Mandalay and Yangon are the key terminal markets for export commodities to China via Mandalay and shipping through port of Yangon to other markets. As such, there is a hierarchy from rural traders through regional CEXCs onto terminal markets handling large volumes and which are closely integrated with exporters. Once agreed, the consignment is checked and the transaction recorded on a blackboard on the floor of the exchange. A daily trading report detailing prices is printed and is now also publicized in newspapers and online, enabling interested parties to look it up. Farmers are able to obtain market information by contacting their collector, trader, or broker, who is in close contact with the CEXC.

⁴⁷ Favre, 2009, p. 121

CEXC	Established	Membership (2012)
Yangon	1994	3,670
Mandalay	1935	1,980
Monywa	1970	720
Magwe	1990	528
Myingyan	2007	500
Pakkoku	1989	430
Taunggi	2007	300

Annex 6 | Additional Details on the Rice Value Chain

PADDY PRODUCTION CALENDAR

Paddy production has been steadily increasing from 20.1 million tons in 2000 to 29 million tons in 2012. Meanwhile, rice consumption in Myanmar is around 10 million MT per annum.

The crop production calendar for paddy / rice is illustrated in Table 7.

Table 7: Paddy production calendar in lower Myanmar for wet and dry seasons

	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Monsoon Season												
Wet Season Paddy Lower Myanmar (83%)												
Sowing												
Growing												
Harvesting & Marketing												
Dry Season Paddy Lower Myanmar (17%)												
Sowing												
Growing												
Harvesting & Marketing												

In 2012, 83 percent of paddy was planted in May – September with monsoon rains, termed “monsoon” or “wet season” paddy, and a further 17 percent of “dry season” or “summer” paddy was planted in the dry summer months of October – November. Dry season paddy is only possible with irrigation, so is limited to certain areas.

High-yielding varieties are the first to be marketed beginning in October and continuing through January, with slow-maturing varieties marketed later in the season. Summer paddy harvesting commences in February and ends in April. If irrigation is available, two rice crops can be grown in the Delta. If irrigation is not available, many farmers elect to plant an alternative succession crop (usually green gram or black gram) immediately after rice is harvested, grown with the residual soil moisture.

TRANSACTION DETAILS

Transaction details between each value chain actor, including the volume and value of transactions, payment frequency, number of actors receiving payments, number of transactions, average transaction size, and payment method are presented in the table below. These figures correspond to the transaction mapping diagram in Figure 9.

#	Origin	Recipient	Volume of transaction MT	Value of transaction US\$	Payment Frequency	# of actors receiving payments	# of transactions	Average volume per transaction MT	Average transaction size	Payment method
1	Miller	Farmer	1,861,091	374,226,357	4	214,600	858,400	2.17	436	Cash
2	Rural Broker/ Trader & Collector	Farmer	16,749,821	3,368,037,217	1	1,931,400	1,931,400	8.67	1,744	Cash
3	Miller	Rural Broker/ Trader & Collector	16,749,821	3,469,078,333	12	38,628	463,536	36.13	7,484	Cash
4	Urban Trader & Wholesaler	Miller	10,645,442	4,421,952,691	12	12,876	154,512	68.90	28,619	Cash/ Bank Transfer
5	Exporter	Miller	1,451,651	602,993,549	12	250	3,000	483.88	200,998	Cash/ Bank Transfer

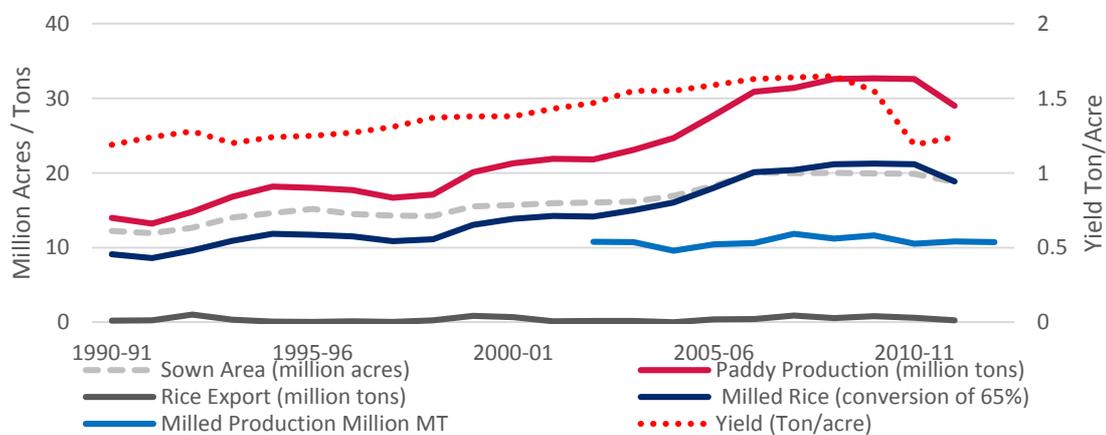
DESCRIPTION OF VALUE CHAIN ACTORS

The actors involved in the rice value chain are described as follows:

- **Farmers**
 - An estimated 2.15 million households grow rice in Myanmar.
 - Farmers are not organized into groups or collectives.
 - 60 percent of the paddy produced is on landholdings smaller than 10 acres. This corresponds to 86 percent of all households growing rice.
 - Credit is supplied to the monsoon crop by the MADB (MMK 100,000 per acre for a maximum amount of 10 acres), which is guaranteed by groups.
 - Additional credit is often required and obtained from input dealers, traders, and/or friends and family.
- **Collectors of paddy (rural traders / brokers / middle men)**
 - Collectors of paddy act as small-scale traders, buying rice paddy from farmers and supplying mainly to larger rice mills.
 - This type of buying takes un-hulled rice (paddy) off-farm and enables proper storage and drying.
 - Collectors are often employed or act on behalf of millers.
 - Commonly, they aggregate small consignments from a number of farmers.
 - Where logistic costs are high, this type of player is more prevalent, as collectors absorb logistics costs into margins, thereby providing market access.
- **Millers**
 - Millers take dried paddy and mill it into rice.
 - Mill sizes range from smaller, village-based mills focusing on small consignments to larger mills in trading centers, which process larger consignments aggregated from traders / collectors.
 - Millers have a wide-range of potential avenues for their rice, differentiated by location and volume, including urban-based traders, wholesale markets, and exporters.
 - Paddy is milled by an extensive network of over 16,000 rice mills. However, only 1,200 have the capacity to handle over 50 MT per day, indicating that the majority of mills are small enterprises servicing the immediate locality.
- **Urban traders**
 - Urban traders are active in the major markets and handle much larger volumes of rice than rural traders.
 - They manage networks of 40 – 50 smaller traders or mills.
 - Much of the rice is destined for the domestic market in rice deficit regions.
- **Wholesalers**
 - Located in major markets, wholesalers buy rice from traders and store / handle product for a range of end markets, including retail, export, and rice deficit areas within Myanmar.

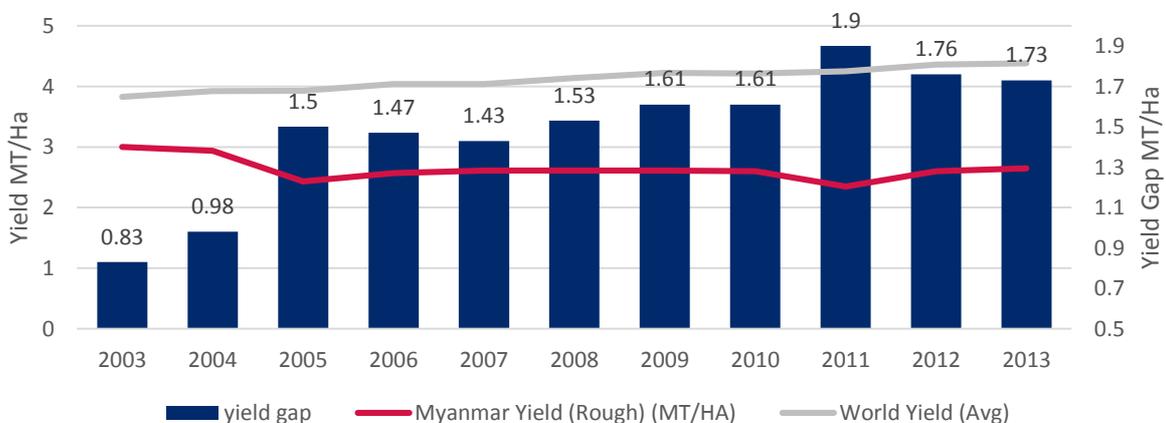
- Wholesalers operate storage facilities and keep a wide-range of rice products in stock.
- **Exporters**
 - Exporters represent under five percent of the rice trade in Myanmar.
 - Exporting requires conformity of quality, and rice from Myanmar often fails to meet these standards; due to post harvest issues (old milling equipment and wet paddy), Myanmar has a large proportion of broken rice.
 - There are two main export markets: overland to China and Thailand and international exports through the port at Yangon.
- **Retail stores**
- **End consumers**

TRENDS IN RICE PRODUCTION AND EXPORT



Source: Wong, 2013, p. 8

COMPARISON OF RICE PADDY YIELDS BETWEEN MYANMAR AND WORLD AVERAGE, WITH YIELD GAP

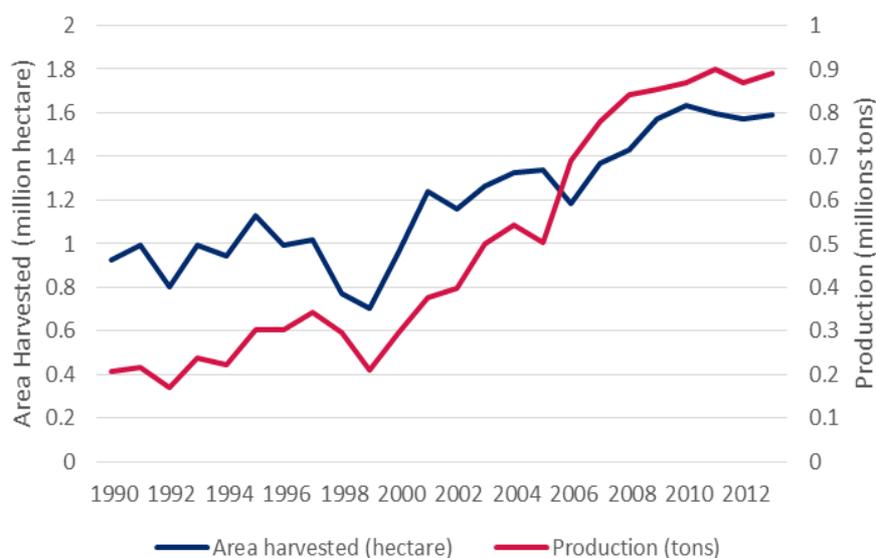


Source: Wong, 2013, p. 11

Annex 7 | Additional Details on Sesame Value Chain

Sesame in Myanmar has seen increases in cropping area in the country, as well as the yield per unit area, which is in-line with or surpasses other origins (see graph below).⁴⁸ The growth of sector has been sustained by this expansion of the land area under crop, with annual growth of 17 percent per annum in the 1990s.⁴⁹

TRENDS IN THE AREA PLANTED (MILLION HA), PRODUCTION (MILLION TONS) AND YIELD OF SESAME IN MYANMAR 2000-2013



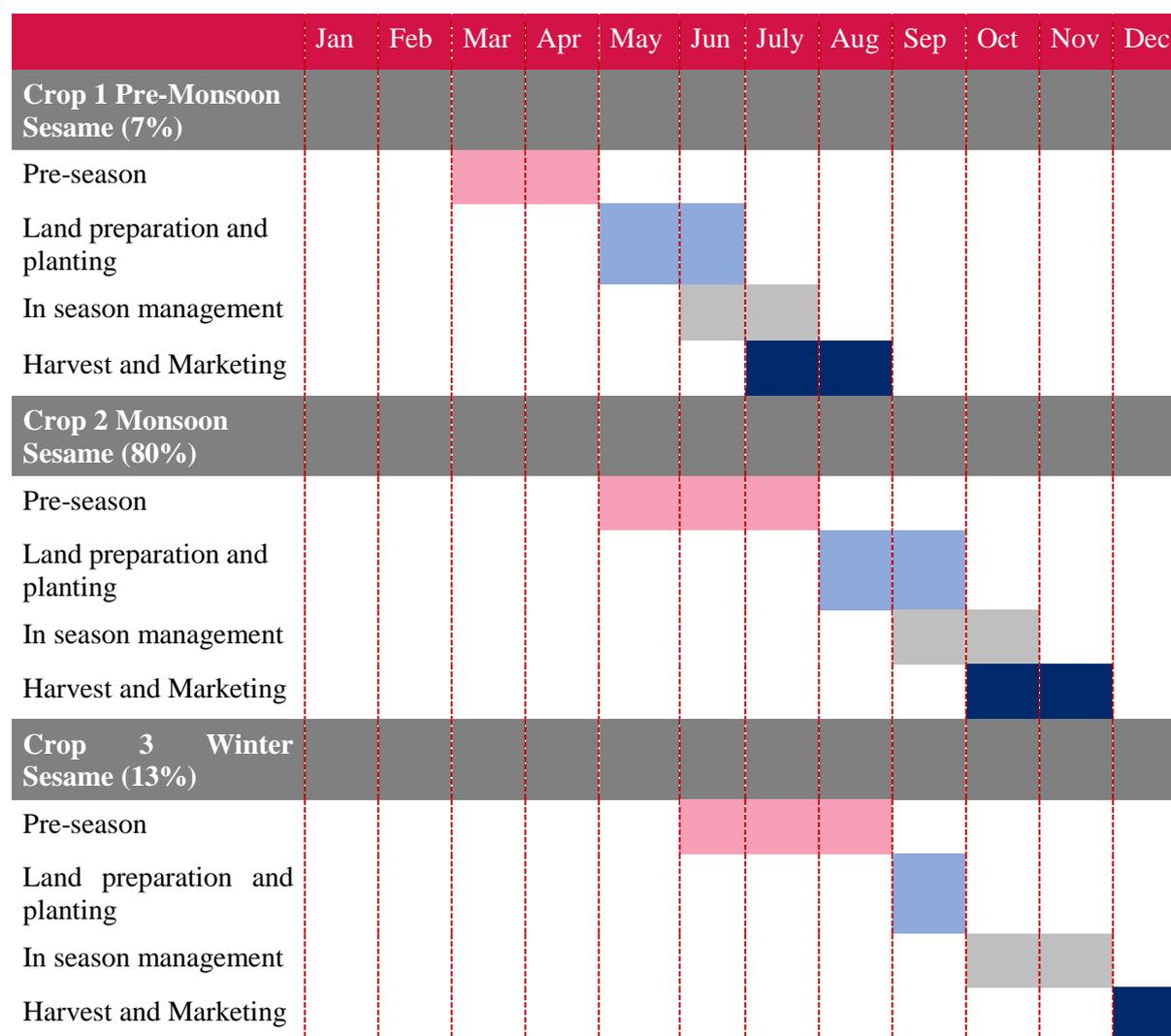
Source: FAO STAT, 2015

⁴⁸ International Trade Centre, 2014

⁴⁹ Steven Haggblade, 2014, p. 5

SESAME PRODUCTION CALENDAR

The crop production calendar for sesame is illustrated in the table below.



Sesame is grown during both the monsoon and cool seasons in the Dry Zone. Sesame that is planted in the pre-monsoon period of the season has the highest gross margin (USD 443/ha);⁵⁰ however, since it is irrigated, only 7 percent of the land cultivated for sesame utilizes this production system. The majority (80 percent) of sesame is grown during the monsoon season and has the lowest gross margin. Winter sesame has more attractive margins than the monsoon crop, but is only grown on 13 percent of the total cultivated area.⁵¹ Winter planting is less popular due to increased risk of crop failure, and competition with other crops such as green gram which show higher returns.

⁵⁰ Favre, 2009, p. 80

⁵¹ Favre, 2009, p. 80

TRANSACTION DETAILS

Transaction details between each value chain actor, including the volume and value of transactions, payment frequency, number of actors receiving payments, number of transactions, average transaction size, and payment method is presented in the table below. These figures correspond to the transaction mapping diagram in Figure 10.

#	Origin	Recipient	Volume in Chain (MT)	Value of transaction (USD)	Payment frequency	# of actors receiving payments	# of transactions	Average transaction size (USD)	Payment method
1	Oil Miller	Farmer	27,502	11,164,739	1	64,632	64,632	173	Cash
2	Broker/Trader/Rural Collector	Farmer	495,037	200,965,303	1	1,163,370	1,163,370	173	Cash
3	Exporter	Farmer	27,502	11,164,739	1	64,632	64,632	173	Cash / Contract Farming
4	Oil Miller	Broker/Trader/Rural Collector	192,514	88,880,079	20	3,600	72,000	1,234	Cash
5	Livestock/Fish Farmer (Cake)	Oil Miller	88,007	4,735,636	12	720	8,640	548	Cash
6	Commodity Exchange Trader (Cake)	Oil Miller	27,502	1,479,886	6	720	4,320	343	Cash / Bank Transfer
7	Commodity Exchange Trader (Oil)	Oil Miller	59,404	39,247,341	12	720	8,640	4,543	Cash / Bank Transfer
8	Retailer (Oil)	Oil Miller	39,603	26,164,894	12	250	3,000	8,722	Cash / Bank Transfer
9	Commodity Exchange Trader	Broker/Trader/Rural Collector	272,270	125,701,827	10	7,500	75,000	1,676	Cash
10	Exporter	Broker/Trader/Rural Collector	30,252	13,966,870	6	500	3,000	4,656	Cash
11	Snack Industry	Commodity Exchange Trader	53,476	38,310,379	52	150	7,800	4,912	Bank Transfer
12	Exporter	Commodity Exchange Trader	123,429	88,424,733	26	150	3,900	22,673	Bank Transfer

DESCRIPTION OF VALUE CHAIN ACTORS

The participants involved in the sesame value chain are described as follows:

1. Farmers
 - a. There are 1.3 million sesame farmers in Myanmar and 3.9 million acres of land cultivated for sesame.
 - b. On average, each farmer cultivates 3 acres of land.
2. Primary collectors (traders, brokers rural)
 - a. Primary collectors procure directly from farmers at the farm gate and bare all the costs of marketing.
 - b. They sometimes provide credit.
 - c. Collectors pay farmers after delivery and sale.
 - d. Collectors sell directly to millers or traders / brokers in urban markets, but are also known to supply wholesalers.
 - e. They earn a margin of approximately 5 – 7 percent.⁵²
3. Oil millers
 - a. Oil millers buy from farmers, primary collectors, and wholesalers.
 - b. They sell oil and seed cake to a range of actors.
4. Urban-based traders / brokers / commissioning agents and wholesalers based around commodity exchanges centers (CEXC) (see Annex 5 for more information on CEXCs)
 - a. Commissioning agents buy and sell on a pre-agreed commission (usually 1 – 2 percent).⁵³
 - b. These actors facilitate transaction completion and work for a number of actors higher in the value chain.
 - c. Wholesalers purchase seed from primary collectors, and in many cases, also buy oil and press cake from millers.
 - d. Wholesalers often employ primary collectors.
 - e. Wholesalers commonly act on behalf of an exporter or as a large-scale commissioning agent.
5. Exporter and export traders
 - a. Exporters and export traders buy from commodity exchanges and rural traders.
 - b. Some are specialized in niche products for particular markets (e.g. black sesame for Japan).
 - c. Traceability for sesame exports is increasingly important, particularly for higher-value markets.
6. Livestock and pond owners
 - a. Livestock and pond owners buy directly from oil millers for their livestock and fish feed needs.
 - b. They may also buy from commodity exchanges if the pressing of sesame into the cake by-product takes place a far distance from the livestock or pond owners' operations.

⁵² Favre, 2009

⁵³ Favre, 2009

7. Oil retailers
 - a. Small-scale and regional oil retailers buy directly from millers.
 - b. Urban and larger retailers commonly buy from commodity exchange traders.
8. Snack industry
 - a. Sesame seed is used in a wide-range of cooking and confectionary products.
 - b. Although there are small scale operators, the larger manufacturers buy from commodity exchanges.

Within this value chain structure, there are six marketing pathways for oil seed to reach market (the prevalence of each pathway varies geographically):⁵⁴

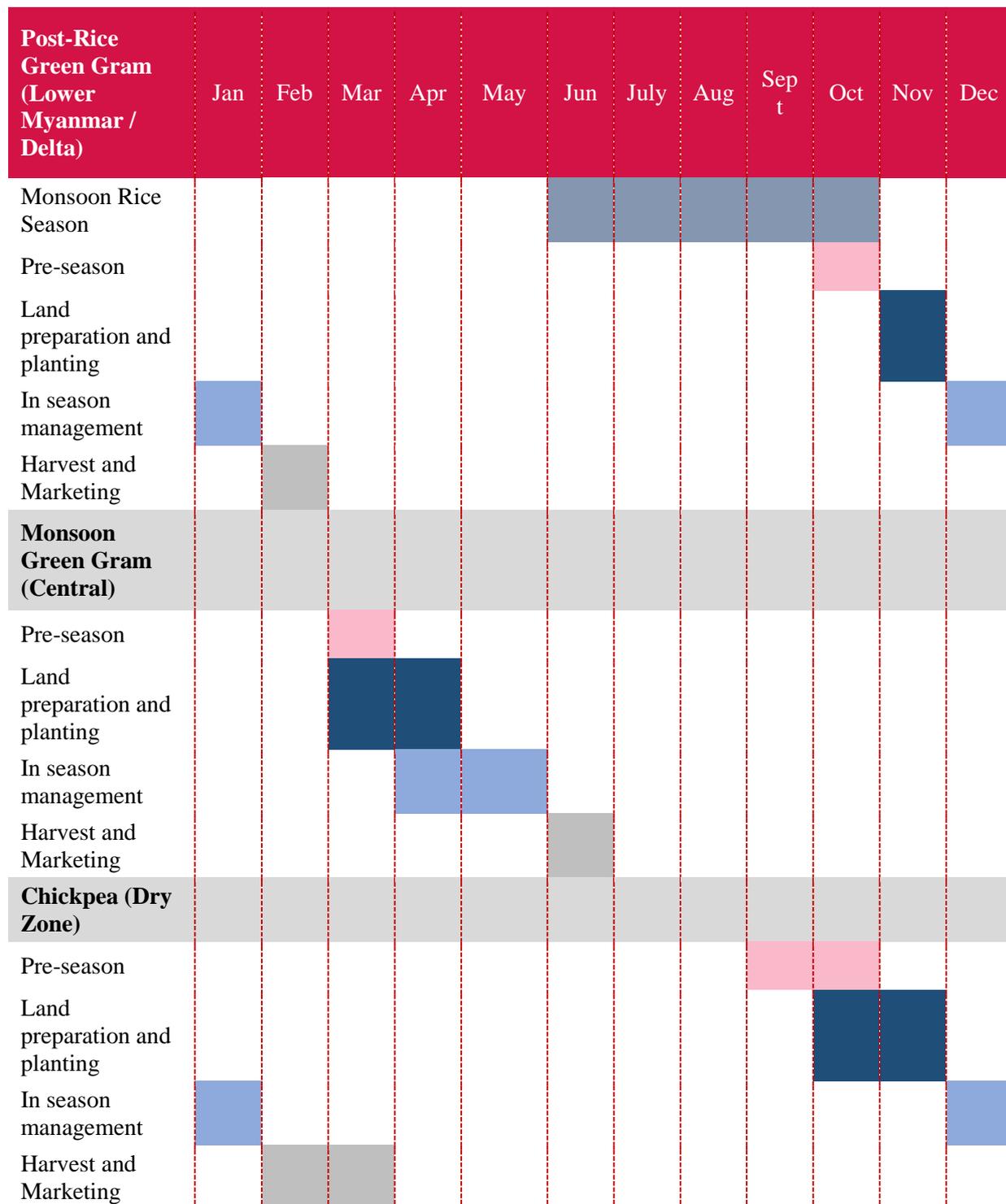
1. Producers to primary collectors, who in turn sell directly or indirectly through wholesalers or commission agents
2. Producers to commission agents / brokers to millers, either directly or through wholesalers or CEXCs
3. Producers to millers directly
4. Producers to commission agents/brokers to export traders, either directly or through wholesalers or CEXCs
5. Producers to export traders under a contract farming agreement
6. Exporters through backward integration of sesame production for export to international markets

⁵⁴ Favre, 2009; confirmed by the study's in-field research

Annex 8 | Additional Details on the Pulses Value Chain

PULSES CROP CALENDAR

The crop calendar for pulses (specifically green gram) is illustrated below.



TRANSACTION DETAILS

Transaction details between each value chain actor, including the volume and value of transactions, payment frequency, number of actors receiving payments, number of transactions, average transaction size, and payment method are presented in the table below. These figures correspond to the transaction mapping diagram in Figure 11.

#	Origin	Recipient	Volume in Chain (MT)	Value of tx	Payment Frequency	# of actors receiving payments	# of tx	Average total business for	Average purchase	Average tx size	Payment method
1	Rural Trader & Wholesaler	Farmer	249,975	141,985,800	1	148,089	148,089	959	1.69	959	Cash
2	Commodity Exchange Trader (in regions)	Farmer	83,325	47,328,600	1	49,363	49,363	959	1.69	959	Cash
3	Commodity Exchange Trader (in regions)	Rural Trader & Wholesaler	249,975	151,924,806	4	10,000	66,880	15,192	6.25	3,798	Cash
4	Retailer	Commodity Exchange Trader (in regions)	33,330	22,079,738	12	200	2,160	110,399	13.89	9,200	Cash / Bank Transfer
5	Trader / Exporter at Terminal Exchange (Yangon / Mandalay)	Commodity Exchange Trader (in regions)	299,970	198,717,646	6	800	2,508	248,397	31.25	20,700	Bank Transfer
6	Animal Feed Manufacturers	Exporter	3,000	2,384,612	12	30	1,200	79,487	8.33	6,624	Cash / Bank Transfer

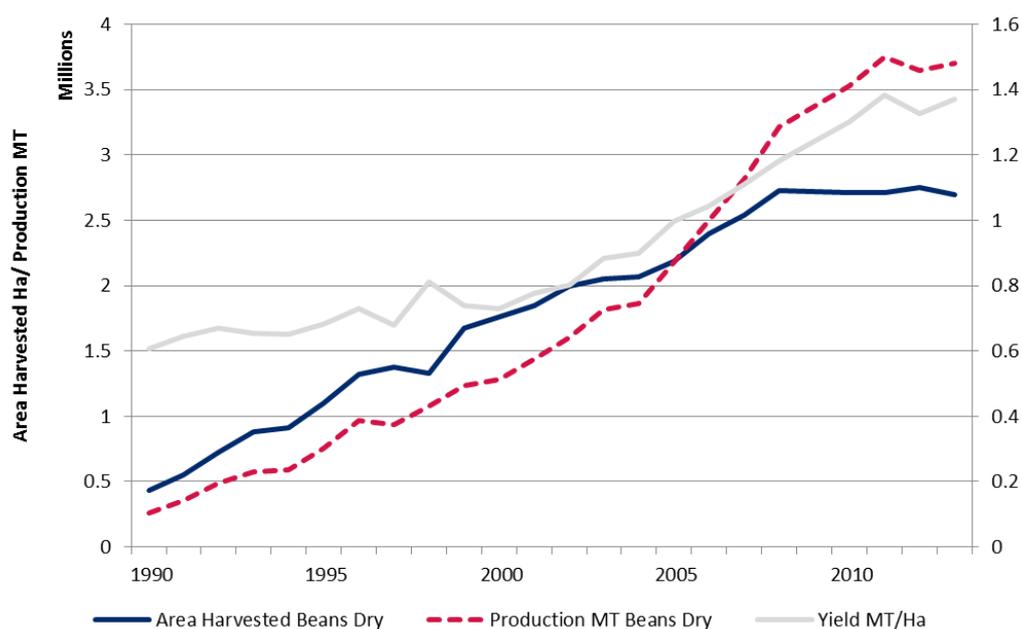
DESCRIPTION OF VALUE CHAIN ACTORS

The actors involved in the green gram value chain are described below.

1. Farmers
 - a. 277,000 farmers grow, on average, three acre plots, mainly after rice but sometimes with the monsoon rains in Central Myanmar.
 - b. To retain quality and value, farmers store crop at a warehouse owned by traders.
2. Rural traders or wholesalers
 - a. Rural traders or wholesalers often have a strong personal, family, and/or economic relationship with farmers developed over many seasons.

- b. All payments are in cash to the farmer.
 - c. Many traders or wholesalers will store the crop for farmers to ensure the retention of quality.
 - d. Storing crop also means that traders have stock ready for sale at attractive points in the season.
 - e. Rural traders will sell to rural wholesalers or traders based at commodity exchanges.
 - f. Close to Yangon, wholesalers often sell directly to a Yangon trader, rather than via a commodity exchange.
3. Regional commodity exchanges
- a. Regional commodity exchanges are made up of trading members who buy from rural traders and wholesalers.
 - b. They are located in Hintada, Danubyu and Pyay and trade on a daily basis with Yangon.
4. Yangon Commodity Exchange
- a. Members of the Yangon Commodity Exchange can be wholesalers, exporters or traders.
 - b. Many often have permanent representatives in the regional commodity exchanges.
 - c. Exporters operating at this market mainly ship to India through the port of Yangon.
 - d. 100 large export traders are based in Yangon
 - e. 30 companies have equipment for the sorting of size and color, which is required to prepare for export.
 - f. Broken pieces are sold to animal feed manufacturers.
 - g. A small number of exporters specialize in high quality and specification exports, mainly to Europe, which also requires traceability.
5. Feed manufacturers
- a. Feed manufacturers buy rejected produce from companies, which sort produce when preparing goods for export.

COMPARISON OF PULSE EXPORTS FROM MYANMAR, 2012-13



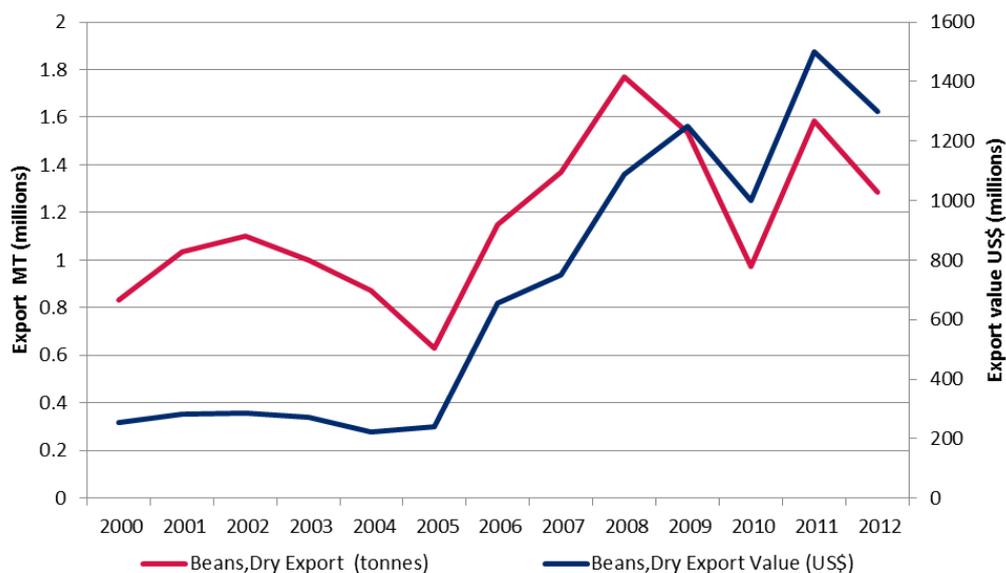
Source: International Trade Centre, 2014, p. 1

EXPORT VOLUME, VALUE IN USD AND PRICE PER TON

Pulse	Volume '000 tons	Value (USD)	Price (USD/ton)
Black Gram	658	382	581
Green Gram	303	240	795
Pigeon Pea	296	170	575
Chickpea	47	34	733
Cowpea	43	37	868
Others	73	50	685
Total Pulses	1420	913	643

Source: Steven Haggblade, 2014

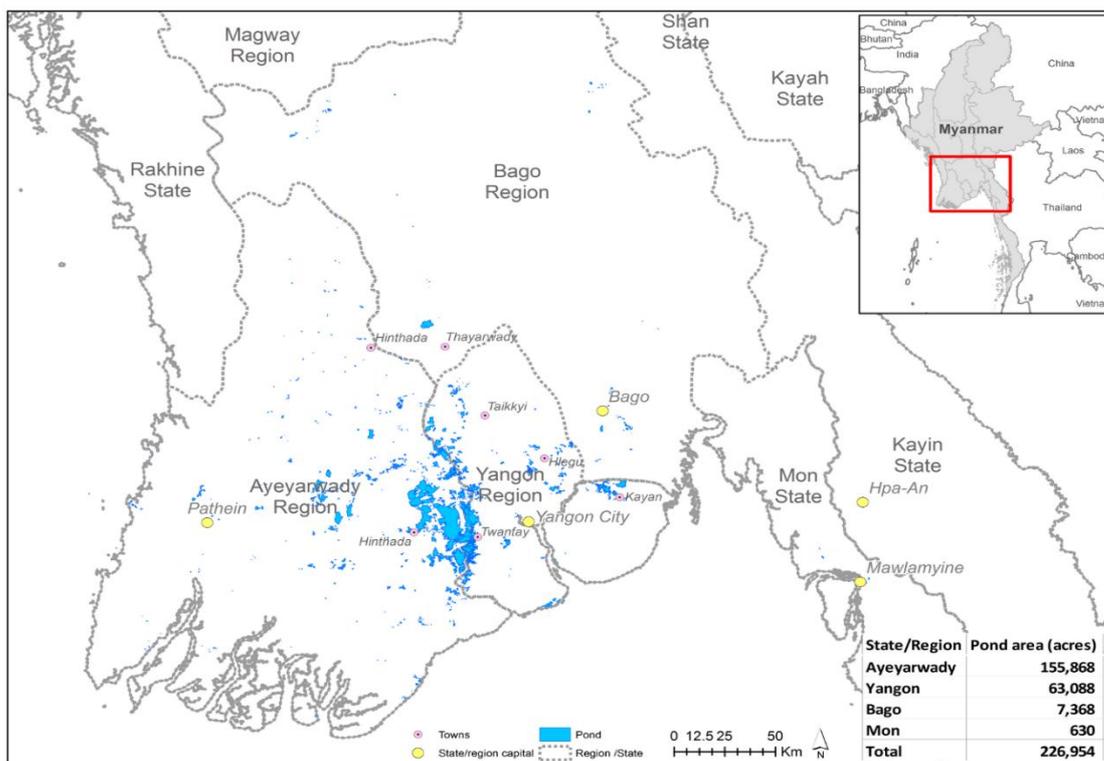
BEANS, DRY – AREA HARVESTED, PRODUCTION, YIELD



Area Harvested (Ha), Production (MT), and Yield MT/Ha of Beans, Dry from Myanmar 1990-2013
 Source: FAO STAT, 2015

Annex 9 | Additional Details on the Aquaculture Value Chain

Until the recent development of widespread pond aquaculture, the prevailing perception held by experts was that Myanmar was dominated by large fisheries (which can reach up to 7,000 acres) with low productivity, though recent research is revealing new insights into the composition of producers in the sector.⁵⁵ Recent satellite imagery analysis has identified over 100,000 small-scale fish ponds, which provide household nutrition and nurseries to service larger operations (see image below). The recent mapping exercise reveals a total of 226,954 acres of fish ponds in the area west of Yangon.⁵⁶ The increase in small-scale ponds is a recent development over the past decade, as ponds originally dug for fresh water supply have been stocked with hatchery seed for household consumption. Land has also been converted from rice paddy and wetland into aquaculture ponds due to more attractive margins. Dwindling supply of fish from inland capture fisheries has been an important driver in this process.



Source: Belton, 2015

⁵⁵ MDRI/MSU, 2015

⁵⁶ Belton, 2015

TRANSACTION DETAILS

Transaction details between each value chain actor, including the volume and value of transactions, payment frequency, number of actors receiving payments, number of transactions, average transaction size, and payment method are presented in the table below. These numbers correspond to the transaction mapping diagram in Figure 12.

#	Origin	Recipient	Volume in Chain (MT)	Value of Tx	Payment Frequency	# of Actors Receiving Payments	Number of Tx	Average Purchase Volume per Transaction in MT	Average Transaction Size	Payment Method
1	Rural Fish Trader	Pond owner	90,782	12,237,630	3	600	1800	50.43	6,799	Cash
2	San Pya market trader/broker	Pond Owner	363,126	48,949,439	3	2440	7320	49.61	6,687	Cash
3	Exporter/Cold Storage	Pond Owner	17,022	2,294,505	3	100	300	56.74	7,648	Cash
4	San Pya market trader/broker	Rural Fish Trader	90,782	13,093,975	6	1000	6000	15.13	2,182	Cash
5	Regional Distributor	San Pya market trader/broker	85,108	14,116,942	52	500	26000	3.27	543	Bank Transfer
6	Exporter/Cold Storage	San Pya market trader/broker	5,674	941,129	5	100	500	11.35	1,882	Bank Transfer

DESCRIPTION OF VALUE CHAIN ACTORS

The participants involved in the aquaculture value chain on the buyer side are described as follows:

1. Pond owners

- a. Pond owners vary greatly in size, as follows:
 - i. 10-15 very large pond owners operate 500-7,000 acres often vertically integrated, internalizing feed and nursery operations.

- ii. Large farms range from 100 to 500 acres.
- iii. Small and medium farms range from 5 to 50 acres.

2. Rural fish traders

- a. Rural fish traders buy from smaller pond owners and organize the sale to market.
- b. They also coordinate transport.

3. Wholesalers / brokers at the San Paya market in Yangon

- a. There are 310 wholesalers / brokers at the market, turning over large volumes.
- b. There are close financial linkages between these wholesalers / brokers and pond owners, who borrow money for feed.
- c. Wholesalers / brokers mainly sell to regional distributors across the country.

4. Exporters / Cold Storage

- a. There are 160 cold store operators.

5. Regional Distributors

- a. Regional distributors distribute to 25 destinations in major regional cities across the country
This has been enabled by improved infrastructure and relaxing controls on the transportation of goods.

The participants involved in the aquaculture value chain on the supplier side are described as follows:

1. Hatchery/ nursery operators

- a. This group specializes in rearing fingerlings and selling them to larger operations and are usually small ponds 1-5 acres in size.⁵⁷
- b. Nurseries can also rear fish to larger sizes (up to 12 inches) which reduces the production time by up to a third.
- c. Very large pond owners integrate nurseries into their operations.

2. Feed manufacturers

- a. Feed manufacturers buy a range of by-products from agricultural chains including, oil seed cake (particularly groundnut), broken rice, rice bran from millers, and waste from pulse mills / export sorters.
- b. They also buy from the commodity exchanges and from larger millers of rice and oil seeds, as well as from rejects from pulse exporters in Yangon.
- c. Large pond owners integrate the capacity to manufacture their own blended feed.

⁵⁷ MDRI/MSU, 2015

3. Rice and oil seed millers

- a. Rice and oil seed millers provide major inputs for fish feed.
- b. Many pond owners source directly from rice millers in close proximity to their operations.
- c. Oil cakes need to be transported from the Dry Zone, so are usually traded through the commodity exchanges, although larger pond owners will source directly.

4. Poultry farms

- a. These livestock operations have greatly increased in recent years, particularly in peri-urban areas.
- b. Operators build ponds to utilize chicken waste as a food substrate, alongside other feeds.

Annex 10 | Note on Value Chain Transaction Map Data

The figures presented in the value chain transaction maps are the output of a model based on assumptions developed from primary data gathering and verified by secondary references. In some cases, secondary data was used where clear answers were not provided during primary data gathering. All the value chains are made up of a diverse range of actors at every level. The information is intended to characterize each transaction type and estimate the average size and frequency of transactions. Further study of specific behaviors of commercial actors is needed to develop a more nuanced model. The model can be adjusted to enable new learning to be added to enhance the accuracy of its outputs.