

# Opportunities for Digital Financial Services in the Cocoa Value Chain CÔTE D'IVOIRE

Insights from New Data

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## Acknowledgement

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# Executive Summary

Managing money can be particularly challenging for farmers since they receive the majority of their income during the harvest and this needs to cover their expenses for the rest of the year. To understand better the farmers' cash flow challenges and the ways that digital financial services could help alleviate some of the burden, IFC has undertaken research into the financial lives of cocoa farmers in Côte d'Ivoire. The World Bank Group is committed to enabling the financial inclusion of one billion people by 2020. Helping cocoa farmers accessing digital accounts is part of meeting that global goal.

Most cocoa farmers in this study had relatively high annual incomes, well above the statutory minimum wage, but very few (six percent) had bank accounts. The main reason for this was neither access to nor the cost of banking, but the perception that "banks are not for them". Most cocoa farmers appear to see banks as "for the rich" and thus not a relevant option for them. However, the various DFS offered by the Ivorian mobile network operators<sup>1</sup> appear not to have such constraints, and they have a high level of adoption (53 percent) among cocoa farmers. The DFS sector in Côte d'Ivoire is successful and continues to grow: and interestingly, usage of DFS in rural areas (26.0 percent) is even higher than in the cities (22.6 percent).

Cocoa farmers receive the majority of their income during the main harvest, supplemented by a smaller amount in the secondary harvest. This money has to cover all expenses throughout the year, including not only regular living expenses but also planned irregular expenses as well as any unexpected financial shocks. Some farmers are better than others at stretching income across the year, and, notably, this financial acumen does not appear to be related to the amount that they actually earn. We found that farmers who save money, either formally or informally, are better able to feed their families throughout the year than those who do not save, irrespective of income.

A substantial minority of farmers save (35 percent), but the most common ways to do so are informal storage of money at home (36 percent) or in simple mobile money accounts operated by an MNO (20 percent). Only 20 percent of farmers had a remunerated savings account at a bank or other financial institution. Some farmers reported borrowing money (15 percent), but, as with savings, this is done mainly informally, from friends and family (54 percent of borrowers), with only 11 percent of borrowers using a financial institution. These loans are more likely to be used to help with emergencies and regular household expenses (70 percent) than for planned events such as buying agricultural inputs (7 percent) or school fees (15 percent).

It is clear that encouraging good financial practices, by providing easily accessible remunerated savings, and enabling the associated credit scoring to support formal lending, would be of great benefit to many cocoa farmers. These services are more likely to have high adoption levels if they are delivered by DFS, because of convenience, acceptance, and the current widespread usage of DFS by farmers for more basic transactions. Farmers' willingness to try new kinds of financial services as alternatives to cash was well demonstrated, with an overwhelming majority (73 percent) responding that they would like it if their cooperative paid them for the harvest digitally.

There are several types of DFS that may be used to service cocoa farmers' latent demand for financial services, for example by expanding the range of services offered by mobile money providers (possibly in partnership with banks or microfinance institutions). These partnerships are being promoted by the Government of Côte d'Ivoire in other sectors such as school-fee payments.<sup>2</sup> There is also an obvious opportunity for formal financial institutions to introduce agent banking services and suitable entry-level accounts to penetrate rural areas.

<sup>1</sup> The most popular DFS in Côte d'Ivoire are Orange Money, MTN Mobile Money and Flooz (Moov), all simple mobile money services.

<sup>2</sup> For more information on school payments via mobile money see <http://www.gsma.com/mobilefordevelopment/programme/mobile-money/paying-school-fees-with-mobile-money-in-cote-divoire>

# Introduction

Côte d'Ivoire has the world's largest cocoa sector, producing over 1.4 million metric tons of raw cocoa per year, accounting for 32 percent of world production.<sup>3</sup> These production volumes multiplied by the minimum farmer price of 1,000 CFA francs (\$1.7) per kilogram for the 2015/16 harvest could result in \$2.3 billion of harvest income paid directly to cocoa farmers.

Despite the large sums involved, nearly all of these payments are made in cash. Cash payments pose a number of problems for farmers. Harvest payments often arrive late – due to the complex logistics of cash-based payments – and it is not uncommon for the amount farmers receive to be somewhat below market value due to high commissions taken by chains of intermediary middlemen. Even if these middlemen do not take an outsized cut of farmers' payments, the cash is still subject to significant risk of theft whilst in transport.<sup>4</sup> These factors mean that the costs of transporting cash are very high. In Uganda, where risks are similar, one analysis found that agricultural businesses were spending about 10 percent of annual operating budget on covering losses – from theft or fraud—and expenses related to insuring, securing, and transporting cash.<sup>5</sup>

Cognizant of these costs and inefficiencies, many actors in the cocoa value chain are exploring alternatives. One such alternative is paying farmers through DFS. Taking advantage of recent technological developments, DFS can be used to enable a full suite of financial services to rural and farmer communities through mobile, card-based, and other e-commerce products that can be accessed through agent networks in rural areas. This research focuses specifically on mobile money accounts and discusses, first, how these have already expanded financial inclusion in Côte d'Ivoire and, secondly, how mobile money could help deliver products to cocoa farmers that meet their needs.

Extending the use of DFS for rural and agriculture purposes could bring many benefits to the entire value chain and to the daily lives of farmers. Once a DFS ecosystem becomes well developed, DFS platforms could be used to link farmers with input suppliers and agricultural buyers, facilitating transactions between all three. Some of the more basic services that DFS could provide to farmers include faster payments for harvest and easier access to savings and lending products. Eventually, DFS could be used to facilitate the provision of crop insurance to farmers, helping them not only to manage risk and protect their investments but decreasing credit risk to lenders and expanding access to credit. Mobile technology can also be harnessed to provide agricultural-extension services, sending farmers information and reminders on best practices, weather forecasts, and harvest calendars, as well as putting them in contact with horticulturalists. Additionally, at the value-chain level, the entire distribution network could be improved through e-warehousing, transportation management, and better traceability of produce or payments (see chart in Annex 1 for details of the services that could eventually be offered).

Although DFS offers an array of promising new technologies with high potential to alleviate longstanding problems in rural finance, there is little data on the actual demand for these new services among potential users. What data does exist often remains siloed or inaccessible,<sup>6</sup> leaving decision-makers with little indication of how to prioritize product innovation and marketing efforts. The limited data we do have suggests that demand for DFS can be highly context dependent: what can work in an environment like Kenya where DFS is well established might not be appropriate in a context that differs in terms of

<sup>3</sup> Food and Agriculture Organization of the United Nations (2013), FAOSTAT database. Latest available data.

<sup>4</sup> Côte d'Ivoire's recent civil war ended in 2011, and although the official post-conflict disarmament program was declared a success and brought to a close in 2015, arms still remain in the country. Rinaldo Depagne (2015), "Côte d'Ivoire: The Illusion of Stability," International Crisis Group, Brussels, Belgium.  
<http://www.crisisgroup.org/en/regions/africa/west-africa/cote-divoire/op-eds/depagne-cote-d-ivoire-the-illusion-of-stability.aspx>

<sup>5</sup> <http://www.cgap.org/blog/digitizing-agriculture-value-chains-story-so-far>

<sup>6</sup> Xavier Martín Palomas (2014), "Filling Data Gaps in Smallholder Finance," CGAP Blog, World Bank Group, Washington, DC.  
<http://www.cgap.org/blog/filling-data-gaps-smallholder-finance>

mobile money adoption rates, literacy rates,<sup>7</sup> or overall trust in the financial sector (perhaps due to a history of bank failures). In the agricultural context, different crops and value chains also provide different challenges.

In many ways, Côte d'Ivoire – with over 100 percent mobile phone penetration<sup>8</sup> and 53 percent of all mobile money transactions in the entire WAEMU<sup>9</sup> – provides a favorable environment for using DFS to promote financial inclusion. Against that background, this study had two key aims. The first was to diagnose farmers' current financial needs and identify demand for financial services – including any sources of latent demand – by looking at data on current financial behavior. The second aim was to explore ways in which DFS might be used to address some of those needs.

This study is based on a sample of 1,149 smallholder cocoa farmers who are members of six agricultural cooperatives in central Côte d'Ivoire (for details on the sampling strategy, see Annexes 2 and 3). Farmers in the sample were interviewed with a detailed questionnaire that assessed their financial needs and behavior. While not representative of all Ivoirian cocoa farmers, this sample provides a rich and detailed snapshot of farmers' individual financial behavior and demand for financial services.

The study is a knowledge product of the Partnership for Financial Inclusion, a joint initiative of IFC and The MasterCard Foundation to expand microfinance and advance digital financial services in Sub-Saharan Africa. It is organized as follows: The first section reviews the financial inclusion landscape in Côte d'Ivoire, revealing that DFS has unusually high penetration in rural areas. The second section analyzes the specific financial behavior of cocoa farmers based on new data collected by IFC, and is followed by a third section presenting a framework for how DFS could help improve farmers' lives. The report concludes with a call to stakeholders to keep piloting and innovating with products and payment channels that cater to the financial needs of rural communities in Côte d'Ivoire and beyond.

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<sup>7</sup> Low literacy in the service-interface language is widely considered to be a key barrier to adoption of mobile money services. Claire Scharwatt et al. (2014), "2014 State of the Industry: Mobile Financial Services for the Unbanked," GSMA, London, UK.

<sup>8</sup> The World Bank, *World Development Indicators* (2014).

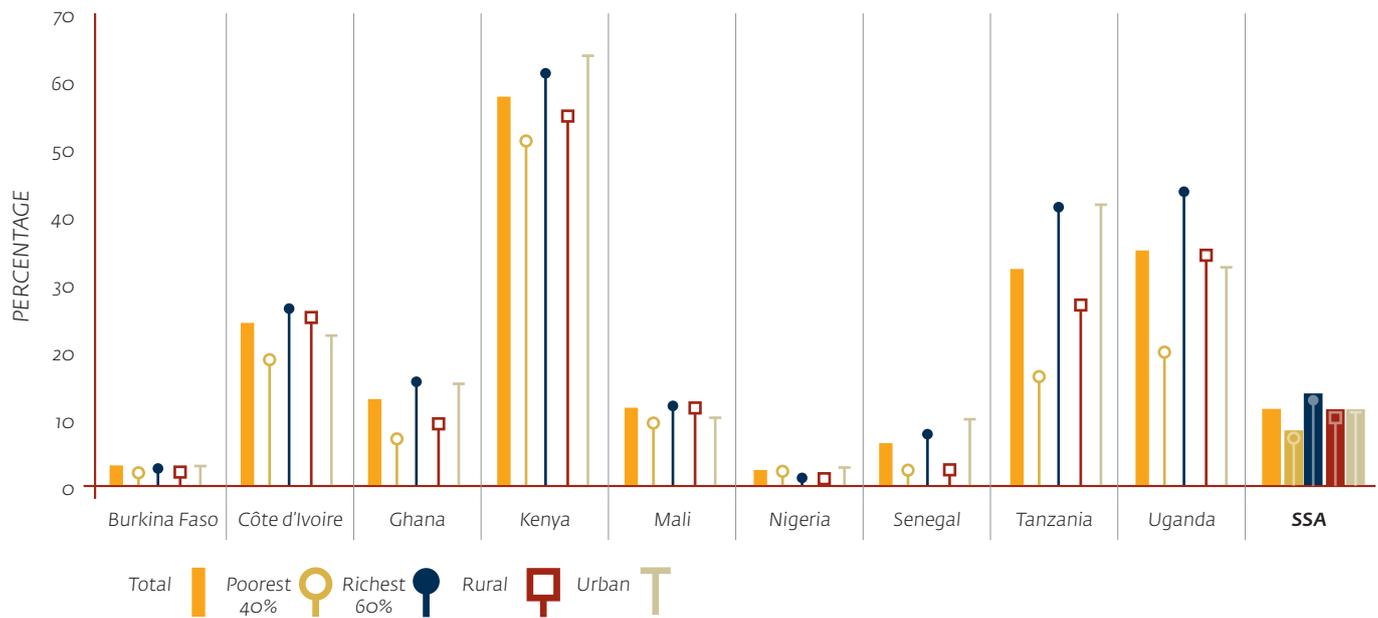
<sup>9</sup> BCEAO (2014), "Situation des services financiers via la téléphonie mobile dans l'UEMOA."

# DFS drive financial inclusion in rural Côte d'Ivoire

Although the financial access landscape in Côte d'Ivoire has been improving in recent years, the country still lags behind much of Sub-Saharan Africa in terms of financial inclusion. According to the World Bank, in 2014 some 29 percent of adults in SSA had an account with a bank or other formal financial institution, up from 24 percent in 2011.<sup>10</sup> In Côte d'Ivoire, the figure is much lower, with only 15 percent of adults having a formal account in 2014, just about half of the SSA average and an increase of only 1.7 percent from 2011.<sup>11</sup> Côte d'Ivoire thus lags far behind both in terms of the rate of formal financial inclusion and the growth rate of the formal financial sector (even as it remains one of the best performing economies in the WAEMU region).

Given this recent stagnation in the rate of formal financial inclusion in Côte d'Ivoire, the key driver of change is digital financial services provided in partnerships between banks and mobile network operators. The increase in mobile phone penetration (to 109 percent in 2015<sup>12</sup>) combined with low access to formal financial institutions has proved fertile ground for mobile money account expansion.

**FIGURE 1: MOBILE MONEY ACCOUNT OWNERSHIP IN SUB-SAHARAN AFRICA**



Source: World Bank Global Findex database.

<sup>10</sup> The World Bank, Global Findex database (2014). Latest available data.

<sup>11</sup> The trend in financial inclusion over time is difficult to track for Côte d'Ivoire, since the political crisis prevented the Global Findex team from collecting data in 2011. The 2011 data referenced is from the Central Bank of West African States (BCEAO).

<sup>12</sup> Penetration rates in excess of 100 percent indicate that some people have more than one phone number registered to their name.

Mobile money account penetration in Côte d'Ivoire is well above the average (24 percent vs. 11 percent) in Sub-Saharan Africa, and approaching levels comparable to some leading mobile money markets such as Tanzania (although Kenya remains the leading market by far at 58 percent penetration) (see Figure 1). The fact that almost a quarter of adults in Côte d'Ivoire have a mobile money account is a very positive development, and although some of these accounts are inactive,<sup>13</sup> the account activity rate in Côte d'Ivoire is substantially higher than the global average (50 percent vs. 33 percent).<sup>14</sup>

Whilst the percentage of Ivoirians with formal accounts declines as one leaves the cities and moves into the countryside (19.9 percent urban vs. 10.3 percent rural), the same is not true for mobile money. In fact, mobile account penetration in rural Côte d'Ivoire is higher than the national average (26.0 percent rural vs. 22.6 percent urban). It is not surprising that mobile money has caught on in rural areas: the existing branch network of financial institutions in rural districts<sup>15</sup> compares negatively to the existing and increasingly large network distribution of MNOs across the country. The two main MNOs in Côte d'Ivoire claimed to have over 6,000 agents each as of January 2015, while the total number of bank branches was just 600 at the end of 2014.<sup>16</sup> In some regions, such as Folon in the north, there are no bank branches at all, according to recent IFC research. In such areas, mobile money has become the de facto financial solution for farmers and rural populations, as existing banks and microfinance institutions are not meeting their needs.

<sup>13</sup> In 2014, IFC conducted research (qualitative and quantitative) on DFS users' inactivity in partnership with two local MNOs. The research revealed that almost half of DFS users registered in Côte d'Ivoire were inactive (on a 90 day basis), posing a key challenge to expanding financial inclusion. The reasons for this are several, including customers' irregular incomes, high service costs, and customers' not finding the service relevant for them. Susie Lonie, Meritxell Martinez, Christopher Tullis, and Rita Oulai (2015), "The Mobile Banking Customer That Isn't: Drivers of Digital Financial Services Inactivity in Côte d'Ivoire," IFC, Washington, DC.

<sup>14</sup> In 2015 the GSMA reported that 32.6 percent of mobile money accounts were active worldwide. GSMA (2015) "State of the Industry Report: Mobile Money" GSM Association, London, UK. IFC research found the equivalent figure for Côte d'Ivoire to be 50 percent. Susie Lonie, Meritxell Martinez, Christopher Tullis, and Rita Oulai (2015), "The Mobile Banking Customer That Isn't: Drivers of Digital Financial Services Inactivity in Côte d'Ivoire," IFC, Washington, DC.

<sup>15</sup> For example in Goh-Djiboua and Sassandra-Marahoue. Finclusion Lab (2015), "State of the Data Report: 2015" MIX, Washington, DC.

<sup>16</sup> BCEAO, 2014.

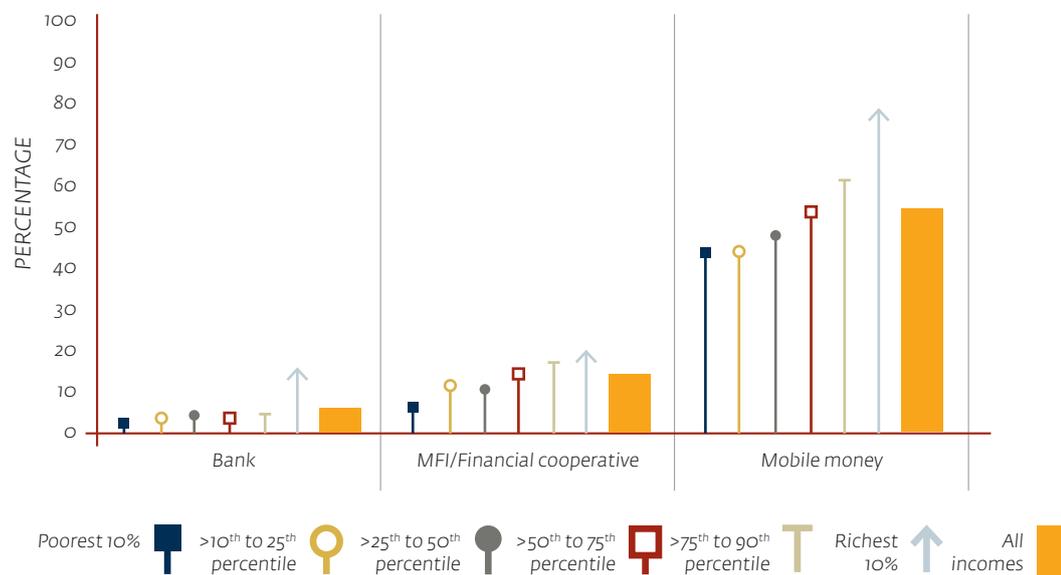
# Are Ivoirian cocoa farmers financially included?

To establish the financial needs of rural populations and better understand how financial services can be expanded in rural areas, IFC carried out research with cocoa farmers in 2013 and 2015.<sup>17</sup> In qualitative interviews, both farmers and cooperative management reported that farmers routinely have to travel long distances in bush taxis to retrieve harvest payments, which is not only very costly but also exposes them to risk of robbery and personal injury. While not representative of the entire population of Ivoirian cocoa farmers, given the meager data on rural financial inclusion in Côte d'Ivoire<sup>18</sup> the data from this study gives a unique insight into the specific needs of rural populations and can help financial institutions design effective financial products tailored to rural farmers' specific needs.

## Formal institutions

Some key messages stood out from this data. First of all, the data suggest that the farmers are less poor than the national rural population, with 42 percent of our sample living below the national poverty line (compared to 57 percent of the rural population of Côte d'Ivoire<sup>19</sup>). Using the World Bank's standard \$1.25 per day,<sup>20</sup> only 27 percent of our sample is defined as poor. Perhaps in part because they are better off than average, the farmers in our sample were also more likely to have an account at a formal financial institution than the general population, despite the fact that they are located in rural areas with little access to bank branches.<sup>21</sup> Overall, 20 percent of our sample reported having some sort of formal account, somewhat higher than the

**FIGURE 2: COCOA FARMERS WITH ACCOUNTS AT A FORMAL FINANCIAL INSTITUTION**



<sup>17</sup> In 2013 and 2015, IFC conducted research with two major cocoa exporters to understand financial habits of cocoa farmers. In total, 2648 farmers were surveyed and provided insight on their needs, habits and expectations for financial services. See Annex 2 for details.

<sup>18</sup> The BCEAO, the regional regulator, does not collect data disaggregated by rural-urban but there are initiatives underway to fill this knowledge gap.

<sup>19</sup> Côte d'Ivoire National Statistical Institute, 2014 National Household Survey (*Enquête sur le Niveau de vie des ménages*).

<sup>20</sup> The data for this report was collected before the World Bank changed the standard poverty line to \$1.90/day in 2015, and the survey instrument used to calculate poverty statistics used the pre-2015 methodology.

<sup>21</sup> The World Bank, Global Findex database (2014). Latest available data.

Ivoirian average of 15 percent. Breaking this down by type of financial institution, 6 percent of farmers had a bank account and 14 percent had an account with an MFI (including financial cooperatives) (see Figure 2).<sup>22</sup>

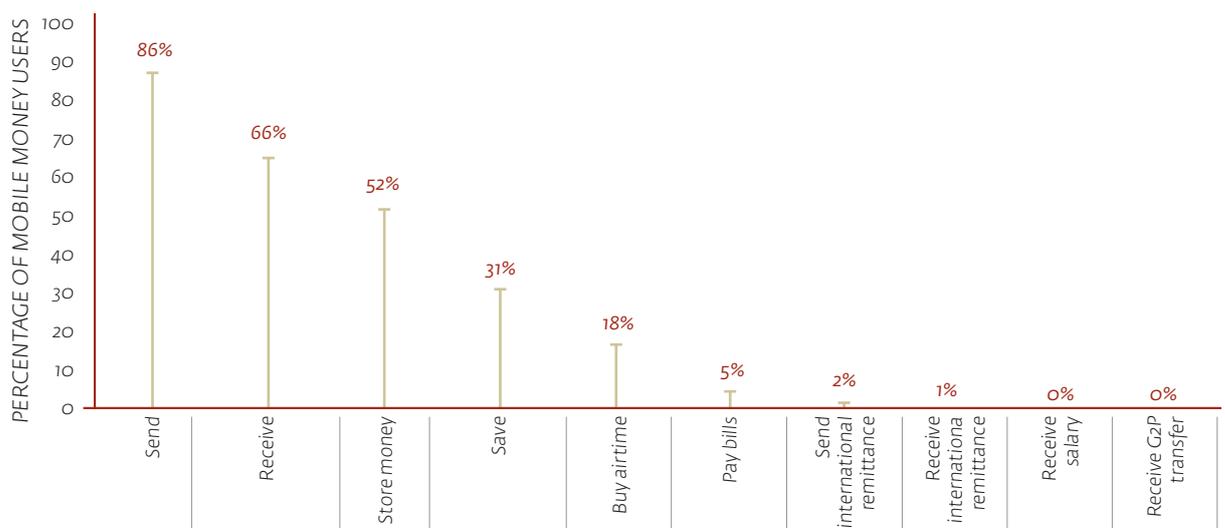
While the rate of access to MFIs is encouraging, it should be kept in mind that the majority of these MFIs are poorly performing financial cooperatives.<sup>23</sup> Of the farmers who are clients of an MFI, the majority has accounts at Unacoopec, a network of financial cooperatives currently under government administration and experiencing substantial financial distress, and which has had issues with the quality of its services. Unsurprisingly, the farmers interviewed for this study appeared to have a low level of trust in Unacoopec, and there were many tales of farmers depositing some of their harvest payments one day to find out the next day that they could not cash out because their local Unacoopec branch had no liquidity. If these poor-quality Unacoopec accounts are discounted, then the level of formal financial inclusion of these farmers is likely significantly lower than 20 percent.

## Mobile money

Although only a minority of farmers have an account at a bank or MFI, mobile money accounts are much more common, with more than half of the surveyed farmers (53 percent) reporting using mobile money. Access to mobile money agents appeared fairly good with nearly half the farmers (46 percent) saying that they could reach their nearest agent on foot in under 20 minutes, and 83 percent able to access an agent in under an hour. No major issues with agent performance were reported, and even among farmers who would not want to receive harvest payments to their mobile money account, only 2 percent gave “agents never have cash” as a reason. Additionally, the infrastructure is in place to reach new mobile money clients. Mobile network coverage was reasonably good in the research area, with 81 percent of cocoa farmers reporting good network coverage near their homes and 99 percent having access to a mobile phone. Some farmers had multiple SIM cards with different providers, but they tended to mainly use one mobile money account, with 75 percent favoring Orange Money, and 23 percent favoring MTN Mobile Money.

So how do farmers currently use their mobile money accounts? Most mobile money customers do not take full advantage of the potential of their accounts, using only one or two of the transaction types available, with a strong focus on sending and receiving money (P2P) (see Figure 3).

**FIGURE 3: WHAT HAVE COCOA FARMERS USED THEIR MOBILE MONEY ACCOUNTS FOR?**



<sup>22</sup> Only 0.5 percent of farmers had an account at both a bank and an MFI, suggesting that they are considered to be almost perfect substitutes.

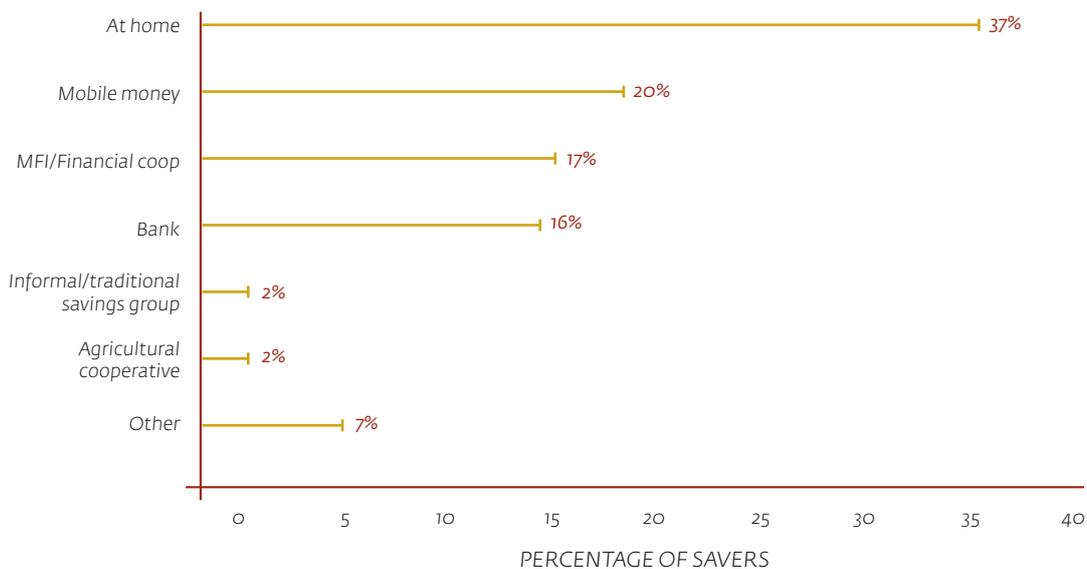
<sup>23</sup> For an analysis of the microfinance sector, please consult <http://www.apsfd.ci/nos-membres/donnees-statistiques>.

There could be many reasons why cocoa farmers are making mainly P2P transactions, providing financial support to family members for example, or making payments for informal business purposes such as buying and selling produce and inputs. If these transfers are indeed informal business transactions, it would suggest that the time may have come in Côte d'Ivoire to start promoting other mobile services such as bill payments and in-store purchases which have become popular in a number of other markets. It is also surprising how few farmers were using their mobile money accounts to buy airtime (18 percent), given that they all consume airtime and buying it in person at a vendor is more difficult in rural regions. This suggests an opportunity for MNOs to promote the convenience of this service as a means of increasing account usage in rural regions.

## Saving

Over one third of the farmers surveyed claimed to have set money aside in the past year (35 percent), with 23 percent of farmers saving with a specific goal in mind. Relatively few of those saving for a specific purpose used a formal account to do so (33 percent). The most common place to store such savings was at home (36 percent of savers) followed by mobile money (34 percent of savers) (see Figure 4). While saving at home is preferable to not saving at all—65 percent of farmers claimed not to set aside any of their income—it is still far from ideal. It is well documented that saving at home can prevent people from meeting their medium- and long-term savings needs. There are a number of reasons for this. For one, saving at home can pose a security risk: 7 percent of our overall sample reported having had their savings lost or stolen at some point in their lives. Money stored at home is also easier to spend, so self-control problems can undermine people's budgeting goals. Such self-control problems are exacerbated by the irregularity of farm incomes.<sup>24</sup>

FIGURE 4: THE PLACES WHERE COCOA FARMERS SAVE THEIR MONEY

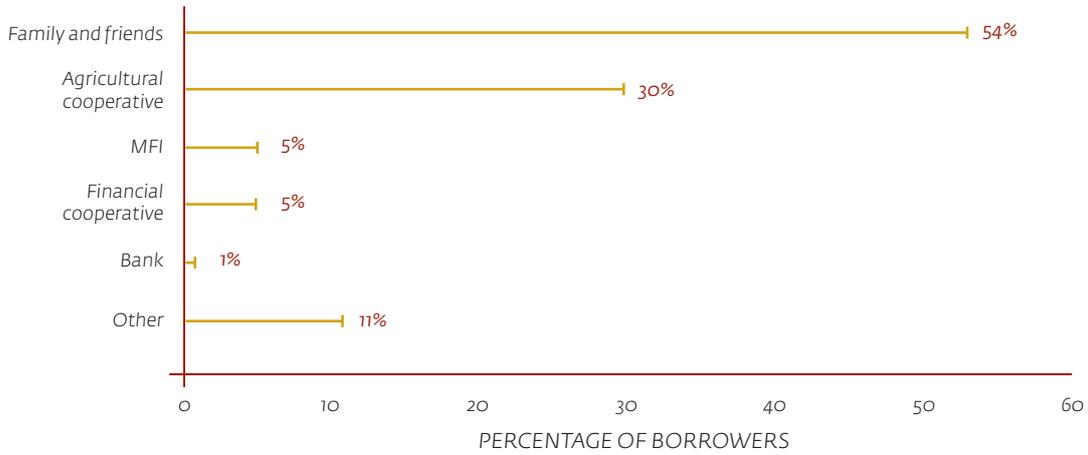


## Borrowing

Similarly, while 15 percent of farmers reported having taken out loans in the past year, just 11 percent of these borrowers patronized a formal financial institution (5 percent of borrowers took their last loan from a financial cooperative, 5 percent from an MFI, and 1 percent borrowed from a bank). The vast majority of savings and credit seems to be coming from informal sources. The primary source of these informal loans was friends and family members, with 54 percent of borrowers reporting having borrowed from kin in the previous year. The next most common lender was the farmers' agricultural cooperative, at 30 percent of borrowers (see Figure 5).

<sup>24</sup> Dean Karlan, Aishwarya Lakshmi Ratan, and Jonathan Zinman, "Savings by and for the Poor: A Research Review and Agenda," *Review of Income and Wealth* 60(1):36–78.

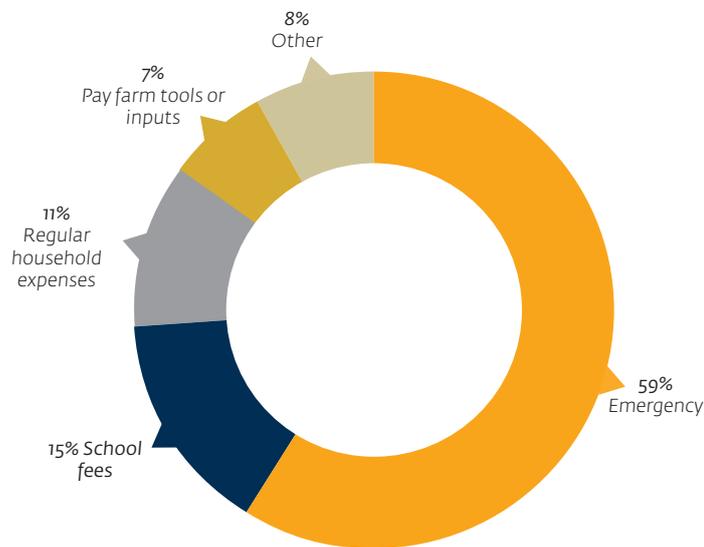
**FIGURE 5: THE SOURCES OF LOANS FOR COCOA FARMERS**



It might be expected that these cooperatives' loans are mostly agricultural input credits, but our data suggests otherwise.<sup>25</sup> While agricultural cooperatives do give credits for inputs in this population, only 9 percent of farmers who had recently borrowed money from agricultural cooperatives reported doing so to finance the cost of inputs, while 63 percent said the loan was to cope with an emergency. Indeed, agricultural cooperatives routinely functioned as a source of emergency funds for farmers going through hard times. In qualitative interviews, cooperatives not only reported giving such emergency loans to farmers, but also said that they had little choice in the matter: farmers feel *entitled* to loans when they have a significant event in the family, such as a death of a close family member, and will feel like the cooperative is not taking good care of them if they don't receive a loan. In order to stay competitive in a market where farmers often have numerous options of where to sell their harvest, agricultural cooperatives often find themselves asked to act as banker to meet farmers' credit needs.

Similarly, from all sources, by far the most common reason was borrowing to deal with shocks, with 59 percent of borrowers citing an emergency of some sort as the reason for taking out their latest loan. The next most common reasons were to finance school fees (15 percent), to cover regular household expenses (11 percent) and financing farm inputs (7 percent) (see Figure 6). Thus while the primary use of credit is to cope with unforeseen expenses, a substantial number of farmers are also using credit as a budgeting aid, to help spread irregular incomes over the entire year.

**FIGURE 6a: REASONS GIVEN BY COCOA FARMERS FOR BORROWING MONEY**



<sup>25</sup> The team does not have enough data to understand how farmers are currently paying for agricultural inputs and suggests further research.

FIGURE 6b: REASONS FOR BORROWING MONEY BY INCOME BRACKET



It is striking that the incidence of reasons for borrowing are similar across all earnings levels, suggesting that among even the richest farmers, many do not have the reserves to deal with unexpected financial shocks and need to resort to borrowing money.

*"Agricultural cooperatives routinely functioned as a source of emergency funds for farmers going through hard times."*

## What are cocoa farmers' specific financial needs?

Access to finance is a problem for rural populations across Sub-Saharan Africa. Bank branches are often located so far away from people's homes as to render banks inaccessible. For many, price is a significant barrier, with account maintenance fees and minimum account balances preventing them from taking advantage of services. Other barriers include know-your-customer legislation, which can require personal documents to open an account which many do not have, as well as a lack of confidence by consumers in the financial sector. The latter can be problematic especially in contexts where banks have gone bankrupt and depositors have lost their savings.<sup>26</sup>

Additionally, if the financial products that banks and MFIs offer are conceived primarily with banks' core urban customer base in mind, these products may not meet the needs of rural farming populations. For example, a loan with strict monthly repayment deadlines, while well suited to an urban employee who draws a monthly salary, can make repayment all but impossible for rural farmers who may only bring home substantial income once or twice per year during harvest seasons.

It is important to better understand why Ivorian cocoa farmers are not making more use of the digital financial instruments available to them: Are they too expensive? Inaccessible? Or in some other way not meeting farmers' needs? What insights into the financial needs of cocoa farmers could be addressed by innovative financial solutions?

### Setting money aside for tomorrow

To begin, we asked farmers who did not currently use various financial services about the factors preventing them from doing so. Surprisingly few farmers cited the traditional barriers to financial inclusion discussed above. For example, when asked why they did not have a formal account, only 8 percent of unbanked farmers cited not having the right documents. Even fewer cited a lack of confidence in financial institutions (7 percent), living too far away from a branch (6 percent) and the services being too expensive (5 percent).<sup>27</sup> The overwhelming reason farmers gave for not having an account at a formal financial institution, cited by 74 percent of unbanked farmers (or 60 percent of the full sample), was being too poor to be able to take advantage of the service. It should be emphasized that they were not saying that formal accounts were too expensive—a reason cited by only 5 percent of farmers—but that they themselves were too poor to benefit from them (see Figure 7).

We tried to tease out what farmers meant by this. In qualitative interviews, farmers expressed the sentiment that since they already had difficulty making ends meet, they did not see how they could be expected to set any money aside. But are these farmers really too poor to benefit from accounts to manage their money given that their earnings are well above the national poverty line? And does being poor really mean that it is impossible to save?

<sup>26</sup> For a full report on barriers to access to finance, see Thorsten Beck, Asli Demirgüç-Kunt, and Maria Soledad Martinez Peria, "Banking Services for Everyone? Barriers to Bank Access and Use around the World," *The World Bank Economic Review* 22, no. 3 (January 1, 2008): 397–430.

<sup>27</sup> Multiple responses possible.

Even though many farmers consider themselves too poor to save (even while they consider the accounts to be affordable), the data reveal no statistically significant relationship between farmers' income (either farm income or overall household income) and the tendency to claim to be too poor to have a bank account.<sup>28</sup> The analysis shows that even the richest unbanked farmers in our sample nonetheless perceive themselves as too poor to benefit from a bank account. If farmers' assessments of whether or not their incomes justified a formal account were accurate, we would expect better-off farmers to be less likely to consider themselves too poor for accounts. This is especially true given that a substantial proportion of the farmers in our sample were relatively well off, with the richest 10 percent bringing in enough income from cocoa alone for each member of their household to live on more than \$4 per day, even without considering any other sources of household income they might have access to. The fact that relatively well-off farmers are just as likely to consider themselves too poor for a bank account suggests that something apart from income is triggering this response. One possibility is that banks' current offerings are not sufficiently addressing farmers' needs, and that financial products need to be better adapted in order for farmers to see the relevance to them. Another likely explanation is that banks in general are seen by cocoa farmers as inaccessible to people like them. Perhaps farmers associate bank accounts with urban elites and salaried employees, writing them off as "not for me"—even in cases where they stand to benefit from them.

Concerning the second question, available evidence suggests that even the poorest of the poor can have substantial latent demand for savings. Household surveys from across Sub-Saharan Africa indicate that the poor do have some surplus funds that they use for non-essential expenditures that could be set aside without lowering consumption of household essentials.<sup>29</sup> Other studies have shown that accounts can be designed in ways that help mitigate behavioral barriers to effective budgeting—including self-control and kin pressure to redistribute – enabling the poor to stretch incomes further than they anticipated being able to. In particular, locked accounts or accounts equipped with other commitment devices can empower the poor to set more money aside and save it for longer.<sup>30</sup>

While farmers' income has no evident effect on the tendency of farmers to see themselves as too poor for a formal account, the same was not true for literacy. In contrast to income, literate farmers were many times less likely see themselves as too poor to benefit from an account, even when holding income constant. This suggests that illiterate farmers are particularly likely to perceive bank accounts as irrelevant to their needs. These farmers' low level of financial education may make it difficult for them to accurately assess the potential benefits of accounts.

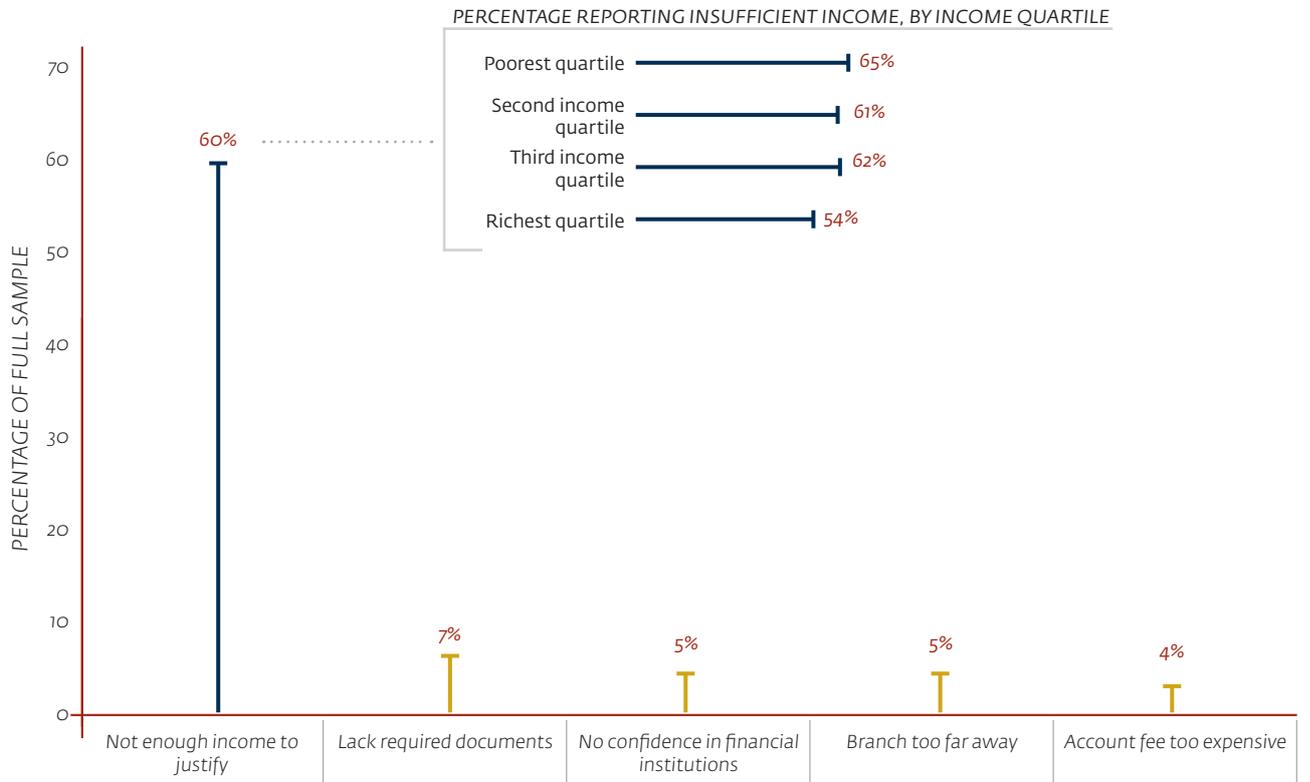
Interestingly, this perception barrier seems to exist to a significantly lesser extent for mobile money accounts. Firstly, many more farmers use mobile money than use formal financial services (53 percent vs. 20 percent). Secondly, fewer farmers reported not having enough money as a reason for not having a mobile money account (17 percent vs. 60 percent for formal accounts). Thirdly, unlike with formal accounts, farm income *was* a statistically significant predictor of farmers' tendency to consider themselves too poor to benefit from mobile money.

<sup>28</sup> For details of the statistical methods used, see description of Model 1 in the Annexes.

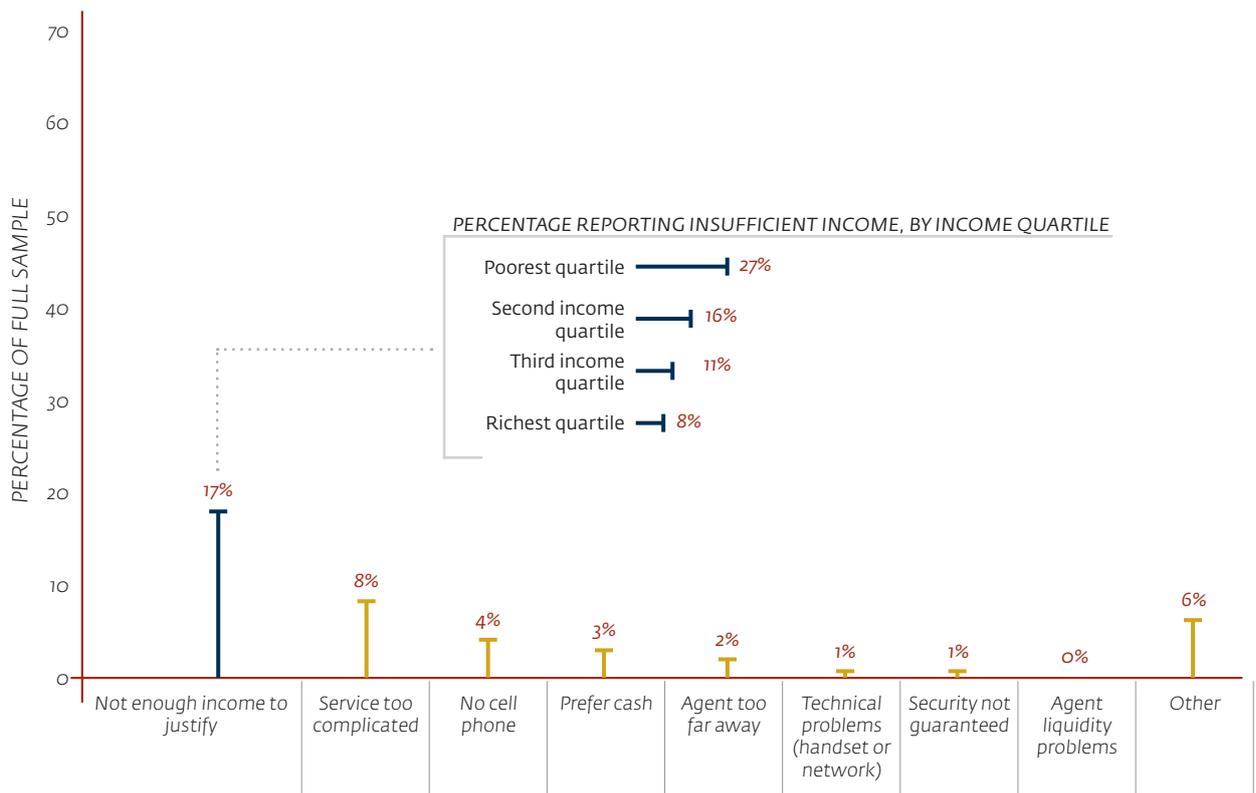
<sup>29</sup> Abhijit V. Banerjee and Esther Duflo (2007), "The Economic Lives of the Poor," *Journal of Economic Perspectives* 21(1):141–168.

<sup>30</sup> Dean Karlan, Aishwarya Lakshmi Ratan, and Jonathan Zinman (2014), "Savings by and for the Poor: A Research Review and Agenda," *Review of Income and Wealth* 60(1):36–78.

**FIGURE 7: REASONS GIVEN BY COCOA FARMERS FOR NOT HAVING AN ACCOUNT AT A FORMAL FINANCIAL INSTITUTION**



**FIGURE 8: REASONS GIVEN BY COCOA FARMERS FOR NOT HAVING A MOBILE MONEY ACCOUNT**



While it is encouraging to see that farmers do not seem to perceive mobile money accounts as being as out of reach as formal accounts, it is important to remember that this does not mean that mobile money has maximized its potential in this population. While uptake of mobile money is relatively high, 47 percent of farmers are still non-users. Of those who do have a mobile money account, recent IFC research suggests that many are likely not active users.<sup>31</sup> The farmers in our sample are not making full use of the mobile money services currently available to them, which is not altogether surprising given that current DFS offerings provide few services that farmers could take advantage of during lean periods. Indeed, one of the main conclusions of the IFC inactivity research was that inactivity would decrease if DFS products were better tailored to target populations' needs.

Taking these findings together, a story begins to emerge. Because perception biases appear to be a key barrier to many rural farmers' adoption of formal bank accounts, financial service providers should tailor their services and marketing strategies to address these biases explicitly. Fortunately, it seems that mobile technology can be an asset in this regard, since it suffers less from these perception problems than formal financial institutions.

## Getting all the way through the year

In the medium term, cocoa farmers have two big budgeting problems: 1) their incomes are irregular, and 2) their expenses fluctuate over time and can often be unpredictable. The extreme irregularity of farm incomes means that especially careful budgeting is required to ensure that harvest income lasts through the year.

Agriculture is by nature seasonal, with time passing between cash inflows and outflows. Cocoa farmers receive their incomes during two harvests seasons.<sup>32</sup> In order to assess the extent to which farmers were able to make this income last throughout the year, we asked them in what months of the year, if any, they typically have difficulty providing food for their families. Thirty seven percent of farmers in our sample reported having difficulty at least one month out of the year. By far the most common months in which farmers had difficulties feeding their families were those immediately preceding the primary harvest season (from July to September), with farmers reporting difficulties increasing dramatically from less than 1 percent at the height of the main cocoa harvest to 27 percent during the two months directly preceding the main harvest. In fact, this is likely to be a conservative estimate of the percentage of farmers struggling with a "hunger season". According to data collected by IFC in 2014 on another sample of Ivoirian cocoa farmers, over 90 percent reported difficulty feeding their families before the harvest.<sup>33</sup> This trend, which can be seen in Figure 9, confirms that many cocoa farmers encounter significant difficulties budgeting incomes to stretch over an entire year.

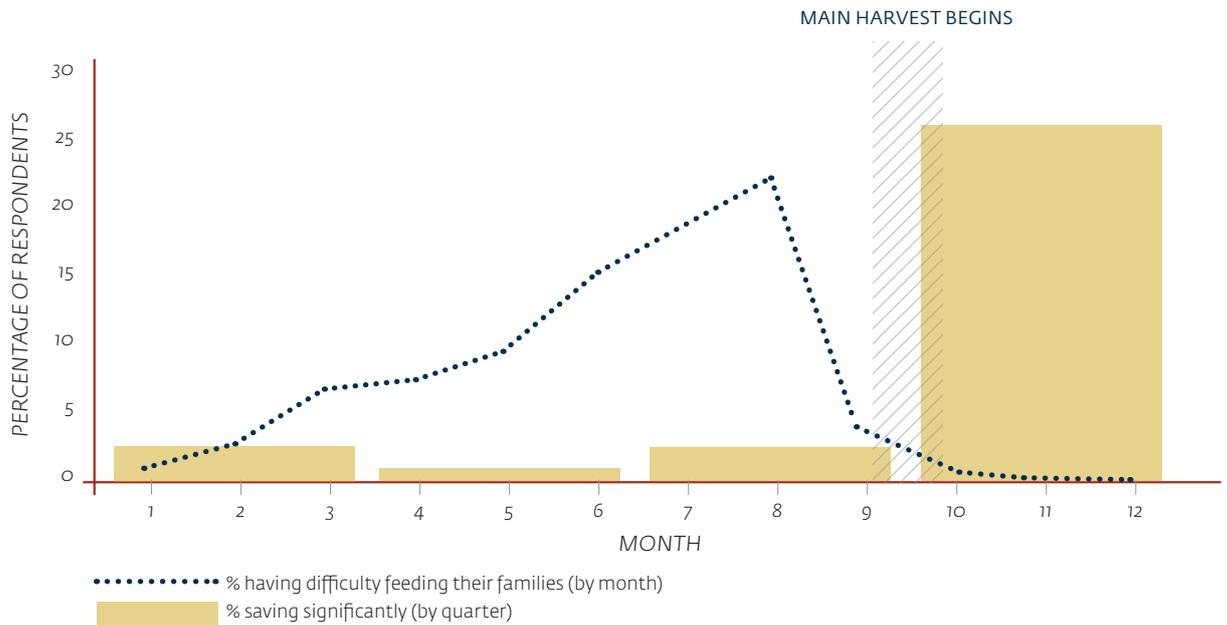
***"The farmers in our sample are not making full use of the mobile money services currently available to them."***

<sup>31</sup> Inactivity was calculated on a 90-day basis. Susie Lonie, Meritxell Martinez, Christopher Tullis, and Rita Oulai (2015), "The Mobile Banking Customer That Isn't: Drivers of Digital Financial Services Inactivity in Côte d'Ivoire," IFC, Washington, DC.

<sup>32</sup> The bulk of the harvest is between October and January, with a second, much smaller harvest between April and June.

<sup>33</sup> IFC Advisory Services internal data collected with cocoa value exporter, 2014.

**FIGURE 9: COCOA FARMERS' SEASONAL SAVINGS AND TIMES WITH INSUFFICIENT INCOME FOR FOOD**



One recurrent expense that causes farmers particular difficulty is paying for their children's schooling expenses. Of those farmers who reported borrowing money in the previous six months, 15 percent cited paying school expenses as the reason for needing this loan. Even though school fees are a perfectly predictable expense happening at the beginning of the school year (early October), they still cause farmers difficulty because they require having a significant amount of cash on hand all at once, on top of regular household budgets, at the time of year when funds are running low.<sup>34</sup> Costly seasonal agricultural inputs such as fertilizer also show low take-up rates in our sample, which may in part be attributable to farmers' inability to make harvest income last through the planting season when inputs are typically purchased. Farmers also have multiple lumpy medium-term expenses such as weddings and festivals, many of which are predictable and ideally should be budgeted for in advance.

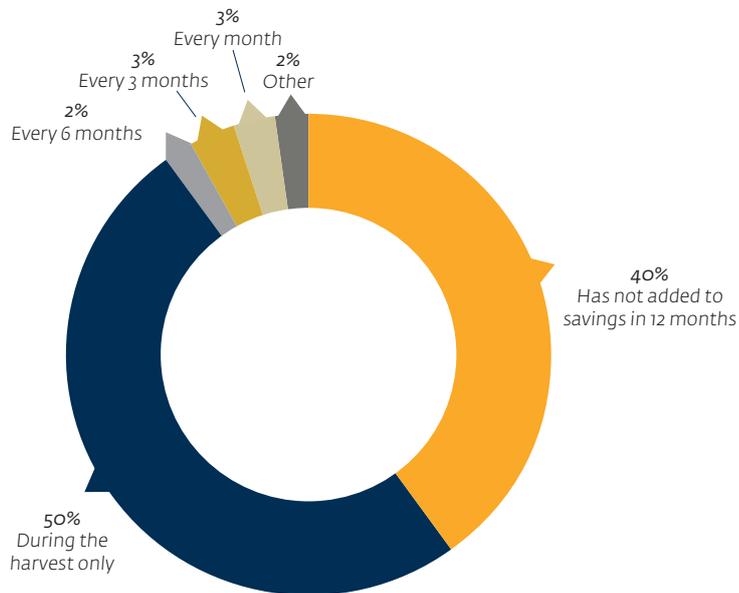
Smallholders use a variety of strategies to budget for an entire year in the face of irregular income.<sup>35</sup> The cocoa farmers in our sample tended to set money aside during the harvest season to pay for expenses later in the year. Most farmers are only able to add to savings during a narrow window during the harvest. Of farmers who save, 90 percent either only manage to put money aside once per year or, if they do manage to add to their savings, the additional time is nearly always during the harvest. Only eight percent of savers reported putting away money regularly outside of the harvest season (see Figure 10).<sup>36</sup>

<sup>34</sup> Although the back-to-school season often falls during the main harvest, payment delays mean that farmers have usually not received their harvest payments by the time school-related expenses are due.

<sup>35</sup> For a comparison of how farmers in different markets cope with their seasonal incomes, see CGAP's research using financial diaries in Mozambique, Tanzania, and Pakistan. The authors uncover some strategies that would not usually be considered financial management mechanisms, such as diversifying crop income to include crops that yield during different parts of the year, and increasing the household's casual labor input during lean periods (demand permitting). Jamie Anderson and Wajiha Ahmed (2016), "Smallholder Diaries: Building the Evidence Base with Farming Families," CGAP, World Bank Group, Washington, DC.

<sup>36</sup> Of savers, the vast majority (77 percent) cited the main harvest season as the time of year when they are most likely to save money, compared to 19 percent for the other three quarters of the year combined.

FIGURE 10: HOW FREQUENTLY DO COCOA FARMERS SAVE?



These savings seem to have a profound impact on farmers' ability to budget for the entire year. Farmers who save see their odds of having difficulty feeding their families in the two months preceding the main harvest decrease by 50 percent compared to those who do not save, even when holding other factors constant, such as education and household income.<sup>37</sup> A farmer who saved in the past year had an 18 percent chance of experiencing difficulties while this number increased to 31 percent for farmers who do not save. In other words, irregular incomes mean that it is essential for farmers to be able to set money aside securely in order to maintain basic consumption levels year round. Additionally, farmers in the habit of saving are better able to budget for the entire year.

In addition to savings, some farmers also borrow as a means of managing medium-term budgets. This reliance on borrowing to fund regular household expenses is also concentrated in the time immediately preceding the main harvest, when many of them experience financial difficulties (see Figure 9). For each additional month that farmers have difficulties in the five months leading up to the harvest, the odds that they will take out a loan during that period increased by over 50 percent (holding other factors constant, including income).<sup>38</sup> In summary, some farmers are using credit as a substitute for medium-term savings, financing regular household expenses on credit to make up for their inability to set aside enough of the harvest income to last the entire year.

<sup>37</sup> For details of the statistical methods used, see description of Model 3 in the Annexes.

<sup>38</sup> For details of the statistical methods used, see description of Model 4 in the Annexes.

# What could DFS do for farmers?

Given how prevalent mobile money accounts are becoming among cocoa farmers existing and potential DFS providers, policymakers, and other parties such as exporters would be well advised to seize the opportunity this new channel provides to improve financial inclusion and bring much needed financial services within farmers' reach. Some experimentation is already taking place regarding potential uses of DFS in agricultural value chains, providing some perspective on the opportunities and also challenges involved in offering DFS to rural populations. While it is still too early to assess the impact of these initiatives, the opportunity to use DFS in agricultural value chains appears large. The next section proposes some potential ways DFS could be used to the benefit of cocoa farmers in Côte d'Ivoire, and other farmers with similar needs.

## Recent experiences of mobile money payments for farmers

**Advans Côte D'Ivoire.** With the vision to extend its footprint into rural areas as well as to reduce cash payments and associated risks, Advans has developed partnerships with local MNOs (MTN and Orange) as well cocoa exporters (Cargill, Barry Callebaut). In a pilot launched with MTN and a number of local exporters, cocoa farmers receive harvest payments through a combination of Advans savings accounts and MTN Mobile Money accounts. Participating farmers are affiliated to agricultural cooperatives which play an essential role in the implementation of the pilot by initiating the electronic payments and ensuring farmers adoption. As of the start of 2016, Advans had successfully registered more than 7,000 farmers from 58 cooperatives. Connecting farmers' Advans accounts to the MTN platform can be challenging as this requires paper-based registrations and verifications by both companies' relevant staff as well as access to MTN's USSD channel. This interconnection allows farmers to withdraw money at MTN's agents in their villages. Otherwise, they would need to travel to an Advans branch, which are only located in the country's biggest cities. CGAP (Consultative Group to Assist the Poor, of the World Bank Group) is providing technical assistance and funding to Advans for this pilot.

**Biopartenaire Côte D'Ivoire.** Established in Côte d'Ivoire in 2010, Biopartenaire works with cocoa farmers to responsibly produce certified cocoa (UTZ and Cocoa Horizons). Biopartenaire is a fully owned subsidiary of Barry Callebaut, the world's leading manufacturer of high-quality chocolate and cocoa products. Together with a leading Ivoirian MNO, the company is implementing a program to pay cocoa farmers directly into mobile wallets for cocoa harvests. This payment is done via a P2P transaction from the Biopartenaire agent to the farmer. This solution aimed to overcome security issues linked to cash handling in rural areas, improve traceability of payments and allow farmers to save money, to be able to transfer money and eventually to become bankable. Biopartenaire distributed handsets and solar chargers to farmers and partially subsidized the cost of cash withdrawal. By 2013, the program had reached more than 10,000 farmers in 122 villages across Côte d'Ivoire. Key challenges to the implementation of this project were the high cost of mobile money transactions in the Ivoirian market (hence the subsidy), sometimes irregular network coverage in rural areas, as well as the effort required to fulfill formal requirements to open mobile money accounts for farmers.

**IFC/Cargill Côte D'Ivoire.** In 2013, IFC launched a country program in Côte d'Ivoire to support increased usage of digital financial services, particularly in the agricultural value chains, with the financial support of The MasterCard Foundation. A key activity of the program is the digitalization of payments in the cocoa value chain, representing 20 percent of the country's GDP. In May 2015, IFC initiated a pilot for the digitization of 1,000 cocoa farmers' payments and savings in cooperation with Cargill (world's leading cocoa exporter), SIB (local subsidiary of Attijari Wafa Bank Group), and Orange Côte d'Ivoire (MNO). The participating farmers, from three different cooperatives, receive payments on their SIB accounts and have the possibility to withdraw money either at a SIB branch or at an OM agent after a bank to wallet transfer. The first payments were for premium on certified cocoa, while the main payments from the harvest production will be added gradually. As of April 2016, 373 farmers were participating in a pilot phase of the project.

**Mercy Corps/KAITE Zimbabwe.** In 2013, Mercy Corps, an international NGO, facilitated a partnership between EcoNet (the country's largest MNO) and a specialized produce buyer, KAITE, to deliver mobile payments to 448 chili farmers in the Domboshawa region, north of Zimbabwe's capital Harare. This initiative falls under the Agrifin Mobile Program led by Mercy Corps and active throughout Sub-Saharan Africa and East Asia. Mercy Corps played a crucial role from the strategic alignment of both companies to the actual implementation of the pilot (registration of farmers, monitoring). According to KAITE management, electronic payments decreased the cost of transporting cash to remote areas and ensured farmers receive their payment in a secure manner and in full, as opposed to instances where KAITE agents would run out of cash while in the field.

**NWK Agri-Services Zambia.** Established in 2000, NWK Agri-Services is the largest cotton buyer in Zambia, with about 120,000 affiliated farmers as of 2015. The company has experienced serious issues linked to cash transportation (armed robbery, fraud) and has been looking for a suitable solution to digitize its payments to farmers. It tried ATM cards in 2012 but was limited by the low density of banks' distribution networks in rural areas. In 2015, NWK started a pilot with 20,000 farmers paid via MTN Mobile Money. Although the pilot had achieved mitigated results in terms of farmers' adoption, network coverage, and liquidity availability, it did decrease NWK's operating costs and security concerns. NWK and MTN are working toward improving customer education on mobile money usage, better understanding farmers' financial habits, and developing a local merchant payments network, hence reducing the need for cash. The company is considering rolling out the solution to its entire network of farmers.

**Rice Mobile Finance Ghana.** With the financial support of Visa Innovation Grant, the Ghana-based NGO Agribusiness Systems International initiated a mobile payment solution (Rice Mobile Finance) for 727 rice farmers in partnership with Tigo, one of Ghana's leading MNOs, and Ghana Agriculture Development Company (GADCO), a major rice producer and miller. During the pilot phase from September 2013 to June 2014, GADCO made 19 bulk payments, resulting in a total of \$250,000 transferred through the Tigo Cash platform. GADCO subsidized all payment and withdrawal fees for farmers. This initiative helped decrease security risks as it eliminated the need for farmers to travel long distances to GADCO offices to receive cash payments. However, an evaluation of the pilot suggested that rolling out mobile payments to a larger group of farmers would require better agent liquidity management, coordinated training of farmers and agents, as well as increasing transactions limits. In response, the partners raised the maximum daily withdrawal cap per account from \$520 to \$1,298, and GADCO began handling some disbursements itself. With these modifications, the program was scaled up to 1,815 rice farmers and has proved sustainable, with a total of \$781,868 disbursed as of April 2016. GADCO ultimately aims to reach at least 5,000 farmers through this mobile payment scheme.

## The short term: receiving money and keeping it safe

Safe storage is one of the main reasons why cocoa farmers currently use mobile money accounts (53 percent). In addition to storage, mobile money can also be used for sending and receiving money; for emergencies; to prevent loss or theft; and potentially as an efficient payment channel. Another short term application of DFS in farmers' lives could be to facilitate harvest payments. Most payments are currently made in cash, with all the risks and inconvenience that implies. However, in our sample, 73 percent of cocoa farmers said that they would like to be paid via mobile money, indicating substantial demand for digital payments if produce buyers and DFS providers were to expand this service.

However, care must be taken when digitizing harvest payments that opportunities for farmers to make other relevant transactions are digitized at the same time. Ideally, digital harvest payments should be accompanied by expanded opportunities for farmers to make relevant digital transactions, such as buying inputs, repaying loans, and bill payments (including airtime). If these transactions remain cash based, then digital harvest payments simply become an alternative form of cash delivery, with the burden of cash management transferred from the buyer to the DFS agent. By focusing on digitizing a core subset of farmers' basic expenses first, farmers can become more familiar with basic DFS, providing a gateway through which they can explore more sophisticated financial services over time.

A significant barrier remains the user interface with DFS, especially among illiterate farmers. Although the majority of farmers would accept harvest payments into their mobile money accounts, among those who would not, a non-negligible minority (17 percent) thought the mobile money service was too complicated for them. This indicates that even though the majority of farmers have the requisite skills to use DFS, there is a need<sup>39</sup> for more and better customer communication and training on how to perform mobile money transactions, with special attention to the specific needs of illiterate and semi-illiterate farmers.

## The medium term: Getting through the year

Mobile money accounts could be well placed to help farmers both save and borrow. Although agricultural cooperatives regularly act as a lender of last resort to farmers who are experiencing financial difficulties, these cooperatives reported difficulties assessing farmers' creditworthiness, as well as high default rates. A DFS-based credit scoring system, for example based on data obtained through DFS account usage, could help by easing the pressure on agricultural cooperatives to provide loans while also making emergency credit more accessible to farmers. In the specific case of emergency lending, DFS could be a way to provide such small loans quickly and on demand, even if the emergency arises outside of business hours of formal lending institutions.<sup>40</sup>

In addition to borrowing, DFS could help empower farmers to set aside enough of their incomes to make it through the entire year. There are a number of ways DFS could help by offering budgeting tools and dynamic reminders to help farmers save and budget more effectively.

For example, DFS providers could offer farmers locked accounts that make portions of the original payment available progressively over the course of the year. Farmers could then choose to deposit some or all of their harvest payments into this account and gain access in the same way as a salaried employee would. Furthermore, since these accounts freeze money for a pre-determined length of time, farmers could potentially earn higher interest rates on their deposits than they would in a simple savings account. Most importantly, such "monthly salary" accounts would have the potential to relieve farmers of some of the burden of income irregularity, empowering them to budget for the year in the same way as salaried employees do.

For digital harvest payments to be effective economic tools, there needs to be an ecosystem of relevant payments that farmers can make using DFS, for example, bill payments and regular in-store purchases.

<sup>39</sup> A recent IFC study in Côte d'Ivoire found that although just 18 percent of respondents said DFS were too complicated for them, 35 percent said they needed help to use the services. Susie Lonie, Meritxell Martinez, Christopher Tullis, and Rita Oulai (2015), "The Mobile Banking Customer That Isn't: Drivers of Digital Financial Services Inactivity in Côte d'Ivoire," IFC, Washington, DC.

<sup>40</sup> This type of service is not yet present in Côte d'Ivoire. In Kenya, Safaricom M-Pesa has partnered with Commercial Bank of Africa to launch M-Shwari a bank account offering a combination of savings and micro-loans accessible exclusively through the M-Pesa mobile money network. A similar service is offered in partnership with Kenya Commercial Bank.

## The long term: planning for the future

Since so much of our sample struggled to set money aside at all, with over a third having difficulties making it all the way through the year, our data revealed little about farmers' long-term savings needs. Common long-term goals farmers cited during interviews were buying land or building a house, all of which are difficult to accomplish without the ability to save effectively.

The applications of DFS to the long-term financial planning of farmers' lives are still unclear. If uptake of mobile money accounts continues to grow and conventional financial service providers do not innovate, mobile money could very well become the default choice that farmers use to manage their money due to its convenience and accessibility. Alternative financial services are already starting to be offered in some markets, including payment of interest held in mobile money accounts and access to loans based on customers' airtime purchase habits. Many of these new services are the product of partnerships between banks and MNOs, combining the former's financial product portfolio with the latter's large customer base and extensive agent network in order to make traditional financial services more accessible.<sup>41</sup> But increasingly, MNOs are also innovating on their own, eschewing difficult-to-manage partnerships with banks and offering increasingly sophisticated financial products themselves.<sup>42</sup>

The potential uses of DFS to address the various needs of farmers identified above are summarized in Table 1.

**TABLE 1: POTENTIAL DFS SOLUTIONS TO FARMERS' NEEDS**

		SHORT TERM	MEDIUM TERM	LONG TERM
P2P TRANSACTIONS	NEED	Send/receive money from friends and family	Small business transactions with suppliers and customers	
	PRODUCT	Mobile money	Mobile money	
RECEIVING HARVEST PAYMENTS	NEED	Secure harvest payments	Budgeting for the year	
	PRODUCT	Mobile money Bank accounts accessed through DFS	"Monthly salary" accounts SMS reminders Soft budgeting tools	
MAKING PAYMENTS	NEED	Merchant payments Paying utility bills	Buying farm inputs Children's school expenses	
	PRODUCT	Mobile money	Mobile money Automatic credit reimbursement	
SAVINGS	NEED	Secure storage	Medium to long-term savings	
	PRODUCT	Mobile money Bank accounts accessed through DFS channel	Bank accounts accessed through DFS channel Commitment savings accounts	
CREDIT	NEED	Small emergency loans	School fee loans Farm input credits	Long-term investments (business, education retirement)
	PRODUCT	Digital credit scoring algorithms adapted to smallholder context Loans delivered through DFS channel Flexible loan-repayment schedules based on harvest cycles		

<sup>41</sup> Examples of fully integrated services include M-Shwari and KCB M-Pesa in Kenya as well as M-Pawa in Tanzania. Additionally, it is becoming increasingly common for banks and MNOs to allow users to connect an existing bank account to a mobile money wallet and make transfers between the two.

<sup>42</sup> In WAEMU the current regulatory framework (BCEAO's 2015 e-money guidelines n°008-05-2015) still requires MNOs to partner with registered financial institutions for any 2nd generation financial services, such as credit or savings. This might limit product development in those two areas.

# Conclusions

Our research indicates that the current offering of financial products in Côte d'Ivoire is not well adapted to the needs of cocoa farmers, but that current trends in the usage of DFS by rural populations suggest this may be a key tool for extending rural financial inclusion. The reasons are multidimensional but the research suggests the following:

**Cocoa farmers were much more likely to consider DFS to be relevant to their needs than formal financial services.**

Despite many of the farmers interviewed being above the poverty line, very few were banked (20 percent). The main reason given was that they could not afford an account. By contrast 53 percent had mobile money accounts which they appear to consider as better suited to their needs, despite the limited service offering of mobile money services currently on the market. Farmers seem to consider bank accounts to be more “for the rich” than mobile money, and thus mobile banking could help counter the impression among farmers that bank accounts are not for them. A key finding of this study is that DFS accounts do not seem to suffer from the same perception barriers that bank accounts do.

**Farmers need innovative savings products designed to help them manage irregular incomes.** Our data show that farmers who are in the habit of saving are better able to stretch their seasonal incomes over the entire year than those who do not save. Even farmers in the top income quartile have the same difficulties feeding their families in lean months as poor farmers if they do not save. In general, formal savings are underutilized, with only 52 percent of savers using some kind of account, and only 33 percent saving in an interest-bearing account at a formal institution. Many farmers already save in mobile wallets—the second most common savings vehicle after storing cash at home—but simple mobile money accounts are not fully meeting farmers’ savings needs. DFS provide an opportunity to help overcome farmers’ perceptions that institutional saving is not for them and expand access to formal accounts. Additionally, there is great potential for financial service providers to design and market savings products adapted to the specific financial situation of farmers in Côte d'Ivoire. In particular, offering an account that converts a lump-sum harvest payment into a monthly payment could empower farmers to overcome barriers to effective annual budgeting.

**Many farmers need loans to help with cash flow.** Since many cocoa farmers are unable to save enough of their harvest payment to cover expenses for the entire year, many borrow to make up this deficit, particularly in the months preceding the main harvest. The majority of borrowing currently takes the form of informal loans from friends and family members (54 percent). Another 30 percent of loans come from farmers’ agricultural cooperatives, who find themselves obliged to act as lender despite being poorly equipped to play this role. There is a clear need for more access to formal loans to satisfy demand for credit, relieving the burden on agricultural cooperatives and giving farmers more flexibility in how they budget for the year. DFS provides a good potential delivery channel for loans, and for repayment—particularly for small emergency loans where farmers need money quickly—as is already happening<sup>43</sup> in other markets.

<sup>43</sup> Since its launch in 2012, M-Shwari has disbursed loans amounting to over \$900 million at an average of 50,000 loans processed per day. In 2014, the service reached 2.8 million unique borrowers with 20.6 million cumulative loans disbursed.

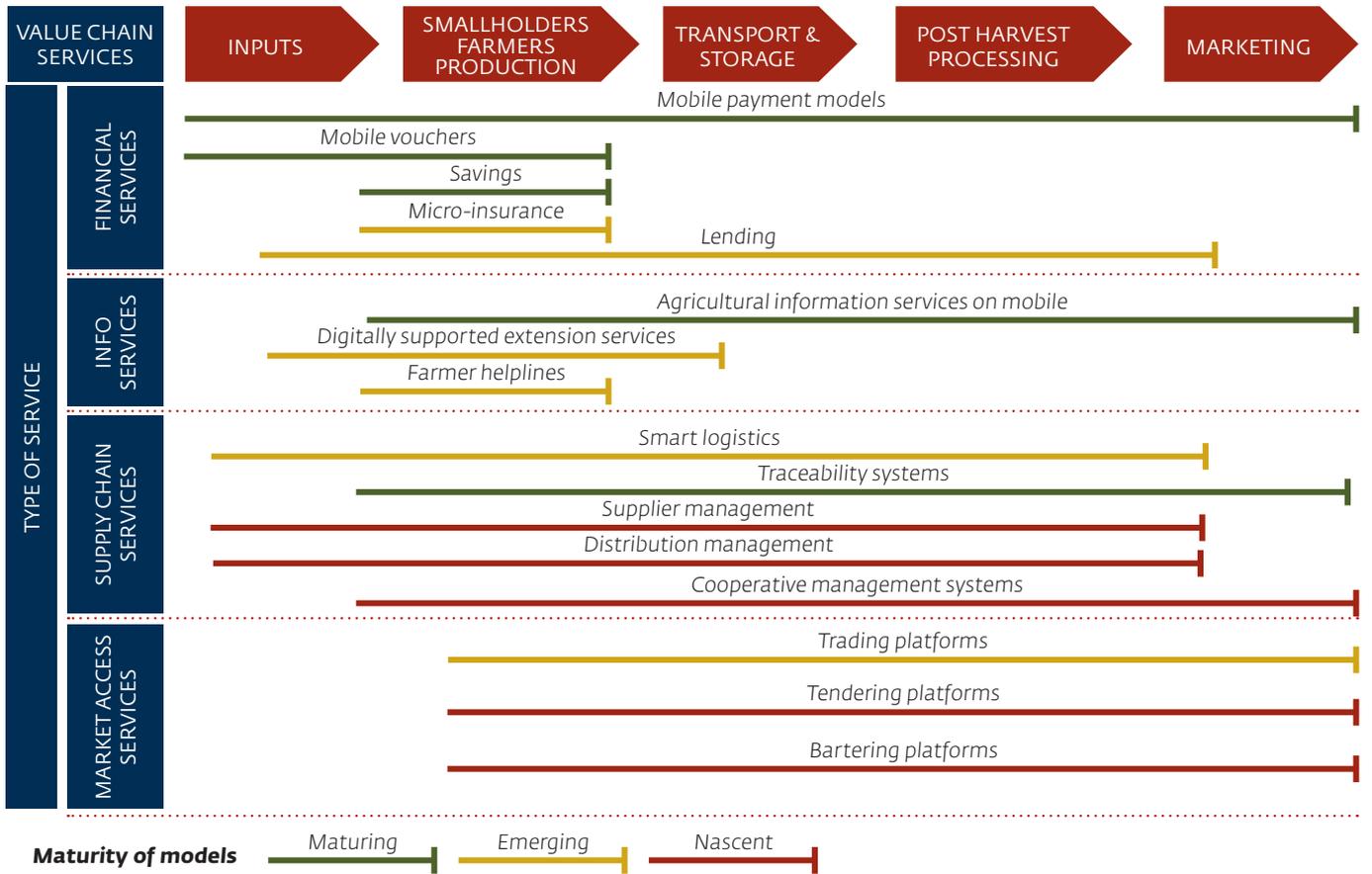
**The demand-side barriers to financially including cocoa farmers through DFS appear to be less onerous than for other populations.** Although perception barriers preventing smallholders from feeling that banks are “for them” remain a key challenge, many of the other barriers to financial inclusion—including lack of trust in banks, resistance to paying fees, and distance to bank branches—were de-emphasized by the farmers in our sample. The benefits of moving away from cash—in terms of safety, security, and timeliness—would appear to outweigh the costs of banking in many cocoa farmers’ minds. Additionally, the barriers to using mobile money are even lower, with 53 percent already having an account and 73 percent eager to receive their harvest payments into it. Financially including these farmers may be a question of putting the right products on the market.

Overall, our data confirms that farmers need a diverse suite of financial products that are adapted to the specific financial challenges they face and are accessible through a DFS channel, for example, through mobile money and agent banking. Mobile technology has penetrated into the rural regions far more than formal financial institutions and mobile money accounts seem to suffer from fewer of the perception issues that dog formal financial institutions. Receiving harvest payments through mobile money accounts is a clear first step to developing a rural DFS ecosystem that can habituate farmers to a non-cash economy and eventually provide a platform for more sophisticated financial services. However, in order to prevent inactivity and ensure that financial providers achieve a return on investment, digitizing these payments needs to be complemented by opportunities for the farmers to use that money digitally, not only by providing savings and loans, but also other services such as bill payment and ultimately buying goods and services.

# Annexes



## Annex 1: Potential future digitization of agricultural value chains



Source: Accenture.

## Annex 2: Methodology and Sampling

The sample included farmers from six cocoa cooperatives in west-central Côte d'Ivoire (regions of Diégonéfla, Guiberoua, Guitri, Oumé and Tiassalé). Each cooperative was organized into sections located near the farmers' residences. The sampling target was two hundred farmers from each cooperative, distributed equally between sections. Once the number of farmers to be sampled from each section was determined, farmers were selected randomly from membership lists supplied by the cooperatives. In cases where a section contained less than the requisite number of farmers, all farmers from that section were included; in such cases, other sections of the same cooperative were oversampled in order to make up the difference. For five of the six cooperatives, all sections were included, while for the sixth cooperative (located in Guitri), a subset of five sections was selected from the total of 15 sections for logistical reasons. For this cooperative, sections with no women members were excluded in order to maximize the number of women in the sample, and the remaining sections were included.

In general, women were oversampled in order to ensure adequate representation in the sample (in Côte d'Ivoire, cooperative registries often include few women due to the fact that women farmers in male-headed households are often not considered to be cooperative members). The final sample included 7 percent women cooperative members while overall cooperative membership was less than 3 percent female.

**TABLE 1: DETAILS OF STATISTICAL MODELS USED**

		MODEL 1	MODEL 2	MODEL 3	MODEL 4
Model type		Binary logistic regression	Binary logistic regression	Binary logistic regression	Binary logistic regression
Dependent variable		Whether or not a farmers reported their own lack of income as reason for not having an account at a formal financial institution	Whether or not a farmers reported their own lack of income as reason for not having a mobile money account	Whether or not farmers experienced difficulties feeding their families in the two months preceding the main harvest (July or August)	Whether or not a farmer had taken out a loan during the second or third quarter of the year (April–September)
Main explanatory variable	Variable	Farm income (percentile)	Farm income (percentile)	Whether or not a farmer reported having saved any money in the past year	Number of months for which a farmer reported having difficulties feeding his family during the five months leading up to the main harvest (April–August)
	Odds ratio	0.99	0.98	0.53	1.53
	Statistical significance	No ( $p = .26$ )	Yes ( $p < .01$ )	Yes ( $p < .001$ )	Yes ( $p < .001$ )
Control variables		Literacy Education level Age Gender	Literacy Education level Age Gender	Household income Literacy Education level Age Gender	Household income Literacy Education level Age Gender

## Annex 3: Summary Statistics

STATISTIC	VALUE
Dates of data collection	April – May 2015
Farmers in sample (n)	1149
By region	
Diégonéfla	182
Guiberoua	202
Guitry	336
Oumé	222
Tiassalé	207
Number of cooperatives	6
Female	7%
Poor	
Less than \$1.25/day (2008 dollars)	27%
Below national poverty line	42%
Literate	55%
Age (mean)	48
Age, ranges	
Under 30	6%
30–39	25%
40–40	28%
50–59	24%
60–69	12%
Over 70	6%
Household size	
10th percentile	4
25th percentile	6
Median	8
75th percentile	10
90th percentile	15
Account usage	
Account at a formal institution	20%
Bank	6%
MFI	14%
Mobile money	53%
Financial habits	
Saved in the past year	35%
Borrowed in the past year	15%

## Authors

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