IMPACT OF AGRICULTURAL VALUE CHAINS ON DIGITAL LIQUIDITY

ITU-T FOCUS GROUP ON DIGITAL FINANCIAL SERVICES

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ITU-T Focus Group Digital Financial Services

Impact of Agricultural Value Chains on Digital Liquidity

Focus Group Technical Report

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The procedures for establishment of focus groups are defined in Recommendation ITU-T A.7. TSAG set up the ITU-T Focus Group Digital Financial Services (FG DFS) at its meeting in June 2014. TSAG is the parent group of FG DFS.

Deliverables of focus groups can take the form of technical reports, specifications, etc., and aim to provide material for consideration by the parent group in its standardization activities. Deliverables of focus groups are not ITU-T Recommendations.

About this report

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Executive Summary

Agriculture is critical to alleviating poverty in developing countries. Developing countries can derive more than 30 per cent of their GDP from agriculture, compared to less than two per cent within a developed country, such as the US. [1] A common approach for alleviating poverty is through commercial value chains. In this framework, policy makers and stakeholders examine the spectrum of 'farm to fork' activities and identify tactics that will benefit smallholding farmers (SHFs). These tactics include incorporating SHFs into existing value chains or improving value chain performance through financing, better training, better fertilizer, and so on. Commercial value chains differ by crop but often have similar activities such as input supply or warehousing. At one end of the commercial spectrum are 'loose' value chains in which growers sell excess crops primarily in local markets. At the other end are 'tight' value chains typically focused on exports and cash crops (e.g., coffee, tea, sugar).

eMoney is a good fit for tight value chains because:

- A single entity typically pays the SHFs.
- eMoney provides an audit trail and reduces cash handling costs and leakage.
- Payment flows are often complex: Payments can leapfrog or be split between value chain participants. eMoney with an accompanying management system can automate this process and provide an audit trail.
- Additionally, eMoney facilitates credit, which is a critical component of agriculture due to uneven cash flows.

eMoney in commercial value chains is clearly beneficial, but will it improve digital liquidity for SHFs? For meaningful improvement to occur, eMoney within value chains would need to reach critical mass and continue circulating in digital form. Otherwise, digital liquidity would be small and temporary. For a number of years into the future, critical mass and electronic circulation seem unlikely. Several issues attenuate the potential:

- Limited reach – only seven per cent of SHFs participate in tight value chains.
- Agriculture is only part of SHFs' lives – for example, diaries from a Pakistani farming community revealed only 39 per cent of all income and expenses were from agriculture. Even if agriculture cash flows were completely electronic, the majority of the cash flow would remain in paper form.
- Digital liquidity requires digital lending – given the SHFs uneven cash flows, credit is essential. Unless loans are disbursed electronically, the proceeds will likely circulate in cash as there is little incentive to convert the disbursement to eMoney.
- Cashing out is better – even if SHFs are paid electronically, cashing out is preferred since they avoid transaction fees and other issues such as interoperability and connectivity.

eMoney within value chains, although more efficient, is clearly not a silver bullet for creating digital liquidity. Besides having limited reach, value chains by themselves do not remove the incentive to cash-out to any meaningful degree.

Given these limitations, is there a role for tight value chains in creating digital liquidity? Is eMoney somehow less important to tight value chains?

1 WORLD BANK'S WORLD DEVELOPMENT INDICATORS. AGRICULTURE VALUE-ADD AS A PER CENT OF GDP IN 2013. LOW-INCOME COUNTRIES (LESS THAN $1,045 GNI PER CAPITA) WERE AT 32.4 PER CENT AND THE UNITED STATES WAS AT 1.4 PER CENT.

One needs to look at payment-enabling these tight value chains as just one part of a holistic approach to digital liquidity – an approach that considers the lifecycle of money and introduces solutions that encourage a digital version(s). A holistic approach gives SHFs and, more broadly, the bottom of the pyramid (BoP) ample opportunity to receive, retain, and pay with eMoney. Within this construct, crop buyers, banks, governments, and urban relatives would inject eMoney into the local BoP economy because it is faster and cheaper than cash. The BoP would retain this money in electronic form until needed because doing so helps them access credit lines, manage household petty cash, and gain other benefits. When the BoP needs to make a payment, they would use eMoney for both local BoP-to-BoP transactions and payments to institutions because doing so provides access to layaway programs, lines of credit, and other benefits. Compelling eMoney use cases are the best way to drive this transition and value chains contribute to this endeavor.

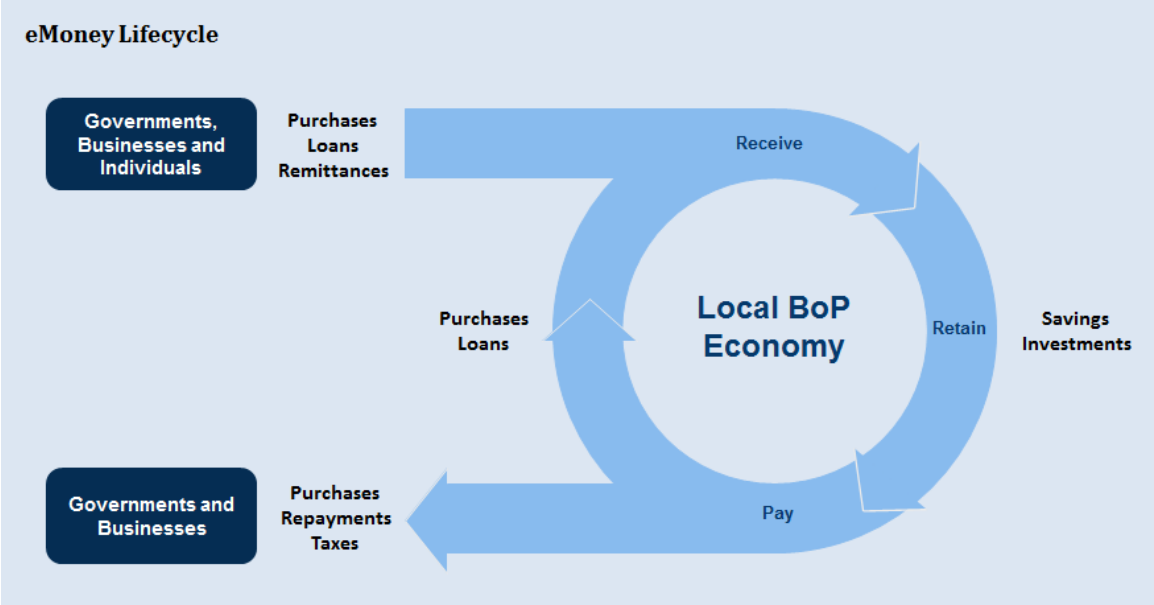
Even if eMoney within value chains will not materially impact digital liquidity, eMoney is still valuable. Some benefits are direct, such as lower cash handling costs. Other benefits are indirect, such as improving access to credit through transaction histories. In some cases, eMoney is part of a much larger solution with broad benefits, such as subsidy programs that improve food security. The justification for eMoney should not and does not need to rest on digital liquidity alone.

What are the implications for strategists and policy makers? For those focused on driving eMoney adoption and achieving digital liquidity, it is important to remember that value chains are just one use case for furthering adoption and digital liquidity. Accordingly, strategists and policy makers should evaluate a range of use cases and evaluate how value chains fit into the roadmap.

1 Introduction

It is widely agreed that digital liquidity is an important goal for developing markets. It enables BoP individuals and businesses to receive, retain, and pay with eMoney – providing safety, greater access to credit, income growth, and other documented benefits. The end goal of digital liquidity involves eMoney circulating within the local BoP economy. This includes BoP-to-BoP transactions, as well as payments from and to entities such as schools, mobile network operators (MNOs), governments, and family members. In this end state, there is much less need to incur costs for cash-in or cash-out transactions. A consumer's eMoney receipts (salary, remittances received, crop sales, loan proceeds, etc.) align with their eMoney uses (purchases, loan repayments, investments, savings, loans to friends, etc.).

Figure 1 – eMoney lifecycle



Achieving this goal is difficult as it requires eMoney to be better than cash for many use cases. But there has been some progress, eMoney has a strong value proposition for remote person to person (P2P) and person to business (P2B) remittances and airtime top-ups. Continued progress requires eMoney to be better for health care payments, salary payments, grocery purchases, and so on. There is some evidence that eMoney is starting to work for other use cases, such as school payments.

Ensuring more balance between an individual's eMoney receipts and uses facilitates this transition. As individuals receive eMoney, they need a near-equivalent opportunity to use that eMoney for schools, groceries, loan repayments, and other expenses. These flows must also be synchronized since the BoP does not have the luxury of retaining eMoney for future purchases if they have near term cash needs. Without an equal opportunity, users must cash-out (or cash-in) which mitigates much of eMoney's core value propositions.

Use cases and the need for balance are mutually dependent since more eMoney use cases make the balance easier to achieve.

Accordingly, agriculture value chains are an interesting topic to study in this regard. A large portion of the BoP participates in agriculture and these value chains bring money into and out of the BoP economy (crop sales, seed purchases, etc.). Therefore, at least in theory, agriculture value chains

would allow a large number of individuals to receive and spend eMoney in an important part of their lives.

This report looks at agricultural value chains and whether they are a potential vehicle for increasing digital liquidity:

- How much of the population do they reach?
- How important are agriculture payments to the lives of the poor?
- Would value chain eMoney tend to stay in electronic form?

Note: A variety of research papers explore the intersection of Digital Financial Services (DFSs) and agriculture. An excellent example is USAID and mSTAR's "Guide to the Use of Digital Financial Services in Agriculture" which provides a framework for using lending, payments, and other DFSs to improve specific agriculture value chains. This report has a different emphasis than the USAID and other papers. This report primarily focuses on the degree to which agricultural value chains can accelerate progress toward digital liquidity and less on the reverse perspective – i.e., whether eMoney is good for value chains. With that said, a strong value proposition is obviously an important consideration, otherwise eMoney implementations will not happen.

2 Background

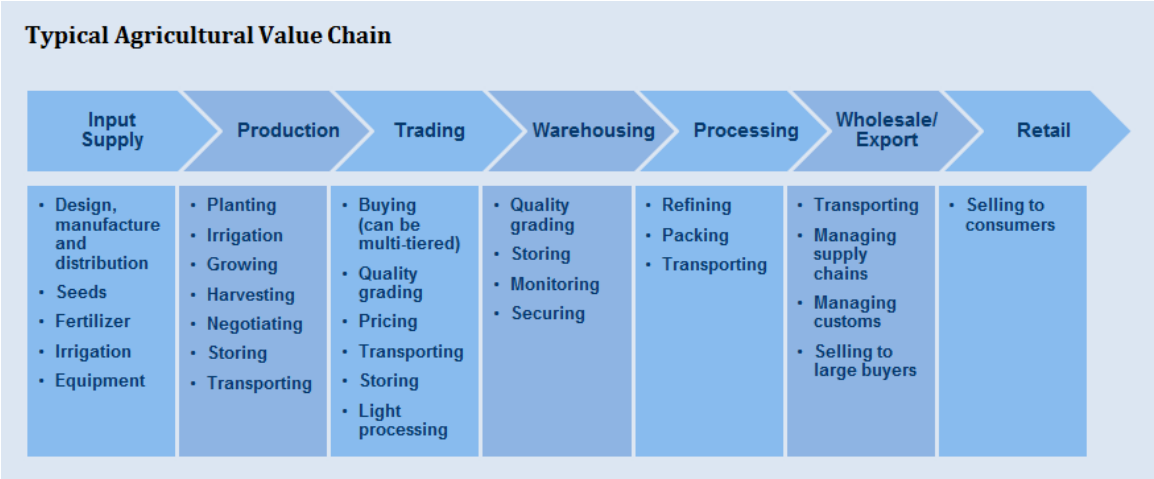
Importance of agriculture

Agriculture is a critical component of the economy in developing countries and can play an important role in helping to alleviate poverty. Developing countries can derive more than 30 per cent of their GDP from agriculture, compared to less than two per cent within a developed country, such as the U.S. Additionally, there is a close connection between the poor and agriculture. SHFs comprise most of the rural poor in developing countries.

A common approach for alleviating poverty is through commercial value chains. In this framework, policymakers and stakeholders examine the spectrum of 'farm to fork' activities and identify tactics that will benefit SHFs. These tactics include incorporating SHFs into existing value chains or improving value chain performance through financing, better training, better fertilizer, and so on.

Commercial value chains differ by crop but often share the activities shown in the diagram below.

Figure 2 – Typical agricultural value chain



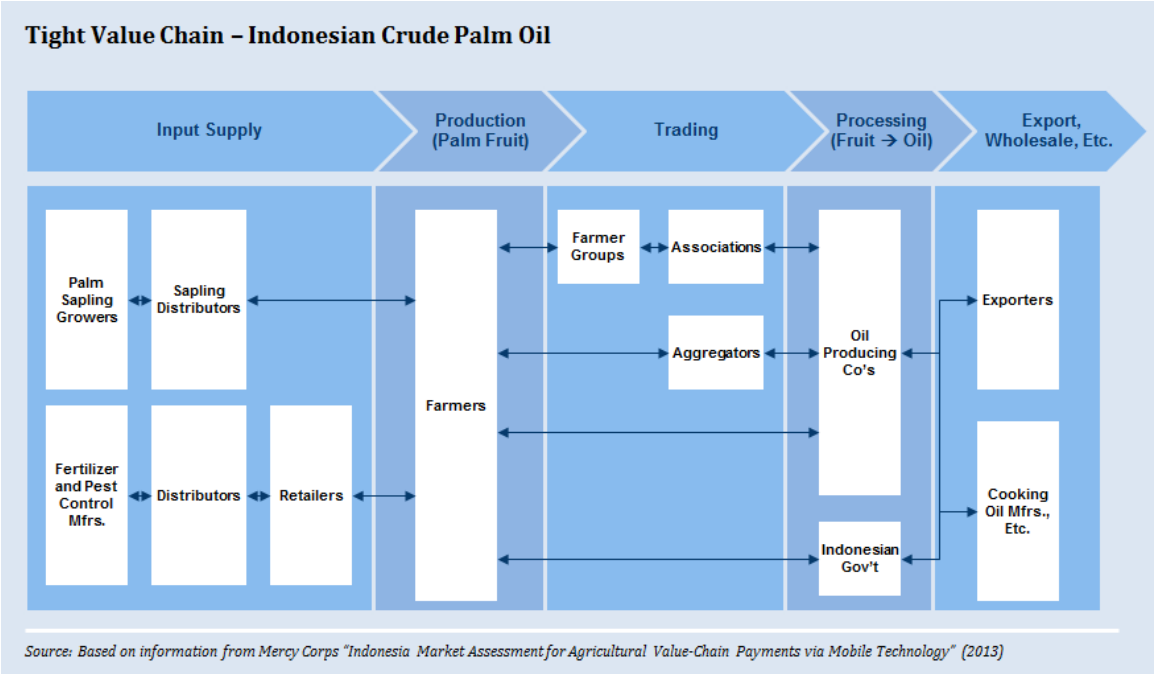
It is important to note that commercial value chains vary in terms of formality and sophistication. At one end of the commercial spectrum are 'loose' value chains in which growers sell excess crops primarily in local markets. [2]

Figure 3 – Loose value chain

At the other end are 'tight' value chains typically focused on exports and cash crops (e.g., coffee, tea, sugar). These value chains tend to be more complex. For example, the value chain for Indonesia palm oil involves multiple input suppliers, post-harvest processing, and private sector and government roles.

2 ALTHOUGH THESE FARMERS DO NOT PARTICIPATE IN SOPHISTICATED COMMERCIAL VALUE CHAINS, THEY CAN ADOPT BEST PRACTICES SUCH AS FORMING FARMERS' GROUPS TO SHARE LEARNING AND ENABLE GROUP LENDING, OR STORING CROPS IN WAREHOUSES FOR SALE IN THE OFF-SEASON WHEN PRICES ARE HIGHER.

Figure 4 – Tight value chain



Actors within tight value chains tend to have strategic goals in mind, such as improving their bargaining power or ensuring a reliable crop supply. Accordingly, these value chains are more formally organized and sophisticated. SHF financing is often a key component in the overall design. These tight value chains are good for effecting change because of their overall sophistication and the availability of aggregation points where services can be delivered or managed.

Value chain models

The Food and Agriculture Organization (FAO) of the United Nations defined four different value chain models, all relevant to tight value chains. [3]

1) Producer-driven

In this model, SHFs join associations or cooperatives that contract with larger buyers. Producer-driven models help SHFs access new markets, obtain higher market prices, secure their market position, and access financing.

Aprocav, a cacao producer association in Peru: 3,500 SHFs are part of the Aprocav producer association. Through Aprocav, SHFs sign a contract pledging to sell their entire cacao crop to a large customer who processes the crop into cacao butter, cacao powder, and glazes. In return for this commitment, SHFs receive bank financing, technical assistance, and above-market pricing. Aprocav enables financing by guaranteeing the loans, identifying loan amounts appropriate for each SHF, repaying lenders from sales proceeds, and remitting the remaining proceeds to the SHFs.

3 AGRICULTURAL VALUE CHAIN FINANCE TOOLS AND LESSONS. FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 2010.

2) Buyer-driven

Buyers such as traders, processors, wholesalers, exporters, and retailers will contract directly with SHFs to ensure a reliable supply of product.

Hortifruti, an institutional buyer in Costa Rica: Hortifruti purchases a variety of crops from SHFs before selling them in bulk to supermarkets. The relationship with Hortifruti helps SHFs manage their cash flow. Since Hortifruti provides a staggered planting and harvesting schedule, SHFs earn money throughout the year. Additionally, farmers can borrow from banks based on their Hortifruti relationship. The banks are willing to lend because they believe Hortifruti will only work with reliable suppliers.

3) Facilitated

SHFs are often unable to participate in tight value chains due to inadequate organizational and technical skills – this creates too much risk for large-scale buyers. To address this challenge, non-governmental organizations (NGOs) and governments intervene to make SHFs viable value chain members. These interventions include organizing farmer groups, training farmers, facilitating financing, identifying market opportunities, or some other gap-filling measure. United States Agency for International Development (*USAID)/Peru Poverty Reduction and Alleviation (PRA) artichoke market opportunity in Peru: In the past, SHFs could not participate in the artichoke export market since exporters primarily worked with larger growers. With a grant from USAID, Peru PRA identified artichokes as an attractive SHF opportunity and then brought together producers, processors, and buyers to bring the vision to fruition. PRA first encouraged a local processor (Agromantaro) to begin artichoke processing. Since the SHFs were unfamiliar with artichokes, PRA and Agromantaro enlisted producer associations to convince the SHFs to grow artichokes. To sweeten the deal, the processor offered the SFHs a contract, fixed price, seedlings, and technical assistance. Since farmers did not pay for seedlings until harvest, this approach also generated a source of SHF financing.*

4) Integrated

Supermarkets, multi-nationals, and other large downstream institutions create integrated value chains to ensure low prices, rigid adherence to quality standards, and a lock on supply. Integrated value chain models go beyond just connecting value chain actors. There is more information flow and control throughout the value chain.

Supermarkets: Supermarkets' purchasing agents will communicate strict product requirements to exporters about variety, quality, volume, hygiene practices, traceability, and residue standards. Exporters and wholesalers then provide this information to producers along with seed and fertilizer inputs, record keeping materials, and technical training to ensure the standards are met.

3 Are payment-enabled agricultural value chains a solution for digital liquidity?

Appealing characteristics

eMoney is a good fit for tight value chains.

- **Bulk payments:** A single entity typically pays the SHF. This entity may be a farmers' group distributing payments from a larger buyer or a large buyer that contracted directly with SHFs. eMoney provides an audit trail and reduces cash handling costs. Cash handling costs include theft /shrinkage, lost advances due to lack of proper record keeping, bank withdrawal fees, insurance, employee fuel and time costs for making bank withdrawals and delivering payments, security guards, shortages of appropriate cash denominations to make exact payments, and soft costs such as fear of robbery and physical harm from robbery.
- **Payment flow complexity:** Value chains do not always follow a simple cash transaction process at each step – i.e., input suppliers sell to farmers, followed by farmers selling to traders, etc. Payments can leapfrog or be split between value chain participants. For example, a contract may require a farmer group to divide sales proceeds between lenders, input suppliers, and farmers. eMoney with an accompanying management system can automate this process and provide an audit trail.
- **Importance of credit:** There are significant cash flow constraints up and down agricultural value chains. For example, dairy farmers need inputs to better feed their cows, but the input providers don't necessarily get paid right away. Dairy farmers will sell their milk to collectors and co-ops that will in turn onsell their milk to coolers that will in turn onsell the milk to processors that will in turn sell products to distributors. Every step of this process results in delays in payments after goods are already delivered. Smoothing out uneven payments through credit can have a substantial impact. eMoney can help in various ways. For example, transaction histories facilitate credit decisions. An eMoney platform can also ensure that money lent is actually spent on a borrower's intended use (e.g., farming inputs). Additionally, repayments can be enforced by automatically deducting payments, or even cutting off access to the market in the event of non-payment.

Not a silver bullet

eMoney is clearly valuable, but will it improve digital liquidity? For meaningful improvement to occur, eMoney within value chains would need to reach critical mass and continue circulating in digital form. Otherwise, digital liquidity would be small and temporary. For a number of years into the future, critical mass and electronic circulation seem unlikely.

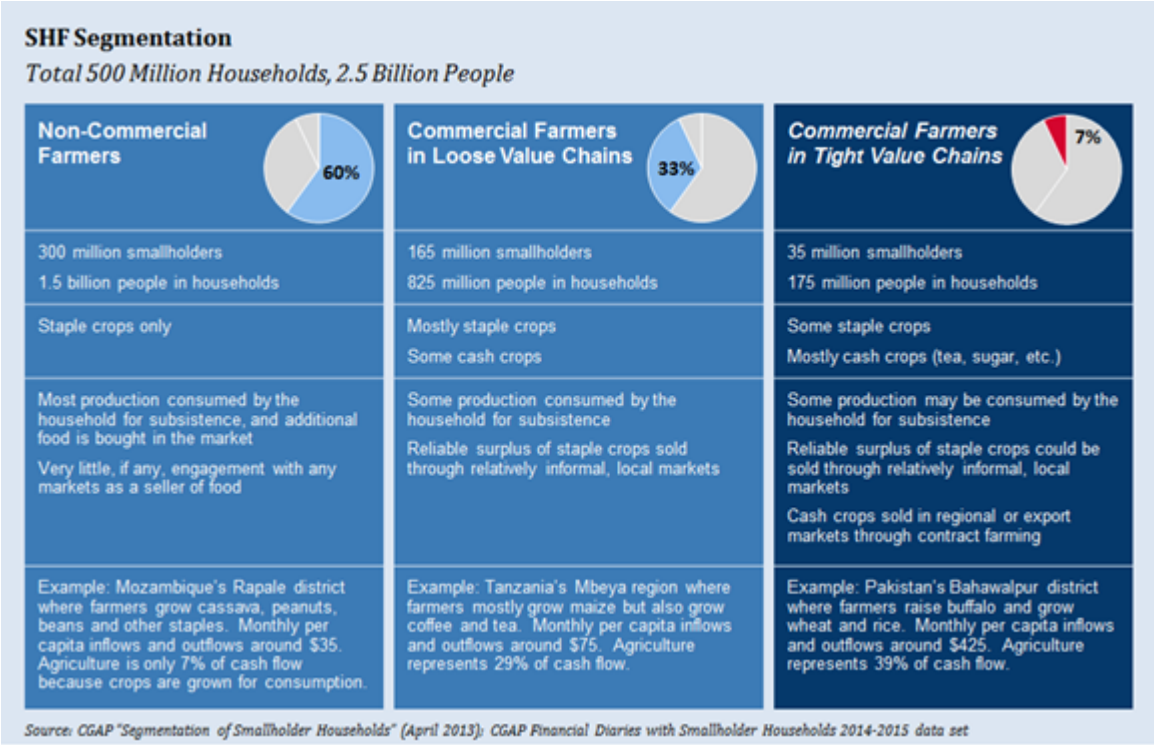
Several issues attenuate the potential:

#1 – Low participation in tight value chains

Only seven per cent of SHFs participate in tight value chains – thus, the reach is limited.[4] While there are efforts to increase participation in these value chains, progress will take time. It is noteworthy that 60 per cent of SHFs are non-commercial (i.e., grow food for subsistence), so there is limited cash flow to digitize.

4 CHRISTEN, ROBERT PECK, AND JAMIE ANDERSON. SEGMENTATION OF SMALLHOLDER HOUSEHOLDS: MEETING THE RANGE OF FINANCIAL NEEDS IN AGRICULTURAL FAMILIES. FOCUS NOTE 85. WASHINGTON, D.C.: CGAP, APRIL, 2013.

Figure 5 – SHF segmentation



#2 – Agriculture is just a part of BoP financial lives

Financial diaries from Mozambique, Tanzania, and Pakistan show that agriculture is only part of the SHF financial picture. In the tight value chain example (Pakistan), only 39 per cent of all income and expenses were from agriculture. In the loose value chain example (Tanzania), the figure averages 29 per cent. In the non-commercial example (Mozambique), the figure averages only seven per cent – agriculture cash flows from non-commercial farmers are low since they grow primarily for consumption.[5]

5 WORLD BANK. TANZANIA, MOZAMBIQUE, AND PAKISTAN CGAP FINANCIAL DIARIES WITH SMALLHOLDER HOUSEHOLDS 2014-2015. REF. TZA_2014_FDSH_V01_M, MOZ_2014_FDSH_V01_M AND PAK_2014_FDSH_V01_M. ALL DATASETS DOWNLOADED ON MARCH 13, 2016.

Figure 6 – SHF finances

SHF Finances	Non-Commercial Farmers (Mozambique)		Commercial, Loose Value Chains (Tanzania)		Commercial, Tight Value Chains (Pakistan)	
	Gross Income	Expenses	Gross Income	Expenses	Gross Income	Expenses
Monthly Per Household (USD)	**$33**	**$34**	**$74**	**$70**	**$427**	**$422**
Income						
Agricultural Income	13%	2%	40%	18%	46%	31%
Self-employment	34%	18%	26%	19%	20%	17%
Resources received	7%	0%	6%	0%	2%	0%
Other income	42%	0%	22%	1%	11%	0%
Asset Sales and Purchases	4%	22%	6%	11%	20%	19%
Household Expenses						
Clothing	-	9%	-	3%	-	4%
Drinks/Cigarettes	-	2%	-	2%	-	1%
Education	-	1%	-	5%	-	1%
Food	-	25%	-	15%	-	12%
Home repairs	-	0%	-	5%	-	2%
Medical	-	2%	-	2%	-	2%
Trans	-	7%	-	3%	-	3%
Utilities	-	2%	-	1%	-	2%
Other	-	7%	-	6%	-	5%
Resources Given Outside Household	-	2%	-	9%	-	0%
	100%	**100%**	**100%**	**100%**	**100%**	**100%**

#3 – Digital liquidity also requires digital lending

Figure 7 – SHF borrowing

SHF Borrowing	Non-Commercial Farmers (Mozambique)	Commercial, Loose Value Chains (Tanzania)	Commercial, Tight Value Chains (Pakistan)
Borrowing as a % of Spending			
Trader / agent credit	0%	<1%	9%
Informal store credit	<1%	2%	7%
Friends and family	<1%	4%	14%
Other borrowing	3%	3%	3%
Total	**3%**	**9%**	**32%**
Household Participation			
Trader / agent credit	0%	14%	97%
Informal store credit	22%	60%	94%
Friends and family	59%	77%	99%

Spending includes all types of spending (household purchases, business purchases, asset purchases).

There are other financial flows to consider beyond income and expenses: loan disbursements and repayments. Credit is essential to the BoP since cash flow tends to be very uneven. Crop sales provide a much needed inflow but the BoP needs money for seeds, fertilizer, and daily living expenses until they can harvest. To fill the financial void, the BoP borrows from many sources: friends, family,

advances from agriculture traders, and MFI loans. The commercial SHFs in the diaries borrow the most, possibly because more of their income and expenses are associated with seasonal agriculture.

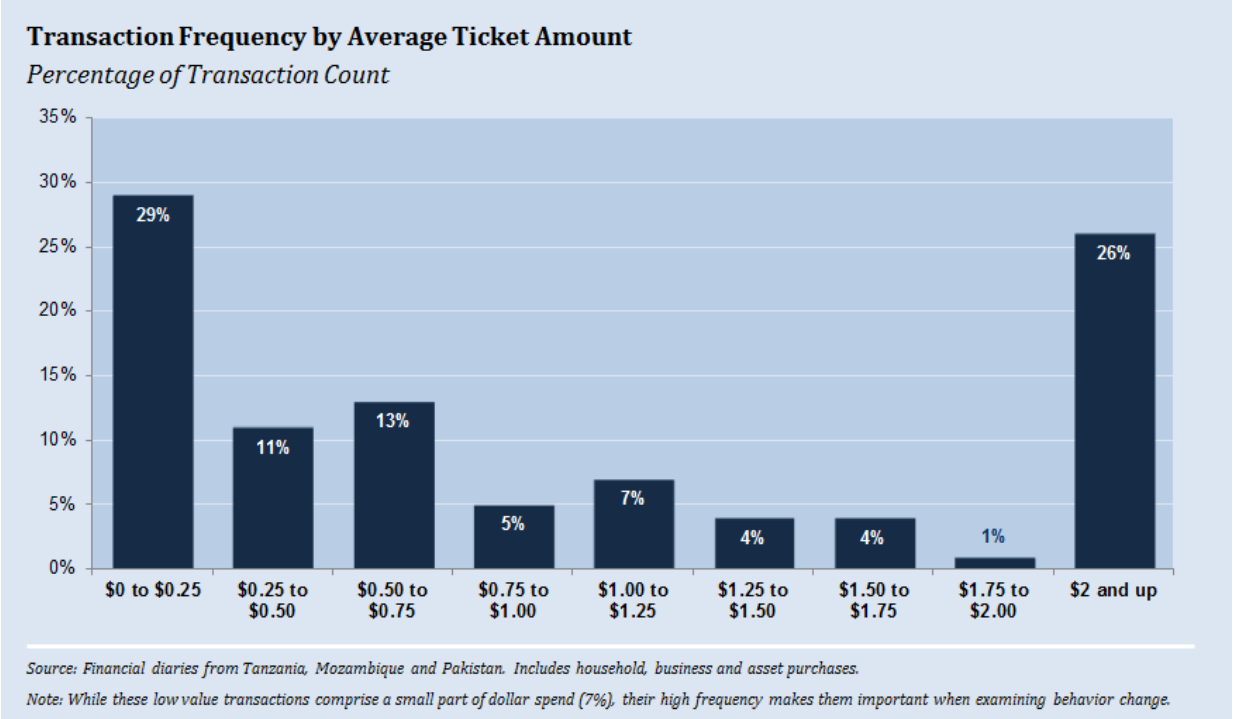
Using eMoney for receiving and repaying these loans is important for digital liquidity. If an individual *receives* a cash loan, they are likely to use that money as cash. They have little incentive to cash-in, thus bypassing an eMoney lifecycle – e.g., the individual does not use eMoney at a local merchant who would later use that eMoney to pay employees and suppliers. Additionally, unless an individual can repay their loan with eMoney, they must cash-out, which also breaks the eMoney lifecycle. eMoney for value chain financing will help, but SHF financial diaries suggest loans from friends/family and local stores can be more important sources of funds.

#4 – They will just cash out

Even if value chains use eMoney, currently, farmers will just cash out. Cash is usually cheaper, easier, interoperable, and not reliant on mobile coverage or agent presence.

Accordingly, BoP eMoney usage has been limited to a few use cases: receiving remote P2P payments then cashing out, and buying airtime. Even in Kenya, where mobile money is widely used, BoP diaries revealed that only 0.7 per cent of payment transactions were electronic and 86 per cent of those were for airtime.[6] In these two uses cases, eMoney is cheaper and simpler with mobile money agents solving the interoperability program with their cash-in, cash-out services.

Figure 8 – Transaction frequency by average ticket amount

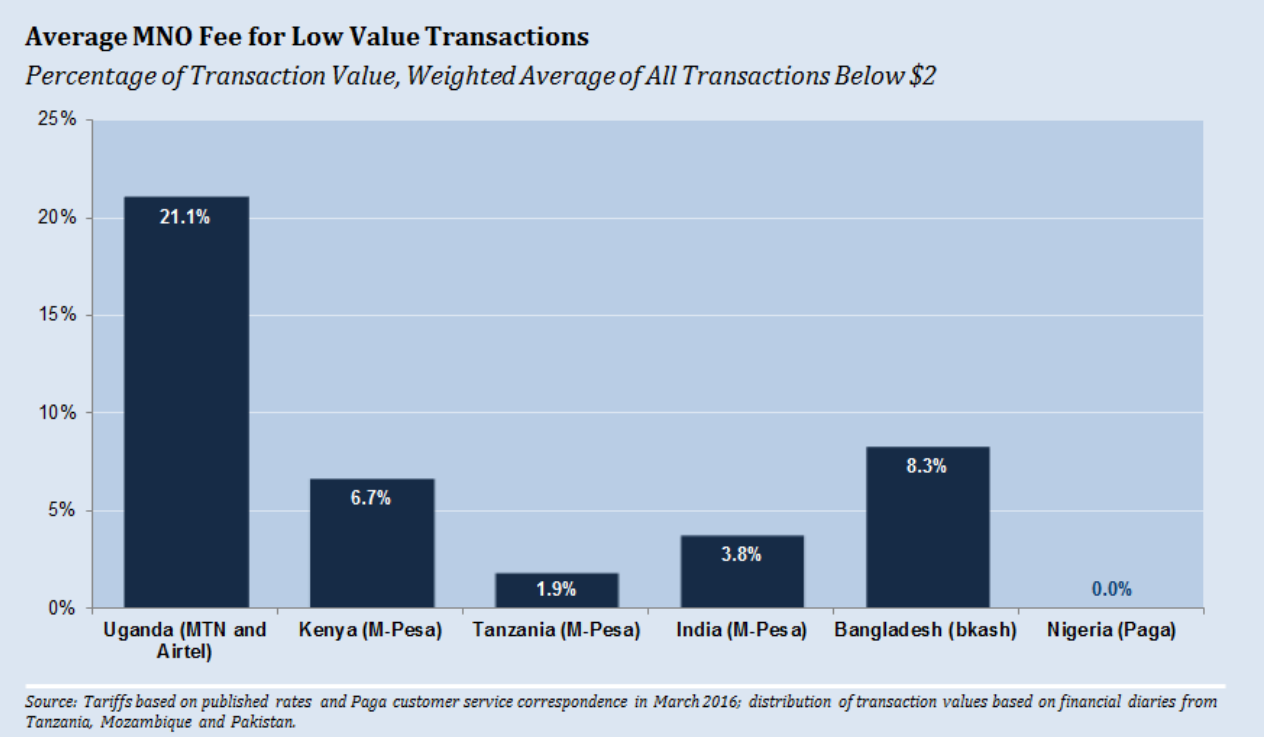


6 ZOLLMANN, JULIE AND LAURA COJOCARU. CASH LITE: ARE WE THERE YET? RETHINKING THE EVOLUTION OF ELECTRONIC PAYMENTS IN KENYA BASED ON EVIDENCE IN THE KENYAN AND SOUTH AFRICAN FINANCIAL DIARIES. BFA AND FSD KENYA. JANUARY, 2015.

Cost: Low eMoney usage makes economic sense. Most BoP transactions are for small amounts which have high transaction fees on a percentage basis. 75 per cent of purchases in the Mozambique, Tanzania, and Pakistan financial diaries were less than $2. [7]

Applying a variety of tariff schedules against this collection of low value transactions would cost up to 22 per cent. Fees are also contagious – a recipient will eventually incur their own transaction fees when they use their funds.

Figure 9 – Average MNO fee for low value transactions



The pricing variation is particularly striking - some MNOs do not charge P2P fees between registered users. It is also important to note that MNOs often have a minimum value they will transfer. In Uganda, this amount is ~ $0.14. Under this policy, 23 per cent of the transactions would be ineligible for eMoney.

User experience: The eMoney user experience is not optimal. For remote bill transactions, paying the correct business and ensuring payment is credited to the correct account is error-prone. For face-to-face P2P transactions, it is easier for someone to reach into their pocket than log into a phone and type the recipient's mobile number. Compelling user experiences are needed for each use case (e.g., 'bumping' phones for face-to-face P2P transactions).

Service availability: eMoney is not universally available to all people at all times. Poor or inconsistent mobile connectivity encourages eMoney subscribers to rely on cash as the more reliable alternative.

7 THE FINANCIAL DIARIES IN MOZAMBIQUE, TANZANIA AND PAKISTAN IDENTIFIED INDIVIDUAL TYPES OF ITEMS THAT WERE PURCHASED (FOOD, AIRTIME, PETROL, ETC.). SINCE THESE ITEMS MAY HAVE BEEN PURCHASED AT THE SAME TIME, ALL HOUSEHOLD ITEMS PURCHASED BY AN INDIVIDUAL ON A PARTICULAR DAY WERE ASSUMED TO BE PART OF THE SAME PURCHASE. THIS APPROACH AVOIDS OVERSTATING THE NUMBER OF LOW VALUE TRANSACTIONS. TO ISOLATE PURCHASE ACTIVITY FROM FINANCING, THE EFFECTS OF STORE CREDIT AND OTHER FINANCING WERE IGNORED (E.G., PAYING AT THE END OF THE MONTH).

Even where mobile connectivity is solid, the local MNO may not provide an eMoney offering or, if they do, they may not have an adequate agent network to make eMoney a practical offering.

Role of eMoney in tight value chains

eMoney within value chains, although more efficient, is clearly not a silver bullet for creating digital liquidity. Besides having limited reach, value chains do not remove the incentive to cash-out to any meaningful degree.

Given these limitations, is there a role for tight value chains in creating digital liquidity? Is eMoney somehow less important to tight value chains?

Part of a holistic approach to digital liquidity: One needs to look at payment-enabling these tight value chains as just one part of a holistic approach – an approach that considers the lifecycle of money and introduces solutions that encourage a digital version(s). A holistic approach gives the BoP ample opportunity to receive, retain, and pay with eMoney. Tight value chains can encourage eMoney adoption and inject eMoney into the local BoP economy, a requisite step for digital liquidity. Since participating SHFs generate a disproportionate amount of revenue and may employ others, their impact should be larger than their seven per cent market share suggests. But, value chains in themselves are not sufficient vehicles for digital liquidity. It is important to note that for value chains to fulfill their liquidity role, they should use the national payment system and not a proprietary solution (e-voucher, etc.).

eMoney is still important: Even if eMoney within value chains will not materially impact digital liquidity, eMoney is still valuable and offers a range of benefits.

- Direct benefits – These include lower cash handling costs, leakage reduction, greater safety, faster payment, and other benefits.
- Indirect benefits – These include access to credit and insurance through transaction histories, higher merchant sales, or more accurate tracking of accounts receivable.
- Solution benefits – In some use cases, eMoney is a component of a much broader solution, such as input subsidy programs that improve food security, or a contract management system used by value chain participants.

Thus, the justification/motivation for payment-enabling agricultural value chains should not, and does not, need to rest on digital liquidity alone.

Part of a holistic approach

The building blocks of a holistic approach are use cases – specific situations such as paying for school fees, receiving wages, or repaying a loan. Digital liquidity depends on making eMoney better than cash for a wide range of use cases, including agricultural payments.

eMoney is already compelling for remote transfers (quicker and cheaper than transporting cash) and airtime top-up (more convenient than visiting stores and without transaction fees). These solutions were powerful enough to incent mobile money adoption. But, these two use cases have not been sufficient to achieve digital liquidity. P2P recipients typically cash-out upon receiving their funds, and small businesses also tend to cash-out quickly after receiving eMoney payments from their customers.

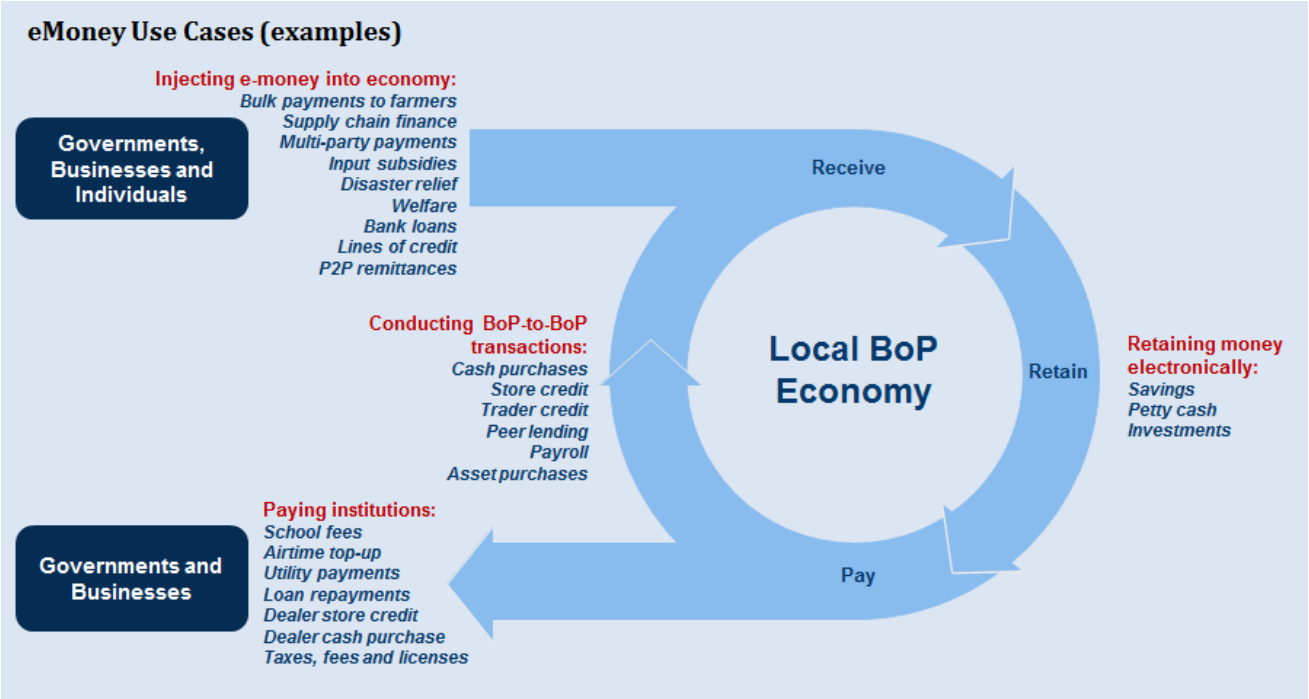
To achieve digital liquidity, the value proposition must widen to include more use cases. eMoney needs to be better for buying crops, paying school fees, buying household supplies, paying utility

bills, paying loans and so on. In other words, value chains are only one category of use cases; non-agricultural use cases are at least as important.

Broadly speaking, digital liquidity requires a *balanced portfolio* of eMoney use cases that encourages:

1. **Injecting eMoney into the BoP economy:** Getting money into BoP digital wallets is one of the first steps towards digital liquidity. Remote P2P payments are an excellent source of funds as payments can be quite large but more use cases are needed. Bulk payments from larger organizations such as governments, produce buyers, and NGOs are a good source. These organizations need to pay thousands or even millions of individuals. With their size and influence, organizations can often dictate how payments will be made. Because bulk payments such as subsidies can be universal, these institutional payments can raise eMoney adoption significantly.
2. **Retaining funds electronically:** Unless a user retains their eMoney in digital form, the digital liquidity cycle breaks. Remote payments aside, why would consumers bother converting their cash *back* into eMoney? They will just use cash. To avoid breaking the liquidity cycle, users must overcome their current preference for cashing out. Providing interest payments, enabling a line of credit or lowering household petty cash requirements are potential motivators.
3. **Conducting BoP-to-BoP transactions:** From an income perspective, this activity includes selling produce locally, selling products (entrepreneurs), providing casual labour, and borrowing money from friends. Expenses include income-related expenses such as paying labourers, repaying loans from friends, buying seeds, as well as household expenses such as food, clothing, and transportation. Until BoP-to-BoP eMoney transactions reach a tipping point, the need to cash-in or cash-out will remain high as these transactions are likely the bulk of BoP activity. Getting the BoP to use eMoney in the local economy can be particularly challenging due to high fees, lack of MNO interoperability, and poor user experience. Removing these barriers is a pre-requisite to eMoney adoption, but is not sufficient. One or several compelling reasons to use eMoney are required, this might include: Using eMoney to document the disbursement and repayment of informal loans, or using eMoney transaction histories to secure credit.
4. **Paying large institutions with eMoney:** While payments to MNOs, schools, governments, and other institutions are a small part of BoP obligations, they may be a meaningful factor in driving eMoney adoption since many individuals use these services. Because these institutions can be quasi-monopolies, government-controlled entities, or otherwise influential organizations, they can mandate eMoney. Examples include registration payments for public schools in The Ivory Coast and tuition payments to the Bridge Academy, an independent school system in Kenya. The often remote nature of these institutions provides an additional catalyst for eMoney adoption.

Figure 10 – Example eMoney use cases



4 Agricultural Use Cases

Although not a silver bullet, agricultural use cases play a role in a holistic approach to achieving digital liquidity. Example use cases for tight value chains include:

- bulk payments to farmers;
- multi-party agriculture payments;
- input subsidy programs;
- trader credit (agriculture items);
- informal store credit;
- savings-based line of credit (LoC).

This section discusses these use cases with the intention of:

- Highlighting the range of benefits eMoney can provide to SHFs, and whether digital liquidity is one of them.
- Illustrating the importance of tailoring solutions to specific use cases. The user experience, value proposition, backend processes, pricing, rollout strategies, and other components must be tailored to each use case.
- Reinforcing the notion of how challenging eMoney adoption can be – how elegant solutions may fail, and how goals such as digital liquidity can be undermined.

Bulk payments to farmers

- **Concept:** A single entity (farmers group, large buyer, etc.) pays farmers with eMoney, possibly mandating this method.

- **E-value proposition:** eMoney reduces the payor's cash handling costs such as theft, security guards, and transportation. Accordingly, these initiatives are often payor-led.
- **Example:** In 2013, GADCO, a major rice producer and miller in Ghana, piloted mobile money payments for 722 rice farmers with plans to increase to 5,000 farmers.[8] Several aspects are notable:
  - GADCO's primary benefit was lower cash handling costs. Accordingly, GADCO was willing to pay a one per cent fee to Tigo, the MNO providing the service. Half of this fee enabled waiver of farmer cash-out fees.
  - Farmer benefits included:

    a) GADCO commitment to purchase all of the farmers' rice;

    b) ease of hiring seasonal workers through proof of cash flow;

    c) financial privacy which reduces the pressure to give loans and gifts, and;

    d) traditional mobile money benefits (safety, 24/7 access, no visits to banks, ease of airtime top-ups, etc.).
  - Wide range of training was essential: mobile phone literacy (SMS, PIN codes, balance inquiry) and financial literacy (savings concepts, recent changes to currency).
  - Tactics for increasing adoption included:
    a) sending $3 to farmers to incent experimentation with mobile phone interface;
    b) providing non-Tigo subscribers with Tigo SIM cards;
    c) integrating mobile money education/promotion into existing agriculture training done in person or via radio (seed placement, pest control, etc.).
- **Digital liquidity impact:** Conceptually, these bulk payments improve liquidity by encouraging eMoney adoption and providing a source of funds. However, as discussed earlier, the reach is limited as only seven per cent of SHFs participate in value chains where this bulk payout is most relevant. Also, implementations are very small (e.g., 5,000 farmers) and require hand-holding. This is not a scalable solution at this point in the eMoney adoption curve, but this could change once value propositions and solutions solidify.
- **Other issues:** Who pays the transaction fees? Farmers do not want to receive eMoney if doing so lowers net proceeds. Payors have been addressing farmer resistance by either paying transaction fees directly or by including additional funds to cover the farmers' cash-out expenses.

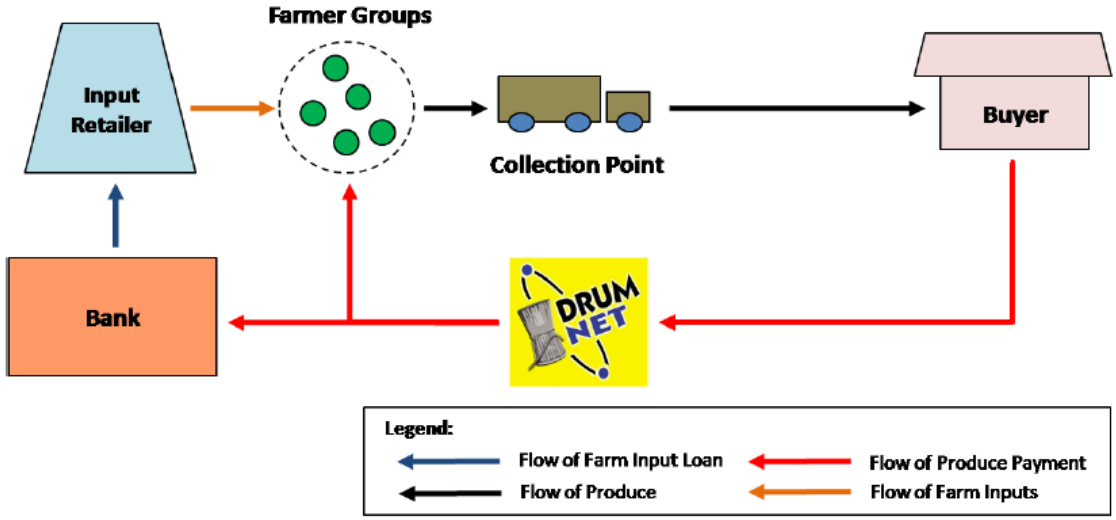
Multi-Party agriculture payments

- **Concept:** Contracts and payments (purchases, loan disbursements, and repayments) are managed holistically across multiple parties. For example, a crop buyer's payment can be split automatically between farmer(s) and bank and input supplier(s) instead of through unaffiliated transactions (buyer pays farmer; farmer probably pays bank; etc.).
- **E-value proposition:** eMoney provides administrative simplicity, encourages lending, lowers credit risks for banks and agro-dealers, and increases production control (ability to specify input packages, etc.).

8 MOBILE PAYMENTS: HOW DIGITAL FINANCE IS TRANSFORMING AGRICULTURE. TECHNICAL CENTRE FOR AGRICULTURAL AND RURAL COOPERATION, WAGENINGEN. MAY, 2015.

- **Example:** Pride Africa, an NGO, started the DrumNet project in 2003 to create an Information and Communication Technology (ICT) platform to help value chain partners (buyers, farmers, agro-dealers, and banks) operate more efficiently. DrumNet was a rules-based platform involving "a fixed price purchase contract offered by a buyer, signed by producers and managed by a master contract establishing the roles, rights, and responsibilities of all chain partners. The contractual agreement allowed producers to access credit (first directly from DrumNet and later from partner banks) and purchase farming inputs from certified input retailers. At harvest, contracted produce was aggregated and graded at designated collection points, then sold to the buyer. DrumNet facilitated and tracked payment following a successful buyer-seller transaction, ensuring credit was repaid and payment to producers was both secure and accurate." DrumNet charged fees for these services.[9]

Figure 11 – DrumNet process flow



Existing and planned capabilities included:

- **Payment:** Collecting payment from buyer and distributing to farmer groups and banks.
- **Information flow:** Providing an SMS system that:
  a) informed buyers what/when farmers planted, allowed buyers to monitor growing progress and enabled buyers to communicate with farmers;
  b) continually updated agro-dealers about stocking requirements;
  c) informed farmers about collection dates and locations.
- **Control:** Allowing supply chain partners to track contract compliance and report/monitor supply chain activities.
- **Financial risk management:** Collecting a 25 per cent line-of-credit deposit from farmers, and facilitating micro-insurance for crops.

Value propositions vary:

- Farmers: Higher prices (broker disintermediation), fixed price contracts, and access to credit.
- Agro-dealers: Visibility into stock requirements, higher sales, and no need to offer credit.

9 INTERVIEW WITH FORMER DRUMNET EXECUTIVE IN MARCH, 2016.

- Buyers: Lower prices (broker disintermediation), more predictable supply, greater visibility, and lower cash handling costs.
- Banks: New customers and lower cost and risk.

DrumNet was donor funded from 2003 to 2009 and operated in several value chains throughout Kenya. It was serving over 3,000 farmers when the main donor withdrew additional funding. Although certain regions approached break-even, the service was not scaling fast enough in the donor's opinion. DrumNet leadership evaluated their options, keeping several lessons in mind:

- Valuable solution: Buyers, agro-dealers, and banks valued the service, and farmers could be quickly mobilized to form groups (a group representative interacted with DrumNet). Field costs could be kept relatively low after initial marketing and training exercises. Although value chains differ by crop, they share general processes (produce collection, payment) that an ICT-driven process could improve.
- Platform was not robust enough: The DrumNet platform was not sufficiently 'hardened.' Too much time and resources were wasted on personnel transporting paper forms from the field to headquarters and then manually entering data into the DrumNet database. Regular platform breakdown also raised costs and created customer service problems. DrumNet needed significant software re-development.
- Funding: Operating DrumNet as a donor-funded entity left it prone to inconsistent cash flow and requirements which were incompatible with commercial development (e.g., expanding before it was ready).

In need of capital to support a technical upgrade, DrumNet created a JV with a Kenyan ICT firm. The arrangement was essentially a 'sweat equity' deal in which the ICT firm would build the next version platform in exchange for equity. Shortly after forming the JV, the ICT firm landed a large contract and redeployed resources to that project. DrumNet did not continue.

- **Digital liquidity impact:** Solutions such as this are certainly elegant and offer a broad value proposition. The impact on digital liquidity is less clear. Other than injecting eMoney into agro-dealers, a solution of this nature probably does not create any more liquidity than bulk payments to farmers would. But, perhaps this type of platform can eventually "virtually aggregate" farmers? DrumNet launched this service targeting farmer groups in tight value chains. But only seven per cent of farmers are in tight value chains. Another 33 per cent are in loose value chains.
  - Could enhancements to these platforms enable independent farmers to graduate into tight value chains?
  - Could these platforms help farmers in loose value chains sell in a more sophisticated manner within local markets?
- **Other issues:** Was the concept simply too early? The service relied on mobile phones extensively. When DrumNet launched, mobile penetration was much lower and functionality more limited. To accommodate this deficiency, farmers had to nominate a point of contact (Transaction Agent) to interact with the DrumNet platform on their behalf. This limitation coupled with a weak platform created a weak stakeholder experience.

Input subsidy programs (ISPs)

- **Concept:** Governments, NGOs, and other entities encourage usage of fertilizer and high quality seeds by subsidizing part of the cost. In one version, eligible farmers redeem an e-voucher or equivalent token at agro-dealers and pay the remaining balance; agro-dealers

collect their funds by submitting e-vouchers to the subsidizing entity. In another version, eligible farmers receive a cash transfer only usable for certain purchases. Non-commercial and commercial SHFs can participate in these programs.

- **E-value proposition:** Farmers experience the benefits of high-quality inputs for the first time, or at least save money repeating an existing practice. Agro-dealers generate extra sales. Governments improve food security and constituent incomes, and can reduce their involvement in procuring and distributing inputs.
- **Example:** In 2011, faced with declining agricultural productivity, the Nigerian government announced several remedial measures including the Growth Enhancement Support (GES) scheme, an input subsidy program. Implementation during the first few years relied on mobile money and experienced a variety of problems, some mobile-related (network coverage, low phone/SIM ownership, phone loss, lack of airtime, etc.) and some program-related (no reliable national ID scheme, supplier exploitation of farmers, delayed payments to agro-dealers, etc.). To address the mobile phone deficiencies, in 2013, the government piloted an alternate solution – the Token Authentication Program (TAP) that did not require mobile phone service. This solution addressed some problems such as low mobile coverage, but the overall program remains under significant strain. One major issue has been 'enumeration' – uniquely identifying all eligible beneficiaries. It has been very difficult to locate farmers, define an eligible farmer, assign unique identifiers, avoid fraudulent registrations, and so on. Another major issue has been distribution fraud and chaos, worsened by the appointment of new dealers to ensure geographic coverage. Many problems surfaced, including: the appointment of unqualified agro-dealers such as friends/family; government officials requiring bribes to process agro-dealer redemption requests; and new agro-dealers crowding out traditional agro-dealers. To address the enumeration challenge, the government is pursuing the National Agricultural Payment Initiative (NAPI) which includes a farmer database based on biometrics, a no-frills bank account with the Bank of Agriculture, and a chip card for identification, redemption, and access to other services.[10]
- **Digital liquidity impact:** While the GES program needs improvement to achieve its goals, it offers several valuable lessons, one of which is separating the evaluation of eMoney from overall ISP issues such as distribution network design. eMoney can improve robust ISPs or worsen weak ones by enabling high scale fraud. A well-designed program is therefore critical. With a functioning ISP as an assumption, the key question is whether ISPs can drive digital liquidity (i.e., the propensity to receive, retain and spend money in electronic form). The answer seems to be 'yes' but mostly by indirect means.
    - ISPs are a good vehicle for encouraging SHF adoption of eMoney (an enabling first step in digital liquidity). ISP programs can be quite large. For example, in Nigeria, GES voucher redemption figures reached eight million in 2014. These programs can be inclusive, targeting both non-commercial and commercial farmers.
    - ISPs do not directly increase a SHF's digital liquidity since the subsidies are not accessible to them. The payments go directly to the agro-dealer or, if sent to the SHF, cannot be used for anything except inputs, at least theoretically.
    - ISPs can increase the digital liquidity of agro-dealers, which could result in eMoney payments to BoP employees. However, a flawed ISP implementation can worsen liquidity if agro-dealers experience long redemption timeframes.

10 EXPANDING AND REPLICATING GES TAP. AFRICAN FERTILIZER AND AGRIBUSINESS PARTNERSHIP. OCTOBER, 2015.

Trader credit (agricultural items)

- **Concept:** SHFs often obtain credit from downstream and upstream partners (e.g., agricultural traders who buy from SHFs and resell to larger buyers). Traders will often provide upfront cash to SHFs and deduct the amount owed from the crop purchase several months later. The eMoney version would involve the trader dispensing funds electronically.
- **E-value proposition:** It is unclear how strong the value proposition could be. These transactions, although significant in size, do not happen very often. There may be some benefit if the disbursement can be done remotely, or if a digital record is useful (e.g., helping a trader obtain bank loan).
- **Examples:** Trader credit is primarily relevant to SHFs selling in tight value chains. In the Pakistan diaries, 97 per cent of the SHFs used trader credit, but through cash advances only. It is not known whether an eMoney version is happening in any measurable way in other countries.
- **Digital liquidity impact:** These payments are relatively large and could be an ongoing source of eMoney for electronic purchases if retained in this form.

Store credit (local suppliers)

- **Concept:** Farmers transact electronically as a way of recording the purchase and repayment. This would involve the purchaser issuing the merchant an "e-IOU" at time of purchase. Future repayments would reduce the IOU balance. Additional functionality, such as interest charges could be added.
- **E-value proposition:** Merchants such as local agro-dealers could sell more merchandise, track amounts owed, send automated repayment requests, generate interest income, and access bank credit through proof of receivables. Consumers could buy more, track amounts owed, and access bank credit through a credit history.
- **Examples:** Store credit is very important. In the Mozambique, Tanzania, and Pakistan diaries, 22 per cent, 60 per cent and 94 per cent of the households respectively used store credit. It is unclear how much, if any, is conducted electronically. Under existing functionality, only repayments would be appropriate for eMoney but tracking store credit disbursement is technically feasible.
- **Digital liquidity impact:** eMoney for store credit could improve digital liquidity if the borrower can time their eMoney repayments to match their eMoney income.
- **Other issues:** Store credit highlights the need to think about an end-to-end solution, not just the payment piece. Unlike a cash payment, store credit is a two-step process: Obtaining the credit during a shopping trip; and repaying at a later date. A robust solution needs to create value throughout the entire lifecycle: Simple user experience during the purchase; ability of merchant to assess credit worthiness; ability to monitor balances owed; option to send reminder notices; and ease of repayment.

Savings-based line of credit

- **Concept:** Mobile money users store excess money in an interest-bearing eMoney account. Those deemed creditworthy can also access a line of credit (LoC), with a maximum loan amount greater than the interest-bearing account balance. The LoC could be used to buy agriculture supplies and possibly even be limited to purchases from agro-dealers.

- **E-value proposition:** This arrangement provides users with a real-time LoC. Although users must temporarily tie-up money in an interest-bearing account, they are able to borrow a greater amount giving them 'net leverage.'
- **Example:** In 2012, Safaricom partnered with Commercial Bank of Africa (CBA) to launch M-Shwari, a micro savings and loan product linked to M-Pesa in Kenya. Registered M-Pesa users can establish an account online and then transfer money between M-Pesa and M-Shwari accounts. Balances within M-Shwari earn two to six per cent interest, depending on balance and willingness to lock up funds. Some users can also access a short-term LoC. There is no formal interest rate, but there is a 7.5 per cent facilitation fee for a loan that is due in 30 days. A consumer that wants to extend the term another 30 days has to pay an additional 7.5 per cent fee. LoC eligibility requires submission of a national ID. CBA's credit decision uses Safaricom data, such as age of account, airtime patterns, and repayment of short-term airtime credits. Low-income borrowers have been less successful at obtaining loans because risk is twice that of the general population. With help from FSD Kenya, CBA tailored their risk models to identify a credit worthy low-income segment. [11]
- **Digital liquidity impact:** The BoP needs frequent, quick access to short-term credit in general and to avoid cash-in and cash-out requirements. A savings-based LoC provides this type of solution. However, this solution requires an ability to save money to build lender trust. That may be too difficult for the BoP.
- **Other issues:** This is a complicated product requiring financial and mobile literacy. Registration also involves agreeing to terms and conditions, and acknowledging data privacy conditions. M-Shwari handles these agreements via the web. This may be difficult to achieve in a purely mobile environment.

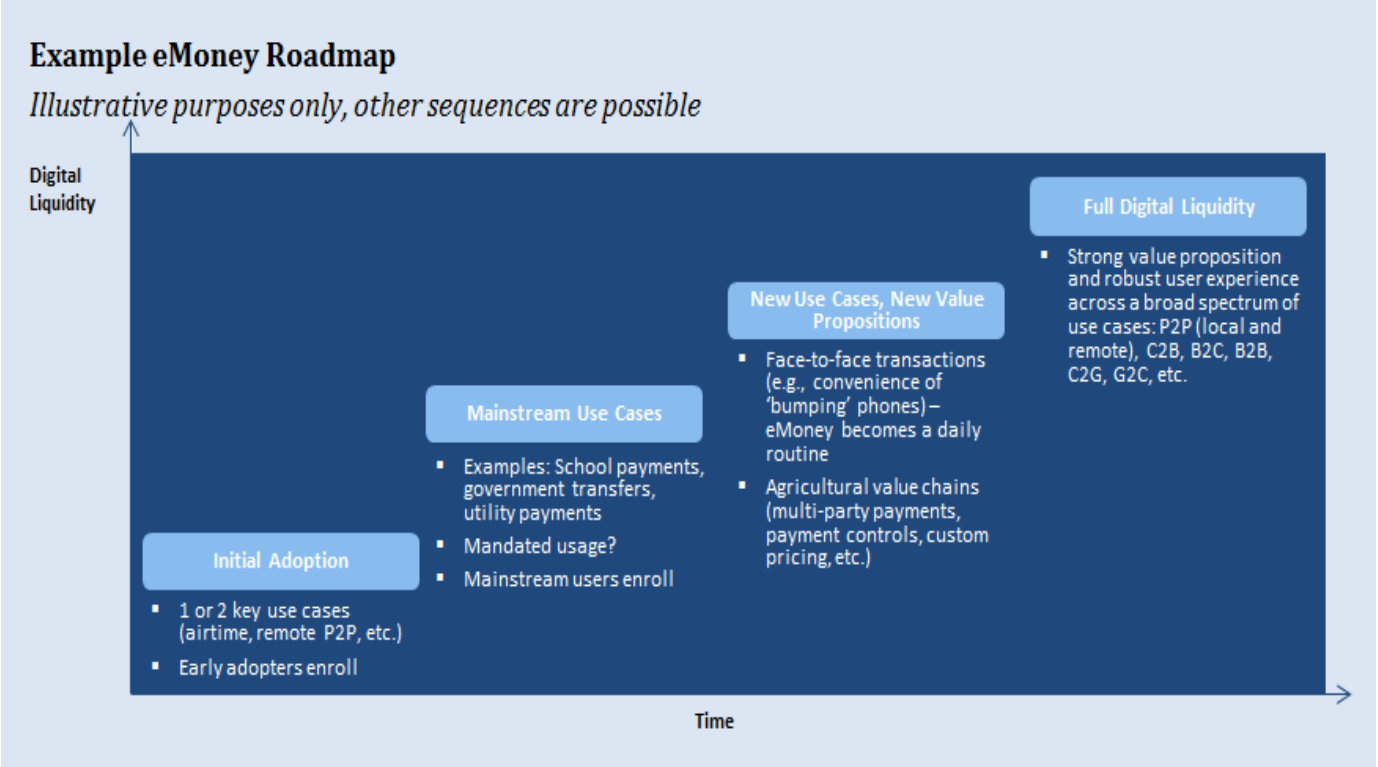
11 COOK, TAMARA, AND CLAUDIA MCKAY. 2015. HOW M-SHWARI WORKS: THE STORY SO FAR. FORUM 10. WASHINGTON, D.C.: CGAP AND FSD KENYA. LICENSE: CREATIVE COMMONS ATTRIBUTION CC BY 3.0

5 Policy Considerations

As noted, this report explores whether eMoney in agricultural value chains can accelerate digital liquidity. This topic should interest strategists and policy makers developing eMoney roadmaps relying on various use cases (value chains, school payments, etc.).

Value chains are just one use case for furthering digital liquidity. Accordingly, strategists and policy makers should focus on the overall goal of digital liquidity and evaluate a range of use cases (including value chains) when creating a roadmap.

Figure 12 – Example of eMoney roadmap



With that in mind, the authors recommend strategists and policy makers consider the following issues:

- Understand where your constituents are within the eMoney journey and identify primary barriers to further adoption. Barriers could include poor mobile coverage, mobile money fees, interoperability issues, poor agent coverage, lack of compelling use cases, awkward user experiences, and limited merchant acceptance, among other reasons.
- Determine the most appropriate interventions and/or use cases to further drive adoption.
  - Are value chains a good fit? Do tight value chains exist to any significant degree within the planner's region? Is there an eMoney value proposition stakeholders will care about (reduction in theft, safety, lending opportunities, etc.)?
  - Are other use cases more appropriate? For example, would school payments or government transfers (e.g., fertilizer subsidies) be more appropriate because of wider reach or alignment with other priorities?
  - Can use cases be sequenced to better balance eMoney receipts and uses? As individuals receive eMoney, they need a near-equivalent opportunity to use that eMoney for schools, groceries, loan repayments, and other expenses. Without an equal opportunity, users must cash-out (or cash-in).

- Make eMoney work within targeted use cases. The solution must be robust and tailored to the use case. Ultimately, the eMoney option must be better than cash for all influential stakeholders. Design considerations include:
  - defining a 'complete solution' (ancillary services like contract management, layaway programs, etc.);
  - user experience of key stakeholders (consumers, small merchants, large institutions, agents, etc.);
  - front-end and back-end functionality (user interface, reporting, integration with accounting systems, etc.);
  - pricing that makes economic sense;
  - training and educational requirements.