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SMALLHOLDER DIARIES

Building the Evidence Base with Farming Families in Mozambique, Tanzania, and Pakistan

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EXECUTIVE SUMMARY

CGAP

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EXECUTIVE SUMMARY

How do small-scale agricultural producers manage their money, and what do their strategies tell us about their need for financial tools? Smallholder households, cultivating approximately two hectares (five acres) or less, present one of the most challenging client segments for financial service providers (FSPs) due to three unique aspects of their financial lives: (*i*) their income from agricultural production is often erratic and infrequent; (*ii*) their required investments can be significant and must be made at specific times of the year; and (*iii*) their risks, whose incidence and covariance across the agricultural sector can be difficult to mitigate. In addition, their financial needs extend beyond agricultural production to a variety of nonagricultural, off-farm enterprises. Like any family, smallholder households also need a range of financial tools to meet regular expenses, respond to emergencies, and finance milestones such as weddings and funerals. Furthermore, improvements to the financial portfolios of smallholder households represent only one contribution to their overall well-being, and major challenges related to health, infrastructure, and education persist.[1]

CGAP launched the year-long Financial Diaries with Smallholder Families (the "Smallholder Diaries") to elucidate the financial lives of smallholder households and build the evidence base on this important client group. The study, conducted between June 2014 and July 2015, captured the financial and in-kind transactions of 270 households in impoverished northern Mozambique, the fertile farmlands of western Tanzania, and the Punjab province, the breadbasket of Pakistan. Nearly all adults in the Smallholder Diaries sample were born into farming households. They began working in agriculture at a young age and self-identified as being part of an agricultural household. When the Smallholder Diaries began, participants indicated that their agricultural activities were their most important sources of income. The data, however, told a more nuanced story.

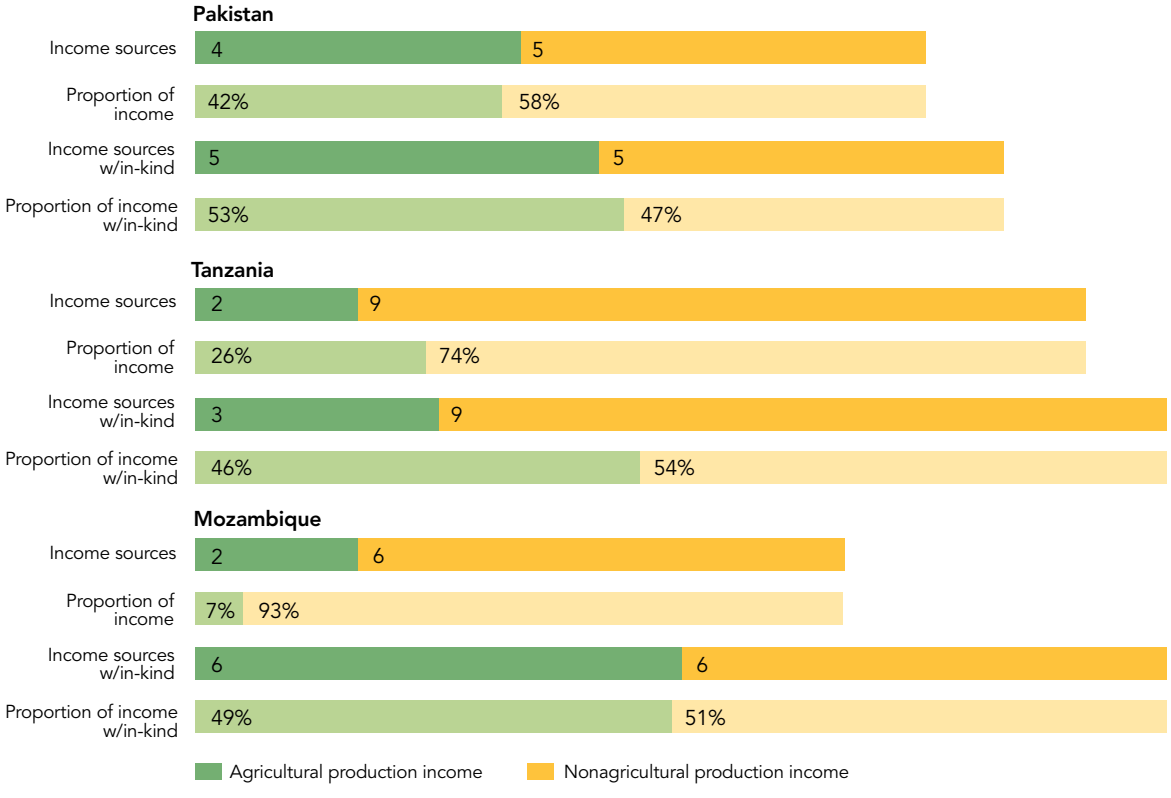
The Smallholder Diaries provide a deep view of how smallholders are affected by the agricultural cycle and manage their money in response to its ebbs and flows, as well as point to ways that FSPs might better meet smallholders' needs. While the Smallholder Diaries methodology and sample size are not statistically representative of all smallholder families in a given country, the findings from the Smallholder Diaries have global implications for the smallholder household sector. The sample of smallholder households from each study country has characteristics that are broadly representative of the types of smallholder segments identified in countries around the world, which presents an opportunity to discuss the types of financial tools that these segments demand regardless of their location.

Income sources and the role of in-kind consumption

Smallholder Diaries families had numerous sources of cash income, which tended to fall into three categories: (*i*) agricultural production, (*ii*) casual labor (often related to agriculture), and (*iii*) other off-farm, nonagricultural sources such as managing a small business, receiving remittances, or engaging in regular or waged employment. At the median, households had a total of eight income sources in Mozambique, 11 in Tanzania, and nine in Pakistan (see Figure ES-1).[2] Much of their casual labor was on neighboring farms, and thus still linked to agriculture. In the Tanzania sample, more than half of the income sources classified as casual labor was related to agriculture.

Families in the Smallholder Diaries also earned the majority of their household net cash income from their numerous nonagricultural production activities. Among the sample families, the median proportion of household cash income from nonagricultural production sources was 93 percent in Mozambique, 74 percent in Tanzania, and 58 percent in Pakistan (see Figure ES-1).

FIGURE ES-1: Smallholder Diaries: Household income from agricultural and nonagricultural production
JUNE 2014–JULY 2015



(1) Median number of household income sources
(2) Median proportion of total household net cash income
(3) Median number of household income sources, factoring in in-kind consumption
(4) Median proportion of total household income factoring in in-kind consumption

Note: Each crop or livestock byproduct (e.g., milk, eggs) that was sold at least once in the Smallholder Diaries is considered a distinct source of agricultural production income. When tracking in-kind consumption, the Smallholder Diaries recorded only activities or transactions related to crops, not livestock byproducts.

But focusing only on cash income underplays the importance of agriculture to smallholder households. The relative importance of agricultural production income increases markedly when household consumption of crops is included in the analysis (see Figure ES-1). In the sample in Tanzania and Pakistan, the median proportion of household income derived from crop production increased from 26 percent to 46 percent and 42 percent to 53 percent, respectively, when also considering in-kind consumption. But the difference is most dramatic in Mozambique, jumping from 7 percent to 49 percent.

Patterns of agricultural production and sales

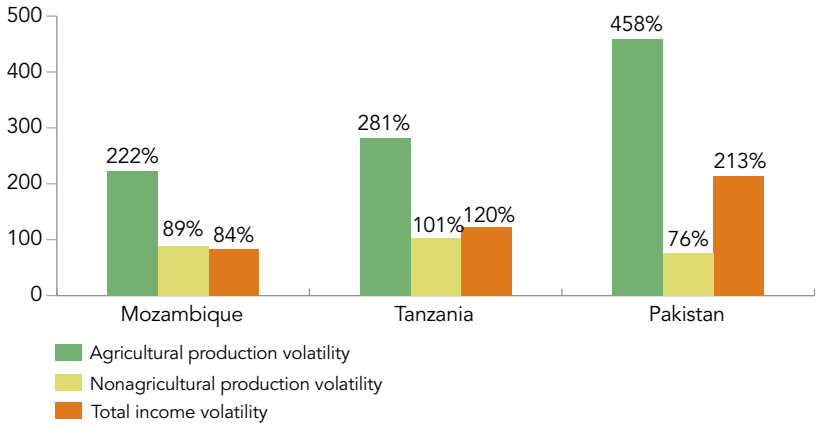
The degree to which smallholders sold their production and the pace of this monetization varies sharply across the three country samples. This echoes the segmentation framework proposed by CGAP that differentiates among (*i*) noncommercial smallholders, (*ii*) commercial smallholders in loose value chains, and (*iii*) commercial smallholders in tight value chains according to what they grow, how they engage with markets as buyers and/or sellers, and how those markets are organized (Christen and Anderson 2013). If and how smallholder households consume or sell their crops and the nature of their connections to value chains, for example, have important implications for the roles that financial tools can play in their lives and how they are tailored to household circumstances.

- **Smallholder families in the Mozambique sample were "net consumers" of their agricultural production** (i.e., they consumed more of their agricultural output than they sold). These were largely noncommercial smallholder households, with limited sales of crops and livestock. And many households did not sell anything over the entire year of data collection. They were able to consume smoothly what they produced, but they were unable to do much else with their harvest. They did not sell their crops for the cash needed to buy other foods, diversify their diet, or meet other household needs.
- **Smallholder households in the Tanzania sample were "net sellers" in loose value chains** (i.e., they sold more of their agricultural output than they consumed). These households typically had one major harvest of a cash crop (e.g., rice, potatoes) each year, which would typically be sold for cash to village-level agents and/or larger aggregating buyers. A few sold direct to market as well. Overall, sales of their agricultural production were fairly lumpy (i.e., they occurred in distinct periods over the year, not continuously) and spiked during the main harvest. Households also stored crops, consuming some proportion of some of them over time, and monetizing them when they needed cash.
- **Smallholder households in the Pakistan sample were net sellers in tight value chains,** consuming an even smaller proportion of their production than in the Tanzania sample. After each major harvest in November and in May, they were usually obliged to sell their output immediately back to the middleman to repay debts for the costly agricultural inputs they had financed.

Relationships between income volatility and agricultural production

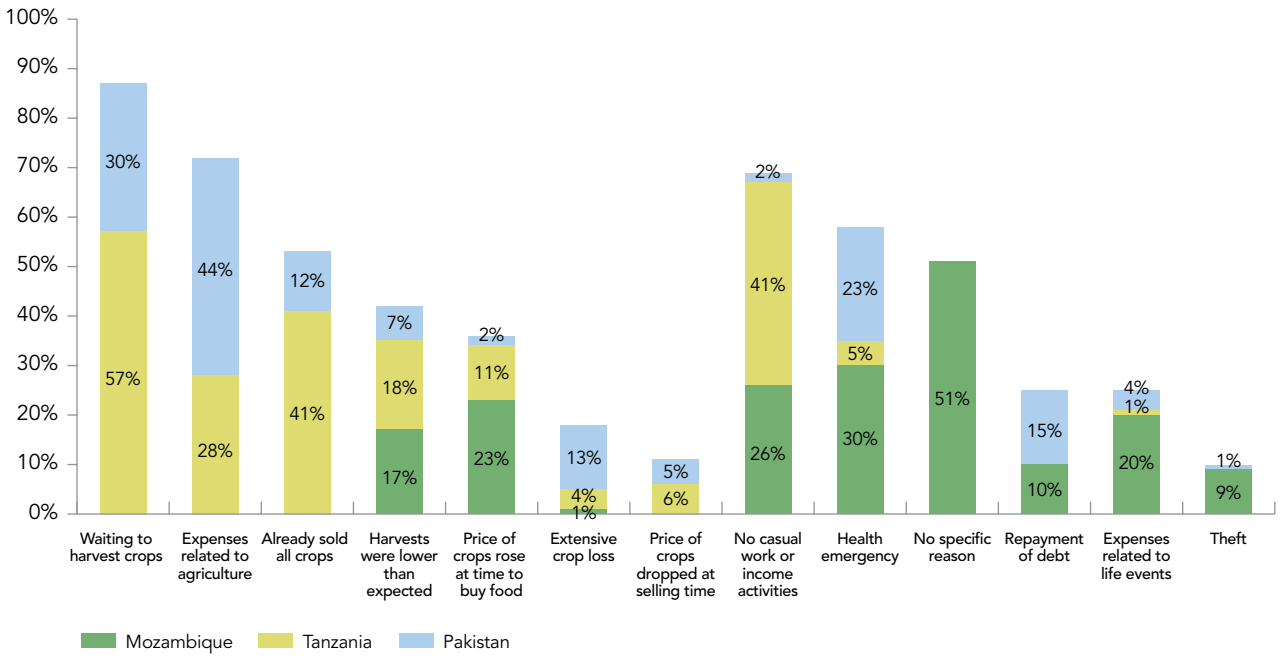
Agricultural production income was markedly more volatile than other sources of income in all three samples, and a household's overall income volatility depended on the balance between agricultural production and nonagricultural production income (see Figure ES-2). The wide range of income sources outside of crop and livestock production did dampen the effects of the agricultural cycle on the sample households, but only to a point. The volatility of agricultural production and its inherent risks still exerted a strong influence over the financial lives of smallholders. In terms of household finances and health, respondents in all three countries struggled most in the months between harvests. Furthermore, smallholders most often pointed to agriculture as causes of financial hardship, citing reasons such as "waiting to harvest crops" and "expenses related to agriculture" (see Figure ES-3).

FIGURE ES-2: Volatility of income: median standard deviation of monthly income relative to average monthly income, JULY 2014– JUNE 2015[a]



a. Relative standard deviation of income = (Standard deviation of monthly income * 100)/ Average monthly income Standard deviation of monthly income represents the amount by which a household's income deviates from the average monthly income of that household

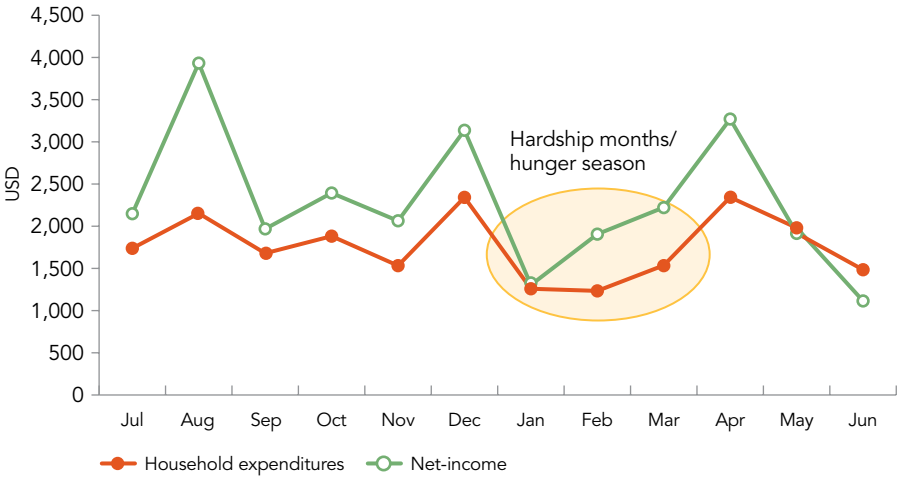
FIGURE ES-3: "[In the months when the family struggled most with money] what happened to cause this difficulty?"
Multiple responses allowed; percentage of household



For the sample in Pakistan, month-to-month net income from agricultural production was highly volatile (458 percent relative to average income). It swung from lows well below zero, when there were major expenditures on inputs, to significant highs, when they sold their output immediately after harvest. In the Mozambique sample, given the low level of crop sales and high reliance on other sources of cash income, families experienced less severe fluctuations in overall income.

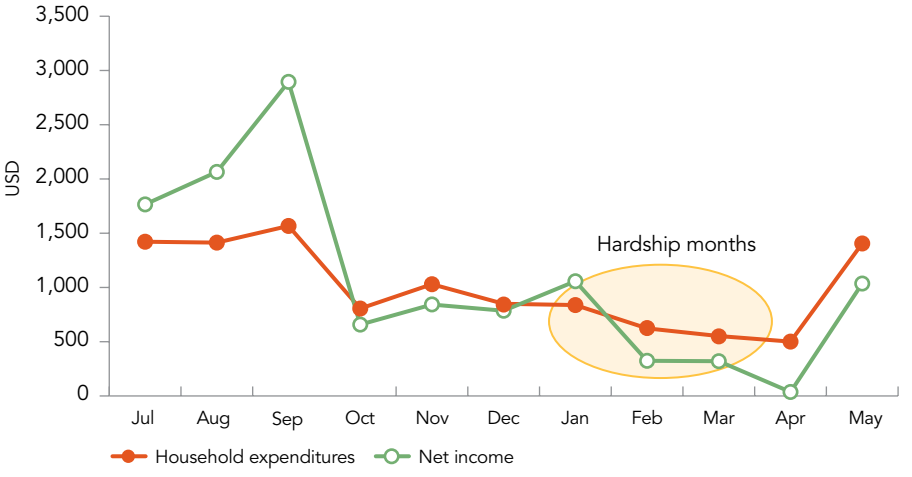
Expenses were smoother than income, but still fluctuated to some extent with income in all three samples. In Mozambique and Tanzania, sample households tended to spend money as it came in, with expenses more closely tied to cash income (i.e., a "spend-as-you-go" expenditure pattern) (see Figures ES-4 and ES-5). The Pakistan sample experienced the largest swings in income,

FIGURE ES-4: Mozambique Smallholder Diaries: Net income and household expenditures all sample level, JULY 2014–JUNE 2015 (US$)[a]



a. The green income line refers to net income. For agricultural production, and small businesses in particular, income refers to revenue less related expenditures. The red expenses line refers to operational expenses of the household separate from income or financial transactions (e.g., spending on groceries, clothes, education, transportation).

FIGURE ES-5: Tanzania Smallholder Diaries, rice production village: Net income and household expenditures all sample level, JULY 2014–MAY 2015 (US$)[a]



a. The green income line refers to net income. For agricultural production, and small businesses in particular, income refers to revenue less related expenditures. The red expenses line refers to operational expenses of the household separate from income or financial transactions (e.g., spending on groceries, clothes, education, transportation).

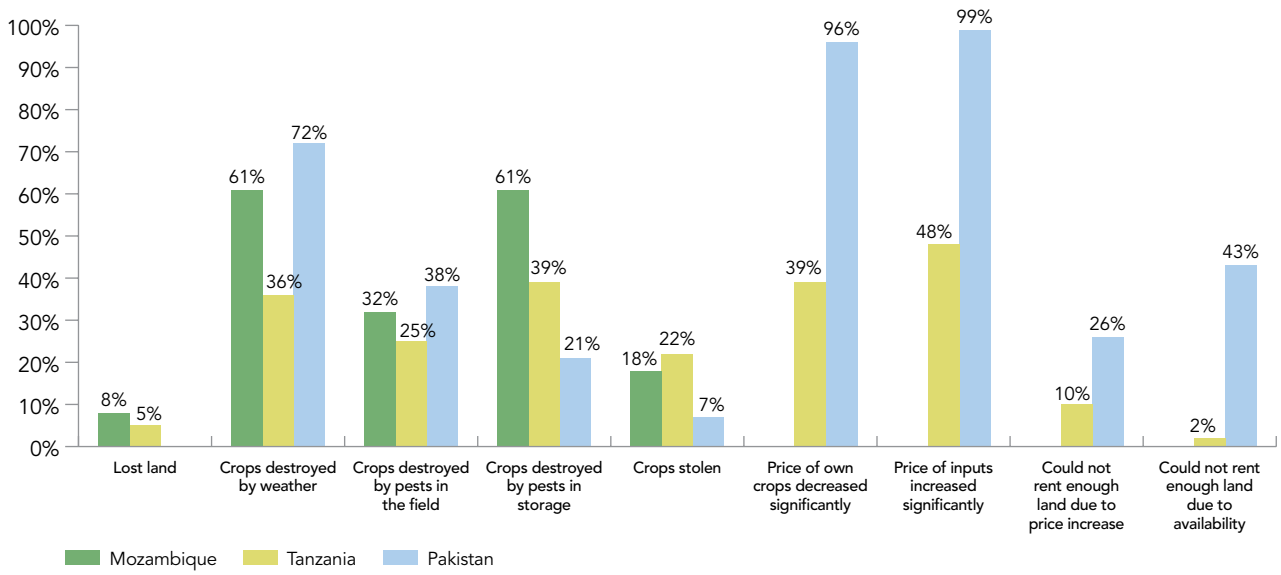
but they were able to maintain a consistent level of expenditures thanks to their greater access to credit options.

Risk mitigation and coping strategies

Less commercialized smallholders experienced more production-related shocks, such as bad weather, drought, and pests, while more commercialized households faced greater market-related ones, such as fluctuations in input and crop prices. These challenges came on top of the shocks commonly experienced by households (e.g., sickness, death of a family member, job loss).

- **In the largely noncommercial Mozambique sample, production risks were paramount, largely because the sample was not engaged in markets.** Households in the Mozambique sample needed to store their harvest for many months to cover their own food consumption and relied on bags kept in the house for crop storage. But their stored crops were vulnerable: nearly two-thirds of sample households had lost crops while in storage (see Figure ES-6). Improvements in post-harvest handling and crop storage would better preserve their agricultural production and maintain its value as both food and a form of savings.
- **The sample in Tanzania, largely commercial smallholders in loose value chains, experienced the full spectrum of agricultural shocks, both production and market related,** though at somewhat lower levels than the other two samples. Over one-third of the sample had experienced significant crop loss due to weather shocks (36 percent) and pests (39 percent) and decreases in the prices for their own agricultural production (39 percent). This range of risks calls for a variety of mitigating mechanisms, involving both agricultural techniques and financial tools.
- **For commercial smallholders in Pakistan embedded in tight value chains, market risk was more pressing than production risk.** Virtually every household was affected by increases in the price of inputs and decreases in the pur-

FIGURE ES-6: Households that experienced selected agricultural shocks at least once in the past five years, JULY 2015 (Percentage)



chase prices for their agricultural production. A wider range of potential buyers and more financial tools to mitigate these risks could be beneficial.

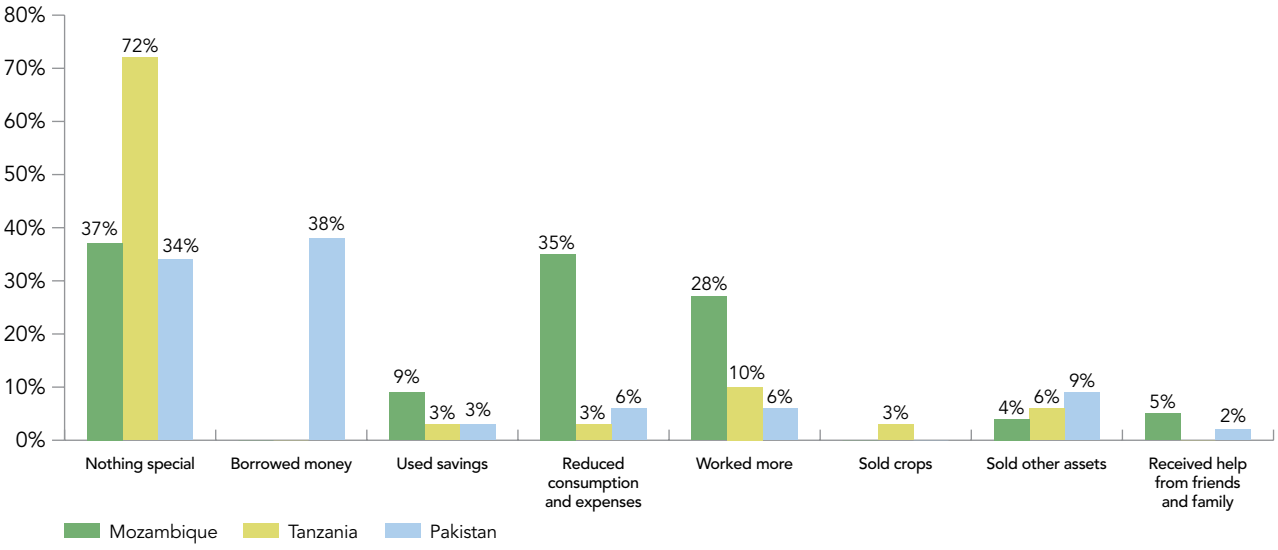
Many Smallholder Diaries households had no specific response to an agricultural shock, signaling a lack of tools with which to cope. The differences between the samples revealed varying degrees of access to financial tools and safety nets, as well as their degree of market engagement. When their crops were destroyed by weather, for example, many Tanzanian households in the Smallholder Diaries sample did nothing (72 percent), reflecting an apparent lack of perceived fallback options (see Figure ES-7). When the sample in Pakistan faced the same situation, some smallholder households borrowed money (38 percent); about one-third also had no specific coping response (34 percent).

Household financial portfolios

The degree to which Smallholder Diaries households could sustain their consumption levels and cope with shocks during lean periods between harvests depended heavily on the range of tools in their financial portfolios.[3] Most Smallholder Diaries households had access to only a thin scattering of informal financial tools—borrowing from friends and family, credit from a store or agent, saving at home or with a money guard—and each mechanism had its limitations (e.g., amount available, proximity, timing). Use of formal financial tools and digital finance remains limited. Households knew when to anticipate cash flow problems from past experience, but they lacked the financial tools to effectively and sufficiently smooth their consumption.

- **Smallholder households in the Mozambique sample used only three financial instruments at the median.** Their very narrow financial portfolio was mostly limited to savings at home and only a fraction of the Mozambique sample was engaged in informal savings and credit groups: 12 percent used rotating savings and credit associations (ROSCAs), 9 percent used accumulating savings and credit associations (ASCAs), and 5 percent used a money guard to save.[4] Though almost half had a mobile phone (45 percent) and some had

FIGURE ES-7: Households that used these coping mechanisms when crops were destroyed by weather
(Percentage, multiple answers allowed)



heard of mobile money products (21 percent), use of mobile money was nonexistent. With limited savings and credit options, sample households looked to casual labor to get through the hunger season, though the timing of this income did not always match the timing of their needs and it was insufficient to carry families through this difficult period.

- **At the median, smallholder households in the Tanzania sample used 12 different financial tools.** They relied most heavily on current income and short-term savings for both farming and nonfarming expenses. The sample also used stored crops as a kind of "term deposit": 21 percent considered crop storage their most important form of savings, with crops tending to gain "interest" as the price increases over time. Those who borrowed had a number of small loans with informal groups and from those in their social networks, and many found casual work to generate income when they needed cash. Almost everyone in the sample had heard of mobile money (98 percent), but only 19 percent had used it to store money or send and receive money. Many of the Tanzanian respondents planned strategically to make investments in their farm, but with few opportunities to borrow, most relied heavily on short-term savings, including crop storage, and earnings from casual labor to buy agricultural inputs.
- **Working with the broadest, most robust financial portfolio, the sample of smallholder households in Pakistan used 18 financial tools at the median.** Households used various forms of credit to get through the months when spending on agricultural inputs was high and revenue from farming was low. The great majority of smallholders in Pakistan had heard of mobile money (82 percent), but no families used it during the Smallholder Diaries study. However, 57 percent said they would likely use it to send or receive money, indicating an aspiration to use the service.

Access to mobile phones and use of digital financial tools

The limited capability of the Smallholder Diaries sample to send and receive SMS texts points to a crucial gap between basic access to a phone, which itself remains a barrier, and the ability to perform financial transactions with it. The majority of respondents among the sample in Pakistan and Tanzania owned a mobile phone (70 percent and 56 percent, respectively), but less than half of the respondents in Mozambique did (45 percent) (see Table ES-1). In fact, only 55 percent of the Mozambican respondents had used a phone at all in the prior year. Among the sample that had access to a mobile phone, the ability to do relatively more complex tasks was limited: 68 percent in Tanzania knew how to send and receive an SMS text, but this dropped to 25 percent in Mozambique and 24 percent in Pakistan.

Use of digital financial tools in the Smallholder Diaries sample was very limited (and only in the Tanzania sample), despite varying levels of awareness of and aspiration to use these tools. General awareness of mobile money (defined in this study as a transfer of funds using a mobile wallet) as a financial tool ranged greatly across Smallholder Diaries respondents, from a low of 21 percent in the Mozambique sample to near complete awareness among the sample in Tanzania (see Table ES-1), which is expected given the strength of the

TABLE ES-1: Mobile phones and mobile money among Smallholder Diaries households (percent),[a] NOVEMBER 2014

	MOZAMBIQUE	TANZANIA	PAKISTAN
Access to mobile phones and use of mobile money			
Had a mobile phone	45	56	70
Had a SIM card	48	56	65
Other household members had a mobile phone	38	43	21
Other household members had a SIM	57	35	22
Had used a phone, even a borrowed one, in the past year	55	77	73
Had heard of mobile money	21	98	82
Selected "Mobile money" as one response when asked "What would you likely use to send or receive money?" (multiple answers allowed)	0	74	57
Had used mobile money (for transfers and transactions on a mobile wallet based on actual cash flows from June 2014 to June 2015)	0	19	0
Self-reported capability with mobile phones			
"I cannot initiate or receive a call, or send or receive an SMS."	0	3	1
"I can only receive calls."	45	9	7
"I can only dial and initiate calls."	2	0	19
"I can dial and initiate calls and receive calls."	27	15	37
"I can dial and initiate calls, receive calls, and send and receive SMS."	25	68	24
"I can dial and initiate a call, receive calls, send and receive SMS, and access the internet."	0	1	7

a. Responses are from a Smallholder Diaries module administered to the most economically active member of the sample household.

Tanzanian digital infrastructure. This was reflected in the perception of mobile money among the sample as a financial tool relevant to their needs. When asked what financial mechanisms they might use to send or receive money, "mobile money" was selected as one answer by almost three-quarters of the sample in Tanzania and more than half of the sample in Pakistan. Yet, despite its perceived relevance, only 19 percent of Smallholder Diaries families in Tanzania used mobile money and no smallholder households in either the Mozambique or Pakistan sample used mobile money at all.

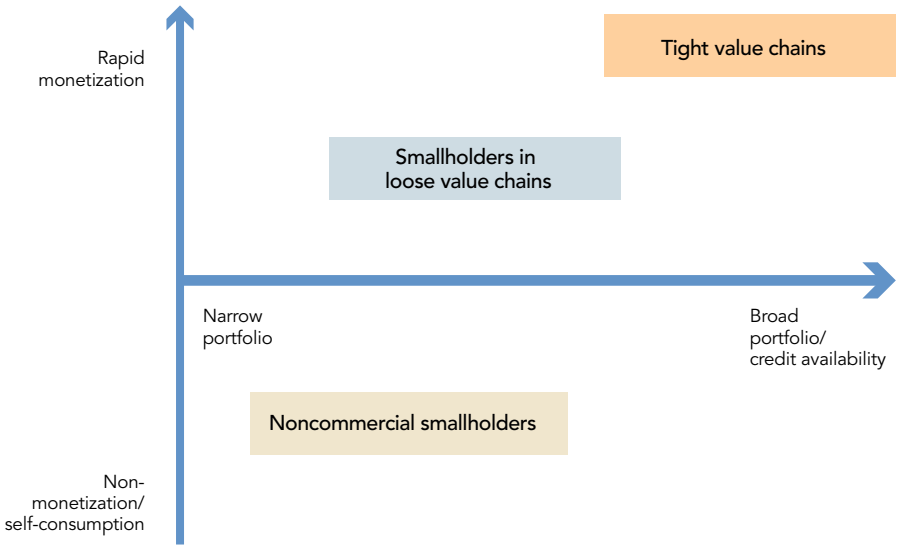
Considering the potential of digital financial services (DFS) to serve smallholder households in areas that traditional brick-and-mortar FSPs have failed to reach, DFS remain important tools to explore and expand for purposes of financial inclusion, and they must be carefully targeted to each customer profile. Digital savings and credit products could provide more compelling use cases than payments, as many households in the sample lacked access to even informal financial services such as savings groups. Additionally, some smallholders may be well-served by digital payment services that facilitate transactions such as bill payments and school fee payments (i.e., person-to-business [P2B] and person-to-government [P2G] payments), though smallholders may prefer over-the-counter (OTC) payment methods over self-initiated mobile transactions from their own wallet.

Implications for financial solutions: Translating the evidence into financial tools tailored to each smallholder household profile

The Smallholder Diaries explored the relationship between the level of agricultural commercialization and the breadth of financial portfolios in each country sample, and relevant financial tools must address the unique challenges and needs of each of these general profiles of smallholder households (see Figure ES-8).

- **Noncommercial smallholders in the Mozambique sample had a very narrow portfolio of financial tools.** Advances in their financial inclusion will likely emphasize savings and layaway products,[5] through digital channels where possible, and the better management of agricultural mechanisms of finance such as crop storage as opposed to pure, standalone credit products. Improved agronomic practices and better agricultural risk management (e.g., post-harvest storage, water catchment, drought-tolerant crop varieties) are also important. Larger buyers and agricultural processors would need to bundle a meaningful package of agronomic support with financial tools to reach more smallholders in this profile. Additional financial tools to help families store and stretch the small amounts of income earned on a daily basis would also be beneficial, especially as a type of safety net during the hunger season.
- **Smallholders in loose value chains in the Tanzania sample need greater capacity to store money across a diverse set of savings instruments, as well as access to higher levels of credit to make desired investments in agricultural production.** Overwhelmingly, the Smallholder Diaries sample in Tanzania kept its savings in-kind or under the mattress, presenting a clear opportunity for FSPs to offer more avenues to store money. A deeper under-

FIGURE ES-8: Three smallholder profiles based on degree of agricultural commercialization and breadth of financial portfolio



standing of the dynamics of household cash flows in this profile could also provide comfort to both FSPs and borrowers alike by demonstrating that certain forms of agricultural lending may not be as risky as previously perceived, or that they are at least mitigated by other less volatile sources of income outside of agricultural production. Relatively higher-income (or somewhat less poor) households like those in the Tanzania sample can also more successfully postpone crop sales to wait for a better price or purposefully use their stored crops to "save" for a lump sum of money. Closer connections to buyers and aggregators in the value chain could also benefit this profile. In a country with a robust digital infrastructure like Tanzania, these relationships and services could be enabled via digital channels. Such services could facilitate the creation of purchase agreements or formal contracts, for example, against which smallholders could borrow for fertilizer, an oft-cited need among the Tanzania sample households.

- **Smallholders in the relatively tight value chains in the Pakistan sample need financial tools that facilitate their relationships with middlemen, as well as a range of other mechanisms to reduce their dependence on them.** The sample in Pakistan faced major agricultural spending at the beginning of each season and relied on one major buyer to finance these inputs and also purchase their production. Their longstanding connection to these middlemen did facilitate a range of other financial services, including holding savings and financing family milestones and emergencies, and allowed them to refinance and bounce back after a bad harvest. But the general terms of their agreement required repayment immediately after harvest, forcing smallholders to sell when prices were lowest. In efforts to create a paper trail of transactions and purchase agreements to improve the transparency of these relationships, as well as build a credit history of interest to formal financial institutions, digital solutions could play a role. Over time, such a system could help smallholders find alternatives to middleman as sources of credit, thereby allowing them to wait longer to sell their agricultural production at higher prices. To compete, however, other service providers would need to emulate the flexibility and proximity of middlemen while offering improved terms. FSPs might also focus on middlemen as a market in need of expanded financial tools.

NOTES

1. See Cuevas and Anderson (2016) for a discussion of smallholders in poverty statistics and their role in food security and financial inclusion. [Cuevas, Carlos E., and Jamie Anderson. 2016. "Understanding Demands, Driving Innovation: Smallholder Households and Financial Services." Working Paper. Washington, D.C.: CGAP.]
2. The several income sources identified by the Smallholder Diaries are defined in Annex 2 of the full paper. Note that households may have multiple types of the same income category (e.g., income from cultivation of four crops, wages from casual labor on two different jobs). Each individual income source is counted and tracked separately.
3. The financial tools (or instruments) identified by the Smallholder Diaries are defined in Annex 3 of the full paper. Note that there may be multiple, distinct uses of each type of financial tool in Smallholder Diaries households (e.g., participation in two savings and credit groups, informal credit at three different stores). Each individual financial tool is counted and tracked separately.
4. ROSCAs are informal savings groups in which members generally combine their savings together at regular, recurring meetings and take turns giving the entire pot to one member. ASCAs are somewhat more complex informal savings groups. They allow members to build up savings over time, lend the group fund to one another, and accumulate interest. A share-out typically occurs once a year when members divide the savings and earned interest among the group.
5. In a layaway purchase agreement, a retailer holds merchandise secured by a deposit until it is paid in full by the customer, usually through a series of payments over time.

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