Supporting Digital Financial Services in Myanmar

ASSESSMENT OF THE POTENTIAL FOR DIGITAL FINANCIAL SERVICES IN AGRICULTURE VALUE CHAINS / *ABRIDGED VERSION*

DECEMBER 2015

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This report is an abridged version of the *Assessment of the Potential for Digital Financial Services in Agricultural Value Chains report*, which was prepared under the Mobile Solutions Technical Assistance and Research (mSTAR) program. The mSTAR program is a strategic investment by USAID to advance mobile solutions and close the gaps that hold back access and uptake. mSTAR supports broad-based coordinated action by a range of market stakeholders including governments, donors, mobile service providers and their customers. mSTAR works closely with the USAID Digital Development team and USAID Missions abroad to identify opportunities to leverage the power of mobile technology to improve development outcomes. Activities are carried out by FHI 360 and a group of highly qualified partner organizations.

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; Leslie Marbury, USAID/Burma, Megan Willis, USAID/Burma; and Daniel Swift, USAID/Burma.

List of Abbreviations and Acronyms

ADB	Asian Development Bank
ATM	Automated Teller Machine
CBM	Central Bank of Myanmar
Cenfri	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 (Myanmar Currency)
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 | Background and Context

Geographically positioned next to 40 percent of the world's population, well-endowed with natural resources, and currently implementing liberalizing economic reforms, Myanmar is well-positioned to seize economic progress through the growth of its agriculture sector. 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 (PARDAP). 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 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 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, 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.

Digital Financial Services Defined

"Digital financial services" is a broad category that encompasses mobile financial services and all branchless banking services that are enabled via electronic channels. Services can be accessed using a variety of electronic instruments, including mobile phones, point-of-sale (POS) devices, electronic cards, and computers. Mobile financial services are a narrower sub-set of digital financial services, and refer to the use of a mobile phone to access financial services and execute financial transactions. This includes both transaction services (such as payments) and non-transactional services (such as viewing financial information on a user's mobile phone).

Source: Grossman, Jeremiah and Paul Khalil Nelson, U.S. Global Development Lab. *Digital Finance for Development: A Handbook for USAID Staff.*

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 by expanding financial services. The main objectives of this assessment are to advance the understanding of:

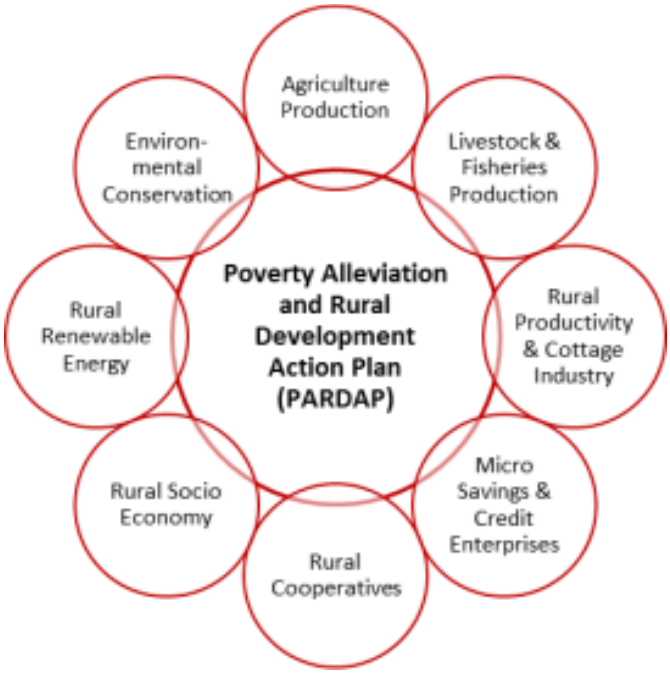
- Payment flows and payment service providers in select agriculture value chains
- Potential for DFS to enhance the efficiency of existing products and transactions within the value chains, enable new partnerships, business models, and product design, and thereby contribute to improved livelihoods
- Value chain actors' familiarity with and openness to DFS, particularly mobile-based payments

The four value chains that comprise the focus of this study, as well as the regions in which the assessment was conducted, include (see map in Annex 1):

- 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)

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 1). For instance, as technology facilitates the creation of new, low-cost delivery models, DFS can enable financial institutions 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 Myanmar's 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.

Figure 1: Pillars of the PARDAP



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.

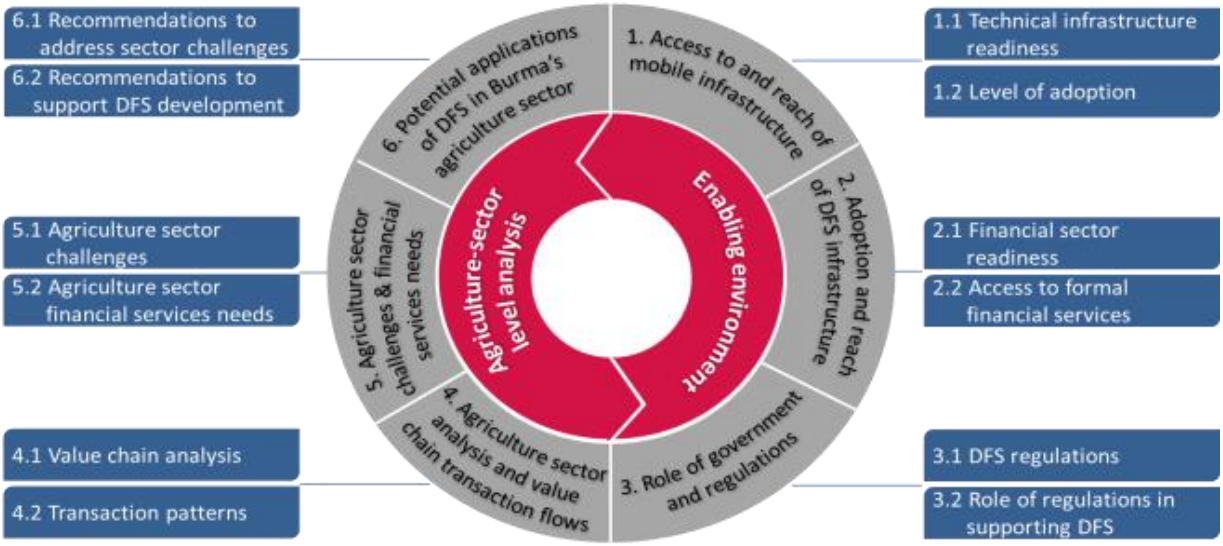
During the desk research, the team found substantial information gaps regarding the structure of value chains in Myanmar (sufficient information was obtained only for the rice value chain prior to the first trip by the team to Myanmar). In comparison with other countries, such as Indonesia, value chains 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.

B | Digital Financial Services + Readiness Framework

To frame the findings and recommendations of the assessment, the report adapts and applies CGAP's DFS + readiness framework for Myanmar's agriculture sector, as illustrated in Figure 2.[1]

Figure 2: Digital Financial Services + Readiness Framework for Myanmar's agriculture sector



The first five dimensions of the framework – mobile infrastructure, DFS infrastructure, regulatory environment, value chain transaction flows, and challenges to growth in the four value chains – represent the components of Myanmar's enabling environment and agriculture sector most relevant to assessing the potential of DFS to address the sector's needs and challenges. The sections below present the assessment's findings across these five components, which directly contribute to the recommendations for potential applications of DFS in Myanmar's agriculture sector, as described in the final section of the report.

1 | ACCESS TO AND REACH OF MOBILE INFRASTRUCTURE

Until June 2013, the state-owned operator, Myanmar Posts and Telecommunications (MPT), had a monopoly on the 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.

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

USD 1.50 Price of SIM cards, reduced from USD 200 prior to 2013

32M No. of subscribers as of October 2015:*
MPT: 16M
Telenor: 11.8M
Ooredoo – 5.2M

60% Mobile penetration rate**

84% Telenor and Ooredoo's commitments for voice and data coverage by 2019***

* 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

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

Mobile Phone Access and Usage – Farmers and Upper Value Chain Actors

The findings of the assessment reflect the increasing mobile penetration rates in rural Myanmar. In the Focus Group Discussions conducted with farmers, 87 percent of respondents reported owning a mobile phone (51 percent had smartphones and over one-third used feature phones). Disaggregated by gender, phone ownership between men and women was generally comparable. Among Key Informant Interview (KII) respondents, which represented upper value chain actors such as millers, input dealers, and traders, 92 percent had mobile phones. The study also reflected the growing transition to smartphones among upper value chain actors, with 25 percent 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.

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 communications. In contrast, upper value chain actors used phones for a wider variety of purposes, including accessing the internet and sending SMS. Coupled with the rapid spread of mobile network coverage, these mobile phone adoption and usage trends indicate a strong potential for mobile-based DFS. At the same time, 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.

2 | 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 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.

Table 1: Launched and Planned DFS Initiatives

Service	Launch Status	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 networks 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.

Financial Sector Underdevelopment and the Potential for DFS to Bridge the Gap

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. Despite recent developments, 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 claim to have access to any kind of financial service from a regulated financial service provider, and 5.9 million adults (approximately 15 percent of the adult population) borrow from unregulated

moneylenders.[2] 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 GDP and two-thirds of jobs.[3]

The main source of financing for Myanmar's agriculture sector is the Myanmar Agricultural Development Bank (MADB). MADB reaches 1.85 million households, and rice accounts for 88 percent of its portfolio. Other formal channels for agriculture finance are also expanding as the country's financial sector develops. Notable players in the rural sector include PACT Global Microfinance Fund, Proximity Design, World Vision, the Global Treasure Bank (formerly Myanmar Livestock and Fisheries Development Bank), the Central Cooperative Society, and input dealers (such as Awba), which offer formal credit.

"Shortage of money happens continuously for farmers. It is worse at [the time of] pulling out [saplings] and transplanting." *– Large Rice Farmer in Delta*

Broken rice

Despite these developments, however, there is still a large unmet demand for affordable financial services in the agriculture sector. Specific gaps include:

"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*

- ***Limited availability of affordable credit:*** Loans provided by MADB cover only a fraction of the farmers' total financing needs; approximately 49 percent of small-scale rice farmers' production costs are not met by MADB loans.[4] 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.[5]

- ***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

[2] UNCDF, FinMark Trust, and Cenfri, *Making Access Possible (MAP) Myanmar Country Diagnostic*, 2014.
[3] OECD, *Multi-dimensional Review of Myanmar*, 2015, pg. 208.
[4] Enclude analysis
[5] Enclude analysis

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. Additionally, very few green gram farmers in the study reported obtaining credit for production of the crop. This is partially due to the fact that MADB winter loans are disbursed in October and November, which is past the land preparation phase when the bulk of the cost of production is required. 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.

- ***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.[6] 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.

> ***"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*

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 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.[7]

> ***"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*

As demonstrated by this example, the use of digital channels would allow financial services providers to improve their operating efficiency and thereby enhance

[6] World Bank, World DataBank

[7] http://betterthancash.org/wp-content/uploads/2012/09/USAID-Presents-Kenya-Case-Studies-in-e-Payment-.pdf

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 6.

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 include the following:

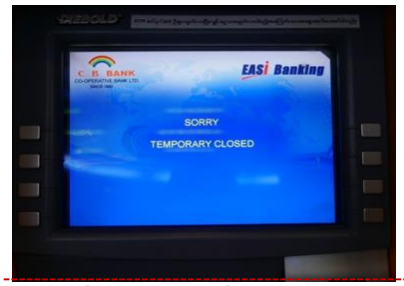
- *Reliance on cash and lack of security concerns*: In the four value chains studied, the majority of transactions between actors are conducted in cash. Although reliance on cash is not unexpected, providers and stakeholders should understand the core needs of rural segments and clearly articulate the value proposition of shifting from cash to digital. For instance, although improved security is often a value proposition in other markets, most farmers said they have no concerns with theft. As Myanmar develops, security may become an increasing concern (as demonstrated by a recent uptick in theft experienced by MFIs), but it does not currently present a compelling value proposition to promote uptake of DFS. On the other hand, credit is an immediate constraint for many value chain actors. Offering credit and repayments through mobile wallets and agents may therefore encourage trial and adoption of DFS.

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

- *Use of informal money transfer services*: Value chain actors also reported substantial usage of informal methods (Hundi and courier) for money transfer. 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, rural merchants and distributors have the potential to become cash-in, cash-out agents, and Hundi agents can be recruited into a formal role, benefiting the service through their network.

- *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 the assessment revealed a general distrust

of ATMs (see text box to the right). These negative perceptions should be explored further, as they could potentially deter adoption of other technology-enabled channels.



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.*

- *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 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 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 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. Commonly cited concerns with using DFS include accessibility and security of storing money in a virtual account, weak mobile connectivity, and potential complexity of the service.

"We are interested in it. We will be fine [to use mobile financial services] if we are taught." *– Sesame farmer in the Dry Zone, on interest in mobile money*

- *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.

- *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 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 pre-paid electricity and off-grid solutions, such as solar panels and solar pumps, on a pay-as-you-go basis.

House in rural Myanmar equipped with solar panels

"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*

3 | 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. Although the Mobile Banking Directive has been beneficial for testing the waters, it has not spurred the level of activity that the CBM would have liked to see after 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 the development of a Dedicated E-money Issuer (DEMI) directive. This draft has undergone several revisions and name changes and remains under discussion by the CBM. In contrast with the Mobile Banking Directive, the new directive is designed to permit non-bank actors to be licensed to issue electronic money (e-money) and utilize agents to conduct electronic transactions. The latest draft regulations also forbid agent exclusivity and mandate various levels of interoperability with other mobile financial services providers, 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. Should a sound version of this draft regulation come to be finalized by the CBM, it would change market dynamics significantly as the industry opens up to a wider range of institutions, such as mobile network operators (MNOs) and third-parties.

Allowing non-bank actors to compete in the DFS space has the potential to spur competition in the market, encourage innovation and investment, 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. When the Reserve Bank of India allowed MNOs and third-party financial service providers to apply for payment bank licenses, for example, 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, a robust regulatory environment for DFS is one that strikes the right balance between promoting competition and ensuring the safety and efficiency of the financial sector. Key elements of building an effective regulatory system for DFS include:

- Create an enabling regulatory environment to encourage entry of new players, which promotes competition and spurs innovation in the DFS sector
- Institute 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)
- Encourage interoperability between providers to accelerate DFS ecosystem development
- Provide 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
- Ensure 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. For example, the telecommunications regulator in India has reached an agreement with telecommunications providers to open up USSD channel to banks and financial services providers that provide DFS.

4 | 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.[8] Agriculture is therefore a critical means of livelihood throughout Myanmar, and 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. A breakdown of the contribution of the selected value chains 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 million acres
Total in Myanmar	**12.1 million**	**30 – 40 percent of GDP**	**55.56 million acres**

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. A summary of the transaction methods and transaction hubs for each value chain is included in the table below (see Annex 1 for transaction maps and details). The payment methods indicate whether transactions between actors are made through cash, bank transfer, or both. Although non-cash (including in-kind) transactions also occur in the value chains, the frequency and terms of such transactions are difficult to identify and quantify. Therefore, the assessment does not account for these transactions in the transaction maps.

[8] World Bank, 2013, p. 7

Represents cash transaction Represents bank transfer

Value Chain	Actors	Transaction / Payment Methods	Transaction Hub
Rice	Farmer-level (miller / broker / traders / collector to farmer)		Rice millers
	Miller to rural trader / broker / collector		
	Urban trader / wholesaler to miller		
	Exporter to miller		
Sesame (oil seeds)	Farmer-level (oil miller / broker / trader / rural collector / exporter to farmer)		Commodity exchanges and oil millers
	Oil miller to broker / trader / rural collector		
	Commodity exchange trader to oil miller		
	Oil retailer to oil miller		
	Commodity exchange trader or exporter to broker / trader / rural collector		
	Snack industry to commodity exchange trader		
	Exporter to commodity exchange trader		
Green gram (pulses)	Farmer-level (rural trader / wholesaler / commodity exchange trader in regions to farmer)		Commodity exchanges
	Commodity exchange trader in regions to rural trader / wholesaler		
	Retailer to commodity exchange trader in regions		
	Trader or exporter at Terminal Exchange (in Yangon or Mandalay) to commodity exchange trader in regions		

Aquaculture	Animal feed manufacturer to exporter			San Paya fish wholesale market in Yangon
	Farmer-level (rural fish trader / San Pya market trader or broker / exporter / cold storage to pond owner)			
	San Pya market trader or broker to rural fish trader			
	Regional distributor to San Pya market trader / broker			
	Exporter / cold storage to San Pya market trader / broker			

5 | 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:

- *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. For instance, the green gram crop requires intensive pest management, but due to limited credit, farmers often do not take sufficient measures to reduce losses through the use of pesticides. Additionally, feed accounts for the most significant component of the cost of production in aquaculture 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 highest-potential yields.

> ***"As we are poor farmers with a few acres, fertilizers are bought at the time of [sowing] seeds. As for machines, 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*

- *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 in rural areas 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. For example, 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. These risks could be mitigated with the use of mechanized threshing for rice.

Workers in the Delta region loading rice onto a truck

"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*

- *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 tailored to farmers' production cycles, as noted in Section 2 above. 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 money lenders.

"The period of cultivating chickpea is not the time of providing loans by the Agricultural Bank and Cooperative Department. So we cannot get loan[s] from the Agricultural Bank and Cooperative Department [for] cultivating chickpeas." - *Large chickpea farmer, Dry Zone*

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.[9]

[9] World Bank, *Myanmar Agricultural Development Bank: Initial Assessment and Restructuring Options,* 2014.

6 | 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.

DFS Applications to Address Agriculture Sector Challenges

1. *Expansion of services by formal financial institutions 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.[10] 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.

    a. *Transfers and payments:* 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. 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 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.

[10] A wallet is a Stored Value Account (SVA), in which monetary value is maintained by the provider and which could be accessed through various instruments, such as mobile phones or cards.

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.

b. *Savings:* 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. Although encouraging savings in a formal account would require behavior change, farmer-focused savings accounts delivered through digital channels near to their places of residence – 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 the support of the Asian Development Bank) – could encourage farmers to save through formal mechanisms. These savings 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.[11]

c. *Credit:* 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 collections associated with operating in rural areas. These realities, combined with regulations that cap interest rates, make it difficult for MFIs to administer loans cost-effectively and 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.

d. *Financing for Energy Solutions*: 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, LeoTech, 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.

e. *Insurance:* Managing the risks associated with agricultural production is critical for Myanmar's agriculture-based rural economy. Crop and weather insurance products are vital for managing crop losses and can help to prevent smallholder farmers from slipping into poverty as a consequence of diseases, adverse weather, and natural calamities. Agent networks and mobile channels can be used to efficiently distribute micro-insurance products in Myanmar. Recognizing this market need and opportunity, 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

[11] Cook, Tamara and Claudia McKay, CGAP and FSD Kenya, "How M-Shwari Works: The Story So Far." April 2015.

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 Ayerarwady 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.

Table 3 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.

Table 3: Agriculture Finance Product Models and DFS Opportunity

Product	DFS Opportunity
Savings and credit from self-help groups and cooperatives	• 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	• 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 that will help in productivity enhancement, as well as risk management
Input financing from dealers and traders	• 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
Equipment leasing	• 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
Insurance: weather index and equipment insurance	• 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
Financing for energy solutions	• 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

- 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

Traders and Millers

- 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

FIs, MNOs, and Payment Services Providers

- 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 to 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.

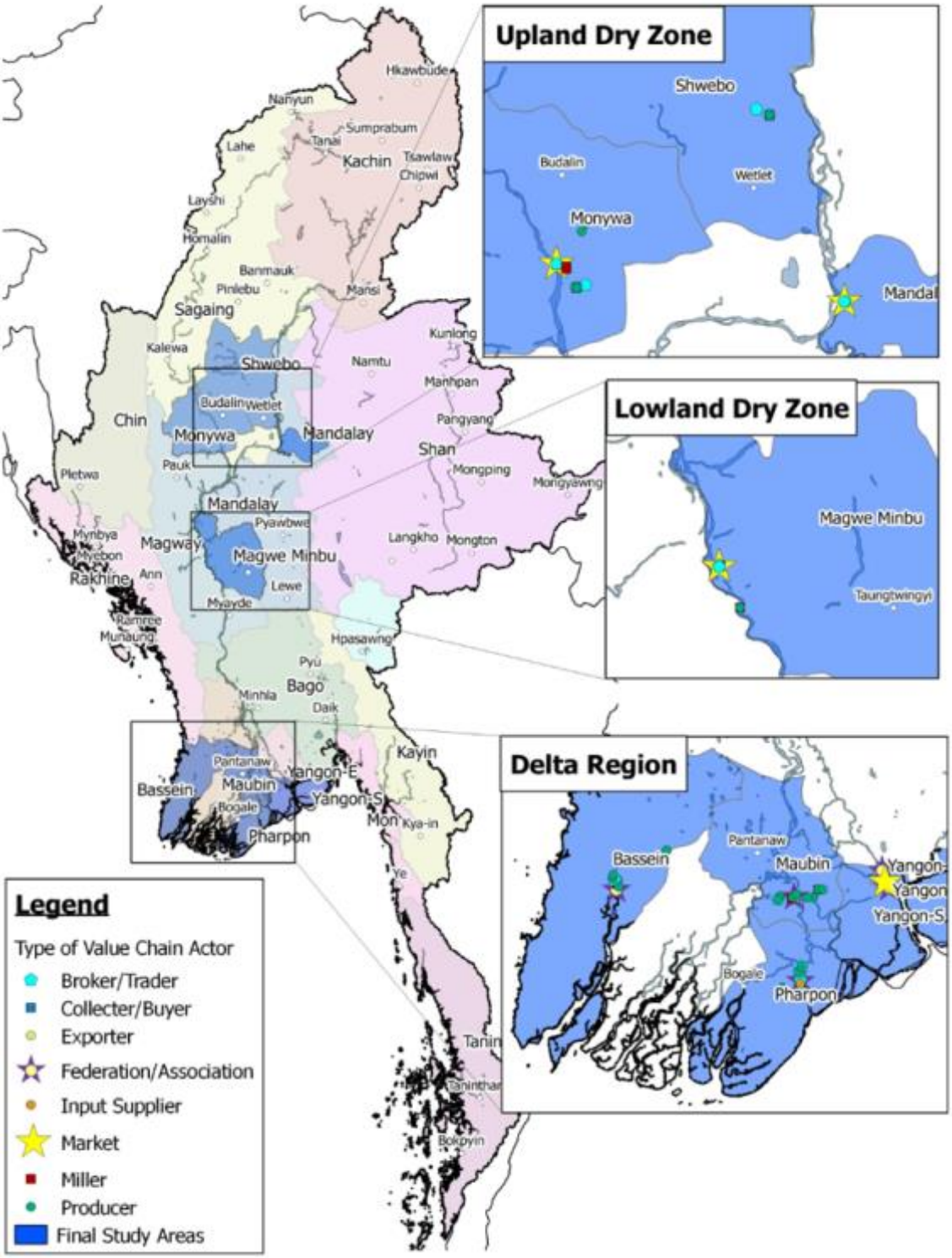
Specific recommendations to assist the growth of commercially-viable digital financial services Myanmar include:

- Create an enabling regulatory environment that promotes competition and innovation in the sector, while effectively managing risks to the financial system, as described in Section 3.
- Support the development of robust agent networks, including interoperable delivery channels and acceptance infrastructures wherever possible to accelerate agent network scale-up, reduce roll-out costs, and keep operational costs to a minimum. LIFT or other donors can play a key role in these efforts. Specific actions may include:
    - Provide technical advice on emerging distribution models, including shared agent networks and agent aggregators
    - Assist in the preparation of template business cases for joint investment
    - Provide technical assistance (technical integration, agent network management, pricing models) and funding for development of such models
- Develop credit assessment and information mechanisms by using data generated through DFS transactions, which would allow MFIs and banks to more effectively assess borrowers' willingness and ability to pay and underwrite risk. Specific actions may include:
    - Expand farmers associations and cooperatives to support group-lending and other methodologies
    - Establish a credit guarantee scheme to stimulate lending by financial institutions to small farmers and lower-income segments
    - 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 to assist in the development of insurance products and infrastructure. Specific actions may include:
    - Application of actuarial methods for modelling of risks and losses
    - Re-insurance in the international market
    - Build capacity of insurance providers for assessment of actual losses
    - Develop robust real-time measurement tools, such as weather stations and remote-sensing through satellites
- Develop a business model for pay-as-you go products, especially for alternative energy products, starting with solar panels and solar pumps
    - 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.

Annex 1 | Locations of Focus Group Discussions and Key Informant Interviews

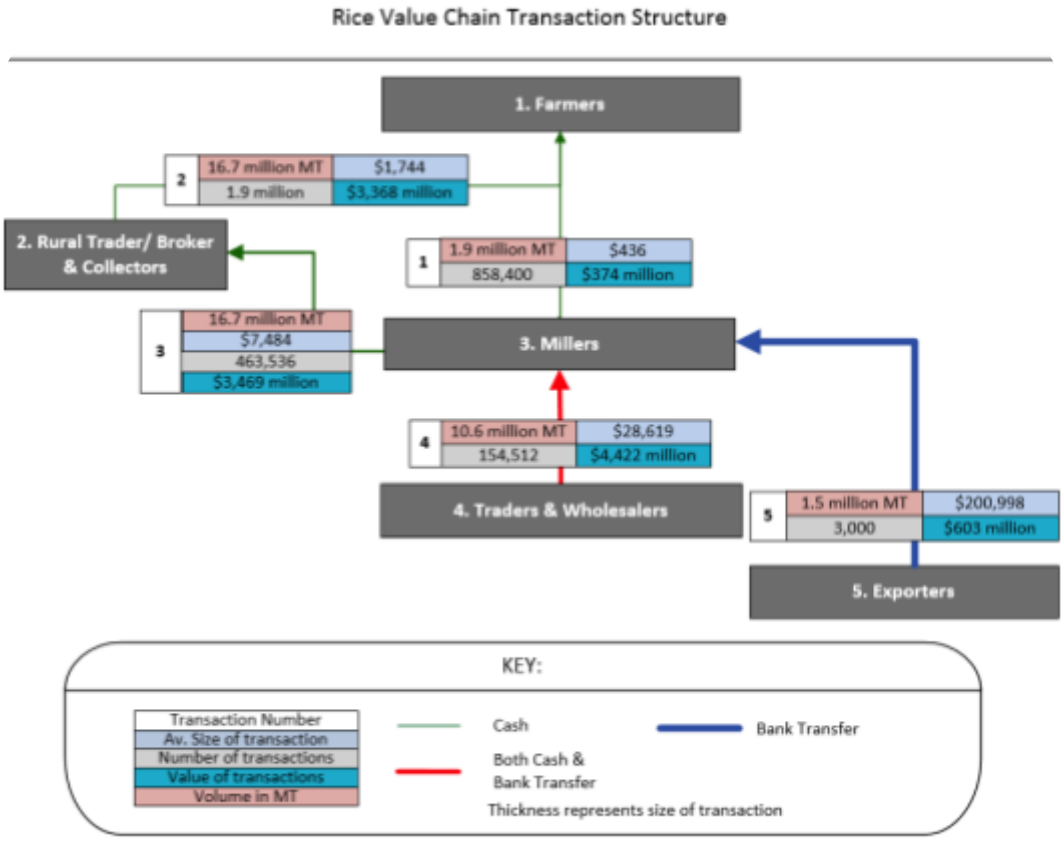


Annex 2 | Value Chain Transaction Flows

For each value chain, the assessment mapped the transaction structure and obtained 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. The transaction structure maps, followed by tables containing more specific details, are included below.

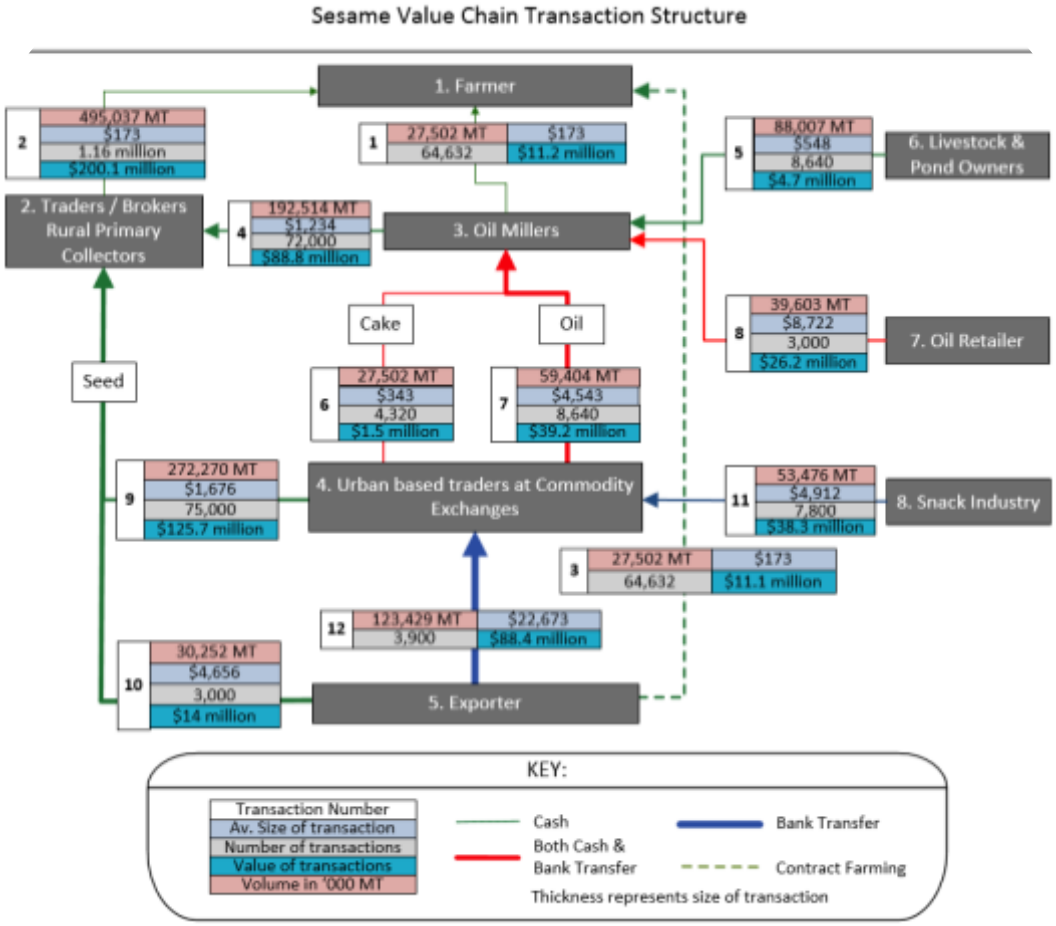
The figures presented are the output of a model based on assumptions developed from primary research and verified by secondary references. In some cases, secondary data was used where a clear answers were not provided during primary research. All the value chains are made up of a diverse range of actors 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.

RICE VALUE CHAIN



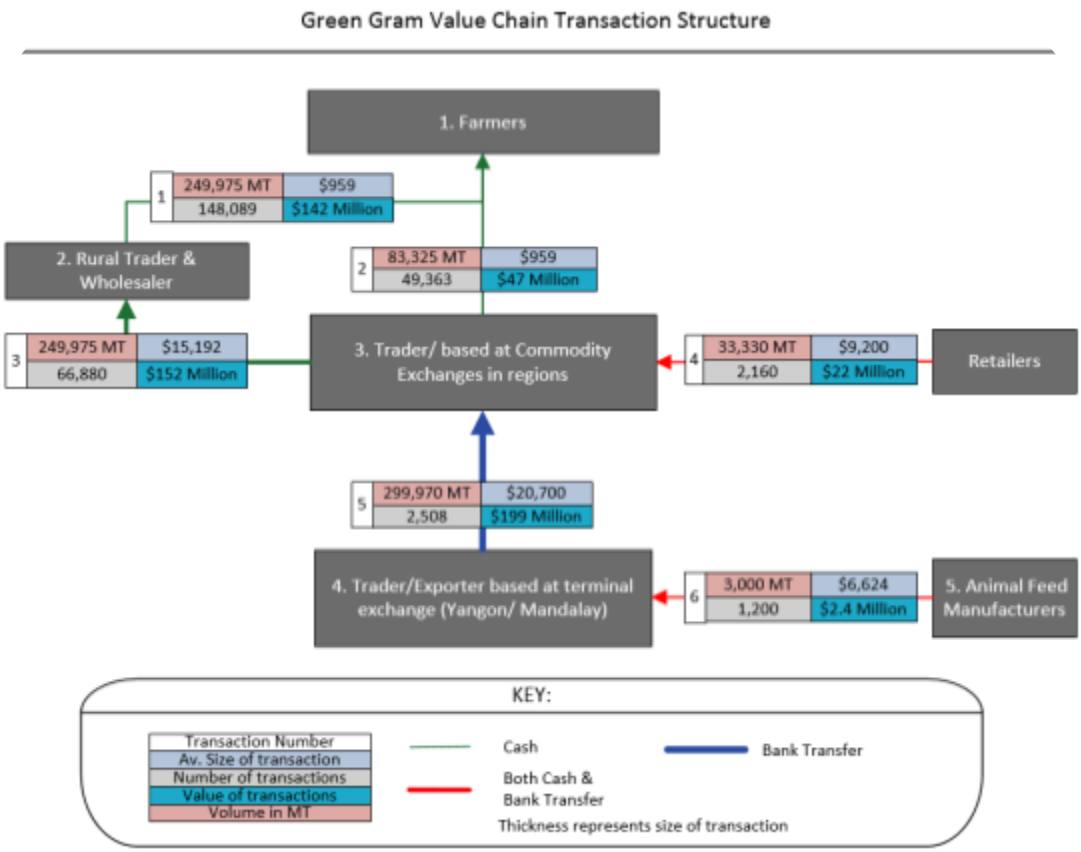
#	Origin	Recipient	Volume of transaction MT	Value of transaction US$	Payment Frequency	# of actors receiving payments	# of transactions	Average volume per transaction MT	Average transaction size	Payment method
1	Miller	Farmer	1,861,091	374,226,357	4	214,600	858,400	2.17	436	Cash
2	Rural Broker/ Trader & 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 & Whole-saler	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

SESAME VALUE CHAIN



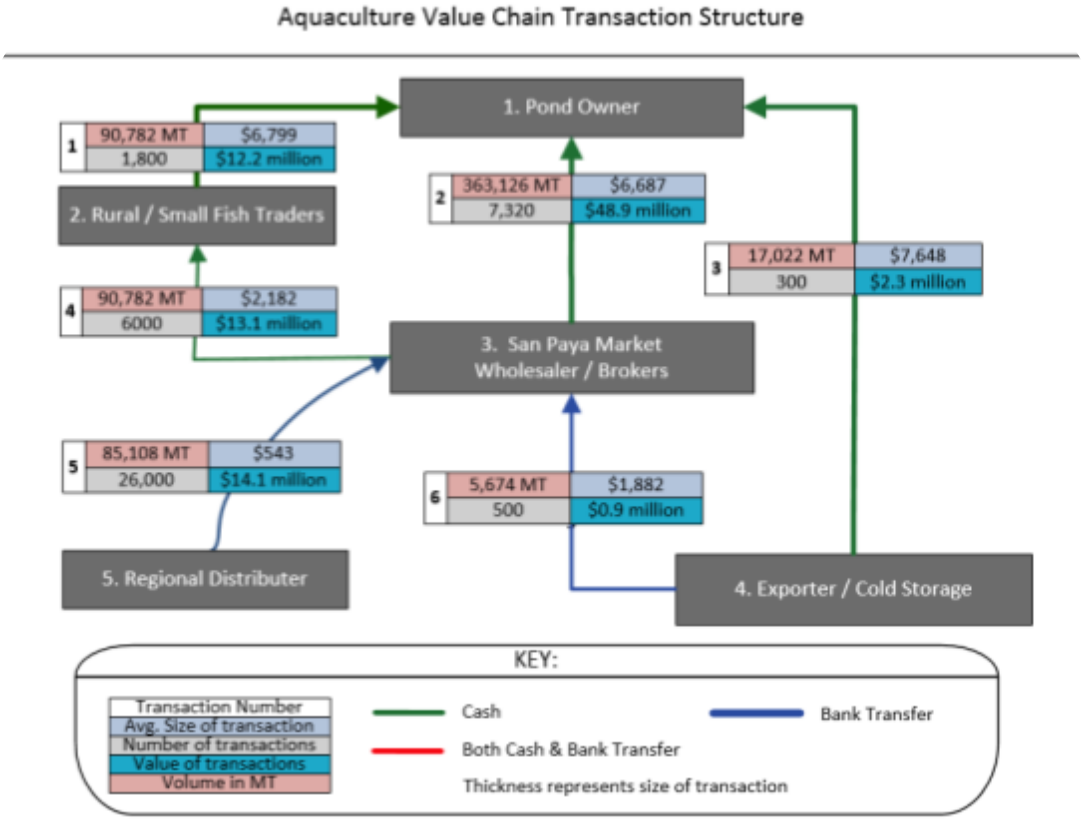
#	Origin	Recipient	Volume in Chain (MT)	Value of transaction (USD)	Payment frequency	# of actors receiving payments	# of transactions	Average transaction size (USD)	Payment method
1	Oil Miller	Farmer	27,502	11,164,739	1	64,632	64,632	173	Cash
2	Broker/ Trader/ Rural Collector	Farmer	495,037	200,965,303	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

GREEN GRAM (PULSES) VALUE CHAIN



#	Origin	Recipient	Volume in Chain (MT)	Value of tx	Payment Frequency	# of actors receiving payments	# of tx	Average total business for season	Average purchase volume per tx in	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 Manufac-turers	Exporter	3,000	2,384,612	12	30	1,200	79,487	8.33	6,624	Cash / Bank Transfer

AQUACULTURE VALUE CHAIN



#	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