CGAP

WORKING PAPER

National Survey and Segmentation of Smallholder Households in Côte d'Ivoire

Understanding Their Demand for Financial, Agricultural, and Digital Solutions

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March 2017

TABLE OF CONTENTS

A. INTRODUCTION AND KEY FINDINGS 1

Introduction 1

Key Findings 2

B. ABOUT THE PROJECT 6

C. FINDINGS: SMALLHOLDER HOUSEHOLD DYNAMICS IN CÔTE D'IVOIRE 11

1. Who They Are 11
2. Income and Expenses 24
3. Risks and Mitigation 36
4. Mobile Phone Tools 47
5. Financial Inclusion 52
6. Market Segmentation 63
7. Desires and Aspirations 94
8. Concluding Observations 103

ANNEX 1: METHODOLOGY AND DESIGN 105

ANNEX 2: RANDOM FOREST 110

ACKNOWLEDGMENTS

The authors extend sincere appreciation and gratitude to Jamie Anderson, Melanie Bernstein, Mary Ann Fitzgerald, Colleen Learch, Lucy Mukami, Denise O'Reilly, Mamadou Thiam, Charles Wanga, Xiaoyan Hu, and Loice Cherwon for their valuable contributions and feedback during the preparation of this paper. The authors also thank all the stakeholders in Côte d'Ivoire for their valuable comments on the questionnaires and/or this document, in particular the representatives of ADVANS, Agence Française de Développement (AFD), Barry Callebaut, World Bank, CARE, Delegation of the European Union in Côte d'Ivoire, Food and Agriculture Organization of the United Nations (FAO), International Fund for Agricultural Development (IFAD), Fonds Interprofessionnel pour la Recherche et le Conseil Agricole (FIRCA), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), International Finance Corporation (IFC), National Institut of Statistic (INS), Ministry of Agriculture, MTN, MOOV, and Première Agence de Microfinance (PAMF).

A. INTRODUCTION AND KEY FINDINGS

Introduction

Côte d'Ivoire, a democratic republic of 24 million people, is an agricultural fixture in the global economy. It is the world's largest producer and exporter of cocoa beans and cashew nuts, and a top exporter of coffee and palm oil.[1] Agriculture supports almost 70 percent of the Ivoirian people and makes up 19 percent of the country's gross domestic product (GDP). Much of the agriculture sector contribution comes from smallholder farmers.[2]

The country has had an average per capita real GDP growth of 6 percent in recent years (2012–2015), following a decade of political crisis.[3] Agricultural exports and natural resources (gold) make the country a regional economic power in sub-Saharan Africa.[4]

Its financial sector is still recovering from the effects of the political crisis, and the development of a performing and inclusive financial sector remains a challenge for supporting a high GDP growth in the long term. National survey data suggest limited access to financial services. As of 2014, just over one-third (34 percent) of adults were financially included; mobile money providers (mobile network operators [MNOs]) were the largest providers of accounts (19 percent out of 34 percent of adult population with an account). [5]

Smallholder farmers, even those in structured value chains, struggle to access formal financial institutions and their services, and have more recently been the target of initiatives to break down barriers to access. For instance, Advans Côte d'Ivoire,[6] in collaboration with CGAP and in partnership with MTN, an MNO, identified branchless banking solutions for cocoa farmers, and offered farmers a remunerated digital savings account using a USSD channel that is accessible on all phones and easily usable by all farmers.[7]

Smallholder farmers are the lifeblood of Côte d'Ivoire, but they are largely neglected by formal financial institutions, which are concentrated in urban areas. This situation results in a rural economy based on cash transactions. Like other Ivoirians, smallholder farmers have a wide range of financial needs, in their specific case, both for their agricultural activities and family life. To better understand them and their needs, CGAP conducted a nationally representative household study of smallholder households between February and June 2016, in close collaboration with local stakeholders. This study sought to map the many activities, interests, barriers, and pressures facing smallholder households. The questionnaire also explored nonagricultural household activities, financial practices and interests, and the challenges and aspirations facing smallholder families in Côte d'Ivoire.

This comprehensive exploration of the lives of smallholder farming households

1 The World Factbook, Côte d'Ivoire, Central Intelligence Agency, and World Bank.

2 Côte d'Ivoire, Fostering Economic Growth, International Monetary Fund, May 2016.

3 Ibid.

4 Ibid.

5 Financial Inclusion Data/Global Findex.

6 Advans provides credit and savings products and a range of financial services tailored to entrepreneurs, traders, artisans and their families, and small and medium enterprises.

7 Digital Financial Services for Cocoa Farmers in Côte d'Ivoire. http://www.cgap.org/blog/digital-financial-services-cocoa-farmers-c%C3%B4te-d%E2%80%99ivoire.

sought to answer the following three questions:

- What does the community of practice need to know or do to help smallholder farmer households build resilient and productive livelihoods?
- How can financial mechanisms respond to the relevant needs and desires of smallholder households?
- What types of market strategies and approaches can cultivate uptake and use of financial mechanisms?

This report shares the findings, observations, and insights from the national survey of smallholder households in Côte d'Ivoire. It begins with an overview of the research approach, core program objectives, research questions, preliminary phases of development, and topics included in the questionnaire. The report examines how households manage their income and expenses, and the issues that threaten their income and often lead to financial instability. It then describes financial inclusion in the smallholder sector, exploring household tools that are essential for financial inclusion, including mobile phones and national identification documents, as well as adoption of, awareness of, barriers to, and interest in various financial products. The sections that follow outline meaningful segments of the smallholder population in Côte d'Ivoire, mapping out groups of smallholder farmers that matter for fostering greater product adoption, and delving into their demand for various financial mechanisms. A full explanation of the research methodology is included in Annex 1 and in the user guide that accompanies the data set.

This report has three main goals:

- Build the evidence base for those working in agricultural finance so that assumptions and/or isolated observations can be paired with known, reliable representative data about the population.
- Connect readers with the unique realities of smallholder farmers in Côte d'Ivoire that otherwise could be overlooked, oversimplified, or erroneously generalized from other smallholder farmer markets.
- Catalyze conversations about "what's next" for smallholder-centered strategies, products, and approaches that facilitate agricultural and household finance.

Key Findings

Like smallholder farmers in many countries, agriculture sustains the household as a source of income and subsistence and, therefore, dictates household priorities. In Côte d'Ivoire, cocoa is the cash crop that shapes and defines the sector. It is the leading source of income and a main cash crop for many households.

Despite the risky nature of and low returns in agriculture, smallholder farmers in Côte d'Ivoire are passionate about and committed to agriculture. They take pride in their work, want to continue in agriculture, and look for opportunities to advance their agricultural pursuits. The realities, however, may cause farmers to reassess their situation and consider diversifying, especially for the sake of their children. They may consider steadier income streams if options ever present themselves. However, transitioning away from agricultural activities is likely to be driven by need, and not by a dislike for farming. Low levels of education make it more difficult for farmers to consider diversifying, and farmers are inclined to stay in agriculture. Low levels of education also mean that farmers may struggle to access information.

Smallholder farming is fairly contained within the household itself. These

households engage in agriculture, relying mostly on their own resources, with limited outside help. What little support they do solicit typically comes by way of family and friends, or other members of the community. More formal entities—such as financial institutions, agricultural inputs providers, resellers, buyers, or other entities that are often a part of an agricultural value chain—play only a small part in the Ivoirian smallholder ecosystem.

Important factors

Six fundamental characteristics of Ivoirian smallholder households that can help the community of practice foster greater productivity and profitability and lead to resiliency and better social well-being are as follows:

- **Women and younger generations face major challenges.** Men dominate smallholder households and the decision-making process. Smallholder farmers are a tenured population; the majority are age 40 or older and have farmed for more than 10 years. And those without any formal schooling lead more than half of the smallholder households in the sample.
- **Smallholder have a common dependence on agriculture.** Agriculture is the main income stream for these households. A majority of families consume what they grow, trade goods for other necessities, and sell their crops for income. Although one crop is used in a variety of ways, households often fall short of their monthly needs. Most smallholder households in Côte d'Ivoire live at or below the poverty line; many live in extreme poverty. They work hard, have big aspirations, and take pride in their accomplishments.
- **Crop diversity exists, but there is some level of dependence on particular crops.** Most smallholders in Côte d'Ivoire grow more than one crop, be it for consumption, selling, or trading. Generally, most of them consume rice, but when asked which crop they consider most important, cocoa comes first, mainly because it provides a reliable income.
- **Smallholder farmers operate in an informal economy and have poor access to information.** Smallholders operate in a cash-based, informal economy. They do not have formal contracts for the crops they are cultivating. Furthermore, they depend mostly on each other for agricultural and financial information. They do not turn to resources that offer contemporary insights into agriculture or finance mostly because they are not connected to these channels. Few smallholders engage in agricultural organizations—mainly because of perceived mismanagement and no perceived clear advantages. Very few are connected to financial institutions that could offer knowledge and advice. This suggests that reaching audiences with meaningful, useful information requires building channels and having a dissemination strategy.
- **Risky practices run counter to financially sound desires.** In practice, smallholder households have no plan to manage and cushion costs of risks and events. They do not have savings, do not have access to emergency funds (including loans from formal or informal sources and/or goods to sell for profit and/or other ways to get money quickly), and do not have insurance or any other way to mitigate risk. Their aspirations, however, reflect a financially astute, responsible, and even prosperous mindset. They want to save, they want to insure their activities, and they want to have more options for mitigating risk. The appetite for financial security has not diminished

because of a lack of access and a challenging context.

- **Smallholder farmers are not a monolithic group.** Smallholder farmers in Côte d'Ivoire have five main personas, or segments, that vary according to demographic and psychographic factors. These personas also vary in terms of the level of financial inclusion. Two segments that represent 54 percent of smallholder farmers are largely excluded, have less access to resources, and are more vulnerable. In addition, there is a discernable lack of young people across the population. Dependence on agriculture decreases as one moves through the segments and as the segments become more financially included, but the willingness to work in agriculture remains high across the segments. Three segments have greater success in farming and greater access to agricultural information and resources to support their work, which increases their affinity for staying in agriculture even though they also have other nonagricultural forms of income.

Relevant and desired financial mechanisms

Smallholder farmers in Côte d'Ivoire have limited knowledge of and exposure to financial mechanisms related to their agricultural activities. Only three in 10 are financially included, with the majority of these being included through mobile money. A majority have a mobile phone and can envision it as both a banking and agricultural tool. However, because they lack exposure to services available through mobile phones, farmers have mixed feelings about the capabilities of a mobile phone. Smallholders currently exhibit positive financial practices in that they save what they can and anticipate expenditures before they occur, but unexpected and emergency events are difficult to manage.

There are also positive signs of digital readiness among smallholder families. In addition to having access to mobile phones, many have an acceptable form of identification for opening an account and know how to send an SMS. There are emerging signs of a digital ecosystem taking hold within the population. More than one-quarter (27 percent) of smallholder farmers have mobile money accounts, and within that group, there are signs that users are engaging with accounts for beyond-basic purposes.

The digital financial services that smallholder farmers most want are those that enable them to live the life they aspire to have, that help them afford agricultural or household essentials, mitigate risk, and plan. They want to be able to purchase inputs on credit, or have a savings plan to attain them, even though they do not currently have these mechanisms. They want access to resources that help them better cultivate their land. They want to meet the requirements for and enter into a payment plan to afford school fees.

Financial inclusion has yet to reach the most vulnerable smallholders in any meaningful way. Some segments continue to struggle day to day, rely on their agricultural outputs to get by, have no other financial service options (even informal products), and stand to gain a great deal from a basic financial mechanism.

Strategies to increase financial well-being among smallholder households

Four implications for cultivating uptake and expanding relevant financial mechanisms emerge:

- **Empathize with life desires and circumstances**. Most smallholder

farmers do not want to leave farming: they want to take what they do and do it better. They want to move away from risky financial practices and behaviors and find a way to build greater economic stability. Many, because of circumstances, lack access to mechanisms that can help them do just that. More access points located closer to the farmers are needed for both mobile money and general financial transactions. In addition to these tangible barriers, smallholders feel that they do not have enough money to open an account; sometimes they are simply not aware of how these financial mechanisms could be relevant to them. Solution providers could inform product design and drive adoption by showing more empathy with the challenges facing smallholder families and appealing to their priorities.

- **Build on the inherent appeal of and desire for financial mechanisms.** Smallholder households are keenly aware of the importance of positive financial practices such as saving, investing, staying on budget, and planning, even though they can barely do these. They try, within their means and resources, to plan or save for the essentials in life and agriculture, even if circumstances limit their ability to save for unexpected events or emergencies. Financial services providers do not have to convince smallholder farmers that they should plan, or save, or invest in their future. They need to provide a realistic means for doing so and educate farmers about using financial products that will serve them well.

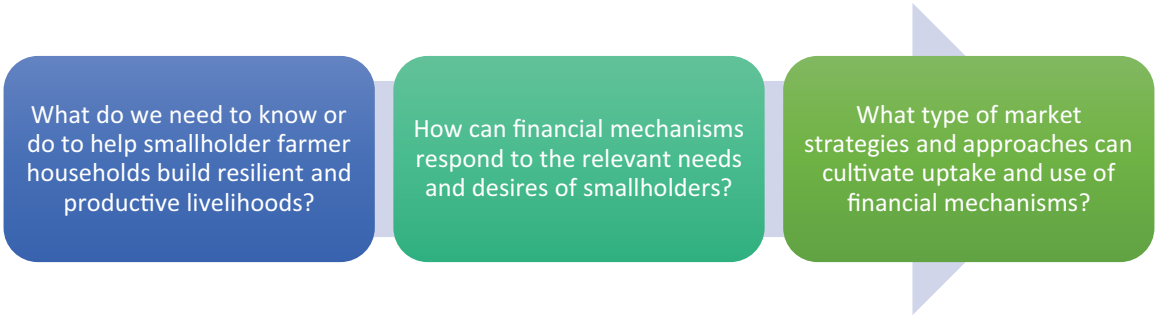
- **Pair immediate needs with long-term desires.** Loans that include insurance or banking or savings accounts and mobile money accounts that include savings and similarly bundled products can go a long way in appealing to immediate needs and conditioning a desirable long-term practice. Further, farmers do not want to see their hard labor go for naught because of bad weather or pests; they want access to insurance, social safety nets, and convenient and reliable information to avoid those risks.

- **Target messaging and initiatives based on where they are in the path to financial inclusion.** One's household economics, outlook on life, and life experiences (including education) influence the uptake of financial mechanisms. With less than a third of smallholder households financially included, there are groups that are ready for a more advanced financial services proposition, which is a worthwhile move for a farmer-led deepening and expansion of a financial ecosystem. There is a need to add active consumers to the financial ecosystem, especially women and those who are under age 30.

Smallholder farmer households' circumstances and surrounding ecosystem lead them to struggle day in and day out, live below the poverty line, and be tied to the most basic of systems. Improving their current situation may involve providing them with facilitative financial tools and teaching them a better strategy for going about their life's work.

B. ABOUT THE PROJECT

Working to build the evidence base on smallholder farming households, CGAP sought to explore in more detail the financial and agricultural lives of smallholder households in Côte d'Ivoire. The research consisted of a survey with an accompanying household listing and a segmentation. It sought to answer three key questions.



Existing Research and Stakeholder Discussions. Building on other household surveys in sub-Saharan Africa (e.g., agricultural censuses, Living Standards Measurement Study [LSMS], FinScope, AgFiMS) and the 2013 CGAP global segmentation,[8] this methodology and survey instrument were designed to answer a number of questions about smallholder households in Côte d'Ivoire:[9]

- **Understanding and segmenting smallholder households.** What are the key characteristics of the smallholder sector at the national level (e.g., demographics, poverty status, hectares, crops and livestock, level of intensification, market relationships)? What segments of smallholder households emerge?
- **Attitudes and perceptions of smallholder households.** How do smallholder households perceive their agricultural activities (e.g., a subsistence activity, business), and do household members, especially youth, see a future in farming? On the financial side, what is the comfort level with digital financial services and other channels and service providers?
- **Opportunities to improve financial inclusion for each segment of smallholder households.** What financial mechanisms does each segment of smallholder households demand, through the lens of customer needs (crop storage, transfer, build, secure, etc.) and products (e.g., credit, deposit, insurance)? What informal and formal suite of financial mechanisms does each segment currently use, and where are opportunities to add value with new services and/or delivery channels?

The first months of the project included a series of deep dives into existing research in the smallholder space to determine what questions have already been asked, identify their findings, and determine how to drive our objectives to complement and expand on them. Several sources were consulted in the process, including IFC, Dalberg,

8 See Christen, Robert Peck, and Jamie Anderson. 2013. "Segmentation of Smallholder Households: Meeting the Range of Financial Needs in Agricultural Families." Focus Note 85. Washington, D.C.: CGAP, April.

9 CGAP retained the services of InterMedia to manage the survey in partnership with Ipsos Côte d'Ivoire. Additional national surveys and segmentations of the smallholder sector, led by CGAP, were also conducted in Mozambique, Uganda, Tanzania, Nigeria, and Bangladesh.

Finmark Trust, AgFiMS, FinScope, FAO, GIZ, IFAD, and the World Bank. The secondary research brought a series of questions that informed discussions with stakeholders.

Several stakeholders and organizations also contributed valuable insights and considerations into the design of the research project and the survey questionnaire. Some of these key organizations included AFD, IFC, AfDB, FAO, UE, GIZ, USAID, IFAD, the Ministry of Agriculture, ANADER, professional agricultural organizations, research centers, financial institutions, MNOs, World Bank Group colleagues, and the LSMS team.

Extensive secondary research and discussions with stakeholders identified an information gap about the actual needs, desires, and perceptions of smallholder households. This research project sought to connect the agricultural data to the financial data to dissect the interactions and intersections between the two.

Identifying Target Group of Smallholder Households. Discussions with stakeholders in sub-Saharan Africa and extensive desk research[10] concluded that there is no clear agreement on the characteristics that define a smallholder, due in part to the heterogeneity of this client group. A matrix was developed of each of the key criteria that could be used to distinguish smallholder households from other households (see Table 1).

The desk research also found a range of definitions of a smallholder household across countries, reflecting the variations in their agricultural sectors. Some governments define smallholders solely by their landholding size. The range differed greatly across Asian and African countries—from a maximum of 2.5 hectares in India up to a maximum 46 hectares in Malaysia. In Côte d'Ivoire, research showed that smallholder farmers dominate the agricultural sector, with average farm sizes between 1.5 and 5.0 hectares.[11] Smallholder farmers contribute a majority of the country's total agricultural outputs.

A high watermark was developed to identify smallholder households in a way that is as inclusive as possible, without diluting or distorting the population

TABLE 1. Key criteria in defining smallholder households

Key Criteria	Considerations
Market orientation	Subsistence vs. market-oriented vs. hybrid
Landholding size	Threshold
Labor input	Family vs. hired
Income	Shared income from farming, multiple sources
Farming system	Technology, irrigation
Farm management responsibility	Owner, influence over how to farm
Capacity	Storage, management, administration
Legal aspects	Formal vs. informal
Level of organization	Member of group—producer, supply chain, service provider

10 Defining Smallholders: Suggestions for a RSB smallholder Definitions; Roundtable on Sustainable Biomaterials; October 2013.

11 Abbott, P. (2013), "Cocoa and Cotton Commodity Chains in West Africa: Policy and Institutional Roles for Smallholder Market Participation." In *Rebuilding West Africa's Food Potential*, A. Elbehri (ed.), FAO/IFAD.

FIGURE 1. Listing criteria to identify relevant smallholder households

Household with up to 5 hectares OR Farmers who have fewer than: 50 heads of cattle; or 100 goats/sheep/pigs; or 1,000 chickens	AND	Agriculture provides a meaningful contribution to the household livelihood, income, or consumption (self-identified)

representation. The identification measure used two key criteria—landholding size and livestock count—as the starting point for identifying the target group for sample selection. A series of self-identifying perception questions was asked to ensure that each smallholder household selected for the study viewed agriculture as a meaningful part of the household's livelihood, income, and/or consumption.

Before the survey, a household listing exercise was conducted to identify potential households to include in the survey sample. The listing exercise targeted smallholder households with the criteria identified in Figure 1.

Methodology. Working closely with the Côte d'Ivoire Institute of Statistics (Institut National de la Statistique de Côte d'Ivoire), InterMedia conducted a household listing operation in randomly selected enumeration areas (EAs) between 2 March 2016 and 26 March 2016 to construct a reliable sampling frame. The listing operation was implemented by Ipsos Côte d'Ivoire, InterMedia's local field partner.

Then, using a stratified, multistage sample,[12] each region was classified into urban and rural areas based on the 2014 population census, and the sample was selected independently in each urban and rural stratum. The 212 EAs were randomly selected as primary sampling units with probability proportional to the number of households in the EAs. The Côte d'Ivoire smallholder survey was the fifth survey in the series, with other surveys in Mozambique, Uganda, Tanzania, Nigeria and Bangladesh. Fieldwork had several failed call-backs, where identified eligible households and household members could not be interviewed during the time allocated to fieldwork in each country. As a result, the final sample size fell slightly short of the target. For this reason, in Côte d'Ivoire, the number of households selected in each EA was increased from 15 to 17, following the household listing operation in all sample EAs. In total, 3,415 households were selected for the survey, of which 3,109 were found to be occupied during data collection. Of these, 3,019 were successfully interviewed.

In the interviewed households, 6,659 eligible household members were identified for the Multiple Respondent questionnaire. Interviews were completed with 5,706 eligible household members. Among the 3,019 eligible household members selected for the Single Respondent questionnaire, 2,949 were successfully interviewed.

The displayed sample (n) sizes in some of the graphs and figures changed during the analysis because of the question order pattern (i.e. skips) in the questionnaire, some new variables were created by combining one or two variables, and in some instances those who did not respond to some of the questions were left out.

Questionnaire Design. The questionnaire design process began by using the secondary research and stakeholder

12 The methodology and design are detailed in Annex 1.

discussions as core inputs into the measurements to shape the survey instrument. This process also involved defining the end goal of the research by doing the following:

- Drawing from existing survey instruments.
- Considering the objectives and needs of the project.
- Accounting for stakeholder interests and feedback.

These foundations led to a framework for the survey instrument for sharing across stakeholders, and ensured the research captured all the necessary elements of a smallholder household. The framework was built around the following sections (Table 2).

Organization of the Survey. The questionnaire was divided into three parts (see Table 3) to capture the complexity of smallholder households, with certain questions asked of all relevant individuals in the household, not just one household member.[13] The survey was designed in this way to capture the complete portrait of the smallholder household, because some members of a household may work on other agricultural activities independently, without the full comprehension of their involvement and responsibilities by other members of the household.

The questionnaire was translated into French, then pretested and validated to ensure the integrity of the questions and to ensure they were in line with social and cultural customs.

TABLE 2. Framework for the smallholder questionnaire

Section	Demographics	Household economics	Agricultural practices	Mobile phones	Financial services
Examples of topics covered	Relationship	Income	Land ownership	Use (own or borrow)	Formal institutions
	Marital status	Jobs	Crops grown	Types of phones	Less than formal institutions
	Age	Government payments	Livestock	Barriers	Informal financial service providers
	School attendance	Saving	Value chain	Habits	Importance
	Income	Investing	Market relationship	Products	Borrowing
	Decision-making	Emergency planning	Water		Products
	Financial situation	Risk mitigation	Labor		
	Progress out of Poverty Index (PPI)		Inputs		
			Storage		
			Coping		

13 The three questionnaires are included in the user guide that accompanies the data set for this research.

TABLE 3. Design of smallholder questionnaires

	Household questionnaire	Multiple Respondent questionnaire	Single Respondent questionnaire
Target respondent(s)	Head of household, spouse, or a knowledgeable adult	All household members over 15 years old who contributed to the household income or participated in its agricultural activities	One randomly selected adult in the household
Topics covered	• Basic information on all household members • Information about household assets and dwelling characteristics	• Demographics • Agricultural activities • Household economics	• Agricultural activities • Household economics • Mobile phones • Formal and informal financial tools

Data were collected from 15 April to 13 May 2016, using computer-assisted data collection tools that regularly yielded data for analysis and quality control to provide timely feedback to field staff. The Côte d'Ivoire smallholder household survey was implemented by Ipsos Côte d'Ivoire, InterMedia's local field partner.

C. FINDINGS[14]

1. SMALLHOLDER HOUSEHOLD DYNAMICS IN CÔTE D'IVOIRE: WHO THEY ARE

Smallholder farmer households span the country, are led mostly by men, and reflect an aging population

The Côte d'Ivoire census divided the country into three major zones; each zone is then comprised of its associated regions for purposes of this nationally representative survey:

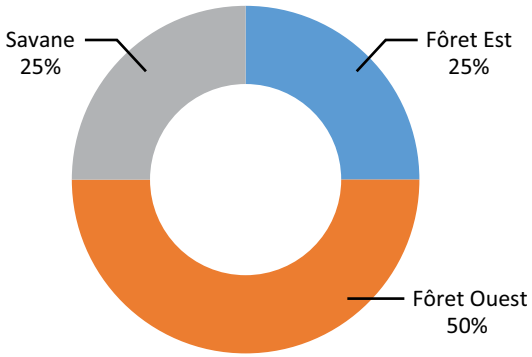
- Forêt Est: Indenie-djuablin, Yamoussoukro, N'zi, Sud-comoé, Lôh-djiboua, Agneby-tiassa, Belier, Grands-ponts, Iffou, La mé, Moronou
- Forêt Ouest: Haut-sassandra, Tonkpi, San-pedro, Marahoue, Gôh, Cavally, Gbokle, Guemon, Nawa,
- Savane: Poro, Gbeke, Gontougo, Kabadougou, Worodougou, Bafing, Bagoue, Bere, Bounkani, Folon, Hambol, Tchologo

Smallholder households span Côte d'Ivoire's three zones, with 50 percent residing in the Forêt Ouest zone, and the other half split evenly between the Forêt Est and Savane zones (Figure 2).

Smallholder households are male-dominated. A man is much more likely to be the head of a smallholder farming household in Côte d'Ivoire than a woman is (90 percent men vs. 10 percent women) (Figure 3). Few women have important decision-making roles in households' agricultural activities. Most female-headed households are led by widows.

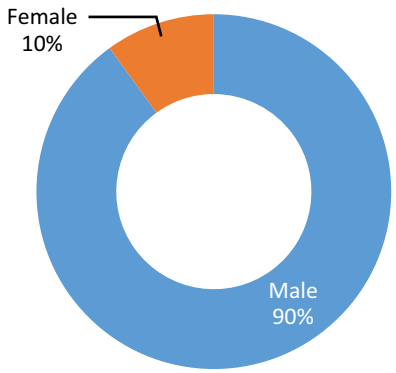
The Ivoirian smallholder population reflects a robust aging generation. Over half (54 percent) of heads of households are between the ages of 30 and 49. Thirty-six percent of smallholder heads of households are over the age of 50. With just over one-tenth of smallholders in Côte d'Ivoire under the age of 30 (Figure 4), there is a relatively small presence of the "next generation" of farmers within the existing head-of-household population. Youth find it difficult to branch out on their own because they lack employment and resources. Therefore, farming remains the ideal option for current and potential young smallholder farmers, but appealing incentives to stay in farming are necessary.

FIGURE 2. Regional Zone



Sample: Smallholder households, n=3,019

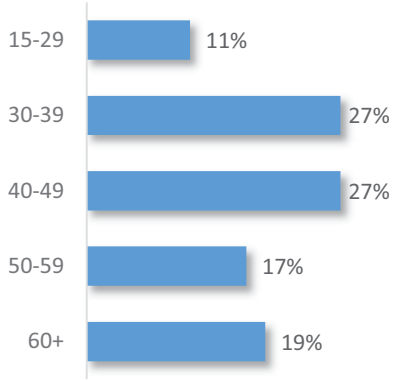
FIGURE 3. Gender of head of household



Sample: Smallholder households, n=3,019

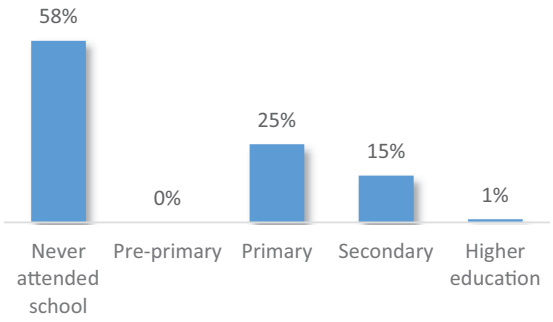
14 Graphs and tables in the main body of the report include references to the unweighted base size, and therefore, at times, they will not look proportional to graphs that show subsets of other graphs. Due to rounding, not all percentages in charts total 100. Due to rounding, percentages in the text that combine two or more categories represented in the subsequent graph may vary by a percentage point.

FIGURE 4. Age of head of household



Sample: Smallholder households, n=3,019

FIGURE 5. Highest education attended by head of household



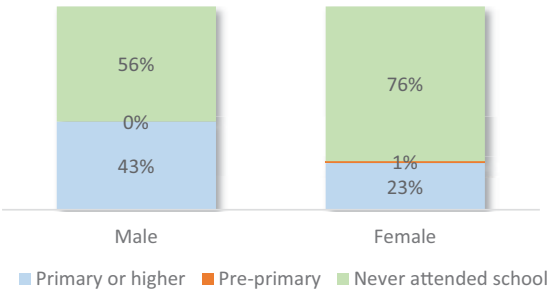
Sample: Smallholder households, n=3,019

Most heads of household have limited education. A majority of heads of households (58 percent) have never attended school (Figure 5), and education beyond primary school is rare among smallholder heads of households. Only 15 percent advanced through secondary school, and 1 percent received a higher education. There is a large gender difference in education levels (Figure 6); three-fourths of female heads of household never attended school.

Most smallholder household heads in Côte d'Ivoire are married or cohabiting (84 percent), and about one-tenth are divorced, separated, or widowed (Figure 7). Male heads of households are overwhelmingly likely to be married or cohabiting, while over half of female heads of household are divorced, separated, or widowed (Figure 8).

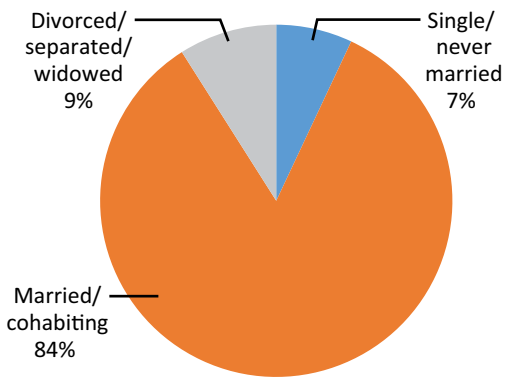
Household size tends to be large for smallholder households in Côte d'Ivoire. Six in 10 households have five or more people; close to a quarter have eight or more people. Four in 10 households have four or fewer people. Just 14 percent are very small, with just one to two members (Figure 9).[15]

FIGURE 6. Highest education attended by gender of head of household



Sample: Smallholder households, n=3,019

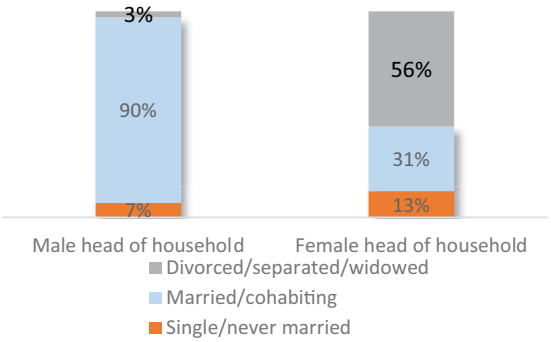
FIGURE 7. Marital status of head of household



Sample: Smallholder households, n=3,019

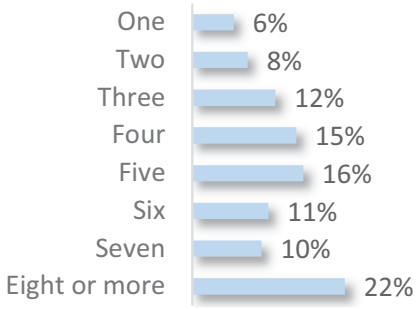
15 For the purposes of this survey, "household" is defined as a group of related or unrelated persons who live together in the same dwelling unit, eat together from the same pot, and share most household expenses. Visiting relatives and domestic workers are not considered members of a household and, therefore, are not be included in this study. Note, however, that domestic servants and other workers living and eating in the same household should be included as household members.

FIGURE 8. Marital status by gender of head of household



Sample: Smallholder households, n=3,019

FIGURE 9. Number of people in household



Sample: Smallholder households, n=3,019

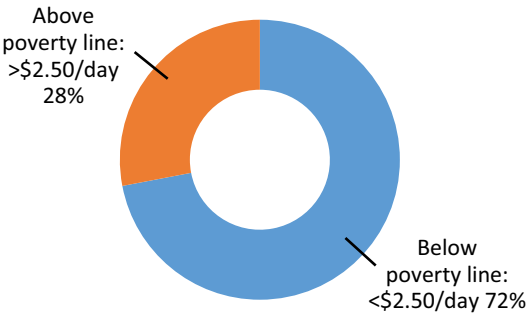
A large household size is significant because a majority of households fall below the poverty line, meaning there is a strain on minimal resources[16] (figures 10 and 11). Smallholder farming households live without much of a cushion to absorb additional expenses.

Almost half of all smallholder households typically do not have enough money for food, and 40 percent have money only for food and clothes (Figure 12). This is mainly because smallholder households farm for subsistence, and the little money earned from selling what they grow goes to buying food that is not available through their farming activities, as well as other basic needs and, in some cases, luxuries.

Smallholder farmers' outlook on life and their agricultural work is in stark contrast to their household circumstances. Despite limited means and economic vulnerability, almost all report they work hard to do their best to cope (98 percent) and are looking for opportunities to improve their current situation (97 percent) (Figure 13). This suggests a proactive rather than a reactive approach to their lives. In fact, the majority reject the notion that it is not wise to plan too far ahead because their luck might factor more heavily into future outcomes than their own planning (50 percent).

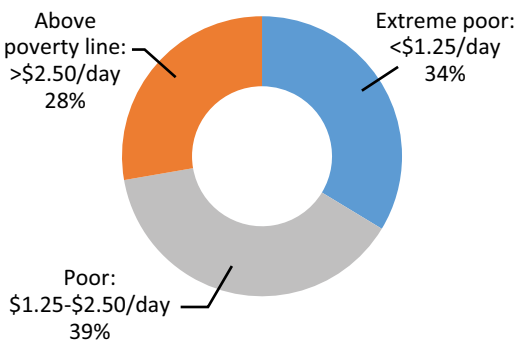
There is also lack of impulsivity. Fewer than two in 10 (16 percent) self-identify

FIGURE 10. Poverty status of household



Sample: Smallholder households, n=3,019

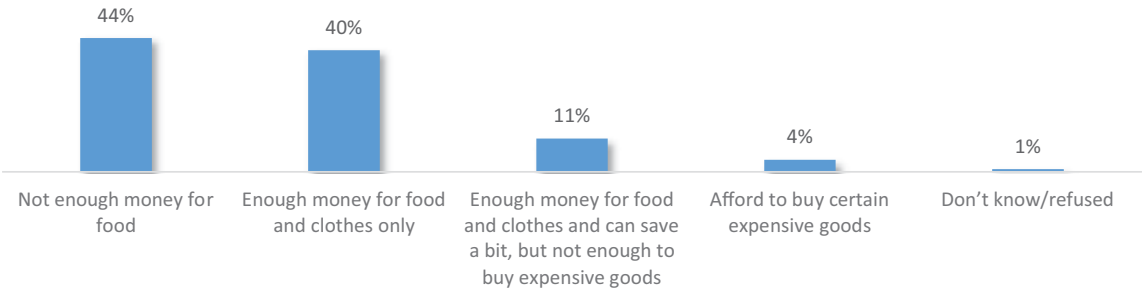
FIGURE 11. Extreme poverty status of household



Sample: Smallholder households, n=3,019

16 From Progress out of Poverty Index 2013, Grameen Foundation, http://www.progressoutofpoverty.org/.

FIGURE 12. Household's current financial situation (self-assessed)



Sample: Smallholder households, n=3,019

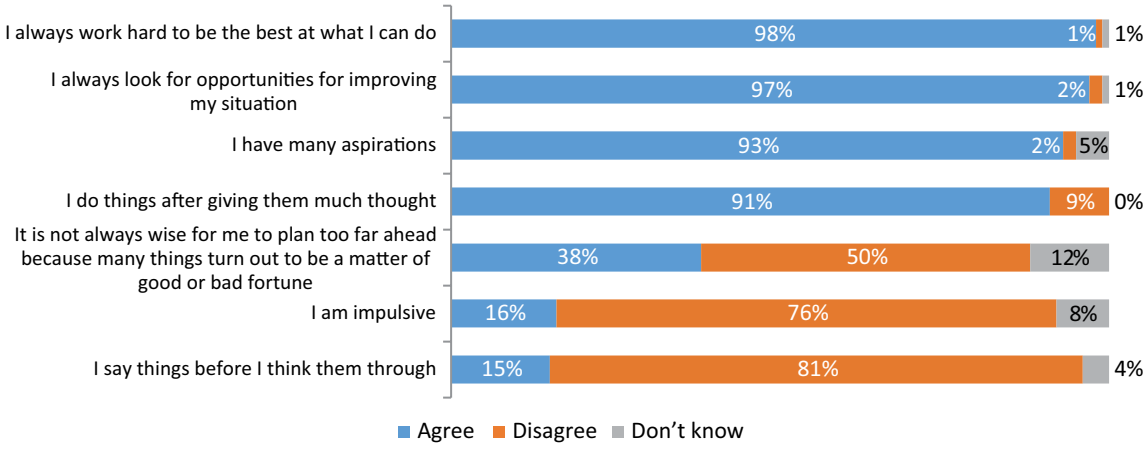
with the statement "I am impulsive," and 15 percent feel they say things without thinking them through. Instead, we see a deliberate, thoughtful population that carefully considers their lives, actions, and livelihoods.

Farm as income, a source for subsistence, sale, and trade

Smallholder farmers in Côte d'Ivoire typically own their plots of land, individually, either through a lease or certificate, or under customary law (Table 4). The majority own through customary law (64 percent), with the remainder by certificate or lease (18 percent). Those in the latter group makes good candidates for financial services, especially loans, because they have documentation of assets with which to borrow against. Of the two-thirds who own farms under customary law, most probably do not have official documentation of ownership, which means maintaining ownership of their property is possibly at risk.

Owned land tends to be in medium to large plots.[17] Just over a quarter of

FIGURE 13. Do you agree or disagree with the following statements?



Sample: Smallholder farmers, n=2,949

17 Land size is a difficult to measure accurately. Many recent examinations of land measurement say that using farmer estimates of land size usually leads to errors. Carletto, Gourlay, Winters. World Bank. "From Guesstimates to GPSstimates," July 2013. http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/07/30/000158349_20130730084245/Rendered/PDF/WPS6550.pdf. The goal in this body of work was to rely specifically on what farmers perceive to be their own land sizes to better understand their way of thinking about and processing agricultural and household decision-making.

TABLE 4. What is the form of ownership of your land?

	Total (%)	Fôret Est (%)	Fôret Ouest (%)	Savane (%)
Individual ownership with lease or certificate	8	5	6	13
Individual ownership under customary law	64	70	61	67
Communal (resources are shared)	2	2	1	2
State ownership	0	0	0	0
Plant-sharing/Sharecropping	4	8	4	1
Individual property with certificate	10	9	15	1
Other	11	5	12	13
Don't know	2	1	1	3

Sample: Smallholder farmers who participate in agricultural activities by regional zone, n=5,354

owned farms are more than 4 hectares (approximately 9.88 acres), and a third are between 2 and 4 hectares. Rented land skews slightly smaller; more than a quarter of these plots are less than a hectare in size, yet another quarter of rented plots are more than 4 hectares (Figure 14). The mean size of owned land (81 percent) is 3.97 hectares and that of rented land (35 percent) is 3.92 hectares.

Diversity and abundance of crop type best characterize what smallholder farmers in Côte d'Ivoire typically grow. The vast majority of smallholder families in Côte d'Ivoire typically grow both food and staple crops and cash crops (89 percent); the types of crops in each category vary. Very few grow only one or the other; 8 percent grow only staple crops, and 7 percent grow only cash crops.

Maize, cassava, and rice are the most commonly grown staple crops, followed by okra, eggplant, plantains, tomatoes, and onions (Figure 15). About half of smallholders grow chilies (classified as a cash crop because they are processed for sale) and cocoa, and a third grow peanuts (Figure 16).

FIGURE 14. How many hectares (ha) of agricultural land do you own?

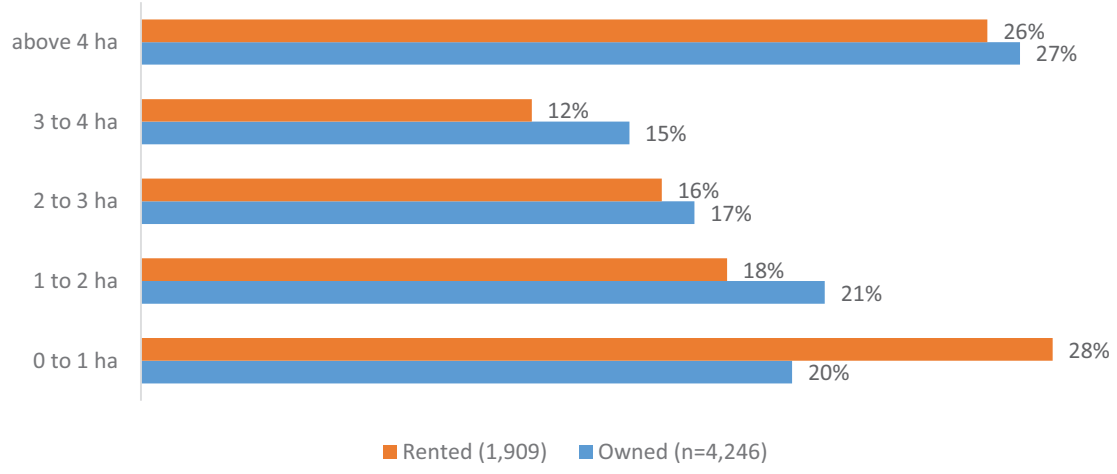
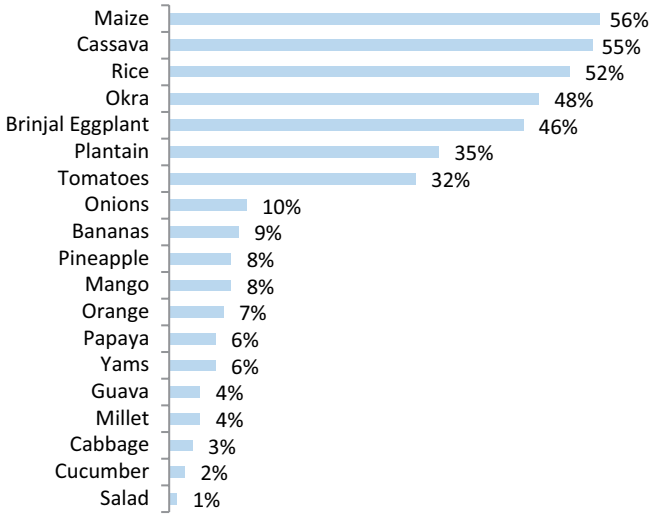


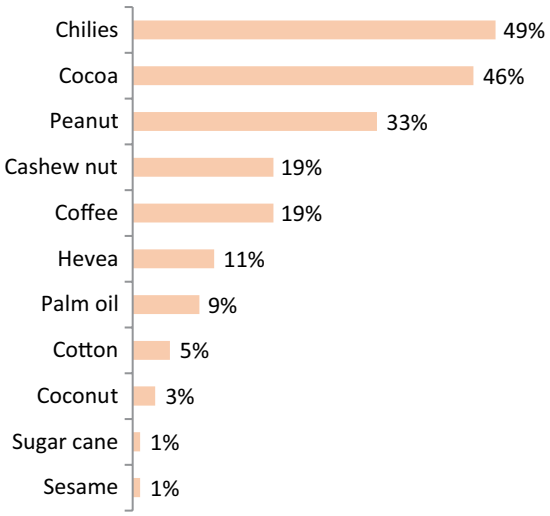
FIGURE 15. Which of the following crops do you grow? Food and staple crops



Sample: Smallholder farmers who participate in agricultural activities, n=5,354

There are some gender variations in crops grown. For instance, men are more likely to grow cocoa, while women put their time into chilies. Sixty percent of male farmers grow cocoa, versus only 28 percent of female smallholder farmers. In contrast, only 38 percent of male farmers grow chilies as opposed to 62 percent of female smallholder farmers.

FIGURE 16. Which of the following crops do you grow? Cash crops



Sample: Smallholder farmers who participate in agricultural activities, n=5,354

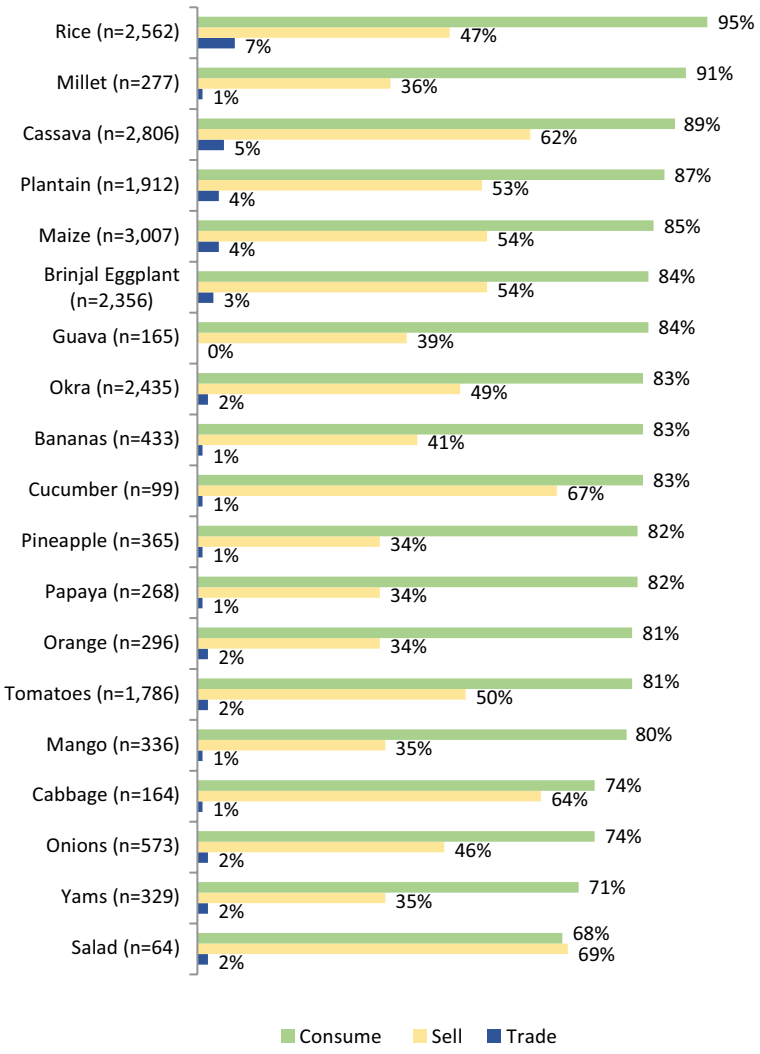
Cocoa, a key crop for this country, is also regional. Cocoa is grown the least in the Savane zone, with only 4 percent of smallholder farmers growing this crop, and it is grown the most in Fôret Ouest (66 percent of farmers).

Most households use their crops in multiple ways, including consumption. Consuming crops rates the highest of the three main uses (consuming, selling, or trading with other individuals/families), for food and staple crops, and even among some cash crops (figures 17 and 18).

Despite the fact that the number and type of crops grown are both diverse and abundant, most smallholders depend on rice for consumption and on cocoa for income. This heavy dependence exposes them to great risk should these two crops be affected by a negative natural or financial event—households will be impacted by the loss of one particular crop because they don't have others they can depend on (figures 19, 20, and 21).

Households also engage in some combination of selling, consuming, or trading (barter trade) their crops, with selling

FIGURE 17. Food and stable crop by percentage of consumption, sale, or trade



Sample: Smallholder farmers, Multiple responses allowed
(% of people who grow each crop)

and consuming being the most common combination:

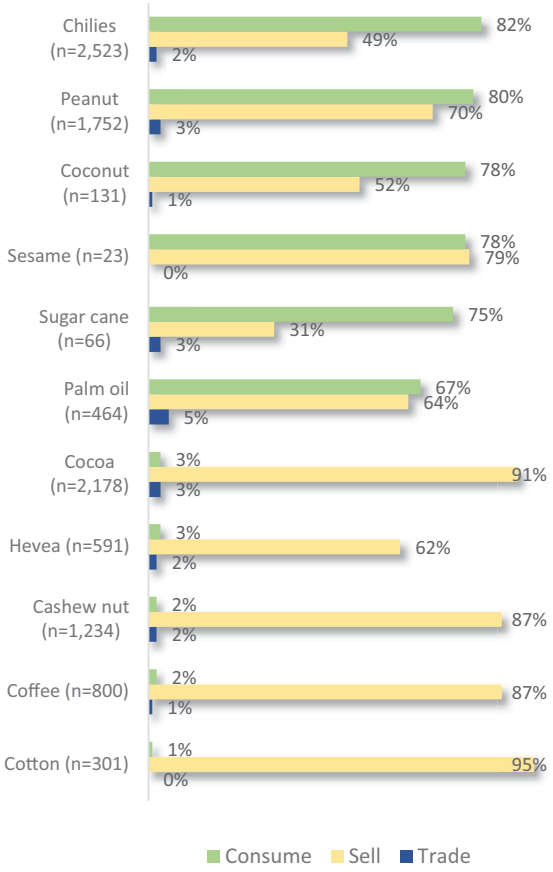
- 84 percent of smallholders grow crops to sell and consume
- 8 percent grow crops to sell, trade, and consume
- 8 percent grow crops to trade and consume
- 8 percent of smallholders grow crops to trade and sell

The tendencies to grow and sell, as well as the types of crops grown for sale versus consumption, are static across gender.

Cocoa and rice are of greater importance to smallholder farmers than other crops. Cocoa stands out as the crop that is most important to smallholders (Figure 22) because it is a revenue source (Table 5). Rice is also important because it is the most consumed crop (Table 5).

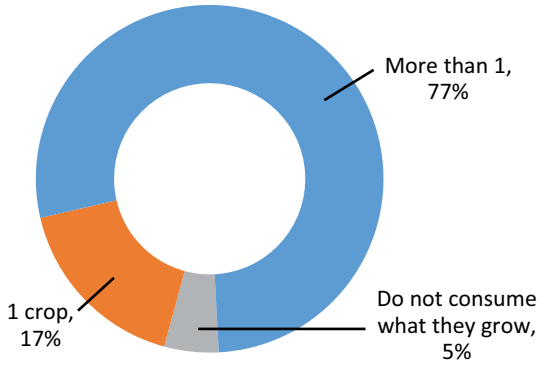
There are regional variations in crops grown. Farmers in the Savane zone mostly grow maize, cashew nuts, rice, and peanuts. Those in the Fôret Ouest region grow cocoa, cassava, rice, and

FIGURE 18. Cash-crop type by percentage of consumption, sale, or trade



Sample: Smallholder farmers, Multiple responses allowed (% of people who grow each crop)

FIGURE 19. Number of crops grown for consumption



Sample: Smallholder farmers who grow crops, n=5,202

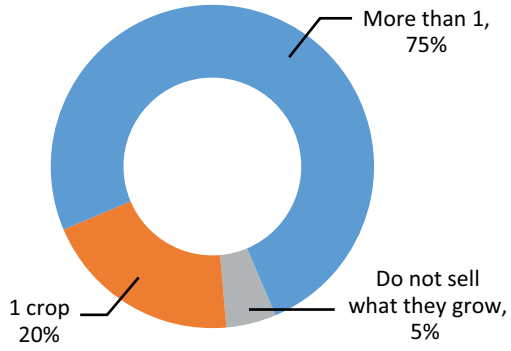
okra, while those in the Fôret Est region grow mostly cassava, cocoa, maize, and chilies.

Three in 10 (31 percent) smallholder farmers in Côte d'Ivoire raise livestock of any kind (Figure 23). Chicken (broilers) are the most commonly reared livestock, followed by sheep and goats (Table 6).

Livestock rearing is also regional. Chicken (broilers), goats (meat), cattle (beef), and sheep are mostly reared in the Savane region, while, in the Fôret Ouest and Fôret Est regions, chicken (broilers and layers), sheep, and goat (meat) are reared the most.

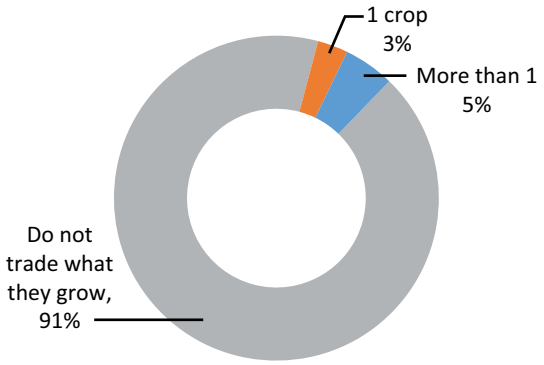
Like crops, livestock are reared for both consumption and sale. Twenty-two percent of smallholder households rear and consume livestock, nearly as many (18 percent) rear livestock for income. While it is common for any one type of livestock to serve both purposes, some

FIGURE 20. Number of crops grown for selling



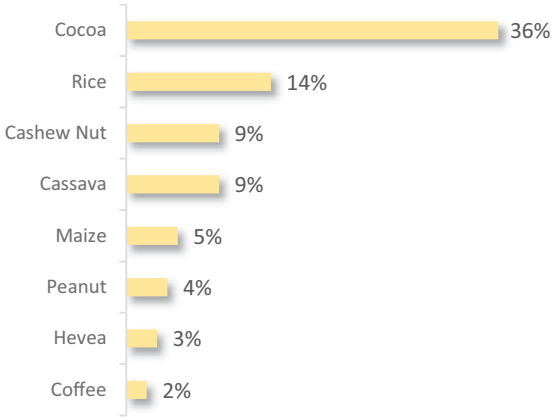
Sample: Smallholder farmers who grow crops, n=5,202

FIGURE 21. Number of crops grown for trading



Sample: Smallholder farmers who grow crops, n=5,202

FIGURE 22. Which of the following crops that you grow is the most important to you and your family?



Sample: Smallholder farmers participating in agriculture who grow at least one crop, n=5,202

types are used more for one purpose than another. For instance, fish and goats are commonly kept for consumption and sale. Sheep and cattle can be close to two times as likely to be reared for income (sale) than consumption. And chicken, duck, and pigeon are much more likely to be reared for consumption (Figure 24).

Women do not have a significant role in decision-making

A great majority of smallholder households in Côte d'Ivoire are headed by men (Figure 3), and men control agricultural decisions. In every agricultural decision-making category, decisions are likely made by the husband or boyfriend alone (Figure 25). Women are likely to have input on any given agricultural decision less than 20 percent of the time.

Dedicated to agriculture and looking to expand their activities

Farming experience and a tenure of farming are fundamental features of smallholder households in Côte d'Ivoire. Close to two-thirds (62 percent) of smallholder farmers have been farming for more than 10 years (Figure 26). Relatively few (2 percent) have been farming less than two years and 16 percent for two to five years.

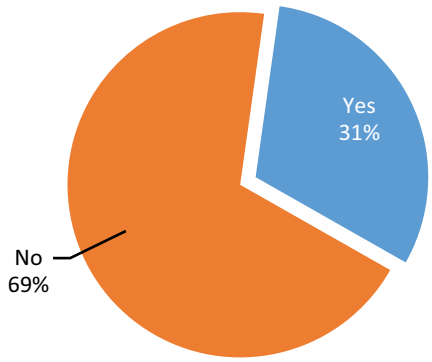
In terms of the length of time smallholders have been farming, the youngest

TABLE 5. Which of the following crops that you grow do you consume the most/get the most money from selling?

	Consumption (n=4,882)*	Selling (n=4,948)
Rice	37	6
Maize	15	3
Cassava	14	11
Plantain	6	1
Peanut	3	6
Brinjal/Eggplant	2	2
Cocoa	0	40
Cashew nut	0	13
Hevea	0	3
Coffee	0	3
Cotton	0	2

Sample: Smallholder farmers who grow crops
(% of smallholder farmers participating in agriculture who grow and consume/sell at least one crop)
*Responses ranked by consumption and later by sales
Table shows the frequently mentioned crops

FIGURE 23. Do you have any livestock, herds, other farm animals, or poultry?



Sample: Smallholder farmers who participate in agricultural activities, n=5,354

TABLE 6. Which of the following do you rear?

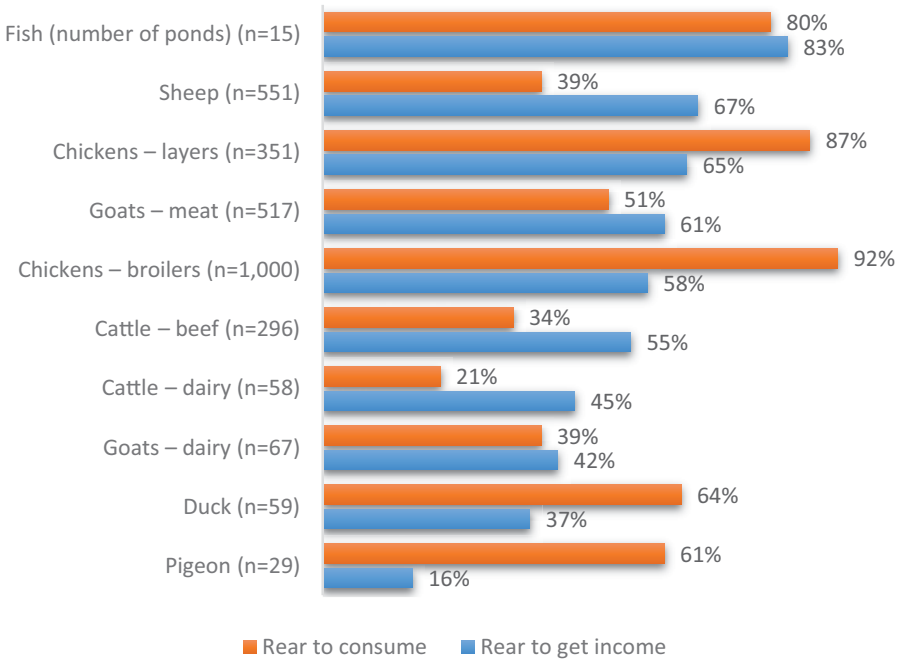
Chickens (broilers)	63%
Sheep	33%
Goats (meat)	33%
Chickens (layers)	20%
Cattle (beef)	16%
Goats (dairy)	4%
Duck	3%
Cattle (dairy)	3%
Pigeon	2%
Fish (number of ponds)	1%
Bees (number of hives or boxes)	0%

Sample: Smallholder farmers who have any livestock, herds, other farm animals or poultry, n=1,623
Multiple responses allowed

generation (29 years old and under) is newest to farming. Relatively few individuals adopted farming as a livelihood later in life (Figure 27).

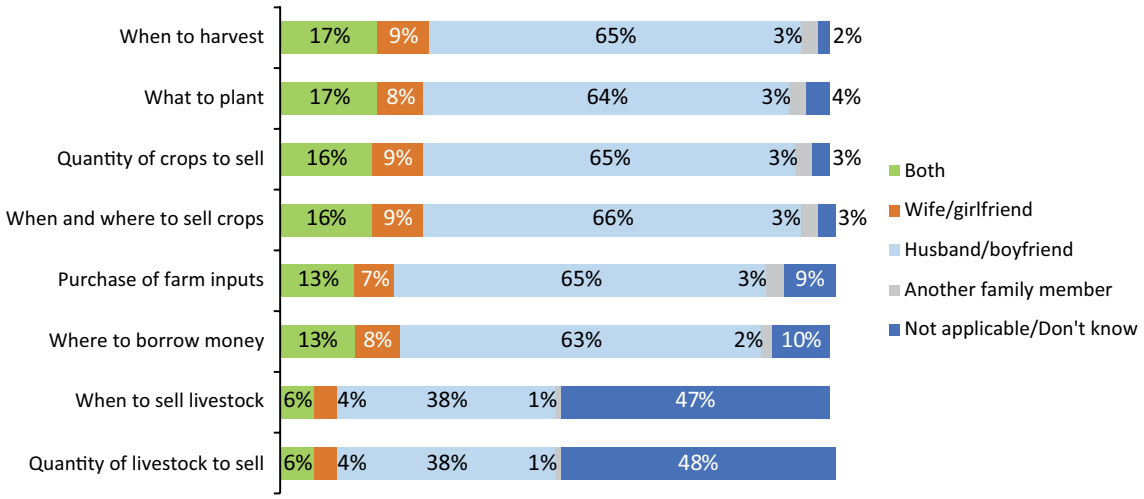
Consistent across households, farming emerges as a life choice and as part of an identity, even if this is a default choice due to a lack of other options. This offers insights into the motivations of this population, given its generally challenging financial circumstances. Ninety percent of smallholder farmers intend to keep working in agriculture (Figure 28). This intent is consistent across tenure in farming, although slightly fewer of the

FIGURE 24. Which of the following do you rear and get income/consume?



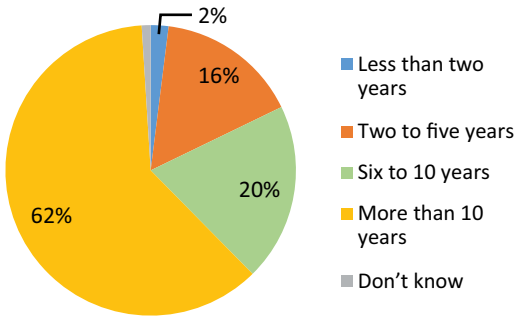
Sample: Smallholder farmers who have any livestock, herds, other farm animals or poultry, n=1,623
Multiple responses allowed

FIGURE 25. Generally, who makes decisions on the following agricultural activities?



Sample: Smallholder households, n=3,019

FIGURE 26. How many years have you been farming?

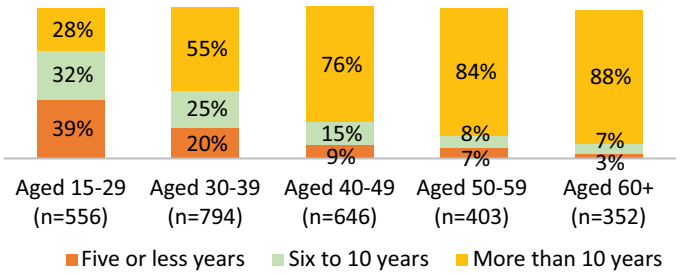


Sample: Smallholder farmers who participate in household's agricultural activities, n=2,751

newest smallholder farmers (farming for five years or less) believe they will continue farming (Figure 29). Regardless of the household's financial situation, dedication to agriculture is high (Figure 30). Ninety percent of those who self-report that they "don't have enough money for food" (even though it might be the farm that feeds the family) want to continue to work in agriculture.

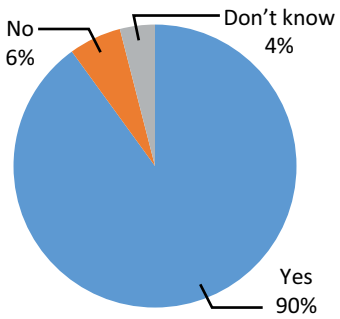
Agriculture is not only what feeds the household, it is a livelihood that smallholders enjoy. Nearly all agree with the statement, "I enjoy agriculture" (96 percent). Large majorities of smallholders want to expand their agricultural activities (94 percent), and

FIGURE 27. How many years have you been farming? By age of respondent



Sample: Smallholder farmers
(% of smallholder farmers who participate in household's agricultural activities and in each age category)

FIGURE 28. Do you intend to keep working in agriculture?



Sample: Smallholder farmers who participate in household's agricultural activities, n=2,751

many (51 percent) are satisfied with what they have achieved with their agricultural activities (Figure 31). Four in five think of agriculture as the legacy they want to leave their family. However, less than half want their children to continue in agriculture (46 percent) (Figure 31).

Farming realities introduce a three-way conflict for smallholders: dedication and commitment meet high-risk, difficult financial circumstances, prompting openness to alternative livelihoods.

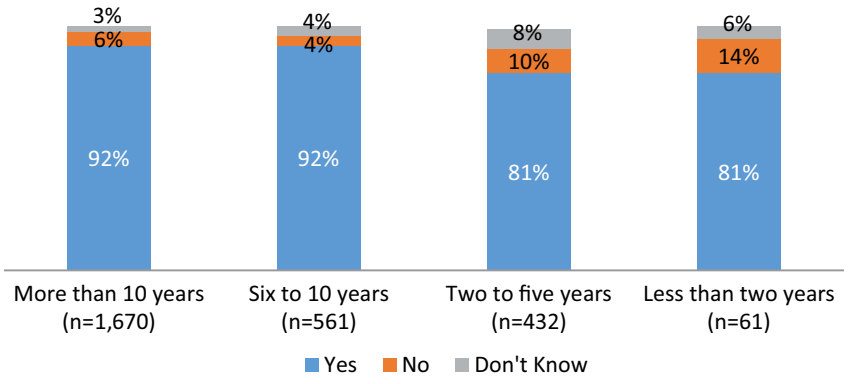
Smallholders have mixed feelings about their future aspirations. They profess a strong commitment to agriculture, enjoy the work, and want to expand their agricultural activities. At the same time, more than half would take full-time employment if available (Figure 31). They might not want to leave agriculture, but they recognize the opportunities and tradeoffs that come with other ways of making a living.

The youngest generation of smallholder households in Côte d'Ivoire (ages 15–29) shows even more interest in full-time employment outside of farming. Sixty-one percent would take full-time employment if offered (Figure 32). Just under four in 10 feel they would not want to do any other type of work but farming.

Smallholder farmers want to remain in farming, but the stark realities of their limited resources and agriculture's abundant risks force some of them to think about life outside of farming, even if they have no other skills.

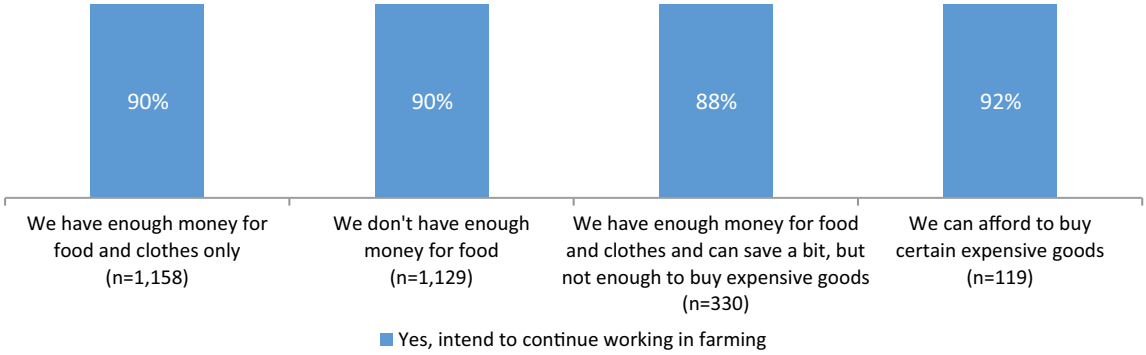
Côte d'Ivoire's smallholder farming population is older (above 40), and its current dynamics may pose challenges for the future of the agricultural sector. The relatively small number of young farmers (11 percent), coupled with the fact that most Ivoirian smallholder farmers do not have a primary school education, could adversely affect the success of the next generation of farmers.

FIGURE 29. Do you intend to keep working in agriculture? By number of years in farming



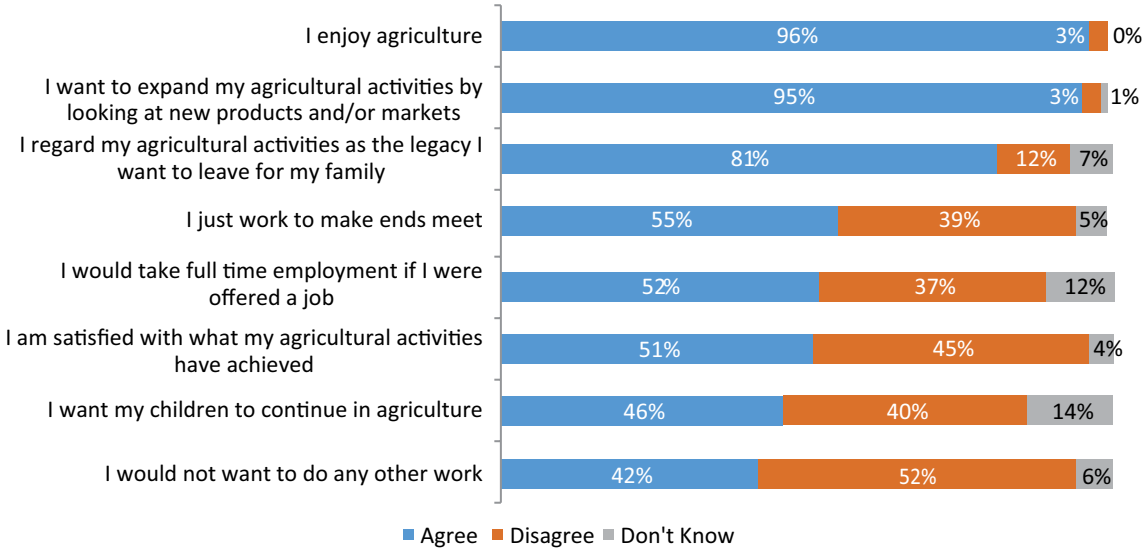
Sample: Smallholder farmers who participate in household's agricultural activities

FIGURE 30. Do you intend to keep working in agriculture? By household's current financial situation (self-assessed)



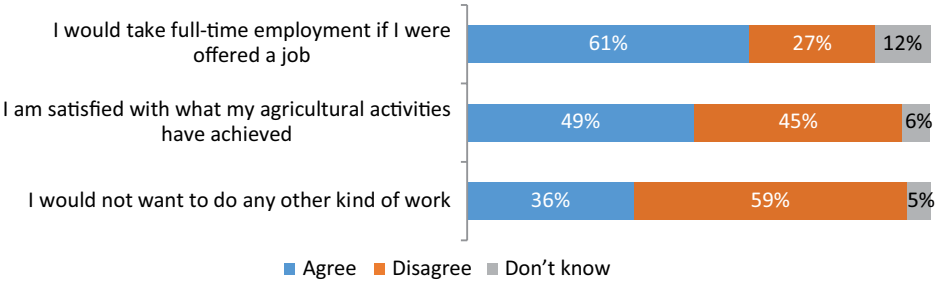
Sample: Smallholder farmers who participate in household's agricultural activities

FIGURE 31. Do you agree or disagree with the following statements?



Sample: Smallholder farmers who participate in household's agricultural activities, n=2,751

FIGURE 32. Do you agree or disagree with the following statements?



Sample: Smallholder farmers aged 15-29 who participate in household's agricultural activities, n=556

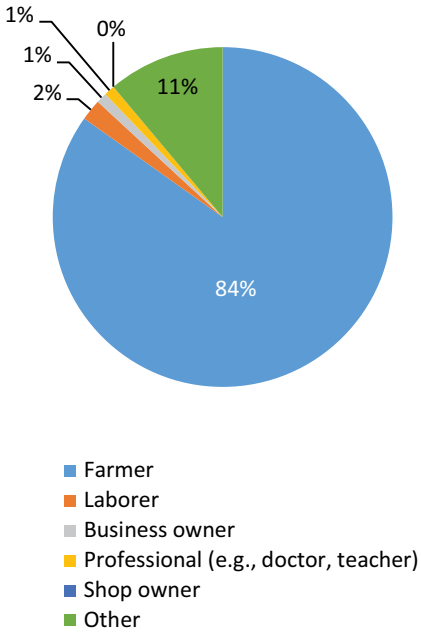
2. SMALLHOLDER HOUSEHOLD DYNAMICS IN CÔTE D'IVOIRE: INCOME AND EXPENSES

Farming activities determine household income

More than eight in 10 smallholder farmers in Côte d'Ivoire say that farming is their primary job (i.e., where they spend the most of their time) (Figure 33). Looking more closely at their sources of income, a vast majority of smallholder households (90 percent) report they generate their incomes from growing and selling crops. Thirteen percent generate income from rearing and selling livestock (Figure 34).

Relatively few smallholder households say they undertake other activities to supplement their incomes. Small percentages of smallholder households in Côte d'Ivoire generate additional income by managing their own retail or manufacturing business, earning wages from occasional jobs, or providing services of some kind. Less than one in 10 smallholders in Côte d'Ivoire receive remittances from family and friends (Figure 34).

FIGURE 33. What is your primary job?



Sample: Smallholder farmers, n=5,706

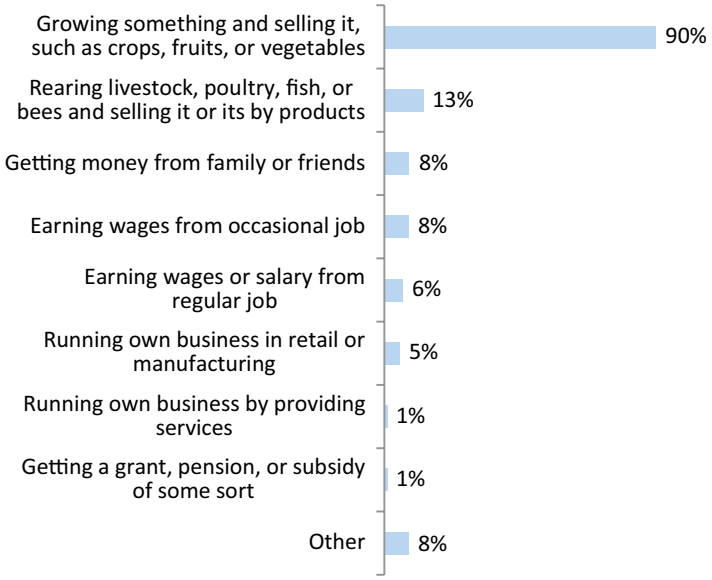
Smallholders in Côte d'Ivoire consistently shared that growing and selling crops is their most important, most reliable, and most enjoyable income-generating activity (Table 7). In comparing these three perspectives, data show that a large portion of smallholders equate the most important income source with the one they like getting the most and with the one that is the most reliable. Very few report any other significant sources of income.

Besides crop production, very few smallholder households earn income from other agricultural activities or sources (Figure 35). Five percent process crops from other farmers into other products for sale; other activities are insignificant.

Apart from what smallholders consider to be income-generating sources, there can be other streams of income into a household. For instance, 8 percent say they generate income from family or friends giving them money (Figure 34). However, a greater number, 14 percent, say they get money from remittances, including family and friends (Figure 36). The latter can include one-off contributions and help in time of need, versus a steady stream contributing to monthly income.

Only 1 percent of smallholder households receive payments from the government (e.g., pension, disability, welfare) (Figure 36). This low level of government transfers to smallholders may indicate that most of them have not had formal employment and would not have been contributing to the Côte d'Ivoire National Social Security Fund (Caisse Nationale de Prévoyance Sociale). Of the few smallholders who do receive these payments, most receive it through direct deposit to a bank account (Figure 37).

FIGURE 34. Do you generate income from any of the following sources?



Sample: Smallholder farmers, n=5,706
Multiple responses allowed

Self-reported expenses are often within income parameters, but smallholders still struggle to get by.

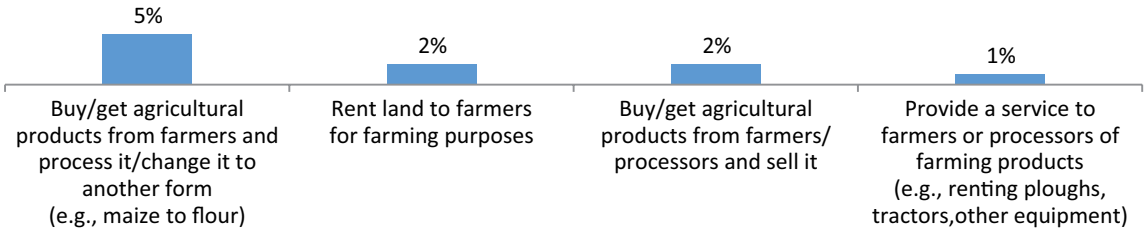
More than 70 percent of smallholder households live below the poverty line, earning under $2.50 a day, with 34 percent living in extreme poverty, earning under $1.25 a day (figures 10 and 11). When asked how much money they need to survive, 16 percent of households said their expenses are 25,000 CFA ($42)

TABLE 7. Which of the following income sources is. . . ?

Income sources	Most important (%)	Like getting the most (%)	Most reliable (%)
Growing something and selling it, such as crops, fruits, or vegetables	84	84	82
Running own business in retail or manufacturing (selling or making goods)	3	3	3
Earning wages or salary from regular job	3	3	3
Getting money from family or friends	2	2	2
Earning wages from occasional job	2	1	2
Rearing livestock, poultry, fish, or bees and selling	1	2	2
Running own business by providing services	1	0	0
Getting a grant, pension, or subsidy of some sort	0	0	0
Other	4	4	4
Don't know	1	1	2

Sample: Smallholder farmers, n=5,706
(highlighted rows are agricultural-related income streams)

FIGURE 35. Are there any other ways that you get income?



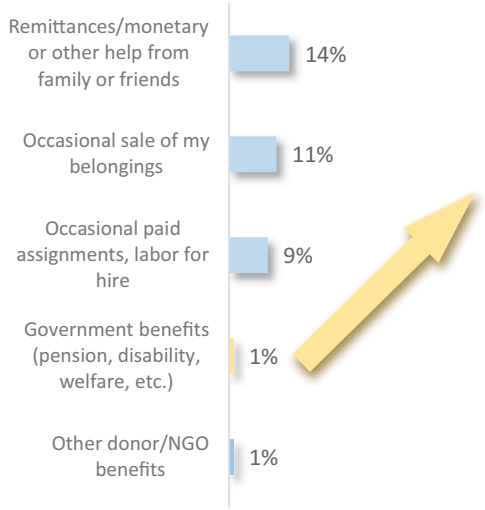
Sample: Smallholder farmers, n=5,706
Multiple responses allowed

or less each month. Thirty-two percent said they need between 25,001 and 50,000 CFA ($42 and $84), and 19 percent of smallholder households require 100,001 CFA ($168) or more per month to manage their households (Figure 38). Half of smallholder households need less than $100 a month to survive, which means either they are focused on acquiring only basic needs or it is much less expensive to live in rural areas where you grow what you eat and do not pay rent.

Despite the seasonality of crops sometimes leading to an impending cash flow problem, household income among smallholder households in Côte d'Ivoire usually surpasses expenses, leaving a majority of farming households with a slight surplus from month to month. This phenomenon is not the same across countries. For example, the National Survey of Smallholder Households in Mozambique shows a different tendency, where smallholder families barely break even each month and typically have to spend more than what they earn.[18]

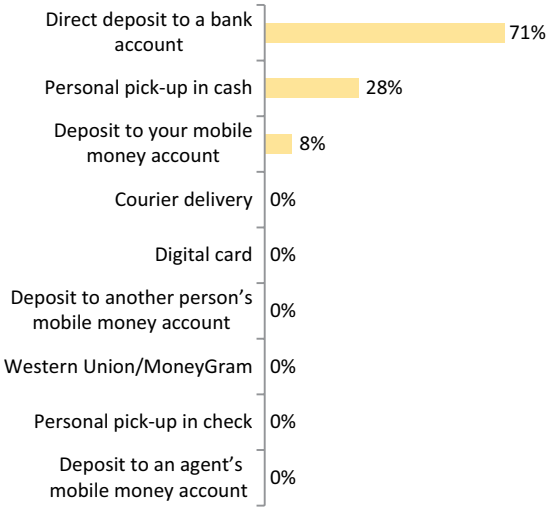
Those who have lower monthly needs tend to bring in a surplus. They are

FIGURE 36. Do you receive income from any of the following?



Sample: Smallholder farmers, n=5,706
Multiple responses allowed

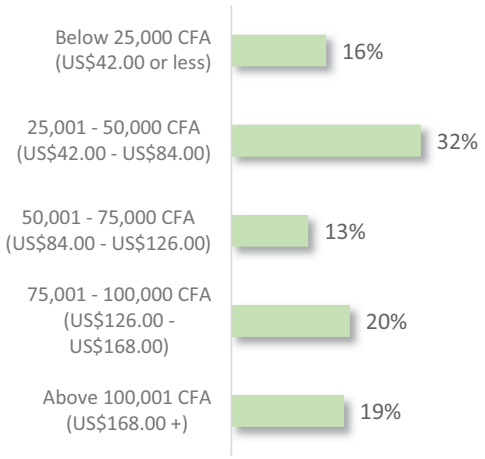
FIGURE 37. How do you usually get this government payment?



Sample: Smallholder farmers who receive income from government benefits, n=40
Multiple responses allowed

18 CGAP National Surveys & Segmentation of Smallholder Households in Mozambique, 2015-2016; http://www.cgap.org/publications/national-survey-segmentation-smallholder-households-mozambique.

FIGURE 38. What is the minimum amount your household needs to survive per month (for personal expenses)? Quintile



Sample: Smallholder households who gave a minimum amount for households' survival n=2,864

able to cover monthly expenses, and still have some left over. This is especially true for those needing less than 50,000 CFA. Here, upwards of six in 10 usually end the month with a surplus. Data also indicate that the higher the household size, the higher the risk that income will be insufficient. Analysis showed that over 50 percent of households with more than 10 members have insufficient income. Female-headed households are less likely to have a surplus (45 percent) than male-headed households (50 percent).

The greater a household's needs, however, the more vulnerable a household is to falling short each month.

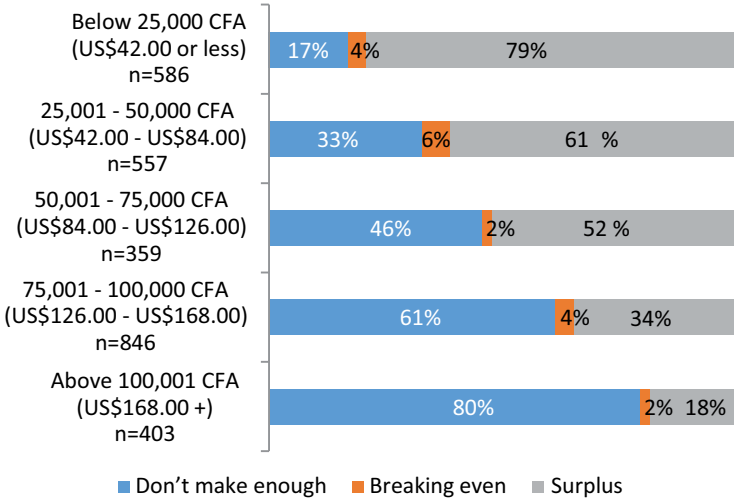
Eight in 10 households that require 100,001 CFA or more per month fall short, far more than among smallholder households with lower minimum monthly expenses (Figure 39).

While lower-income smallholder households are vulnerable, they report more budgeting within means and a lower incidence of falling short. Self-reported data also suggest that lower-income households have a little bit of extra money each month that can be redirected into a financial account, potentially increasing this group's attractiveness as a consumer segment.

Traditional spending framework and prudent spending

Expenses for smallholder households reflect a conventional spending frame-

FIGURE 39. What is the minimum amount your household needs to survive per month (for personal expenses) and is your income sufficient?



Sample: Smallholder houdeholds who gave amount of survival & income in each category

work, where smaller expenses are incurred more regularly than larger expenses (Figure 40).[19] Grocery expenses are the most common frequent expense for smallholders. Grocery expenditures could potentially serve as a merchant channel for expanding the digital financial ecosystem, given how much of the population this touches.

Apart from grocery expenses, bills (including utilities, rent, or airtime) and transportation costs are incurred more often. Other larger expenses, such as investments, educational expenses, home repairs, or large purchases, are incurred infrequently, if at all.

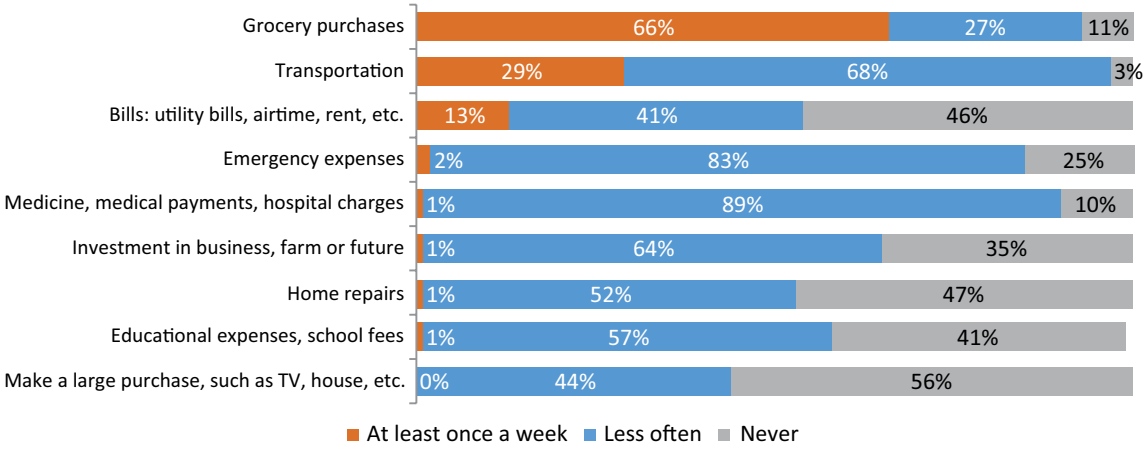
The presence of a traditional spending framework among smallholder farmers is a characterizing factor. This framework is not always present in other countries to the extent it is in Côte d'Ivoire. In Mozambique, for example, smallholder households do not have smaller, regular expenses; instead they have larger, infrequent expenditures.[20]

Male and female smallholders spend at a slightly different frequency. Women are more likely to spend on a weekly basis for groceries, while men have a greater tendency to pay for transportation and bills (Table 8). Differences also exist on a rural versus urban basis, with urban households spending more frequently on groceries and transportation.

Transactions typically made with some regularity, such as paying utility bills, were not made in the recent past. Just under one-quarter of smallholder households had paid utility bills in the 90 days before the survey. In the past 90 days, only as much as a fifth had deposited money or withdrawn money, only 15 percent had received money from family or friends, and a quarter had sent money to family members or friends (Figure 41).

Smallholder households have few resources, typically bring in limited funds, and are still obligated to pay school fees and household costs. Yet there was not a high frequency of transactions in the three months before this national survey of smallholder households. This suggests that the period for paying school fees was over at the time of the survey,

FIGURE 40. How often do you make each of the following expenses?



Sample: Smallholder households, n=5,706
Ranking by once a week

19 Expense question displayed in Figure 40 did not include agricultural inputs, such as seed and fertilizer, specifically, and instead focused on broad-based household needs. Farming was only specific as a part of investments.

20 Ibid.

TABLE 8. Expenses by demographics

Expense	1st column (At least once a week) 2nd Column (Less often) 3rd Column (Never)											
	Gender						Setting					
	Male (%)			Female (%)			Rural (%)			Urban (%)		
Groceries	56	23	17	77	17	5	65	21	12	75	16	8
Transportation	34	61	3	24	72	2	28	68	3	52	43	3
Bills (utilities, mobile, rent, taxes, etc.)	16	43	36	9	27	58	13	34	48	18	59	19
Emergencies	2	45	18	3	29	34	2	38	26	3	33	15
Medical/health/hospital	1	82	6	1	71	16	1	77	11	2	82	5
Investments in business, farm or future	1	58	26	1	36	46	1	48	35	1	47	31
Education/school fees	0	57	37	1	32	59	1	45	48	1	59	33
Home repairs	0	57	26	1	23	60	1	42	41	0	41	38
Large purchases (TV, moto, house, etc.)	0	37	46	0	17	68	0	27	57	0	33	46

Sample: Smallholder households, n=5,706
Note: Due to rounding, percentages within demographic may not equal 100 percent.

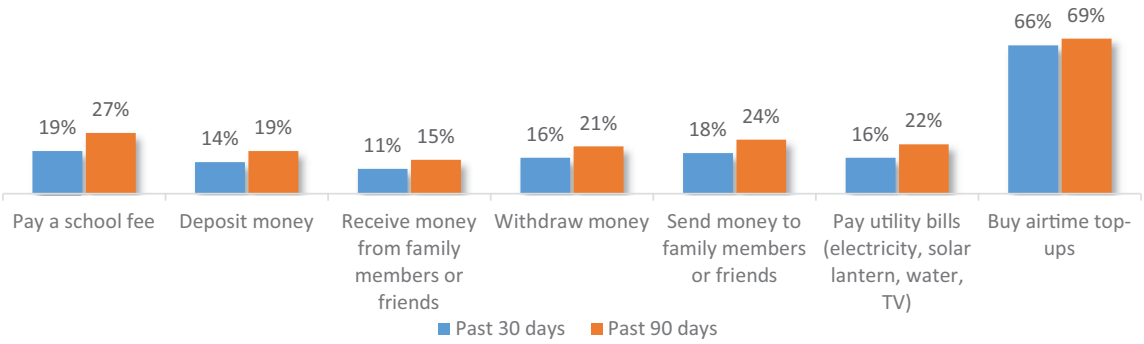
and since smallholder households are predominantly located in rural areas, they most likely live in their own houses, do not have electricity, and therefore may not have monthly bills to pay.

Risky money management practices leave few options to mitigate an emergency.

Smallholders find themselves in at-risk situations despite their best intentions and desires. They recognize the importance of sound financial behaviors, such as saving money and preparing for unexpected events, but despite their best efforts, some have debts and/or expenses greater than their savings and income.

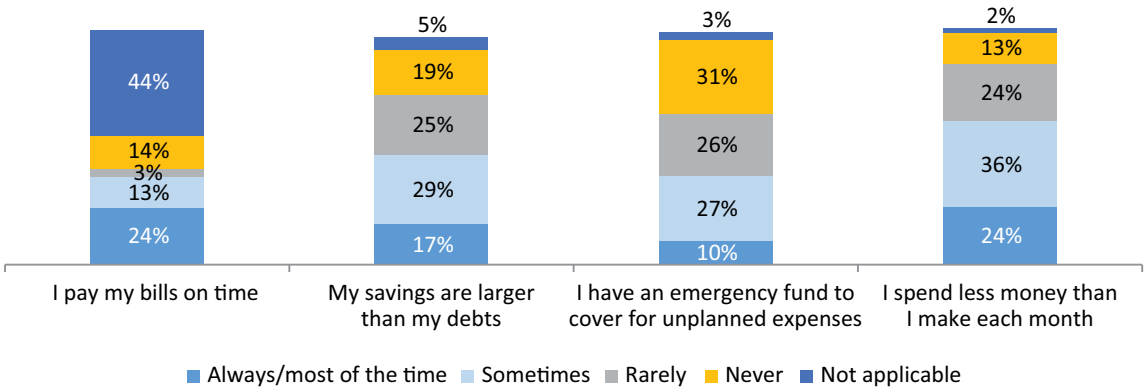
Twenty-four percent of smallholders feel they always/most of the time spend less than they make. They also report they often cannot pay their bills on time, although 44 percent report that they do

FIGURE 41. Did you do the following activities AT LEAST ONCE in the past 30/90 days?



Sample: Smallholder farmers, n=2,949

FIGURE 42. How often does the following apply to you?



Sample: Smallholder farmers, n=2,949

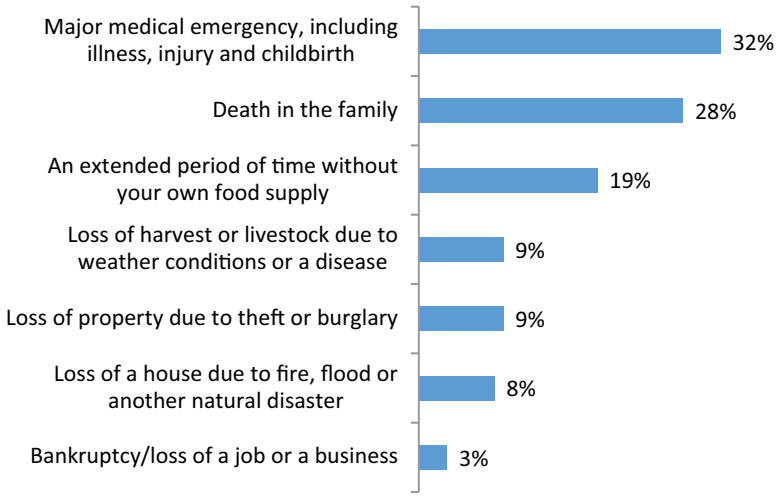
not have bills to pay (Figure 42). This could support the theory that they make tough decisions about what to pay and what not to pay each month to be able to live within their monthly incomes.

Few smallholders have a consistent emergency fund. While saving occurs frequently, the amount saved is minimal (Figure 42). Their inability to access resources and invest limits the options available to get out of poverty.

Less than half of smallholder households plan to manage unexpected expenses. The most common plans are geared toward coping with a major medical emergency, followed by a death in the family. Still only a third of smallholder families maintain an emergency plan for these events (Figure 43). Few have a plan for the loss of harvest or livestock due to weather or disease, and loss of a house due to fire, floods, or other natural disasters. Very few have plans for how to face bankruptcy.

While most smallholders do not have explicit plans to manage a variety of unexpected expenses, they do exercise

FIGURE 43. Does your family have a plan to manage these unexpected expenses, which might result from the following?



"Yes" answers
Sample: Smallholder farmers, n=2,949

Table 9. Saving methods, by demographics

Number of savings methods	Total (%)	Gender (%)		Education (%)*	
		Men n=1,858	Women n=1,091	Attended at least some school n=1,195	Did not attend school n=1,754
0	16	15	17	15	16
1	48	46	50	41	52
2	26	26	25	28	24
3	8	9	6	10	6
4	3	3	2	5	1
5	1	1	1	1	1
6	0	0	0	0	0
7	0	0	0	0	0

Sample: Smallholder farmers, n=2,949

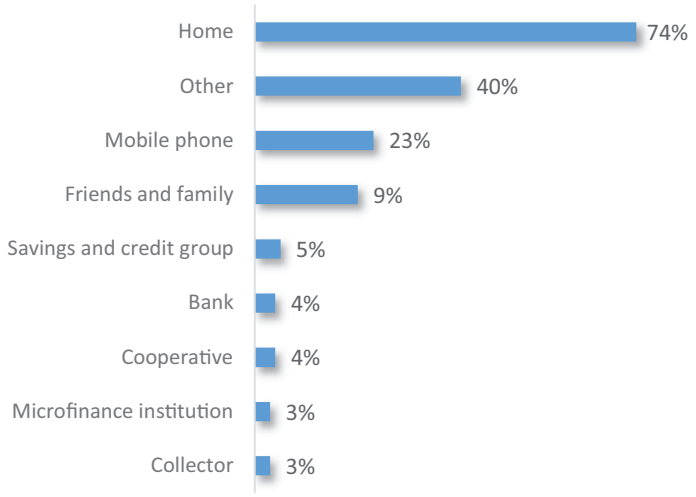
general financial preparedness. In the past year, most saved money (Table 9):

- 84 percent of smallholders report saving money through at least one mechanism
- 11 percent report saving through three or more mechanisms
- There is a small difference in savings across men and women
- The average number of savings channels used among smallholders is 1.37

The savings channels that smallholders tend to use are informal, and within the home (74 percent saved at home) (Figure 44). Only 5 percent used a formal banking service.

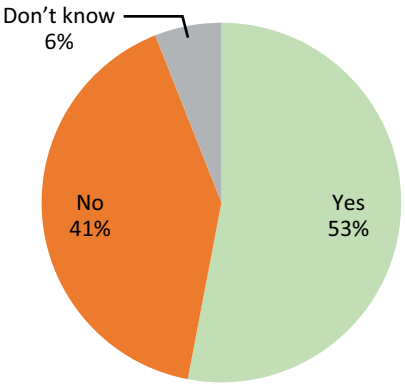
There are some demographic differences in tendency to save, most substantively by education level. Close to eight in 10 (79 percent) smallholders who did not attend any school saved through at least one channel in the past 12 months, compared with 86 percent of smallholders who did attend school. This disparity

FIGURE 44. In the past 12 months, have you saved money with any of the following groups?



"Yes" answers
Sample: Smallholder farmers, n=2,949

FIGURE 45. In the event of an emergency, could you get extra money through relatives sending money or by selling assets?



Sample: Smallholder farmers, n=2,949

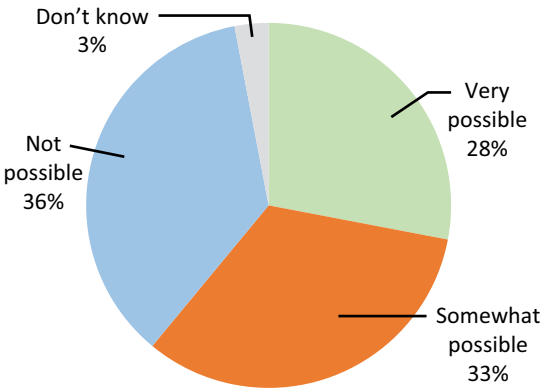
increases when considering the diversity of savings channels: 8 percent of smallholders who did not attend school used three or more savings channels, compared to 16 percent who did attend school, and they used three or more channels.

Even with savings, options for liquidity are limited. Just over half of smallholders think they could get extra money to cope with an emergency by asking relatives to send money or by selling assets (Figure 45). Still, the possibility of coming up with a modest amount of money—44,000 CFA (about US$75)[21]—in the next month gave some pause. Just over one-quarter said it was very possible (Figure 46). More than a third said it was not possible to come up with this amount of money in a month. For those who said it would be possible (61 percent said "very" or "somewhat" possible), they would most likely go to family or friends for the money (42 percent) or draw it from their limited savings (28 percent).

Unable to cope with negative events that affect them

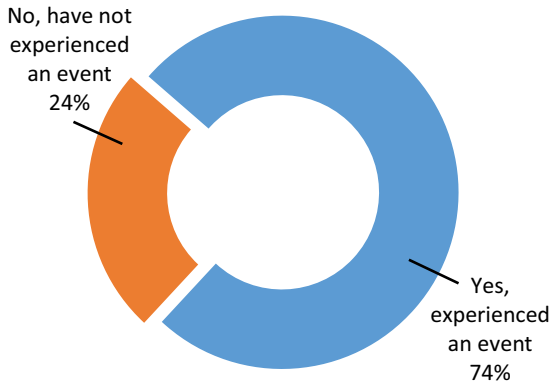
More than seven in 10 smallholders experience financial shocks and major events in the year before the survey (Figure 47). A significant number of smallholders experienced multiple financial shocks over the past year. The most frequently reported event was a

FIGURE 46. Imagine that you have an emergency and you need to pay 44,000 CFA. How possible is it that you could come up with 44,000 CFA within the next month?



Sample: Smallholder farmers, n=2,949

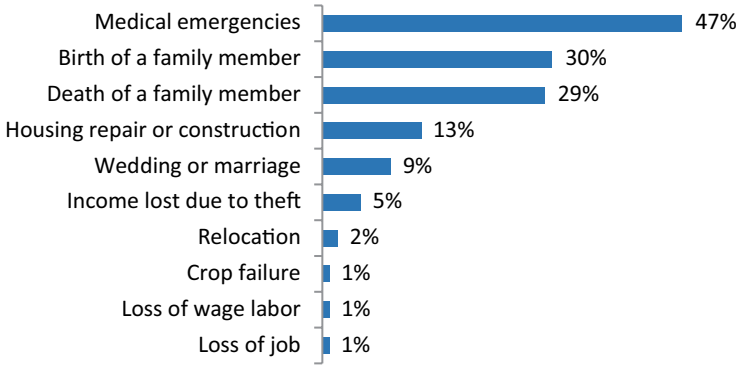
FIGURE 47. In the past 12 months, have you experienced any events?



Sample: Smallholder farmers, n=2,949

21 This amount was derived from the World Bank Global Findex question series, which tests whether respondents could come up with a nominal amount, set at 1/20th GNI per capita in local currency. Source: http://bit.ly/1QqNaHl.

FIGURE 48. In the past 12 months, have you experienced any of these events?



Sample: Smallholder farmers, n=2,949
Multiple responses allowed

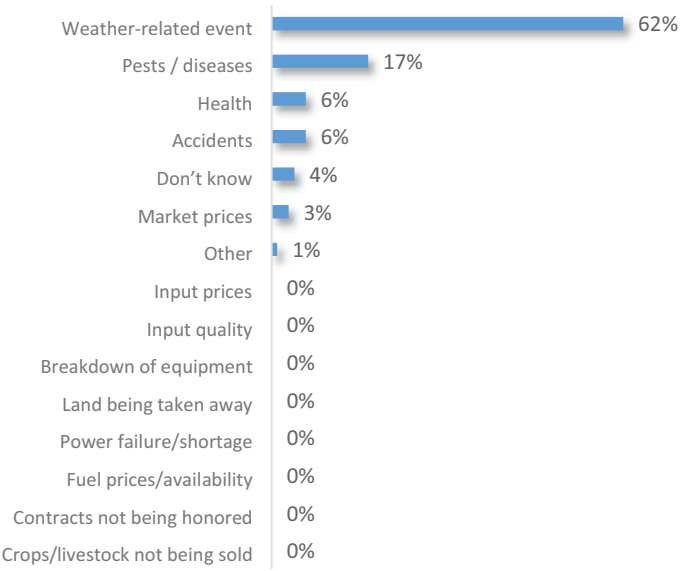
medical emergency, followed by a birth or death in the family (Figure 48).

Smallholders feel weather poses the greatest risk to their household agricultural activities (Figure 49). In the past three years, almost 70 percent had their agricultural activities seriously affected by a weather-related event; pests or diseases affected just over a third (Figure 50).

The three major regions of Côte d'Ivoire generally face the same types of unexpected events, but there are some regional nuances. Problems with pests or diseases are more prevalent in the Fôret Ouest and Fôret Est regions. Unexpected market price fluctuation was not a major issue across the regions (Figure 51).

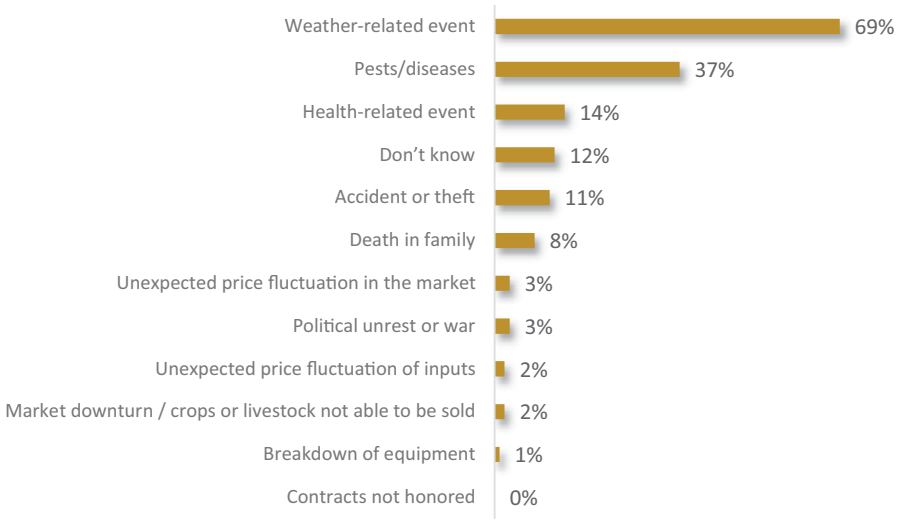
Smallholders tend to do one of two things when they experience loss or shocks: they use any savings that they have to address the problem, or they do nothing. A smaller number will take out a loan to get them through the shock or loss. Over half (52 percent) of those who say they would do nothing, also say they do not have a savings account. Furthermore, the younger and less educated farmers are, the more likely they will do nothing.

FIGURE 49. What poses the most significant risk to your agricultural activities?



Sample: Smallholder farmers who participate in household's agricultural activities, n=2,751

FIGURE 50. Have your agricultural activities been seriously affected by any of the following events in the past three years?



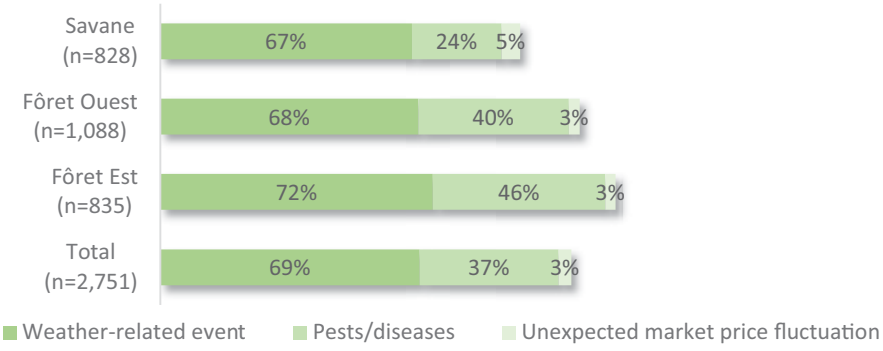
Sample: Smallholder farmers who participate in household's agricultural activities, n=2,751

A health issue is most likely to prompt using savings or loans, more so than damage to the farm by way of pests and disease. In fact, farmers mostly do nothing when weather causes a loss on their farm (Figure 52).

Minimal water supply

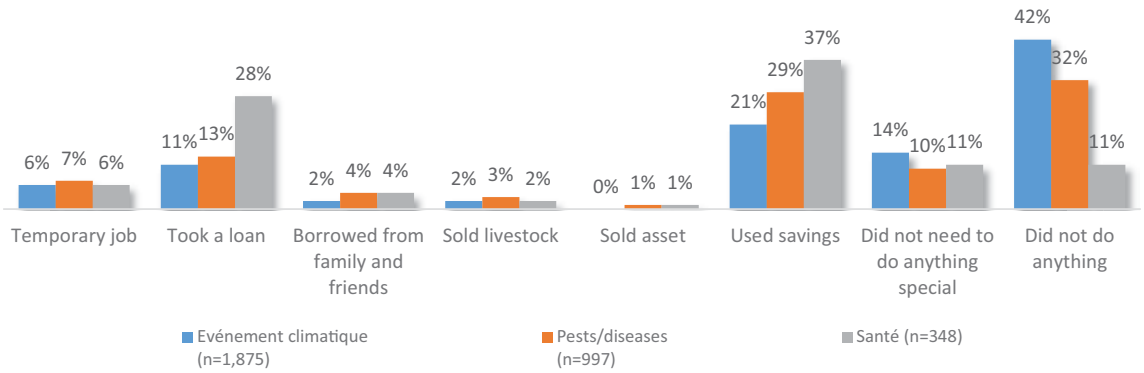
One-third of smallholder farmers indicate that their households' farming activities are affected by intermittent water supplies. Close to two in 10 (19 percent) have intermittent access to a water supply that does not affect their agricultural activities. About one-quarter (23 percent) report always having enough water for their agricultural activities and another quarter have enough water, but also report that more water would allow them to expand their agricultural activities (Figure 53).

FIGURE 51. Have your agricultural activities been seriously affected by any of the following events in the past three years?



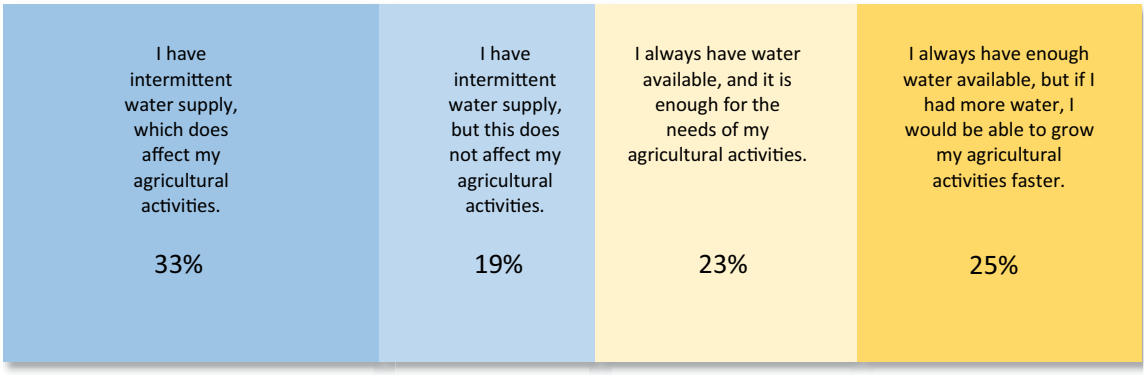
Sample: Smallholder farmers who participate in household's agricultural activities in each region

FIGURE 52. How did you mainly cope when this happened?



Sample: Smallholder farmers who say their agricultural activities have been seriously affected by each category

FIGURE 53. Which of the following best describes your water situation?



Sample: Smallholder farmers who participate in household's agricultural activities, n=5,354

3. RISKS AND MITIGATION

Tools for agricultural risk mitigation

Known importance, desire for risk mitigation

Smallholder farmers face numerous risks common to agriculture. Weather shocks like droughts and flood, pests and diseases, lower-than-expected yields, and insufficient crop storage are known concerns. The household depends heavily on its own agricultural output—consuming, trading, and selling its crops and livestock. Risk mitigation, using whatever means at hand, is therefore critical; smallholder households want to mitigate against risk even more than current circumstances allow.

Working to mitigate risks often involves planning and accessing resources, such as savings mechanisms, that often may be outside the reach of smallholders. To gauge their ability to mitigate risk, the National Survey of Smallholder Farmers in Côte d'Ivoire assessed various tools that help foster:

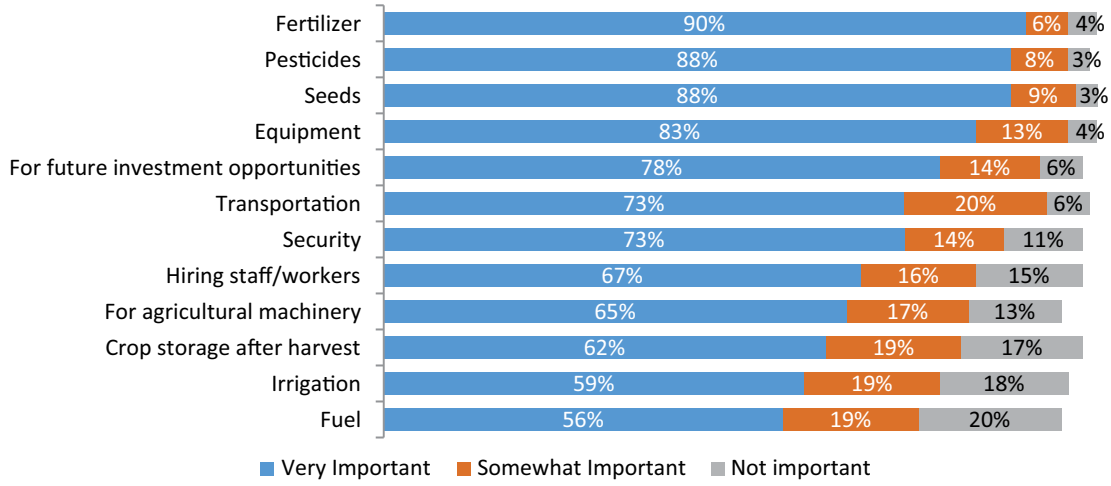
- Preparedness, in the form of savings for known agricultural expenses.
- Monetization of crops, in the form of being able to store and sell goods.
- Maintenance of land, by being able to manage the land (e.g., weeding, planting).
- Knowledge, by way of having information channels related to agriculture.

Preparedness: Importance and ability to save for needs

A majority of smallholders see the importance of keeping money aside for key agricultural expenses, most notably seeds, fertilizer, pesticides, and equipment (Figure 54). There is less perceived relevance in keeping money aside for fuel, irrigation, or crop storage.

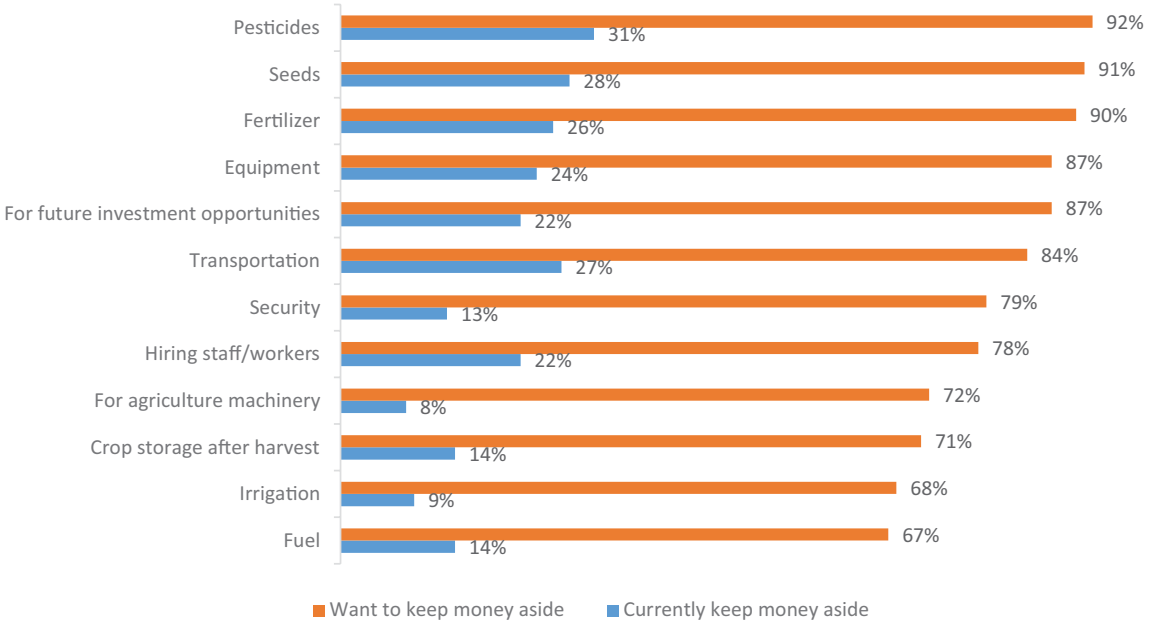
There is a large disparity between what smallholders want to do and what they actually practice when it comes to agricultural savings (Figure 55). In addition to considering it important, most smallholders *want* to be able to keep money aside for their agricultural expenses, particularly for those activities most closely connected with planting crops.

FIGURE 54. How important is it to keep money aside for the following agricultural needs?



Sample: Smallholder farmers who participate in household's agricultural activities, n=2,751
Ranking by very important

FIGURE 55. Do you want to keep money aside for any of the following agricultural needs? vs. Do you currently keep money aside for any of the following agricultural needs?



Sample: Smallholder farmers who participate in household agricultural activities, n=2,751

The desire of smallholder households to save surpasses their actual practice, sometimes by 2 to 1. The gap between aspirations and actual savings might inadvertently suggest that there is less saving within the population than actually occurs. Smallholders, in fact, save for a number of purposes (Figure 55).

Overall, about half (49 percent) of smallholders set aside money for at least one agricultural expense over the course of a season, whether it is for harvesting, equipment, staffing, transportation, or future investment opportunities. On average, the Ivoirian smallholder farmer is saving for just under three different agricultural expenses or pursuits (2.37), such as pesticides, seeds, or fertilizer. Close to one-quarter of smallholders keep money aside for five or more of these expenses (Table 10).

The need for savings crosses over a number of items, and smallholders have to make potentially tough choices on which items need savings the most. Therefore, the gap between what farmers want to save for and what they actually save for could reflect a prioritization of limited resources. They save what they can, when they can, and put those savings where it will help them most.

Smallholder households present themselves as less engaged savers. But they also recognize the necessity of savings and are doing what they can to plan for needs or anticipate unfortunate circumstances, both of which can help mitigate risks.

Significant differences in number of expenses saved for do not emerge by gender or education (Table 10).

Opportunities for broadening savings as a risk mitigation tool

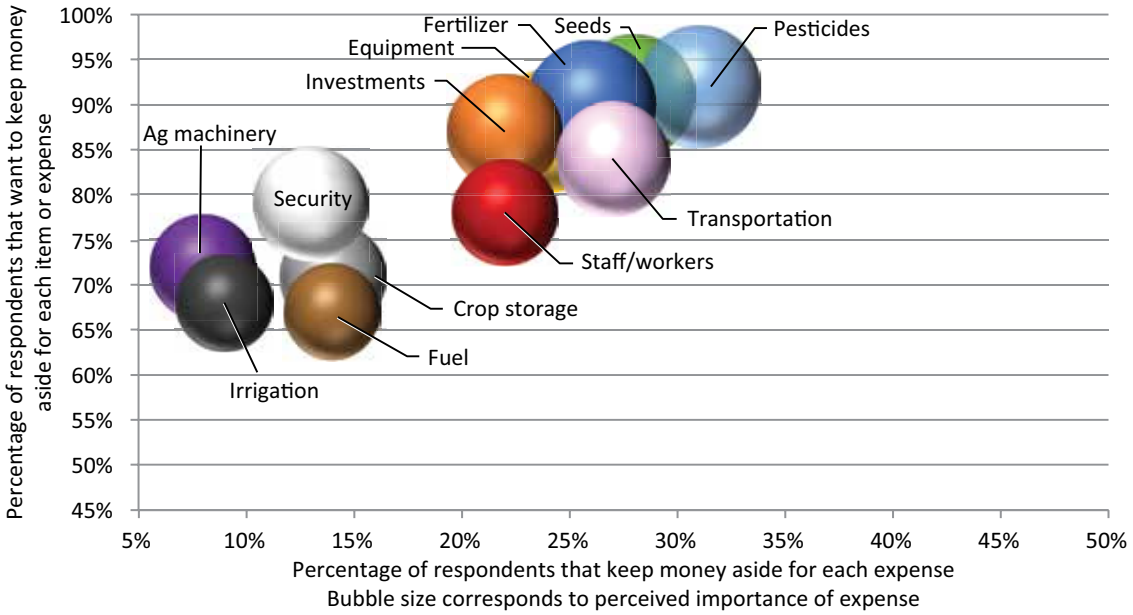
Figure 56 combines all three dimensions of agricultural expenses: (1) importance of saving for them, (2) desire to save for them, and (3) current practices. The importance of the item is equivalent to the size of the bubble on a 10-point index, with the largest bubbles

TABLE 10. Keeping aside money for agricultural expenses or pursuits, by demographics

Number of expenses	Total (%)	Gender (%)		Education (primary or higher)(%)*	
		Male	Female	Attended	Did not attend
None	51	49	55	47	54
Net (1+)	49	51	45	53	46
1	8	9	7	8	8
2	7	7	6	7	7
3	5	5	6	5	5
4	5	5	4	6	4
5	5	6	5	5	5
6	4	6	4	5	3
7	4	4	3	6	3
8	3	5	2	3	2
9	2	3	2	3	2
10	2	2	2	2	2
11	2	2	2	2	1
12	2	2	1	2	2

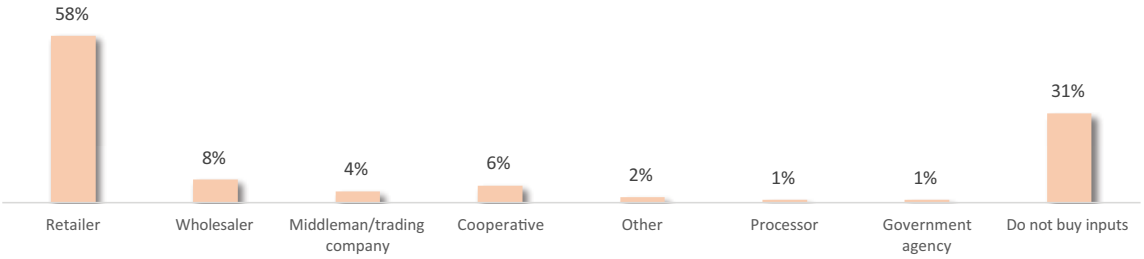
Sample: Smallholder farmers who participate in household agricultural activities, n=2,751

FIGURE 56. Perceptual map: Importance, desires and possession of agricultural expense



Sample: Smallholder farmers who participate in Agricultural activities, n=2,751

FIGURE 57. Who do you normally purchase your agricultural and livestock inputs from?



Sample: Smallholder farmers who participate in household's agricultural activities, n=5,354
Multiple responses allowed

perceived as the most important. The percentage of respondents who currently save is shown as a percentage on the X (horizontal) axis, and the desire to keep money aside for that purpose is represented as a percentage on the Y (vertical) axis.

Pesticides, equipment, fertilizer, and seeds, taken together, are the most important and most desired expenses, and the ones a farmer most commonly saves toward. This suggests that savings and layaway products or, in some cases, credit mechanisms for pesticides, equipment, and seeds could be good options for bundled products that appeal to smallholders.

Investments and transportation earn almost as much importance and interest as pesticides, equipment, and seed, yet similarly, smallholders also save for these. This suggests some opportunity and potential appeal in financial mechanisms to put more farmers within reach of investment and transportation options.

Saving for other agricultural interests such as security, irrigation, fuel, and agricultural machinery are relevant to smaller majorities of smallholders. Fewer find these as relatively important or want to save for them, and fewer are currently saving for them. Expanding the use of these mechanisms for proactive risk management would have to include a more robust value proposition to generate more widespread interest.

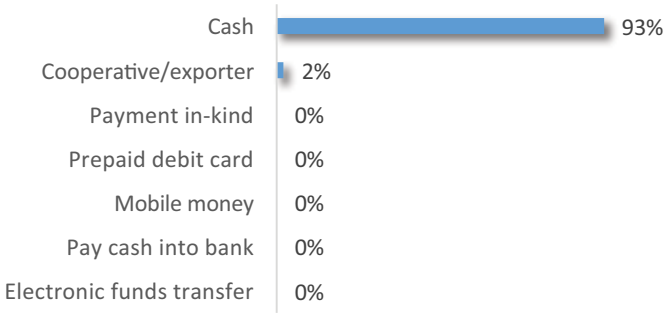
Preparedness: Purchasing inputs and contracts

About two-thirds of smallholders purchase inputs such as seeds, fertilizers, or pesticides, and they buy them largely from retailers. Small portions of smallholders buy from wholesalers, middlemen, or cooperatives (Figure 57). Transactions across all sources tend to be in cash and paid at the point of purchase (Figure 58). Few smallholders have an option to pay later (Figure 59). This can strain their budgets and explains their emphasis on saving for inputs.

Monetization: Storing and selling goods

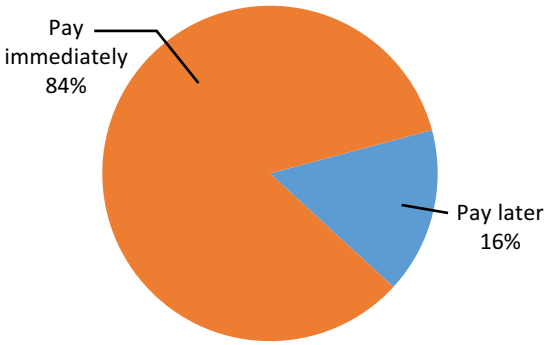
Though they may not be keeping cash aside for their agricultural needs, not all smallholder farmers are storing crops as a form of savings either. About half of all smallholders currently store crops after the harvest (Figure 60). The most commonly stored crop is rice (Figure 61), because most smallholder farmers grow this crop. Storage focuses almost exclusively on food or staple crops. The storage location is frequently in a granary or warehouse (49 percent) or at home (34 percent) (Figure 62).

FIGURE 58. How do you usually pay your suppliers of inputs?



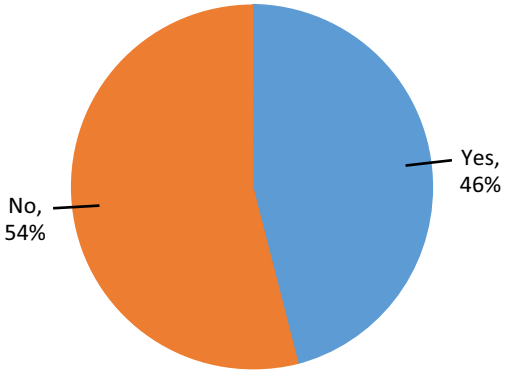
Sample: Smallholder farmers who purchase main agricultural and livestock inputs, n=3,795
Multiple responses allowed

FIGURE 59. Do your suppliers give you the option to pay them later or do you have to pay immediately?



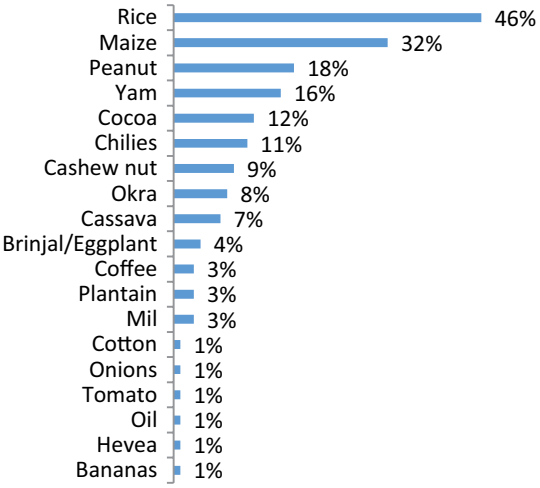
Sample: Smallholder farmers who pay suppliers for inputs, n=3,681

FIGURE 60. Do you currently store any of your crops after the harvest?



Sample: Smallholder farmers who participate in household's agricultural activities, n=2,751

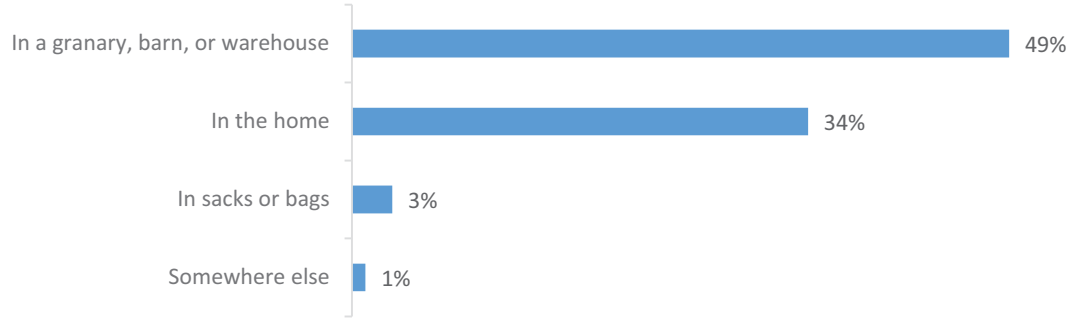
FIGURE 61. Which crops do you normally store?



Sample: Smallholder farmers who currently store any crops after harvest, n=1,204
Multiple responses were allowed

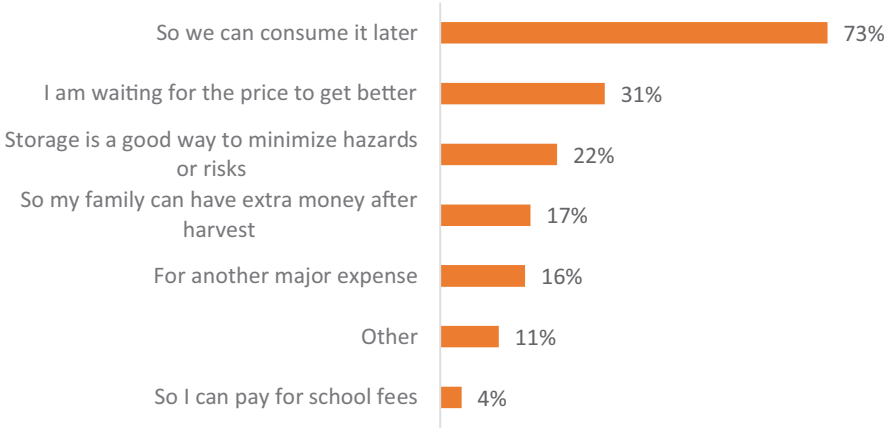
Crop storage also emerges as a tool for risk mitigation. The main reason for storing crops is so the family can consume them later, further emphasizing the dependence on their agricultural outputs for subsistence (Figure 63). Smallholders also use crop storage as a form of monetization in the short term or long term. Close to a third (31 percent) store their crops until they get the market price they want, indicating their willingness to wait to maximize the returns from their crop. Almost one-quarter (22 percent) of smallholder farmers view crop storage explicitly as a risk mitigation strategy in the event of an unforeseen hazard.

FIGURE 62. Where do you store your crops?



Sample: Smallholder farmers who currently store any crops after harvest, n=1,204
Multiple responses allowed

FIGURE 63. Why do you currently store any of your crops?



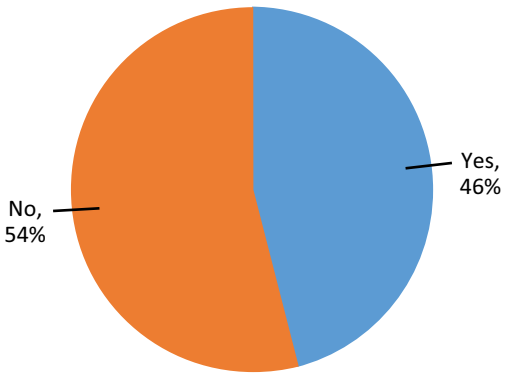
Sample: Smallholder farmers who currently store any crops after harvest, n=1,204
Multiple responses allowed

The reasons half of smallholders do not store their crops after the harvest (Figure 64) are mainly because there are no leftover crops or because there is an immediate need for money after the harvest (Figure 65).

Most smallholders sell to a retailer (Figure 66), usually in the village, sometimes at a local market (Figure 67). A few sell their crops at the farm gate (16 percent). Other less common sales outlets include regional markets or a neighboring farm.

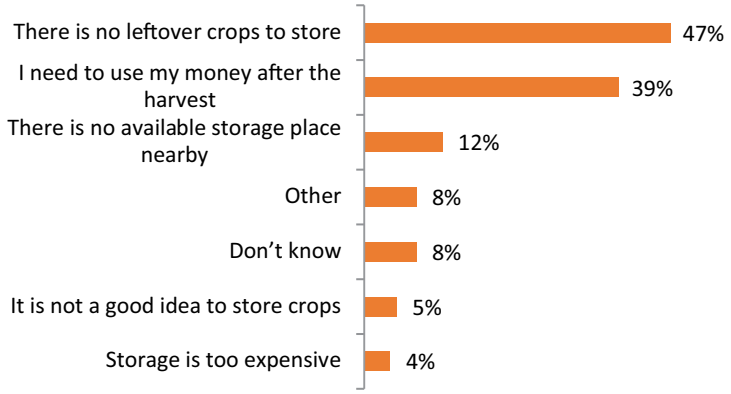
A majority of smallholder farmers choose their market based on factors

FIGURE 64. Do you currently store any of your crops after the harvest?



Sample: Smallholder farmers who participate in household's agricultural activities, n=2,751

FIGURE 65. Why do you not currently store any of your crops?



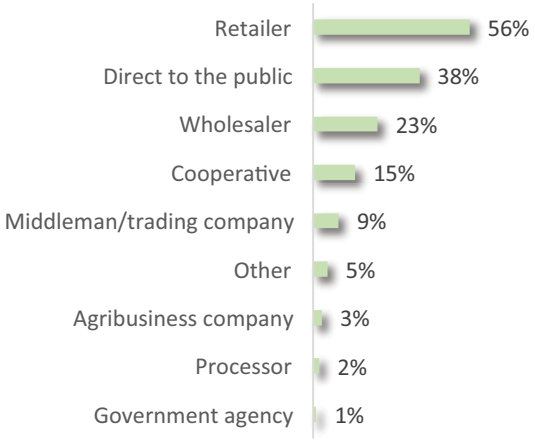
Sample: Smallholder farmers who currently do not store any crops after harvest, n=1,547
Multiple responses allowed

related to price. Some are motivated by the perceived competitiveness of the prices at their market (52 percent), 27 percent report they do not think it is worth transporting their crops to a bigger market, and a quarter do not have access to transport to get to other markets (Table 11).

A majority of smallholders think they are getting the current market price for their goods (Figure 68). The most common reason that smallholders report they do not get the current market price is that they are taken advantage of by their customers, but a few say they do not have the ability to transport their crops to a better market (Figure 69).

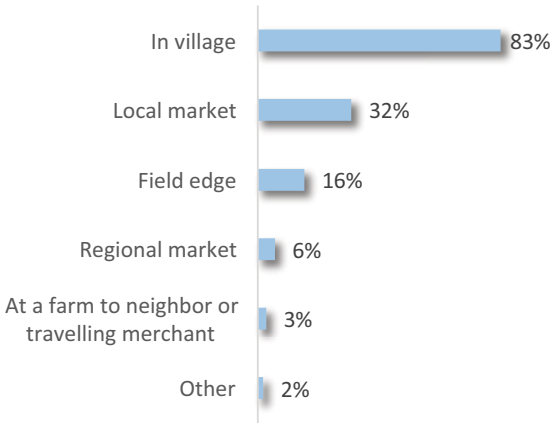
In addition to capturing where smallholders bring their goods to sell (Figure 67), the survey also asked about circumstances surrounding the selling of goods. Nearly all sales happen outside of a formal agreement (Figure 70), and transactions are almost exclusively done in cash. No other form of payment surpasses 2 percent (Figure 71).

FIGURE 66. Who do you sell your crops and livestock to?



Sample: Smallholder farmers who grow and sell crops, n=4,948
Multiple responses allowed

FIGURE 67. Where do you normally sell your crops and livestock?



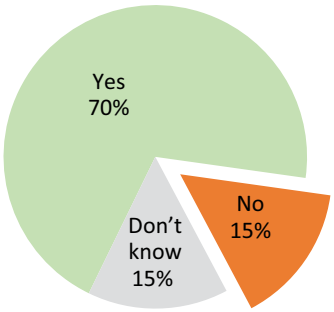
Sample: Smallholder farmers who grow and sell crops, n=4,948
Multiple responses allowed

TABLE 11. Why do you sell your crops and livestock at this location?

I get the best price at this market	52
Do not produce enough to transport to bigger market	27
I do not have access to transport to other markets	25
Poor road conditions to other markets	11
Cooperative organization	8
Other reason	7
I am not aware of prices at other markets	5

Sample: Smallholder farmers who know where crops and livestock were sold, n=4,917
Multiple responses allowed (%)

FIGURE 68. When you sell your crops and livestock, do you get the current market price?



Sample: Smallholder farmers who grow and sell crops, n=4,948

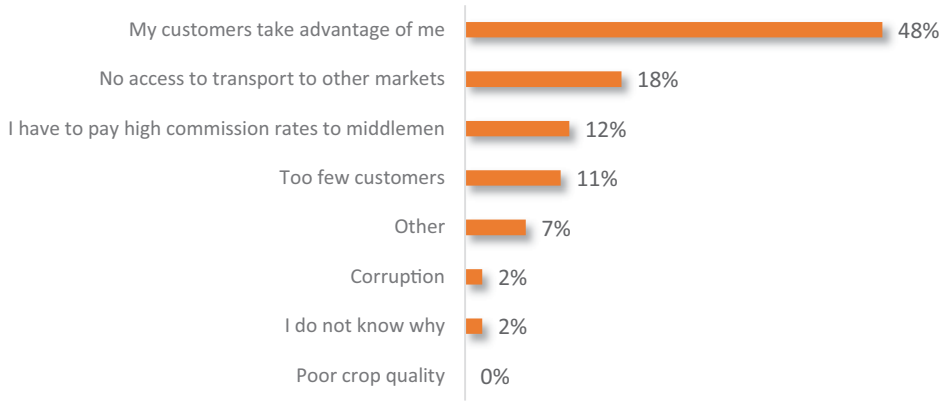
Monetization: Livestock as investments

Investing in livestock is not a significant means of risk mitigation for smallholders. Less than a quarter of smallholders have made this type of investment, but a large portion of those who currently have livestock view it as a form of investment (Figure 72).

Land maintenance: Resources

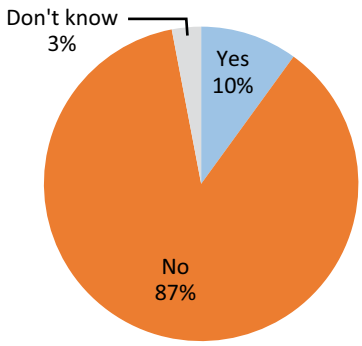
Smallholders view their family's agricultural activities as a household business. They tend to rely primarily on themselves and their families for labor to support their agricultural activities. They turn first to family for help when they need it. Most smallholders use some sort of labor; only 11 percent report using none (Figure 73). Of those who do use labor, labor is throughout all phases of the crop cycle, from planting to harvest (Figure 74). Much smaller numbers of farmers use labor for selling crops.

FIGURE 69. Why do you not get the current market price?



Sample: Smallholder farmers who do not get current market price for crops and livestock sold, n=727
Multiple responses allowed

FIGURE 70. Do you have a contract to sell any of your crops or livestock?



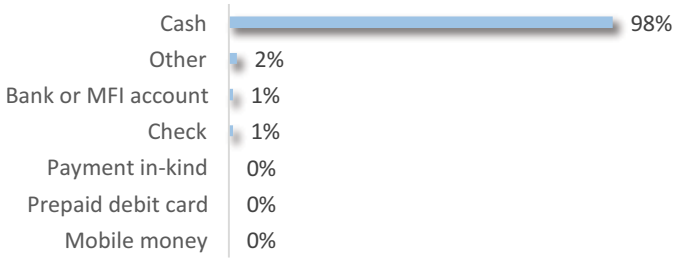
Sample: Smallholder farmers who grow and sell crops, n=4,948

Knowledge gathering: Information sources

Smallholders most frequently turn to their families, friends, and community for information on agricultural activities, followed by cell phone/SMS (Table 12). All other sources are used much less often, with some getting only single digits for frequent use.

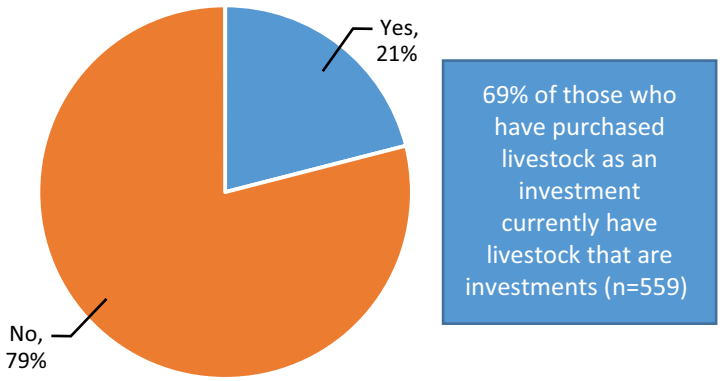
Friends and family, including the respondents' spouses, are primary sources of financial advice. Fifty-seven percent of smallholders first go to their families, and just under half confer with their spouses. No other source rates above 6 percent (Figure 75). Some smallholders (both men and women) turn to groups or associations related to farming, saving, or credit; a quarter are members of an agricultural association and a few women have access to women's only organizations (Figure 76). This indicates an opportunity for more natural aggregation points.

FIGURE 71. How do you usually get paid for what you sell?



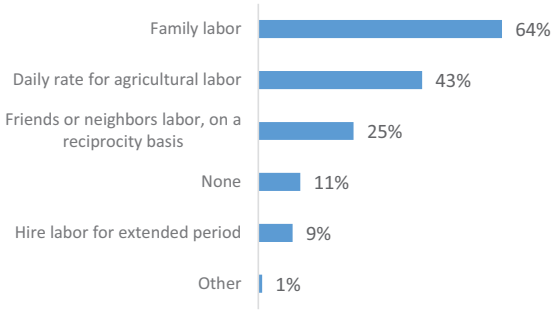
Sample: Smallholder farmers who grow and sell crops, n=4,948
Multiple responses allowed

FIGURE 72. Have you ever purchased livestock as an investment?



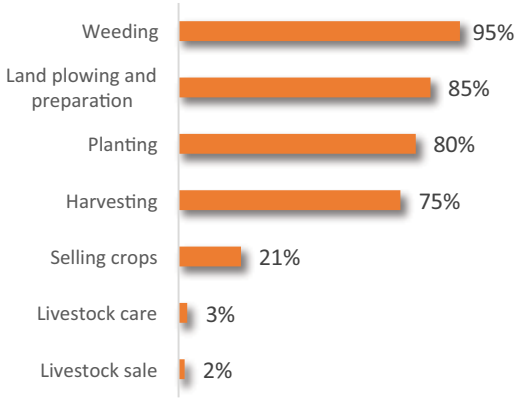
Sample: Smallholder farmers who participate in household's agricultural activities, n=2,751

FIGURE 73. For managing the land and livestock, what types of labor do you use?



Sample: Smallholder farmers who participate in household's agricultural activities, n=5,354
Multiple responses allowed

FIGURE 74. What do you use the labor for?



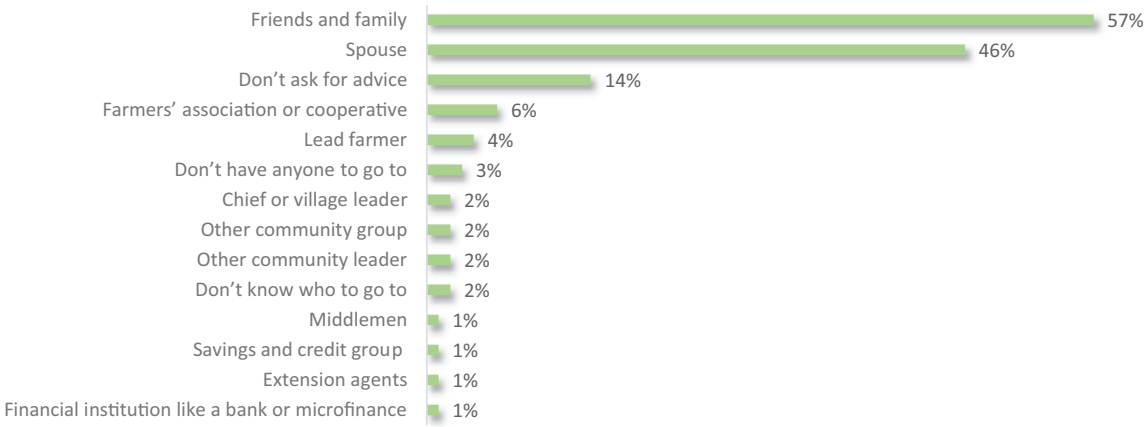
Sample: Smallholder farmers who use labor for managing land and livestock n=4,737
Multiple responses allowed

TABLE 12. How often do you use each of the following sources of information for agricultural activities?

	Daily (%)	Weekly (%)	Monthly (%)	More than monthly (%)	Never (%)
Friends or family members	**43**	**12**	**10**	**18**	**13**
Cell phone/SMS	27	5	2	4	55
Radio	19	11	5	8	49
Community members	17	10	7	11	45
Television	9	6	3	7	66
Religious leaders	5	12	3	5	66
Merchants	3	3	5	8	70
Cooperative	2	5	9	6	66
Input suppliers	2	4	9	10	65
Intermediaries/middlemen	1	1	2	5	77
Newspapers/magazines	1	1	2	2	88
Internet	1	1	1	1	93
School teachers	1	1	3	4	83
Government officials	0	1	4	6	75
Rural development agents/NGOs	0	1	5	5	76
Government extension workers	0	0	2	4	79

Note: Table shows rated sources of information only
Sample: Smallholder farmers who participate in household's agricultural activities, n=2,751

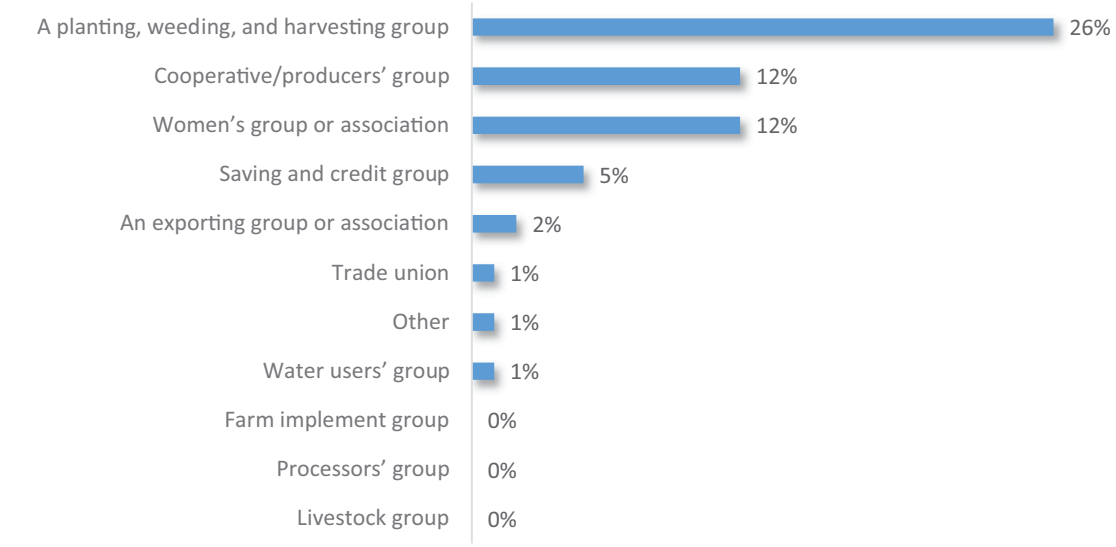
FIGURE 75. When it comes to financial or income-related advice, who do you regularly talk to?



Sample: Smallholder farmers, n=2,949
Multiple responses allowed

It also identifies a need for more information about financial- and income-related topics, especially as they pertain to risk mitigation. The concentration on family and friends as a source of financial advice, combined with the very limited exposure to other outside sources, suggests that there could be a lack of existing information channels for bringing new, current, and relevant news about financial mechanisms into smallholder farming communities. It also suggests that family, friends, and community members could be circulating information based on their own experiences, but not necessarily from a position of financial expertise.

FIGURE 76. Are you a member of any of the following groups or associations?



Sample: Smallholder farmers who participate in household's agricultural activities, n=2,751
Multiple responses allowed

4. MOBILE PHONE TOOLS

Mobile phones: A critical tool for households and agriculture in Côte d'Ivoire

Mobile phones are critical for smallholders, and farmers recognize them as such. A vast majority (86 percent) of Ivoirian smallholder farmers have their own mobile phone. In contrast, 69 percent of smallholder farmers in Uganda[22] and 46 percent of smallholder farmers in Mozambique have their own mobile phones.[23]

There is widespread importance placed on owning a mobile phone among smallholders in Côte d'Ivoire. They also recognize the relevance of mobile phones to their agricultural activities. Conversely, in Mozambique and Uganda there is less of a connection between mobile phones and meeting agricultural needs.

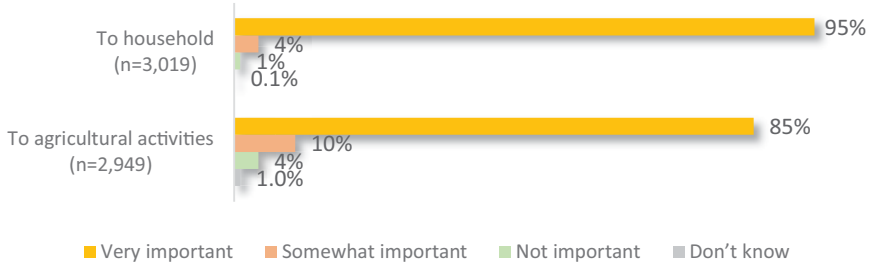
Perceived high importance, relevance to farming

The mobile phone itself is considered a very important device (98 percent of smallholders say that a mobile phone is "very" or "somewhat" important). That importance transfers almost fully to a phone as a household tool (93 percent deem it "very important") or an agricultural tool (85 percent deem it "very important") (Figure 77). Widespread recognized importance means that smallholder farmers do not need to be convinced that a mobile phone can help their home or their farm. They have already made that connection.

Limited knowledge

While mobile phones are important to the household and agricultural activities, smallholders see a mobile phone's main purpose to be communicating with friends and family. Running their businesses and accessing a mobile money account are second-tier benefits to having a mobile phone (Figure 78). The perceived utility of conducting financial transactions on a mobile phone is comparatively low. It is therefore imperative to sensitize farmers to the connection between their mobile phones or SIM cards and financial transactions and agricultural activities.

FIGURE 77. Regardless of the phone you have, how important is it to your household/agricultural activities to have a mobile phone?

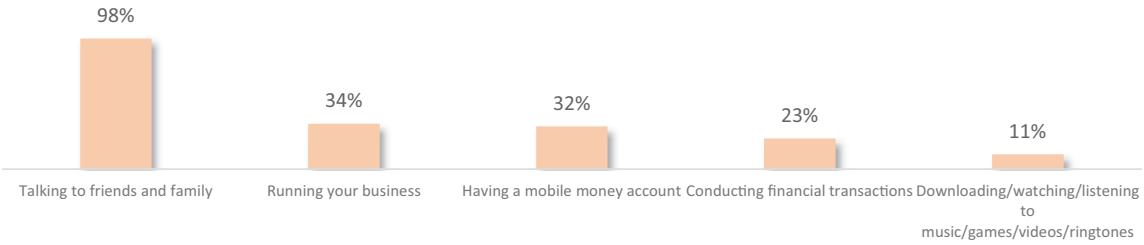


Sample: Smallholder households, n=3,019; Smallholder farmers, n=2,949

22 CGAP National Surveys and Segmentation of Smallholder Households in Uganda, 2015–2016; http://www.cgap.org/publications/national-survey-and-segmentation-smallholder-households-uganda.

23 CGAP National Surveys and Segmentation of Smallholder Households in Mozambique, 2015–2016; http://www.cgap.org/publications/national-survey-segmentation-smallholder-households-mozambique.

FIGURE 78. What are the benefits to having your own mobile phone or SIM card?



Sample: Smallholder farmers who have ever used a mobile phone, n=2,564
Multiple responses allowed

Widespread phone ownership, and use

Eighty-six percent of smallholder farmers have used a mobile phone (Figure 79), and of those who have used a mobile phone, an equal percentage (86 percent) have their own mobile phone. Most have used a basic phone, without internet capability (Figure 80). Feature and smartphone use is low (21 and 5 percent, respectively) among smallholders.

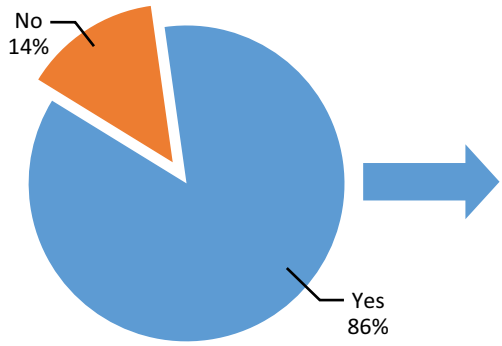
There can be multiple handsets in the household (Figure 81). This suggests that, with exposure, household members recognize the device's utility, even though that perceived utility does not yet extend beyond a communications tool.

Phone ownership is inclusive of both genders. A vast majority of both men and women (89 percent and 80 percent, respectively) have their own mobile phone. That said, phone ownership still incurs a 9-point gap by gender, indicating that women are still less likely to own a phone, even though many women have a handset.

Urban smallholders who used a mobile phone are only 10 points more likely to have a cell phone than rural smallholders (95 percent versus 85 percent).[24]

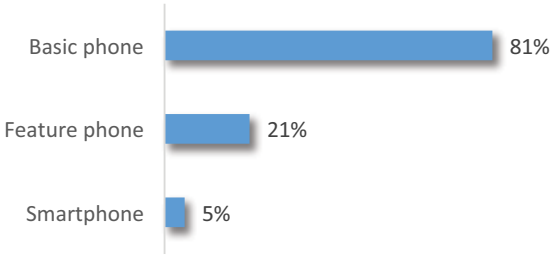
Ivoirian smallholder farmers with mobile phones typically use them to make and receive calls or to send and receive texts (Figure 82). Among farmers, phones are used less frequently for

FIGURE 79. Have you ever used a mobile phone?



Sample: Smallholder farmers, n=2,949

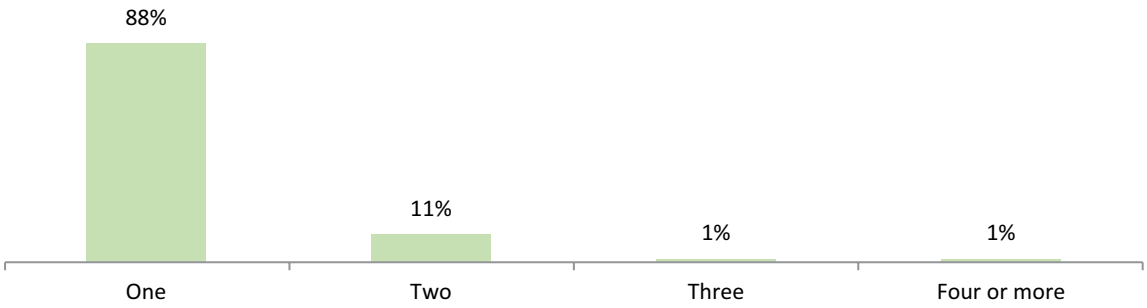
FIGURE 80. What type of phone have you used?



Sample: Smallholder farmers who have ever used a mobile phone, n=2,564

24 Urban/rural distinction information.

FIGURE 81. How many mobile phones do you own?



Sample: Smallholder farmers, who currently own a personal mobile phone, n=2,246

making financial transactions. Most financial transactions were made in the past 30 days or more before the survey, versus calls and texts, which were made in the past day or week.

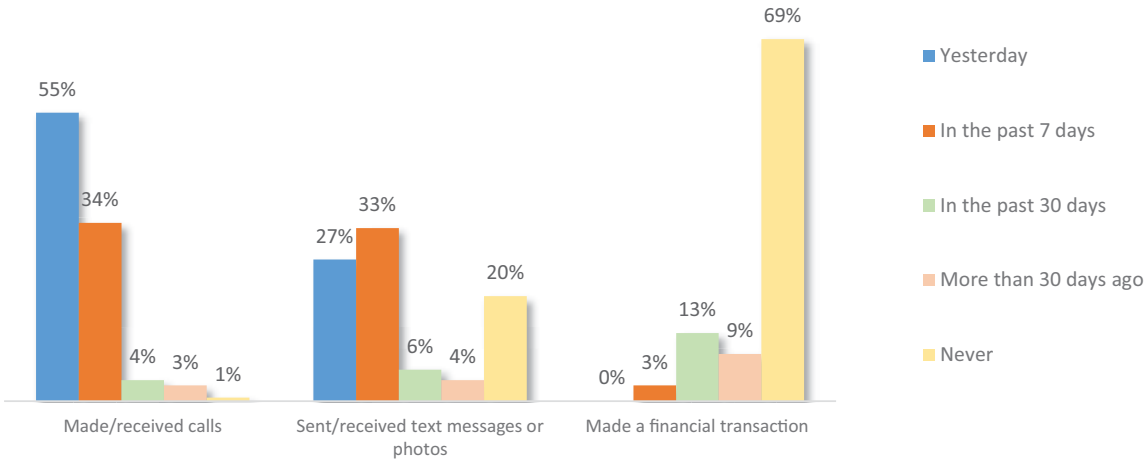
Data further show that men and women are equally as likely to have made financial transactions with a mobile phone (47 percent and 48 percent, respectively) and with the same frequency. This suggests that gender is not a barrier to accessing a financial account via a mobile phone for those who currently have a handset.

Interest in phone ownership

Smallholders who have not used a mobile phone (only 14 percent) show strong interest in using a handset. Over four in 10 (45 percent) are "very interested," and 28 percent are "somewhat" interested in mobile phone use (figures 83 and 84).

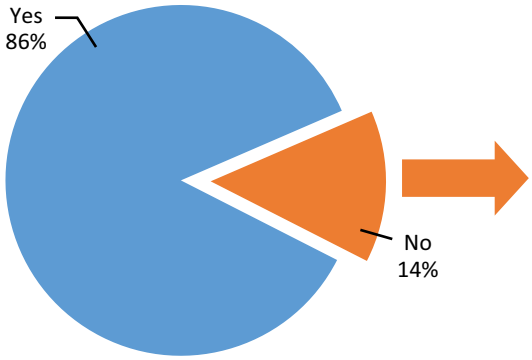
The main reason for not owning a mobile phone is the perceived cost of obtaining the phone. Nearly one-half of smallholders (44 percent) feel they do not have the means to purchase a handset (Table 13). There is no other barrier

FIGURE 82. Apart from today, when was the last time you performed the following activities on the mobile phone you use?



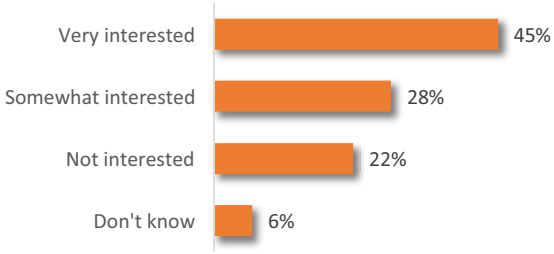
Sample: Smallholder farmers who currently own a phone or borrow or pay to use a mobile phone, n=2,392

FIGURE 83. Have you ever used a mobile phone?



Sample: Smallholder farmers, n=2,949

FIGURE 84. How interested would you be in using a mobile phone?



Sample: Smallholder farmers who have never used a mobile phone, n=385

that is as pervasive as the perceived cost of obtaining a handset. The limited network and challenges of illiteracy are the second and third barriers to ownership (each at 6 percent). This is static across demographic groups, including gender and age.

In addition to self-professed interest in using a phone, close to one-quarter of those who do not currently have a phone say they are "very likely" to purchase the device in the next 12 months (Figure 85). More than one third of smallholders are "not likely" to purchase a mobile phone in the next year.

TABLE 13. What is the main reason you do not have a mobile phone?

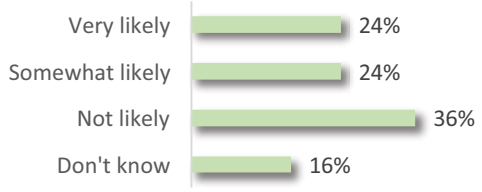
I don't have money to buy phone	44%
There is no network where I live/work	6%
Not able to read/write	6%
No specific reason	5%
I am not allowed to use a phone by my spouse or family	4%
I don't have a need to use a phone	4%
I don't have money to pay for airtime	1%
There is no place to charge a phone	1%
Other	26%

Sample: Smallholder farmers who currently do not own a phone but have used a phone, n=318

Smallholders have the necessary IDs to open an account

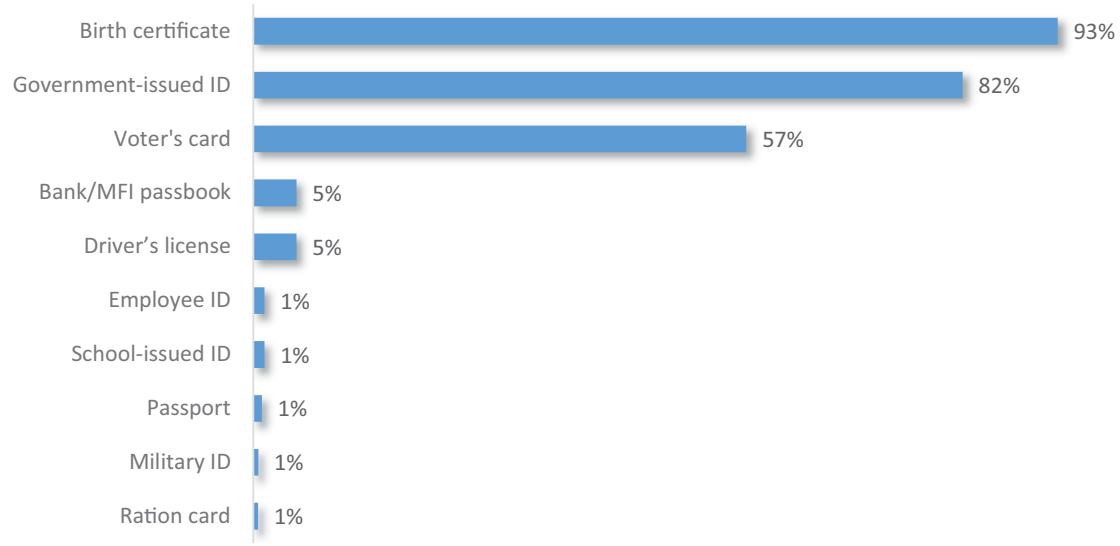
Most smallholders have the identification documents needed to open a financial account at a formal financial institution; lack of qualifying identification had been a common barrier to having a financial account. Over nine in 10 (93 percent) of smallholders have birth certificates, and over eight in 10 (82 percent) have an official government-issued identification document. Voters' cards are less common (57 percent), and even fewer have bank/MFI passbooks and drivers' licenses (5 percent each) (Figure 86).

FIGURE 85. How likely are you to purchase a mobile phone in the next 12 months?



Sample: Smallholder farmers who currently do not own a phone but have used a phone, n=318

FIGURE 86. Do you have any of the following types of an official identification?



Sample: Smallholder farmers, n=5,706
Multiple responses allowed

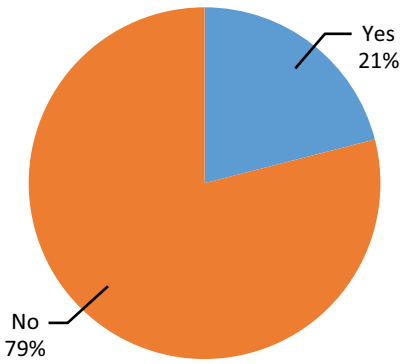
5. FINANCIAL INCLUSION AMONG SMALLHOLDER HOUSEHOLDS IN CÔTE D'IVOIRE

Nearly three in 10 smallholders (29 percent) are financially included, meaning they have a formal financial account in their own name. Some even have more than one formal account. Mobile money accounts are the most common among smallholders (27 percent), followed distantly by accounts at banks and nonbank financial institutions (NBFIs) (5 percent each).

Bank exposure and use

More than three-quarters of smallholder farmers have never been inside a bank (Figure 87). Therefore, any perceived benefits, challenges, or general perceptions pertaining to banks are drawn from what they see and hear from others, and not from their own firsthand exposure to or experiences with these institutions.

FIGURE 87. Have you ever been inside a bank?



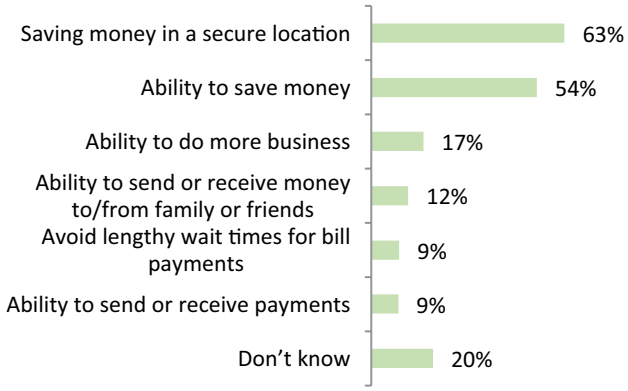
Sample: Smallholder farmers, n=2,949

Banks are highly thought of for their ability to offer savings in a secure location (63 percent) and enable someone to save (54 percent). The benefits of banks are less associated with providing individuals the ability to do more business (17 percent), or enabling them to send or receive money (12 percent). Twenty percent of Ivoirian smallholders did not know of any benefits to having an account (Figure 88).

Only 5 percent of smallholder farmers have a bank account registered in their names (Figure 89), with over nine in 10 mostly using over-the-counter services and rarely using it for business transactions. The numbers of smallholder farmers having a bank account remain low compared with other African countries where this study has been conducted.

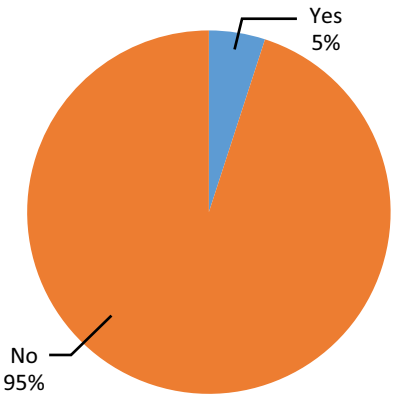
Among the 95 percent who do not have a bank account, just over half (53 percent) think they do not have enough money

FIGURE 88. What are the benefits to having a bank account?



Sample: Smallholder farmers, n=2,949
Multiple responses allowed

FIGURE 89. Do you personally have a bank account that is registered in your name?



Sample: Smallholder farmers, n=2,949

to qualify for or sustain an account. Other barriers include lack of interest ("I never thought about using a bank"), unfamiliarity with the products or processes associated with banks ("I do not know how to open" an account), and limited access ("there are no banks close to where I live") (Figure 90).

Men are more than twice as likely as women to have a bank account (7 percent men versus 3 percent women), and barriers to bank accounts differ slightly for men and women (Figure 91). While perceived lack of money to justify an account is a barrier for men and women, women are even more encumbered by lack of knowledge about a bank account (15 percent of women "do not know what one is" versus 7 percent of men) (Figure 92). This implies that women lag partly because they lack knowledge of what a bank account is or does, making it difficult to judge its relevance to their lives.

Bank account ownership is also greater for those 40 and older. A mere 2 percent of youth (15–29) have a bank account, but incidence tends to rise for those over 30 (Figure 93).

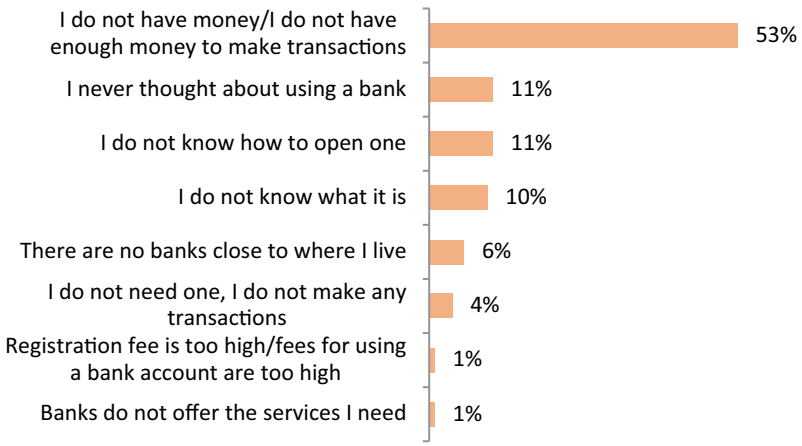
NBFI use contributes little to financial inclusion

Overall, only 5 percent recall having used an NBFI. The highest use is among MFIs (6 percent); account ownership is lower at 4 percent (Figure 94). Very few have used or have an account with the post office. The majority of transactions in NBFIs include cash-in/cash-out activity with limited loans and payments (Figure 95).

Informal financial services

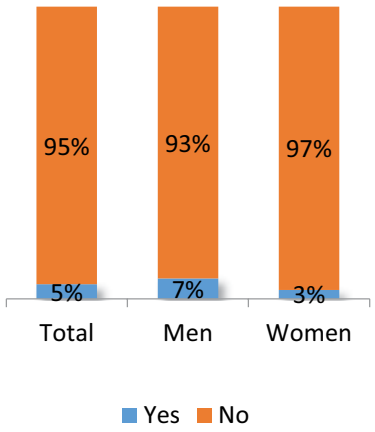
Overall, 23 percent of smallholders have used informal financial services, with ROSCAs being the most commonly used (Figure 96).

FIGURE 90. What is the main reason you do not have a bank account?



Sample: Smallholder farmers who don't have a bank account, n=2,746

FIGURE 91. Do you personally have a bank account that is registered in your name?

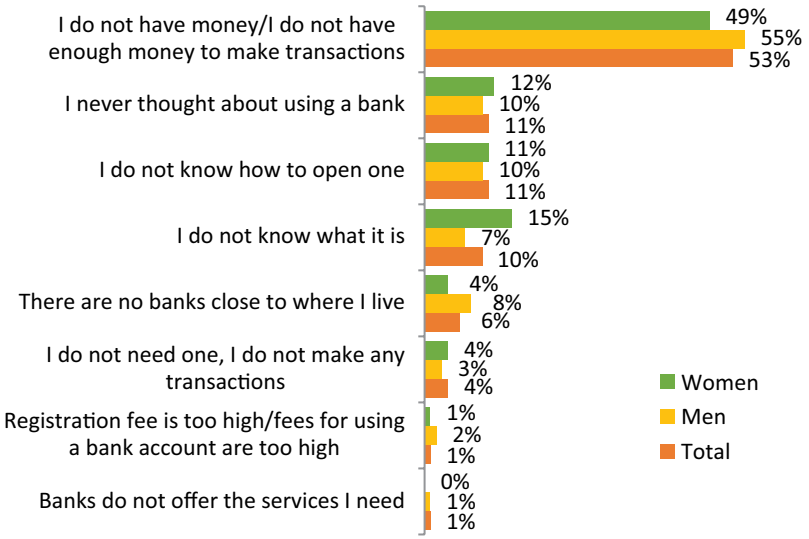


Sample: Smallholder farmers, n=2,949

Smallholders who use VSLAs, ROSCAs, money guards, or someone in the workplace or neighborhood, who collects and keeps saving deposits, do so on a somewhat irregular basis. In the week before the survey, most of the smallholders had used a money guard (almost three in 10), 21 percent had used a ROSCA, and fewer (7 percent) had used a VSLA (Figure 97).

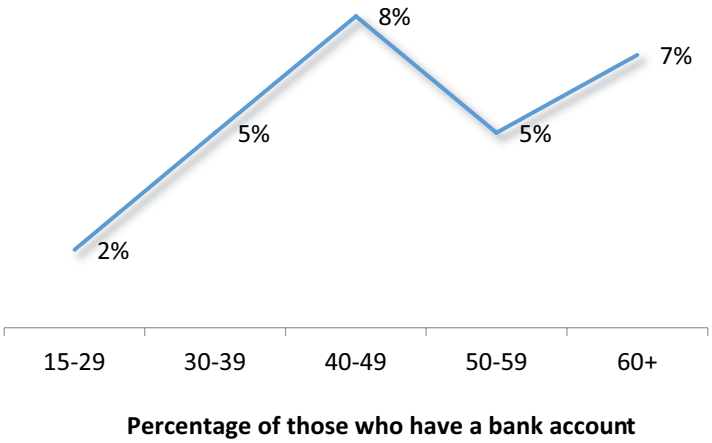
The main reason smallholders are not members of any informal financial services provider groups is mostly financial. They do not think they have enough money to participate. Almost one-third do not trust the groups, and 18 percent

FIGURE 92. What is the main reason you do not have a bank account?



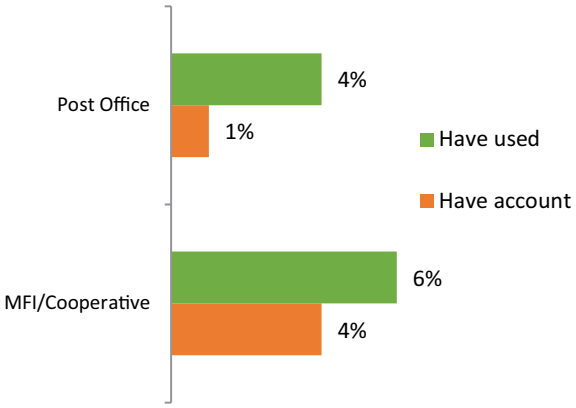
Sample: Smallholder farmers who don't have a bank account, n=2,746

FIGURE 93. Do you personally have a bank account that is registered in your name?



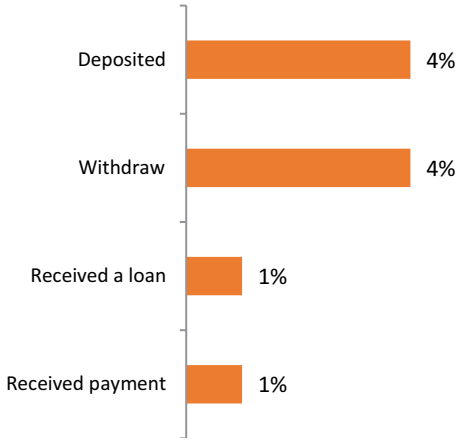
Sample: Smallholder farmers, n=2,949

FIGURE 94. Have you ever used any of the following? Do you have an account/ membership in your name with any of the following?



Sample: Smallholder farmers, n=2,949

FIGURE 95. Uses of NBFIs



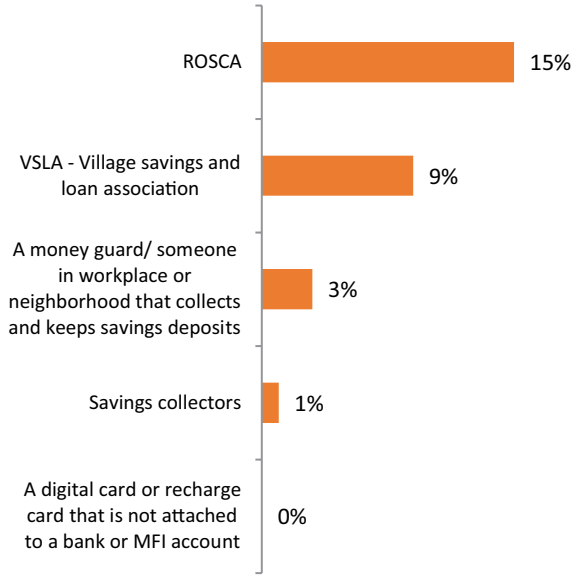
Sample: Smallholder farmers who don't have a bank account, n=2,949

report they do not need the services the groups offer (Figure 98).

Mobile money awareness and use

Mobile money was introduced in Côte d'Ivoire in 2008. Currently five recognized mobile money services operate in the country: Orange Money, MTN Mobile Money, Flooz, Celpaid, and Qash Mobile Banking.[25] Almost three-quarters of Ivoirian smallholder farmers say they have heard of mobile money (Figure 99), and a majority of those who have heard of mobile money also see benefits to having such an account (94 percent) (Figure 100). This suggests that mobile money is a concept that has some initial meaning and relevance to a smallholder, which is a positive for building greater access to digital financial services.

FIGURE 96. Have you ever used any of the following?



Sample: Smallholder farmers, n=2,949

25 http://www.gsma.com/mobilefordevelopment/wpcontent/uploads/2014/05/MMU_Cote_dIvoire_Turnaround_Story.pdf

FIGURE 97. Apart from today, when was the last time you used these services or service providers for any financial activity?

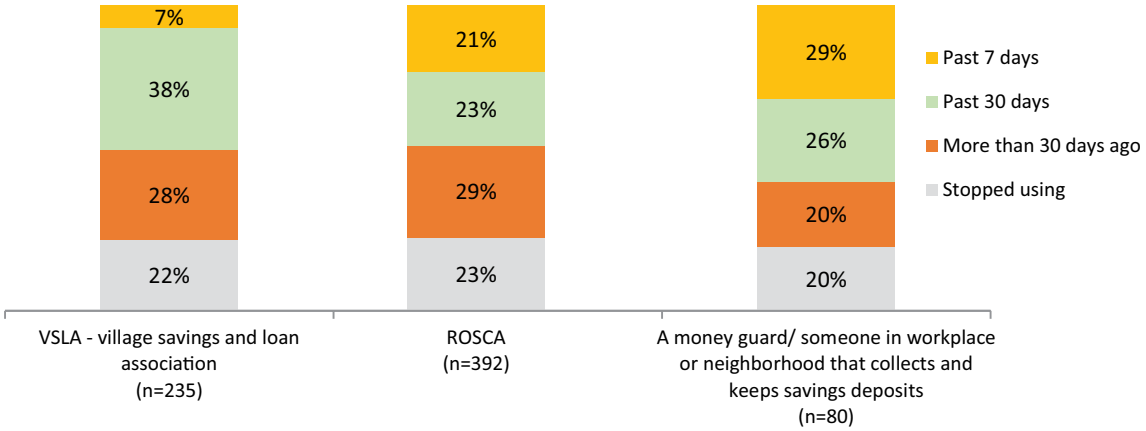
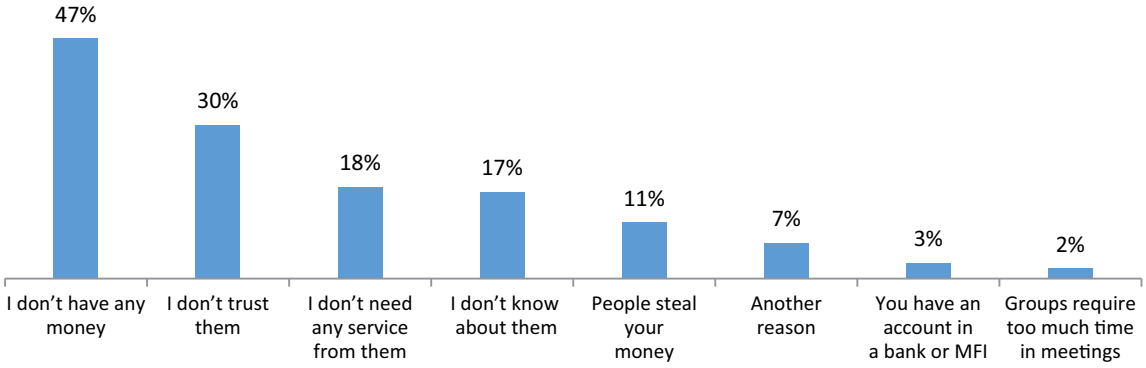
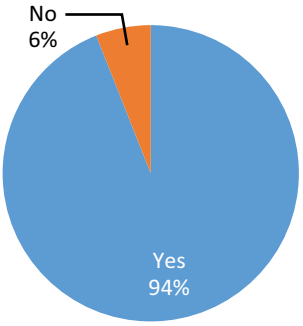


FIGURE 98. Why do you not have a membership with any of these groups?



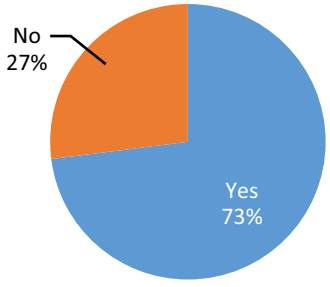
Sample: Smallholder farmers who do not have any membership with an informal financial service provider, n=2,346
Multiple responses allowed

FIGURE 99. Have you ever heard of something called mobile money?



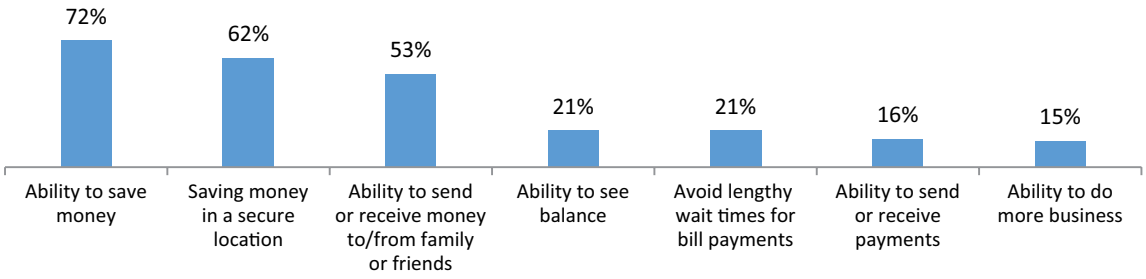
Sample: Smallholder farmers, n=2,949

FIGURE 100. Are there benefits to having a mobile money account?



Sample: Smallholder farmers who are aware of mobile money concept, n=2,189

FIGURE 101. What are the benefits to having a mobile money account?



Sample: Smallholder farmers who believe there are benefits to having a mobile money account, n=2,043
Multiple responses allowed

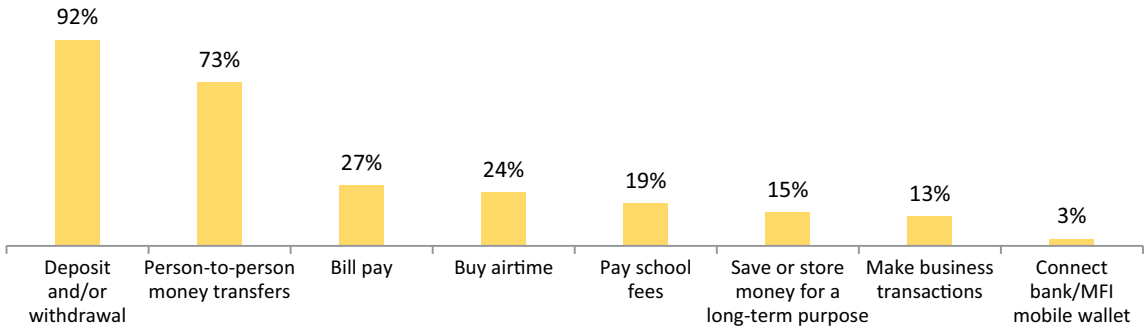
Smallholders see the ability to save money and make person-to-person transfers (i.e., sending and receiving remittances) (Figure 101) as core benefits of mobile money. Saving money has particular traction as a benefit, which is highly desirable given smallholder farmers' predisposition to wanting to have savings, and their tendency to set aside money.

Conducting business via a mobile money account does not seem to register highly as a benefit, as it was one of the lowest-scoring applications for this financial mechanism.

Separate from perceived benefits, the survey also explored the types of tasks that one thinks one can do with mobile money. Smallholder farmers who had heard of mobile money were most confident that it lets users deposit/withdraw funds and transfer money. Some know that mobile money also enables bill-pay, air-time, school fees, and long-term savings. While saving is a big perceived benefit of mobile money, there is less actual recognition for the service's ability to support more advanced uses, including long-term savings (Figure 102).

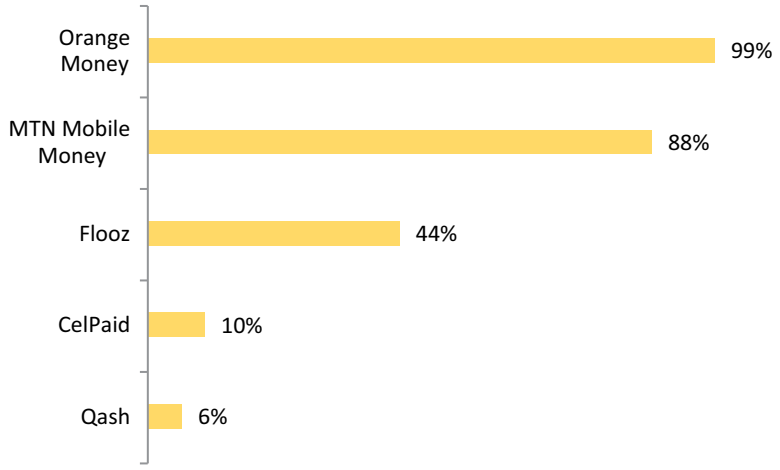
Like awareness of mobile money, the overall awareness of mobile money providers is widespread for the two main providers: Orange Money and MTN Mobile Money. Over four in 10 (44 percent) are aware of Flooz. Cel-Paid and Qash Mobile Banking had lower awareness scores comparatively, coming in at 10 percent or less (Figure 103).

FIGURE 102. To the best of your knowledge, for what types of financial activities can you use mobile money?



Sample: Smallholder farmers who are aware of mobile money concept, n=2,189
Multiple responses allowed

FIGURE 103. Please tell me the names of any mobile money providers that you are aware of?

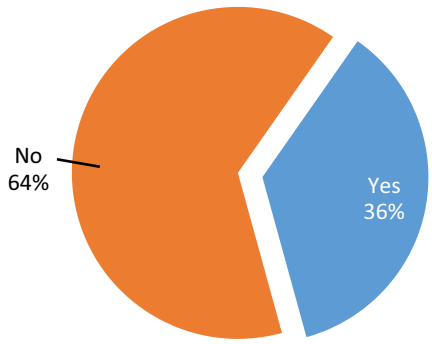


By overall awareness and awareness of mobile money concept
Sample: Smallholder farmers who are aware of mobile money, n=2,189
Multiple responses allowed

Mobile money use

Nearly four in 10 (36 percent) smallholder farmers have used mobile money in the past for a financial activity (Figure 104). Access to mobile money is mostly among men in urban areas. Women and those in rural areas show relatively less use of mobile money for financial services. Smallholders between the ages of 30 and 49 are most likely to have used mobile money for a financial activity (Figure 105).

FIGURE 104. Have you ever used a mobile money provider for any financial activity?



Sample: Smallholder farmers, n=2,949

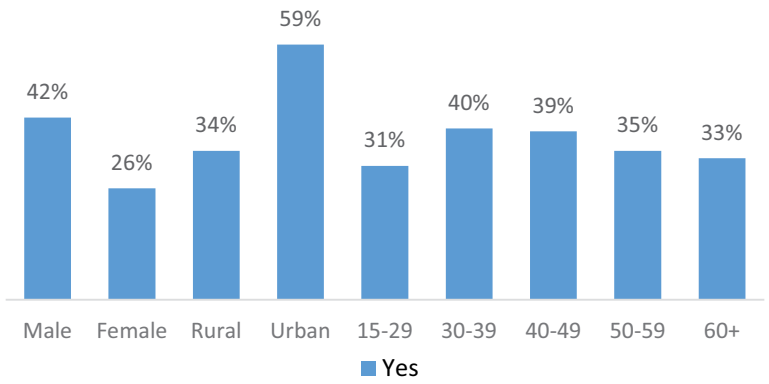
The main reasons smallholders start to use mobile money is to send money to another person, followed by the need to receive money from another person (Figure 106). Using mobile money for saving ("I wanted to start saving money with a mobile money account") or because "somebody requested I open the account" are secondary reasons for starting to use mobile money.

Perceived lack of money, followed by lack of substantive knowledge about mobile money (beyond concept and provider awareness) are the primary reasons for never having used mobile money (Figure 107). One in 10 smallholders (11 percent) indicate they do not need an account, which points to the need for increased awareness and education about the benefits of mobile money.

Advanced use among mobile money users is minimal among smallholders. Less than one in 10 are paying school fees, and even fewer are paying business expenses, receiving payments, or getting loans (Figure 108).

Most of those who have used mobile money ultimately get a registered

FIGURE 105. Have you ever used a mobile money provider for any financial activity?



By gender, region and age
Sample: Smallholder farmers, n=2,949

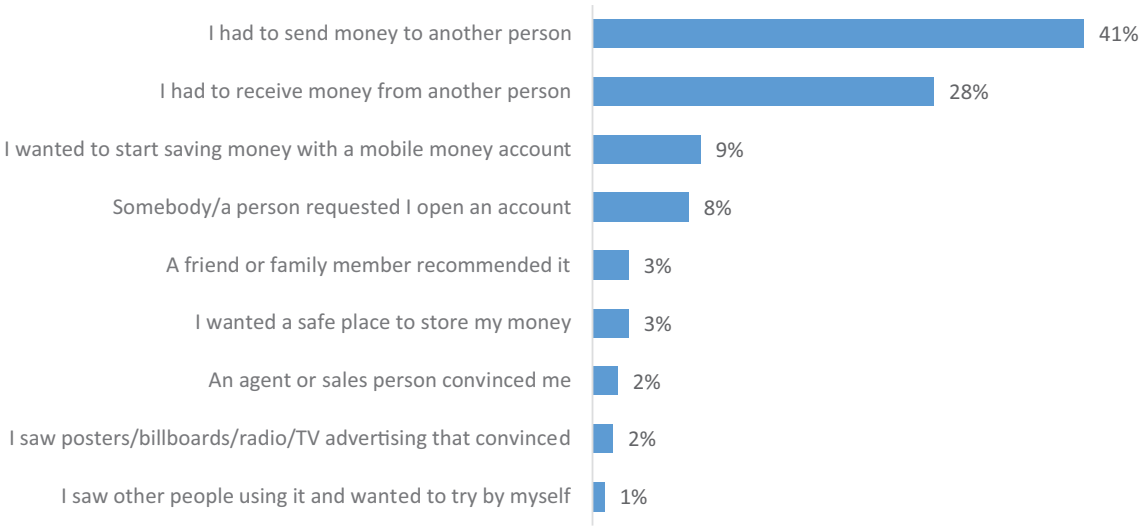
account, considering that 36 percent of adults have used mobile money and 27 percent of smallholder farmers report having a registered account with a mobile money provider (Figure 109). As with those smallholders who have used mobile money, the ones in urban areas are more likely to have a registered mobile money account (53 percent) compared to those in rural areas (25 percent) (Figure 110). There is a 16-point gap between male and female smallholders when it comes to mobile money account ownership (33 percent and 17 percent, respectively).

There is traction for financial planning products

Rental property and investment plans are common among smallholder farmers, with about 19 percent claiming ownership of a rental property. The use of savings plans, living wills, and insurance is less common (Figure 111).

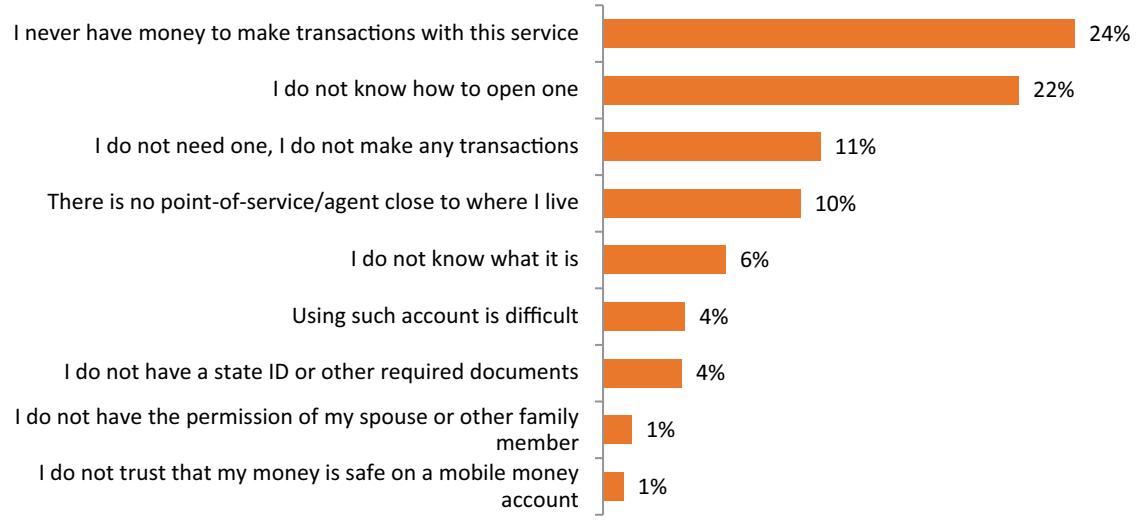
Even though only 3 percent of smallholders have insurance, a majority believe their household needs insurance. Medical, life, agricultural, house, and property insurance are the most desired (Figure 112).

FIGURE 106. What is the main reason you started using mobile money?



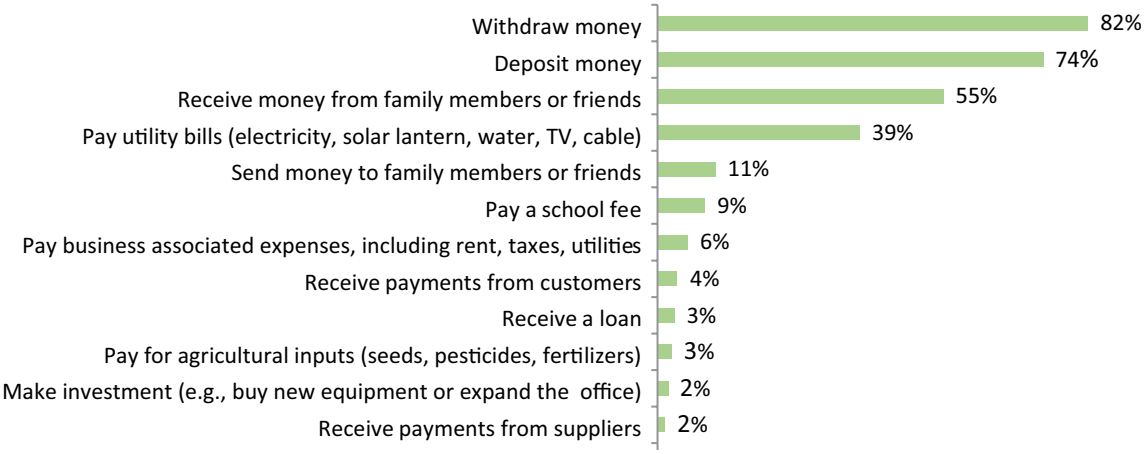
Sample: Smallholder farmers who have ever used mobile money, n=1,124
Ranking by mostly mentioned

FIGURE 107. What is the main reason you have never used mobile money services?



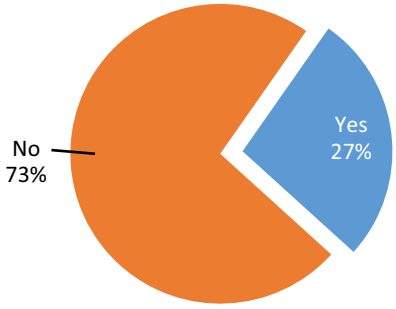
Sample: Smallholder farmers who have ever heard of mobile money but never used, n=1,065
Ranking by mostly mentioned

FIGURE 108. Have you ever used mobile money to:



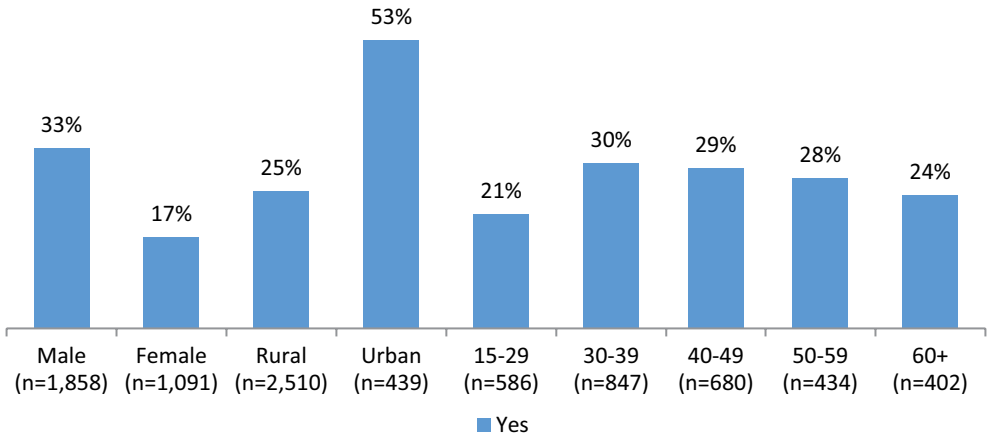
Sample: Smallholder farmers who have ever used mobile money, n=1,124
Multiple responses allowed

FIGURE 109. Do you have a registered account with a mobile money provider?



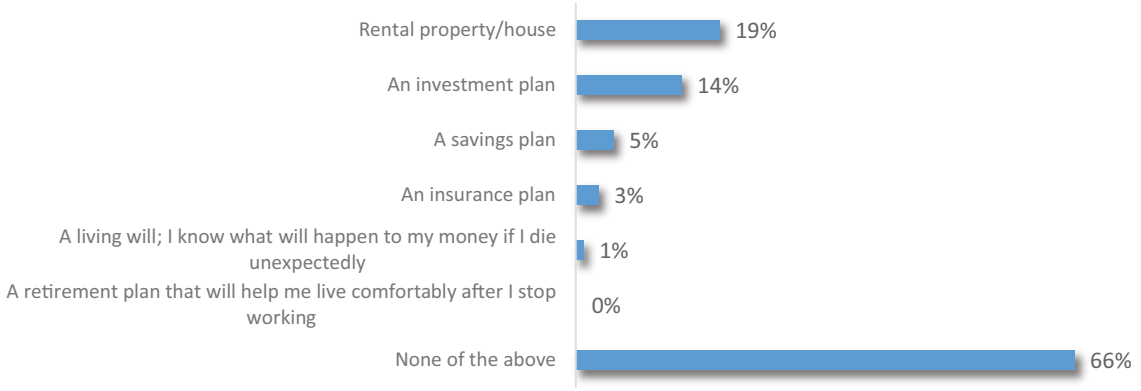
Sample: Smallholder farmers, n=2,949

FIGURE 110. Do you have a registered account with a mobile money provider?



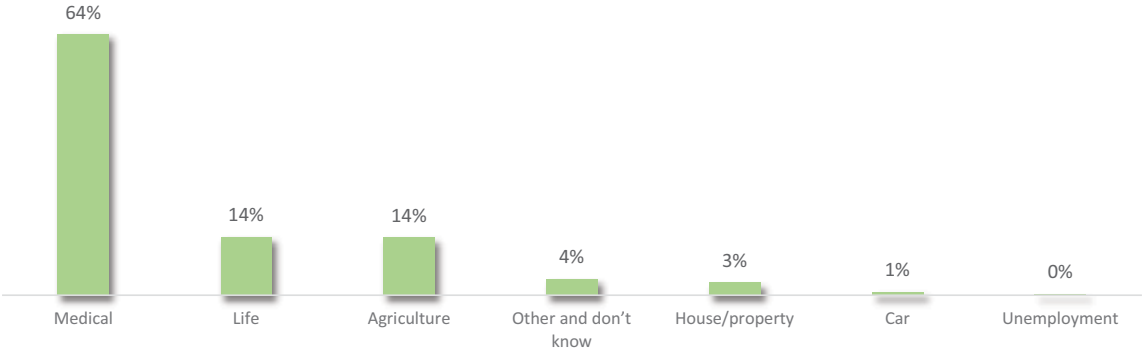
By gender, region and age

FIGURE 111. Do you have any of the following?



Sample: Smallholder farmers, n=2,949

FIGURE 112. Which of the following types of insurance do you feel your household needs the most?



Sample: Smallholder farmers, n=2,949

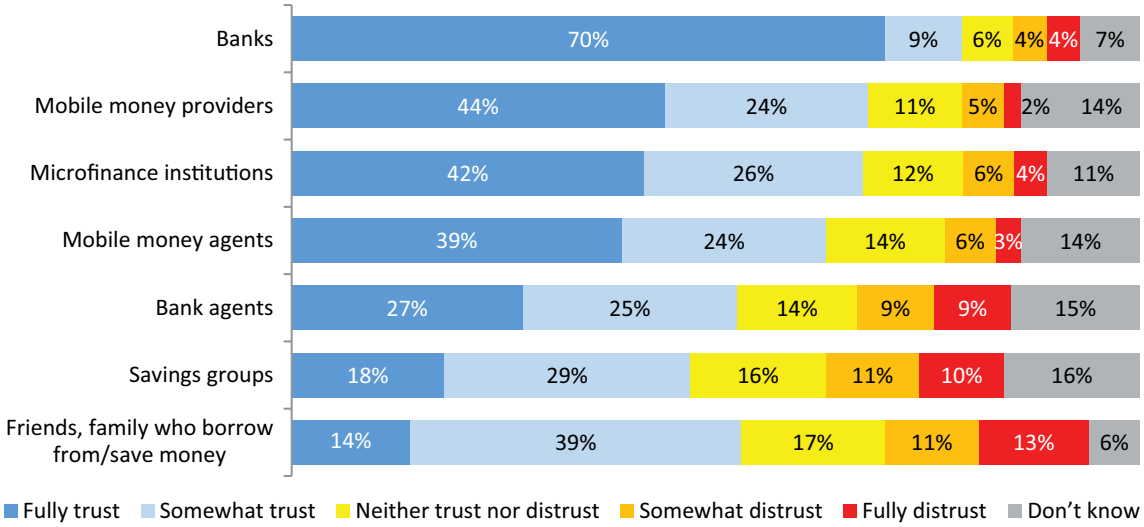
High trust in banks, mobile money, and MFIs highlights an opportunity for smallholders

Seven in 10 smallholders "fully trust" banks. Mobile money providers (44 percent) and MFIs (42 percent) also receive relatively high levels of trust (Figure 113). This solid level of trust in financial institutions is a strong foundation for building financial inclusion among smallholder farmers.

What's more, formal institutions are more than two to three times as likely to be trusted than informal sources. Trust is much lower for savings groups and family and friends. While some of this is just a lack of intensity around trust ("somewhat trust" vs. "fully trust"), both of these entities have three times the distrust of formal institutions (Figure 113).

However, institutions are more trusted than their agents—the individuals who interact with account holders regularly. Bank agents, in particular, are twice as likely to be distrusted than banks themselves (Figure 113).

FIGURE 113. How much do you trust each of the following as financial sources?



Sample: Smallholder farmers, n=2,949

6. MARKET SEGMENTATION

Tools and financial inclusion: Côte d'Ivoire's five unique smallholder household segments

The segmentation technique

A collection of demographic, psychographic, behavioral, and attitudinal dimensions often characterizes unique groups within an overall population, more so than any single factor or variable. The CGAP National Survey and Segmentation of Smallholder Households in Côte d'Ivoire anticipated the complexity of smallholder households, expecting that there would be unique personas within the broader population.[26] To that end, it sought to explore the key dimensions that underlie different groups of smallholder households using a segmentation analysis.

Segmentation is a form of statistical multivariate analysis that groups people based on their psychographics,[27] attitudes, expectations, or behaviors with respect to their own household dynamics. The groups, also referred to as clusters, that emerge from the analysis ultimately allow a deeper understanding of how various characteristics drive financial inclusion. Classifying smallholder households by key attitudinal and behavioral characteristics provided a better understanding of the population and its challenges to achieving financial inclusion.

The segmentation process uncovered various underlying structures that delineated groups of smallholders. This clustering technique looked for homogenous groups within the population sample. It did not create these groups. Rather, the technique identified groups through analysis of the responses given by each respondent to various questions, examining how respondents in the sample are similar to each other and how they differ from each other.

Truly effective segmentation analyses are rooted in dimensions that lead to a common, desired, and shared goal for the population overall. This allows a segmentation analysis to be more germane and better targeted and, ultimately, more useful to interested parties. In the case of smallholder households in Côte d'Ivoire, the common shared goal is building strategies that lead to more useful, reliable, trusted, consumer-focused financial services solutions, formal or informal, including solutions connected to agriculture and those that meet the wide range of other household needs. This segmentation, therefore, is rooted in defining elements that correlate with greater formal financial inclusion.

Looking beyond the initial analysis, this segmentation can be replicated in follow-up or tangential studies, where the discerning indicators that define the unique segments are included to create the same groups within the target audience. For instance, an organization bringing a financial mechanism to market can use these segments to do the following:

- Identify which segment has the most potential for the organization and its intentions.
- Customize the type of mechanism based on the needs of a desired segment.
- Fine-tune application and go-to-market strategy based on market readiness of the segment.
- Optimize market positioning of the mechanism to capture a specific segment of the population.

26 Personas as profiles that create reliable and realistic representations of key audience segments for reference.

27 "Psychographics" refers to behaviors, interests, activities, and acquisitions of a population, together with demographics and other attitudinal factors.

- Level-set expectations for uptake and use based on the size of the desired segment.
- Track impact of a mechanism within the most relevant and intended segment.

Additional segmentations can be made using data from the National Survey of Smallholder Households. This first segmentation of the population focused on identifying the key factors that drive financial inclusion among smallholder families. Other approaches could segment the population by those living above the poverty line, or purchase of inputs, or use of mobile money as the dependent variable.

Phases of the smallholder household segmentation[28]

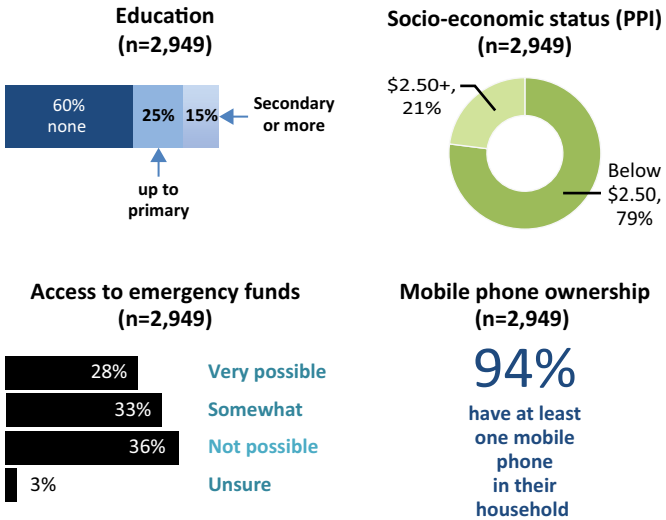
Predicting corollary values

The first phase of the segmentation analysis involved a machine-learning algorithm called Random Forest[29] that assessed the individual factors that best correlate with the ownership of a formal financial account (e.g., mobile money, bank, NBFI). The four most predictable and discerning measures of financial account ownership among smallholders in Côte d'Ivoire are as follows:

- Educational attainment of the head of household
- Socioeconomic status or PPI of head of household
- Access to emergency funds
- Mobile phone ownership

These measures emerged as the most discerning after extensive tests and modeling that took into consideration more than 30 demographic, psychographic, and agricultural variables (e.g., size of land, type of crops, value chains, inputs used) collected by the survey. The model showed that listed variables correlated the most with the tendency to have a formal financial account (Figure 114). None

FIGURE 114. Cote d'Ivoire smallholder farmers



Sample: All smallholder farmers

28 The segmentation analysis is based on a three-part survey that gathered information from all aspects of the smallholder farmer—the household, all household members who contribute to the income of the household, and a randomly selected household member. The term "smallholder household" is used throughout this report to refer to the sampled population, which draws information from the head of household or a randomly selected household member.

29 See Annex 2 and http://www.statsoft.com/Textbook/Random-Forest for documentation on the Random Forest Algorithm.

of the agricultural or land-specific questions correlated with formal financial account ownership (mobile money, bank, NBFI) with enough relative strength to be considered part of the model.

At first, this seemed perplexing, knowing that agriculture is central to smallholder households. Further exploration suggested that the relative homogeneity of smallholder farming activities in Côte d'Ivoire and the predominance of cash-based transactions were in fact manifesting itself in the model. For instance, the number of crops or tendency to sell them are not the factors that drive smallholders to have a financial account. In a different financial ecosystem, where sales relationships exist with formal contracts, payments are digital, or loans are more formal, there may be more direct correlations between agricultural activities and financial inclusion. In Côte d'Ivoire, however, correlations manifest themselves through socioeconomic elements such as educational attainment, PPI, access to emergency funds, and mobile phone ownership.

Forming segments

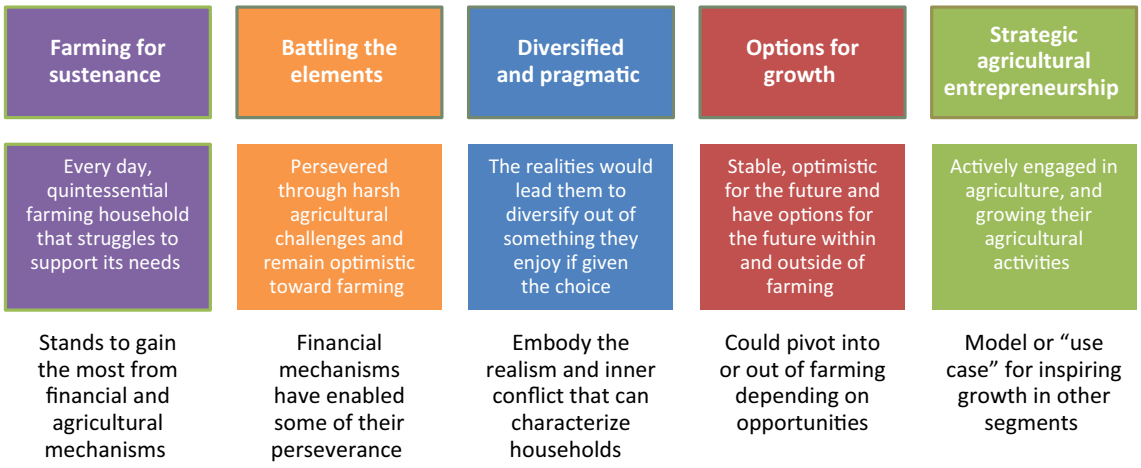
The second phase of the segmentation analysis was to explore the degree to which these factors together explained the variation within the population and formed meaningful cleavages within it, carving out distinct personas. Individually, these measures are the strongest predictors of financial inclusion and are useful in helping to determine the likelihood of becoming part of the financial fold. Compiled together in a segmentation model, these factors elicit meaningful divisions that enable greater understanding of the population and can facilitate targeted strategies for moving the group to the end goal—being financially included.

Using the most predictive variables identified in the Random Forest exercise,[30] the clustering analysis delineated five unique segments of smallholder households:

- Farming for Sustenance
- Battling the Elements
- Diversified and Pragmatic
- Options for Growth
- Strategic Agricultural Entrepreneurship

Since the sample was randomly selected and represents the population of smallholder farmers and households across Côte d'Ivoire, we can reasonably assert that the five segments represent natural

FIGURE 115. Côte d'Ivoire smallholder household segments



30 See Annex 2 and http://www.statsoft.com/Textbook/Random-Forest for documentation on the Random Forest Algorithm.

groups in the population as a whole. We also expect that similar groups exist in smallholder farming populations outside of Côte d'Ivoire, though the description and the incidence of each reported herein is unique to Côte d'Ivoire.

By segmentation variables only, the five clusters or segments of smallholder households in Côte d'Ivoire are as follows:

1. **Farming for Sustenance.** The Farming for Sustenance group represents the largest segment in Côte d'Ivoire (38 percent of smallholder farmers). It is the most vulnerable farming household has a very low PPI, and shows a high number of years in farming. Smallholders in this segment generally want their children to continue in agriculture, though they themselves could be interested in full-time employment outside of agriculture. This segment truly does live off what the farm produces, consuming, selling, or trading their agricultural outputs, with little else to sustain their households. This is a highly vulnerable group, and perhaps, the one that stands to gain the most from the financial and agricultural mechanisms that can facilitate its members' daily labor and mitigate the range of risks they face.

2. **Battling the Elements.** The Battling the Elements segment is also a vulnerable group (16 percent of smallholder farmers). A greater portion of this segment generates income from agriculture, and a greater portion of these households has multiple income sources than the Farming for Sustenance group. This segment has better access to emergency funds, but is challenged by unexpected life or farm-related events. The smallholders in this group are proactive, and more of them take action to alleviate the losses resulting from unexpected events. They also perceive insurance as very important to agricultural activities. Challenges have not dampened their future aspirations or dissuaded them from working hard. This group has persevered through those challenges, sometimes with the support of financial tools. This exposure to financial mechanisms might make them the group that best understands the value of having some form of safety nets like insurance.

3. **Diversified and Pragmatic**. The Diversified and Pragmatic segment includes young adults who are less tenured in agriculture and more likely to find opportunities to leave the sector than either the Farming for Sustenance or Battling the Elements segments (26 percent of smallholder farmers). Their experience has conditioned them to take a more pragmatic approach to farming. They tend to diversify income sources and plan for the unexpected. Though they enjoy and take pride in farming, they would also consider full-time employment outside of agriculture if the opportunity presented itself. More than a third of this segment is financially included. This population has already opened accounts and is already using them, which suggests an opportunity to foster more advanced use of mobile money.

4. **Options for Growth.** The Options for Growth segment stands out because of its high level of financial inclusion and because it is dominated by more tenured smallholder farmers (5 percent of smallholder farmers). Those in this group see their futures in farming, are more empowered, derive enjoyment from agriculture, and are keen to expand their agricultural activities. A majority of households in this segment have had their agricultural activities seriously affected by an unexpected event, though they are positioned as the most enabled by savings when disasters do strike. They have greater access to financial tools and

external support. With close to two-thirds of this segment financially included, members of this group show that smallholder households can put their livelihoods on a path toward greater stability and growth.

5. **Strategic Agricultural Entrepreneurship**. This segment is keen on building their agricultural activities, with some indications of success or at least progress (15 percent of smallholder farmers). They are more enabled than the other segments and have a higher income, more education, greater access to emergency funds, and access to more financial mechanisms. They have been affected by the realities of farming, but have been able to rely on their savings or other resources to get through tough times. They enjoy agriculture and want to expand their agricultural activities. Most smallholders in this segment are not satisfied with what their agricultural work has achieved, reporting the most dissatisfaction among all the segments. They have big aspirations that include a future in agriculture.

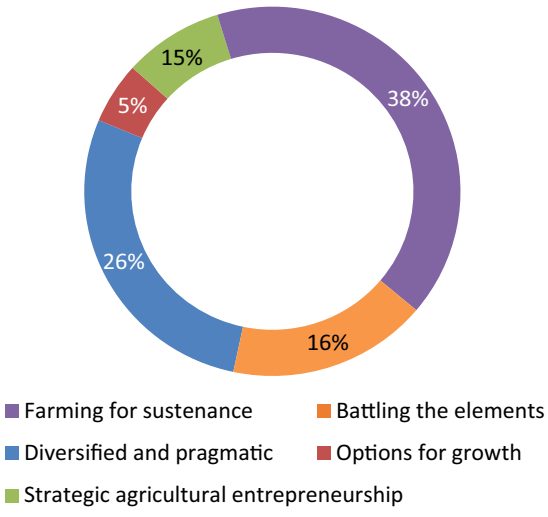
There is greater definition and characterization of these segments when we explore more deeply how they behave, what they believe, and where their interests lie.

As a whole, these five segments of smallholder households behaviorally characterize smallholder households across Côte d'Ivoire. The Farming for Sustenance segment dominates the landscape in this country (38 percent), as this segment does in Uganda and Mozambique (54 and 77 percent, respectively). In Côte d'Ivoire, as well as Uganda and Mozambique, movement in the marketplace will require transitioning portions of this massive group into the financial fold. Comparatively, Tanzanian smallholder households are more evenly distributed across the segments.

Table 14 shows each segment and how it fares by each of the cluster-defining variables: educational attainment, socioeconomic status, access to emergency funds, mobile phone ownership, attitude toward the future, and experience with unexpected events.

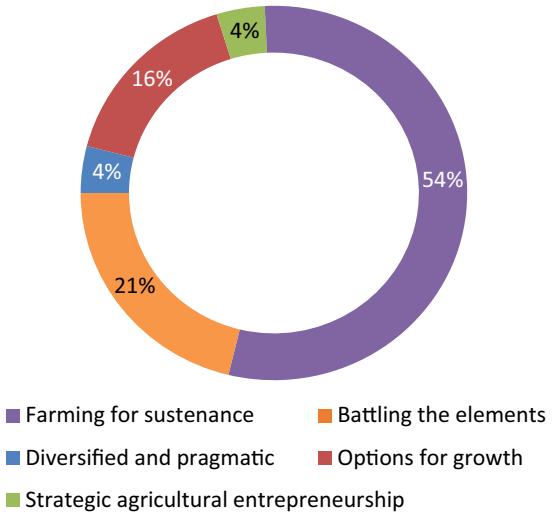
The profiles in figures 120 and 121 detail the dynamics of each segment,

FIGURE 116. Côte d'Ivoire smallholder household segments



Sample: All smallholder farmers

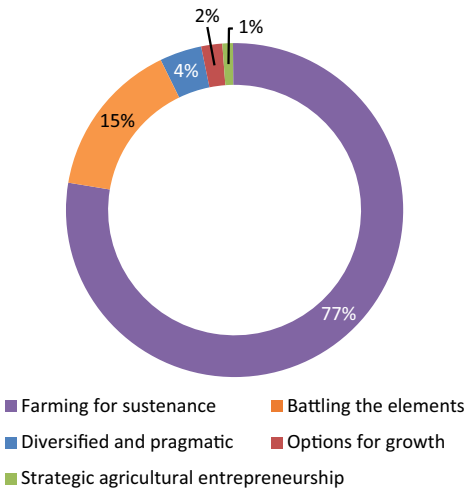
FIGURE 117. Uganda smallholder household segments[31]



Sample: All smallholder farmers

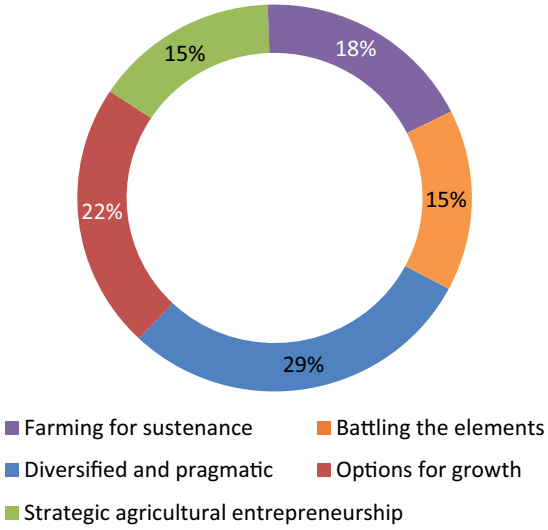
31 CGAP National Surveys and Segmentation of Smallholder Households in Uganda, 2015–2016; http://www.cgap.org/publications/national-survey-and-segmentation-smallholder-households-uganda.

FIGURE 118. Mozambique smallholder household segments[32]



Sample: All smallholder farmers

FIGURE 119. Tanzania smallholder household segments[33]



Sample: All smallholder farmers

bringing character and depth to each of them. Perhaps the best illustration of the differences in the segments, however, is the linear progression of the five groups, where the Farming for Sustenance (the largest group) is the most impoverished and in need, and the Strategic Agricultural Entrepreneurship segment is at the opposite end showing models of progress within the population.

Segment 1: Farming for Sustenance: Dependent on the farm for day-to-day survival

The **Farming for Sustenance** segment includes 38 percent of smallholder households in Côte d'Ivoire. It is the most dominant segment of the population among Ivoirian smallholders, and the most vulnerable.

SEGMENT SYNOPSIS

As in Mozambique, Tanzania, and Uganda, the Farming for Sustenance segment in Côte d'Ivoire represents the most vulnerable farming households, indexes very low on the PPI, shows a high number of years in farming, and its members generally want their children to continue in agriculture, though they themselves could be interested in full-time, off-farm employment.

Members of this segment truly do survive on what the farm produces, consuming, selling, or trading their agricultural outputs without much else to sustain their households.

This is a highly vulnerable group, and perhaps, the one that stands to gain the most from financial and agricultural mechanisms that can facilitate its smallholders' daily labor and mitigate the range of risks they face.

32 CGAP National Surveys and Segmentation of Smallholder Households in Mozambique, 2015–2016; http://www.cgap.org/publications/national-survey-segmentation-smallholder-households-mozambique.

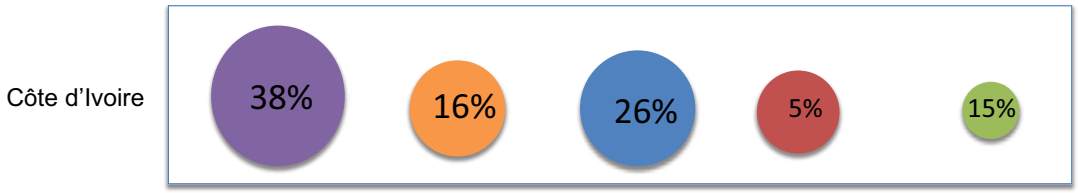
33 CGAP National Surveys and Segmentation of Smallholder Households in Tanzania, 2015–2016; http://www.cgap.org/publications/national-survey-segmentation-smallholder-household tanzania

TABLE 14. Côte d'Ivoire smallholder household segments, by clustering criteria

Segment n=2,949	Farming for Sustenance n=978	Battling the Elements n=474	Diversified and Pragmatic n=858	Options for Growth n=100	Strategic Agricultural Entrepreneurship n=539
Educational attainment of household head (%)					
Never attended school	78	84	53	23	9
Preprimary	0	0	0	0	0
Primary	18	7	39	16	40
Secondary	4	9	7	60	45
Higher education	0	0	1	1	5
Socioeconomic status (%)					
Above the poverty line	8	17	32	0	48
Below the poverty line	92	83	68	100	52
Access to emergency funds: Can come up with 44,000 francs within the next month (%)					
Very possible	13	33	23	40	64
Somewhat possible	18	45	53	31	22
Not possible	63	20	23	22	13
Don't know	5	2	2	8	1
Mobile phone ownership—at least one phone in the household (%)					
No	15	3	0	0	0
Yes	85	97	100	100	100
Attitude: The future will take care of itself (%)					
Agree	45	43	47	47	42
Disagree	37	44	44	38	46
Don't know	18	13	9	15	12
In the past 12 months, experienced unexpected events (including, but not limited to death, illness, accidents, etc.) (%)					
No, I didn't	29	27	24	22	20
Yes, I did	71	73	76	78	80

Sample: All smallholder farmers

FIGURE 120. Côte d'Ivoire smallholder household segment mindset



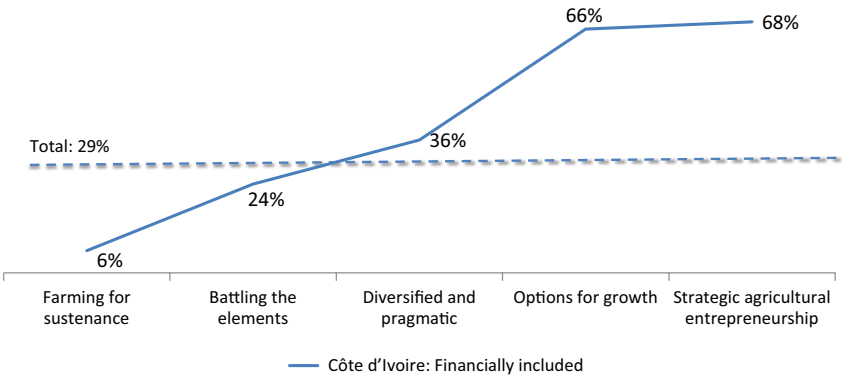
Mindsets (% agree)	Farming for sustenance	Battling the elements	Diversified and pragmatic	Options for growth	Strategic agricultural entrepreneurship
My life is determined by my own actions	91%	94%	90%	95%	90%
I can determine what will happen in my life	19%	18%	20%	33%	20%
I can only focus on the short term	22%	20%	19%	22%	17%
I live more for the present than tomorrow	22%	25%	24%	13%	21%
What is going to happen will happen	54%	63%	57%	63%	60%

Sample: All smallholder farmers

Demographics: Most households in this segment live in poverty (56 percent earn $1.25 a day or less), live in rural areas (97 percent), and are headed by older farmers.

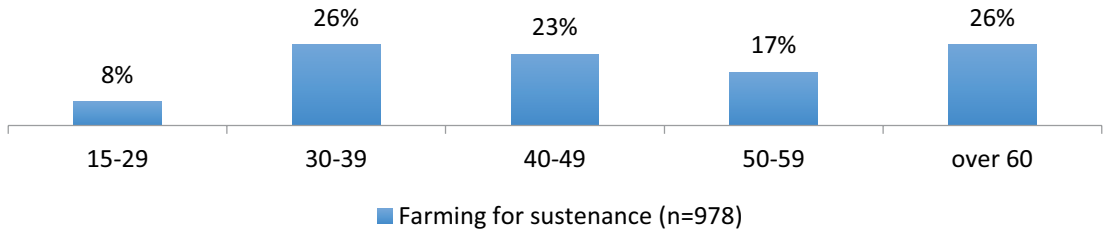
Relative to other segments, the Farming for Sustenance segment skews older. Two-thirds of the population is age 40 or over, with a large portion over 50. Almost two in 10 (17 percent) are 50–59, and a quarter (26 percent) are over 60. The adults in this segment want their children to continue farming, which could encourage and support young farmers in Côte d'Ivoire, and sustain the agricultural sector.

FIGURE 121. Smallholder farmers in Côte d'Ivoire, financial inclusion* by segment



Sample: All smallholder farmers
*Financial inclusion defined as having a full-service bank, mobile money or nonbank financial institution account with access in one's own name.

FIGURE 122. Age distribution (head of household)



Sample: Smallholder farmers by segment

Smallholder households in this segment are concentrated in the Tonkpi region (15 percent), the Hambol and Marahoue regions (8 percent each), and the Haut-Sassandra and Poro regions (7 percent each).

Farming: Experienced, and dependent on crops for income

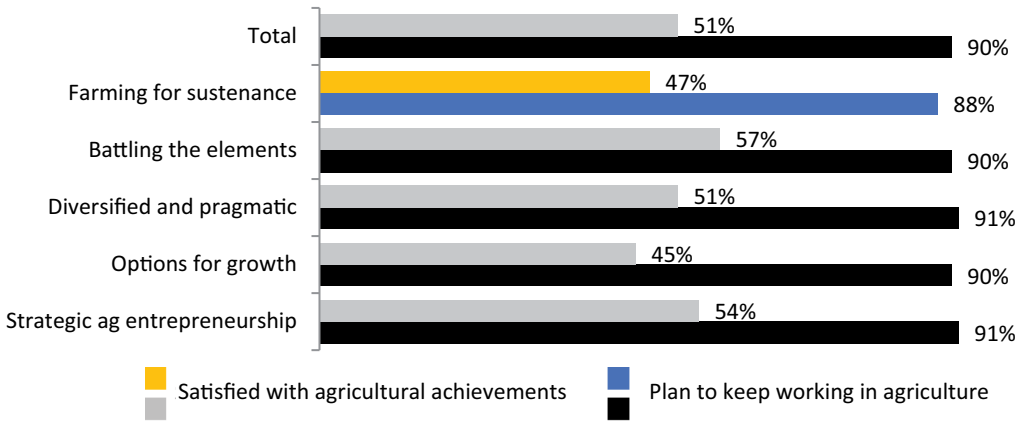
Most of the Farming for Sustenance households in Côte d'Ivoire have been working in agriculture for more than 10 years (61 percent), showing a relatively higher level of experience in the sector.

These households intend to continue working in agriculture (88 percent). They also enjoy agriculture (96 percent) and want to expand their agricultural activities (93 percent). Compared to the other segments, fewer of the Farming for Sustenance households would be interested in taking up full-time employment if offered a job (49 percent).

Less than half (47 percent) of smallholders in this segment are satisfied with their agricultural work achievements (Figure 123). This may suggest a large portion of smallholder households are critical of themselves and, perhaps, wanted better outcomes than their circumstances could support. The lack of satisfaction may also reflect frustration with health challenges, educational opportunities, and limited infrastructure.

Farming for Sustenance households are also disadvantaged by extreme poverty, age, (the majority are 40 or more years old), and lack of resources.

FIGURE 123. View of success in agriculture vs. willingness to continue working in it



Sample: All smallholder households who participate in agricultural activities, by segment

This can translate into feeling trapped by their circumstances and less capable of changing the course of their lives. While they might intend to keep working in agriculture, and also agree they regard their agricultural activities as the legacy they want to leave for their families (78 percent), only 47 percent agree with the statement, "I would not want to be doing any other type of work." This suggests that their trajectory might be more predetermined based on their skills, abilities, and access to other income streams rather than a true choice.

Farming for Sustenance households lack income diversification. They tend to depend almost exclusively on their own agricultural outputs. Considering sources of income, on average, these households have 2.3 income sources, with the top two income sources related to agriculture. Ninety-seven percent of Farming for Sustenance households generate income from growing something and selling it, such as crops, fruits, or vegetables; 25 percent generate income from livestock. Crops tend to be this segment's single biggest source of income (97 percent), with no other single source of income reported as a significant contributor to households. Thirty-seven percent of smallholders in this segment report only one source of income, and just over a third report two (31 percent); crops and livestock are again the most common. Thirty-two percent have three or more income sources.

Collective reporting from all household members active in agriculture shows the average size of land owned is 3.7 hectares, and the size of land rented is, on average, 3.2 hectares for households in this segment.[34]

On average, the smallholder households in this segment grow seven crops (7.4) each year on their land. They tend to sell, on average, five of the seven (4.7) crops they grow. Maize (71 percent), rice (66 percent), cassava (59 percent), okra and chilies (58 percent each), brinjal/eggplant (55 percent), and cocoa (52 percent) are the most commonly grown crops.

Vulnerable to outside elements

Nearly seven in 10 (67 percent) of the smallholders in this segment had their agricultural activities seriously affected by weather-related events, including droughts, floods, and late rains. Thirty-five percent were affected by pests and diseases. This segment experienced unexpected price fluctuation in the market (3 percent), accidents and theft (9 percent), and farmers' health issues (15 percent) relatively less than other segments.

Thirty-seven percent were affected by more than one unexpected event in the past three years, such as a death in the family.

When the unexpected does happen and agriculture activities are impacted, Farming for Sustenance households are likely to have no specific response (52 percent). The tendency to do nothing outweighs any single action that a farmer could take:

- 20 percent turned to their savings
- 19 percent took a loan

34 The land size measurement comes from the household survey where multiple members of the agricultural household offer up their recollection of various dynamics so as to capture full dynamics instead of relying on just one member's knowledge of the household. An aggregate estimate of this measure was then created and appended to the segmentation, which is based on participant responses to the individual questionnaire (asked of just one randomly selected household member). These data are weighted accordingly, and land size numbers are calculated using combined data (own land and rent land are calculated by choosing the largest land size among all members in each household); the base is the household. The data excluded those who had responded with more than 10 hectares, as these respondents were treated as outliers that are part of the sample because the listing phase otherwise deemed them qualified.

- 7 percent took a temporary job
- 3 percent sold livestock

Reflecting lack of access to savings and credit, close to two-thirds (63 percent) report they would not be able to come up with 44,000 CFA within the next month.[35]

Financial attitudes

The segmentation model is built on predictors of financial inclusion, which are defined here as those smallholders having a full-service bank, mobile money, or NBFI account in their names. It follows, then, that ordering segments from more vulnerable Farming for Sustenance and Battling the Elements groups to Strategic Agricultural Entrepreneurship shows a somewhat linear relationship with financial inclusion.

Extremely limited access to financial services

Overall, 29 percent of Ivoirian smallholder households are financially included; mobile money accounts are the most common financial services accounts held by smallholders. The Farming for Sustenance segment is the least included, at 6 percent; of those, most have a mobile money account (5 percent).

Most smallholders in the Farming for Sustenance segment have never used mobile money services. The main reason sighted was that they do not know how to open an account (20 percent). One-third (33 percent) mention they do not have enough money to make transactions with the service. A sustained effort to sensitize these smallholders to the concept of mobile money and how to open an account, with appropriate awareness-building initiatives, could lead to uptake among this segment.

Most of the Farming for Sustenance segment (85 percent) have at least one mobile phone in their homes, indicating that access is not an issue. For the 15 percent who do not have a phone in their homes, access to mobile money will be a challenge. Just 1 percent of Farming for Sustenance smallholders have an NBFI account, and no use is reported for the past 90 days for such an account. Less than 1 percent of smallholder farmers in this segment report having or using a bank account (Table 15).

While more prevalent than formal financial services, one quarter (25 percent) of the Farming for Sustenance segment has access to an informal financial mechanism such as a savings or loan association, moneylender, or money guard.

Close to eight in 10 of Farming for Sustenance households managed to save money in the past year (78 percent), trailing the overall population of smallholders, but only by a small gap (84 percent all smallholders saved).

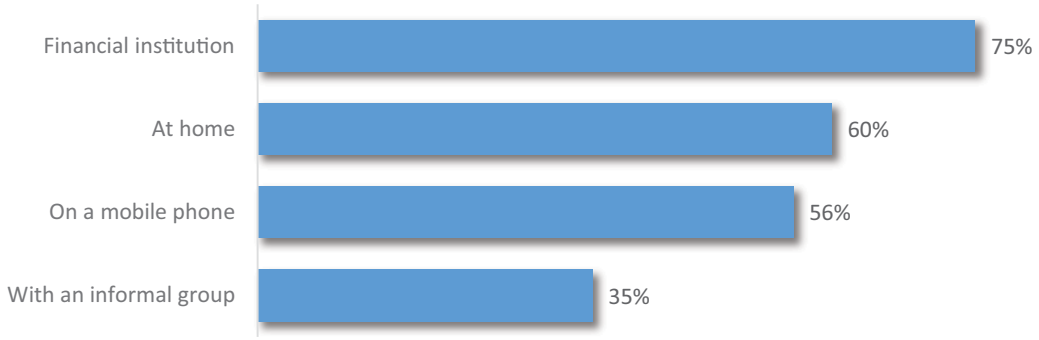
TABLE 15. Informal and formal financial mechanisms

	Financially included (%)	Own bank account (%)	Own mobile money account (%)	Own NBFI account (%)	Access to informal savings (%)
Farming for Sustenance	6	0.28	5	1	25

Sample: Smallholder farmers by segment

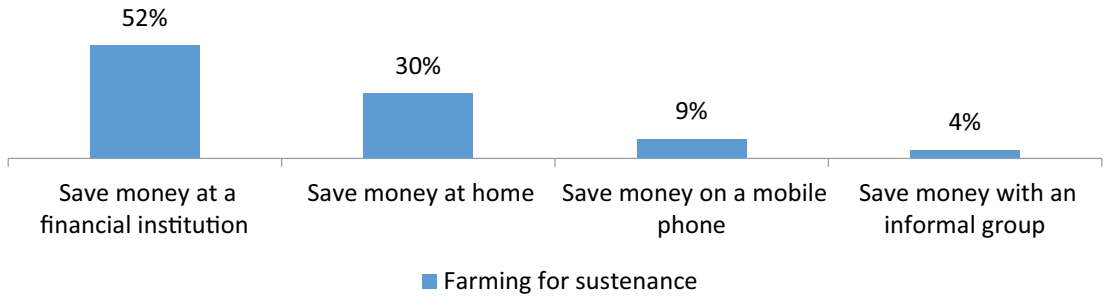
35 Smallholders were asked if they could produce 44,000 CFA (US$75) within a month, in case of emergency.

FIGURE 124. View saving money through different mediums as "very important"



Sample: "Farming for sustenance" households, n=978

FIGURE 125. Perceived importance of savings channels



Sample: Smallholder farmers by segment

High perceived importance of financial practices

Though Farming for Sustenance households might be without financial mechanisms, formal or informal, they do have a strong sense of the importance of saving, investing, and using formal financial institutions.

This segment of smallholder households finds it "very important" to save with a financial institution (75 percent). Saving at home also earns high importance (60 percent) (Figure 124). Saving money at a financial institution (52 percent) and saving money at home (30 percent) are also perceived as important savings channels for smallholder farmers (Figure 125).

The Farming for Sustenance group finds it more important to save on a mobile phone than to save with an informal group (9 percent and 4 percent, respectively) (Figure 125).

Segment 2: Battling the Elements: Challenged, with limited resources, but persevering

The third largest segment, the **Battling the Elements** group, makes up 16 percent of smallholder farming households in Côte d'Ivoire. These households face many of the same limiting circumstances as those in the Farming for Sustenance group (e.g., low education, high poverty, limited financial resources), but have some resources for addressing their needs. They are aging, but its members are not as old as those in the Farming for Sustenance group. They are optimistic and committed to farming and taking better financial steps in their lives, despite facing the daunting realities of farming.

***Demographics*:** Majorities of households live in poverty and are concentrated in the Poro (10 percent), Guemon (9 percent), and Tonkpi (9 percent) regions.

SEGMENT SYNOPSIS

The Battling the Elements segment is also a vulnerable group, but as a group, does not face as many of the limitations faced by the Farming for Sustenance segment. The vast majority of this group generates income from agriculture, but also has multiple income sources in addition to agriculture. This segment has better access to emergency funds, but is challenged by the incidence of unexpected life or farm-related events.

The Battling the Elements segment, unlike the Farming for Sustenance group, is proactive. More of the smallholders in this group take action to alleviate the losses resulting from unexpected events. They also perceive insurance as very important to agricultural activities. Challenges have not dampened their future aspirations or dissuaded them from working hard. This group has persevered through those challenges, sometimes with the support of financial tools, which might make them the group that best understands the value of having some form of a financial safety net like insurance.

Battling the Elements smallholder house holds represent a more mature, aging group of farmers, much like the Farming for Sustenance segment. A majority are over 40, though a smaller portion are currently in their 60s versus those in the Farming for Sustenance group. One-third (33 percent) are under 40 years old (Figure 126).

They live largely in the rural areas (96 percent), and a majority (66 percent) live in extreme poverty (earning $1.25 a day or less) just like those in the Farming for Sustenance group.

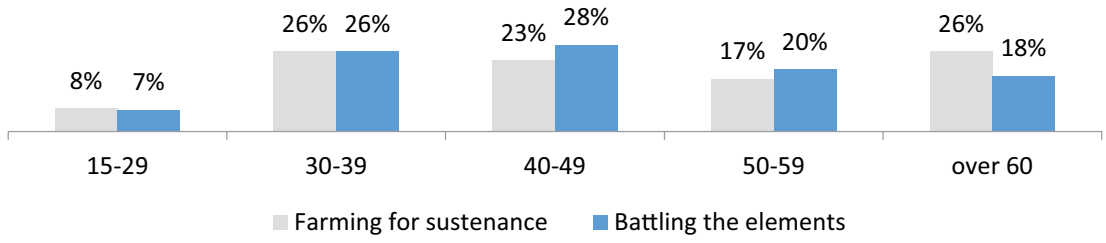
***Farming**:* Experienced farmers who enjoy their work, though they contemplate life outside of farming.

Battling the Elements households include a mix of mature, tenured farmers and newer, younger farmers. They are the most experienced segment; 67 percent have over 10 years of farming experience, and 20 percent have been farming for six to 10 years.

Enjoyment of farming

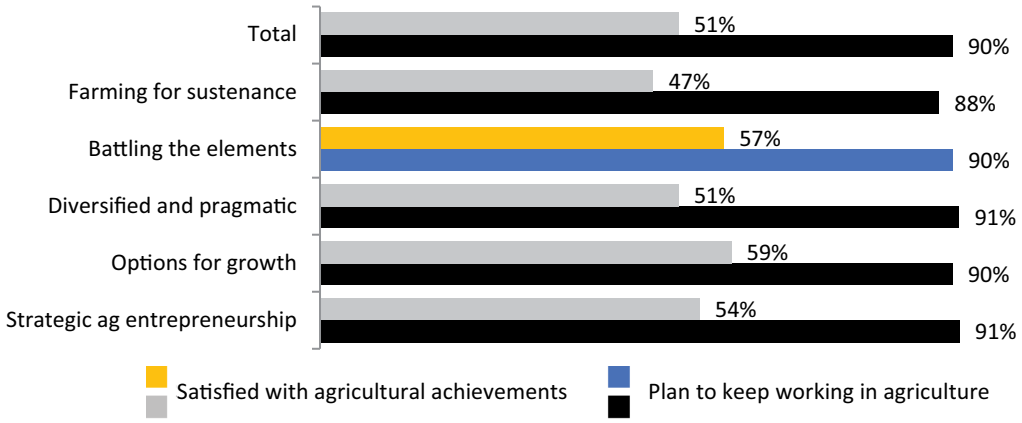
Households in this segment intend to continue working in agriculture (90 percent) (Figure 127). They generally enjoy it (97 percent), and many would like to expand their agricultural activities (96 percent). Fifty-seven percent of these farmers are satisfied with their farming achievements (Figure 127). That said, it is worth noting that full-time employment also could be attractive to half of these households (50 percent) and only about four in 10 (44 percent) say they do not want to do any other kind of work outside of agriculture.

FIGURE 126. Age distribution



Sample: Smallholder heads of household by segment

FIGURE 127. View of success in agriculture vs. willingness to continue working in it



Sample: All smallholder households who participate in agricultural activities, by segment

Most Battling the Elements households generate income from agriculture, either selling crops (98 percent) or livestock (27 percent). Agriculture is still this segment's largest reported income source (88 percent, crops; 2 percent, livestock), though they have other income sources that offer their households some options for meeting expenses. Over two-thirds (37 percent) of this group have three or more sources for generating income (versus 32 percent for the Farming for Sustenance group), including the following:

- An occasional job (8 percent)
- Running a retail or manufacturing business (11 percent)
- Running another type of business by providing services (4 percent)
- Remittances from family and friends (11 percent)

On average, smallholder households in the Battling the Elements segment have 3.9 hectares of owned land and 3.3 hectares of rented land[36] and are growing eight crops each year on their land. They tend to sell, on average, five of the crops they grow. Commonly grown crops include the following:

- Maize (78 percent)
- Rice (71 percent)
- Chilies (67 percent)
- Okra (65 percent)
- Brinjal/eggplant (64 percent)

Vulnerable to weather

Nearly eight in 10 Battling the Elements households (84 percent) experienced an unexpected event in the past three years in their agricultural activities (including weather, pests, illness, loss, accidents) that caused a loss of income. The most common of these are weather-related events (69 percent) and pests (34 percent).

Price fluctuations hurt this group more so than the Farming for Sustenance

36 The land size measurement comes from the household survey where multiple members of the agricultural household offer up their recollection of various dynamics so as to capture full dynamics instead of relying on just one member's knowledge of the household. An aggregate estimate of this measure was then created and appended to the segmentation, which is based on participant responses to the individual questionnaire (asked of just one randomly selected household member). These data are weighted accordingly and land size numbers are calculated using combined data (own land and rent land are calculated by choosing the largest land size among all members in each household), the base is the household. The data excluded those who had responded with more than 10 hectares, as they were treated as outliers that are part of the sample because the listing phase otherwise deemed them qualified.

segment. Five percent were impacted by market-driven price fluctuations when it came to selling their crops, and 4 percent were impacted by changes in the cost of inputs. Only 1 percent faced a market downturn during which they could not sell their crops or livestock.

Among those who were seriously affected by agricultural and household shocks, close to one-half (45 percent) of smallholder households did nothing specific in response. Others turned to what they had, including savings, or options they had to bring in more money (e.g., temporary job, borrowing, selling):

- 32 percent used savings
- 13 percent took a loan
- 5 percent took a temporary job
- 5 percent borrowed from someone they knew

Financial attitudes

Compared with the other groups, the Battling the Elements segment comes in with the second lowest percentage of those who are financially included. Only 24 percent of this segment of smallholder households are financially included, compared to 29 percent of smallholder households overall.

Some formal financial accounts

Nearly all of the financially included in this segment have a mobile money account (21 percent). Among this group, 3 percent have an NBFI account in addition to their mobile money account (Table 16). Only 3 percent have a bank account, and 5 percent have access to a bank service. Mobile money is driving financial inclusion.

Battling for Elements smallholder households in Côte d'Ivoire are more equipped for mobile money account than Farming for Sustenance households. Ninety-seven percent have at least one mobile phone in their homes, 76 percent are aware of mobile money, and 32 percent have tried mobile money.

Mobile money awareness is far greater than use. The actual conversion rate, comparing awareness of mobile money to use, is 0.42 to 1, and awareness to account ownership is 0.28 to 1, indicating that there are still some barriers to entry. In this case, the barriers are more about perceived eligibility and ability to access mobile money providers, which suggests a need for building meaningful awareness (awareness of how to use the product and services available) that goes beyond conceptual awareness (awareness of just the product). There is a general sense among this segment that it is important to save money on a mobile phone (64 percent), more so than through an informal channel. This segment has yet to feel that this is a service they can afford and that fits their needs.

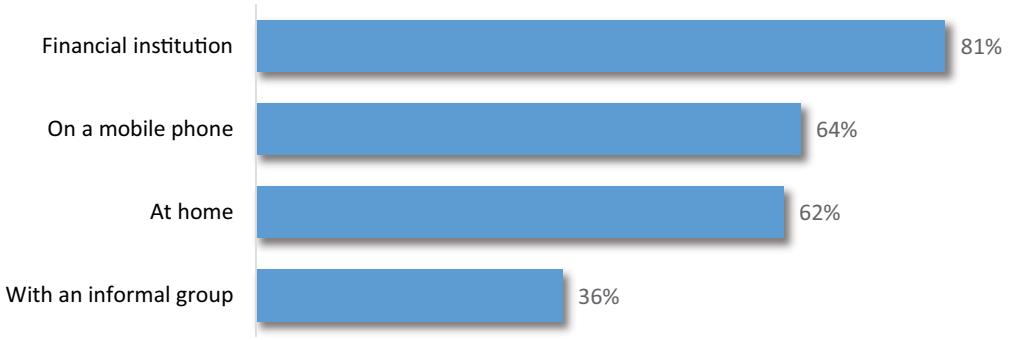
Access to informal financial accounts among the Battling the Elements

TABLE 16. Informal and formal financial mechanisms

	Financially included (%)	Own bank account (%)	Own mobile money account (%)	Own NBFI account (%)	Access to informal savings (%)
Farming for Sustenance	6	0	5	1	25
Battling the Elements	24	3	21	3	23

Sample: Smallholder farmers by segment

FIGURE 128. View saving money through different mediums as very important



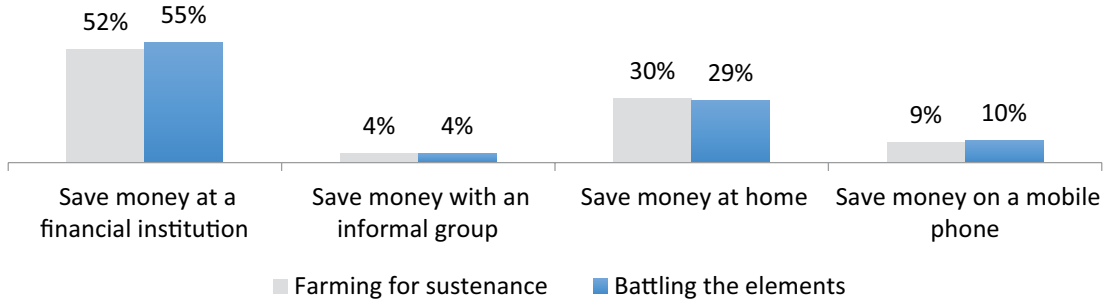
Sample: "Battling the elements" households, n=474

segment is 23 percent. Use of other informal saving networks or ROSCAs is 15 percent, for village savings and loans groups is 10 percent, and of money guards is 3 percent within this segment.

Overall, 87 percent of smallholders in the Battling the Elements segment have saved money in the past year. Like the Farming for Sustenance group, the Battling the Elements segment thinks it is very important to save for future purchases (93 percent), unexpected events (82 percent), or even regular purchases (83 percent). Paying school fees is also important (78 percent). A significant proportion find it important to invest money in the farm (95 percent), home improvements (77 percent), and an educational opportunity (which could include school fees) (74 percent). That investing in household-related items is nearly as important as investing in farming items indicates that there could be multiple ways to appeal to this segment, and outreach does not have to be limited to agriculture.

Saving on a mobile phone has the same level of importance as saving at home (64 percent and 62 percent, respectively) (Figure 128). Those in the Battling the Elements segment place greater importance on saving with financial institutions (55 percent) than they do on saving at home (29 percent) or with informal groups (4 percent) (Figure 129). Eighty-seven percent of Battling the Elements households managed to save money in the past year. This is more than those who saved in the overall population of smallholders (84 percent), but only by a small margin.

FIGURE 129. Perceived most important savings medium



Sample: Smallholder farmers by segment

SEGMENT SYNOPSIS

The Diversified and Pragmatic segment reflects the realism and inner conflict that can characterize smallholder farming households. In Côte d'Ivoire they tend to be tenured in agriculture and more likely to find more opportunities to leave agriculture than either the Farming for Sustenance or Battling the Elements segments.

Their experience has conditioned them to take a more pragmatic approach to agriculture. They tend to diversify income sources and plan for the unexpected. Though they enjoy and take pride in farming, they would consider full-time employment outside of agriculture if the opportunity presented itself.

With more than a third of this segment financially included, it suggests an opportunity to foster advanced use of mobile money accounts, as these individuals already have accounts and are using them.

Segment 3: Diversified and Pragmatic: Realistic, grounded, and planning for the realities of agricultural life

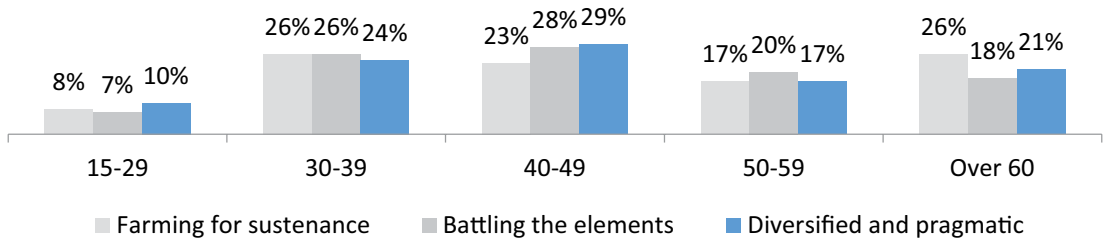
The **Diversified and Pragmatic** segment includes 26 percent of Côte d'Ivoire smallholder households. This segment is moving away from vulnerability and onto a path of stability. Perhaps what is most important about this group is its large size, suggesting plenty of use cases and models in the marketplace for emerging from vulnerability. Its size is also important in level-setting expectations as to what financial and agricultural mechanisms mean for a less-entrenched household.

Demographics: A majority of these households live in poverty and are headed by farmers who are 40 and older. This segment is relatively evenly distributed throughout the country when considering the regions, with the highest concentration in the Marahoue (12 percent) region.

The Diversified and Pragmatic group tends to be more mature. The majority are over 40 (67 percent), with a plurality (29 percent) being squarely "middle-aged" between 40 and 49 (Figure 130). One-third (34 percent) are under 40.

The Diversified and Pragmatic group is divided among the regions of Marahoue, Tonkpi, Lôh-djiboua, Haut-Sassandra, Guemon, Cavally, and Nawa, with all regions having more than 5 percent of smallholders in this segment. The highest concentration of this segment is in Marahoue (12 percent), followed

FIGURE 130. Age distribution of household head



Sample: Smallholder farmers by segment

by Tonkpi (9 percent), and Lôh-djiboua (8 percent). The majority of this group (68 percent) lives below the poverty line (earning less than $2.50 a day).

***Farming**:* Experience, income, and crops

Diversified and Pragmatic smallholder households are the most experienced in farming. Three out of five have been farming for more than 10 years (61 percent), and 38 percent have been farming for 10 years or less. Compared to the Battling the Elements group, fewer people in the Diversified and Pragmatic segment are more tenured in agriculture, having worked in the sector for more than 10 years (compared to 67 percent of the Battling the Elements group).

Enjoyment of farming

The Diversified and Pragmatic segment of smallholder households in Côte d'Ivoire intend to continue working in agriculture (91 percent), showing similar intentions as other segments. They enjoy it (97 percent), and many would like to expand their agricultural activities (96 percent). Farmers in this segment feel only somewhat satisfied with their agricultural achievements (51 percent), suggesting they may have wanted better outcomes than their circumstances could support (Figure 131).

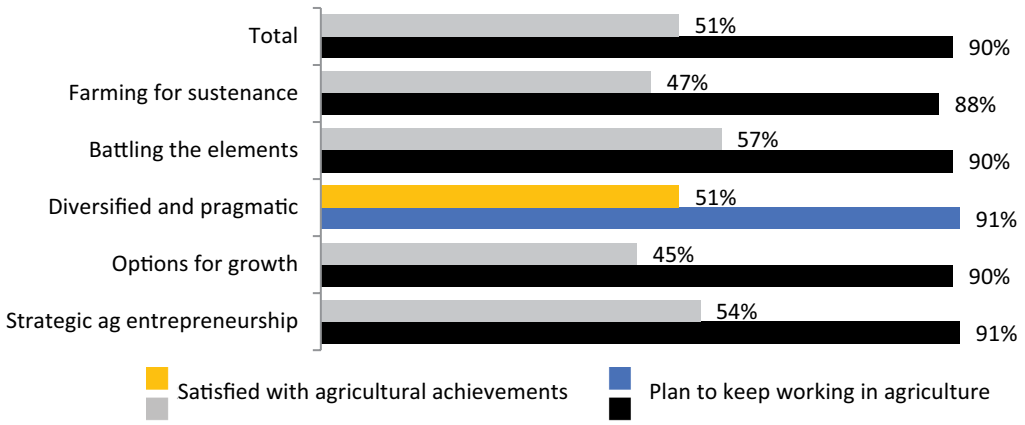
It is critical to point out that full-time employment is attractive to this segment (51 percent). Those in this group are pragmatic, and are more likely to find opportunities to leave agriculture than those in either the Farming for Sustenance or Battling the Elements segments. Their income streams are more diverse, opening up more possibilities that could be developed into full-time employment.

More sources of income

More than nine in 10 (95 percent) Diversified and Pragmatic smallholder households generate income from crops; 22 percent generate income from livestock. Other sources of income for the Diversified and Pragmatic households can include the following:

- Money from family and friends (13 percent)
- Wages or salary from a regular job (12 percent)
- Wages from occasional jobs (12 percent)
- Running own business in retail or manufacturing, selling or making goods, (8 percent); 2 percent say this is their largest source of income

FIGURE 131. View of success in agriculture vs. willingness to continue working in it



Sample: All smallholder households who participate in agricultural activities by segment

On average, land size for Diversified and Pragmatic smallholders is 3.6 hectares for owned land and 3.2 hectares for rented.[37] They typically grow seven crops each year on their land. They tend to sell, on average, four crops that they grow. Commonly grown crops include the following:

- Cassava (68 percent)
- Cocoa (67 percent)
- Maize (64 percent)
- Okra (63 percent)
- Chilies (63 percent)
- Eggplant (61 percent)
- Rice (58 percent
- Plantain (50 percent)

Affected by outside elements

Nine in 10 smallholders in this group have experienced unexpected events (91 percent). However, they are less likely to have experienced two or more unexpected events in the past three years (40 percent).

- More than two-thirds (68 percent) were affected by weather alone.
- Two in five (41 percent) faced notable challenges with pests and disease.

Health-related issues and accidents, such as fire and theft, are also a challenge for this group (15 percent and 12 percent, respectively). Smallholders in this segment cope with these events in a number of ways. Most notably, this segment was more likely to have done nothing to address the problems than they were to have used their savings to recover. Borrowing is more commonly a method for coping among this segment, versus Farming for Sustenance or Battling the Elements segments:

- Do nothing (42 percent)
- Use savings (33 percent)
- Take a loan from a financial institution (14 percent)
- Work a temporary job (6 percent)
- Borrow from someone (4 percent)
- Sell livestock/crop (3 percent)

Financial attitudes

The segmentation model itself is built from predictors of financial inclusion. More than a third (36 percent) of the Diversified and Pragmatic segment is financially included. The level of financial inclusion among this segment surpasses the overall level of financial inclusion among smallholder families in Côte d'Ivoire (29 percent).

This segment offers hope that farming households can put their livelihoods on a path toward greater stability. With more than a third of this segment financially included, it suggests an opportunity to foster more advanced use of mobile money accounts because these individuals already have accounts and are using them. Their audience size and digital capabilities might help fuel expansion of merchant payments, digital savings, and/or bill pay. Moreover, the segments'

37 The land size measurement comes from the household survey where multiple members of the agricultural household offer up their recollection of various dynamics so as to capture full dynamics instead of relying on just one member's knowledge of the household. An aggregate estimate of this measure was then created and appended to the segmentation, which is based on participant responses to the individual questionnaire (asked of just one randomly selected household member). These data are weighted accordingly, and land size numbers are calculated using combined data (own land and rent land are calculated by choosing the largest land size among all members in each household); the base is the household. The data excluded those who had responded with more than 10 hectares; they were treated as outliers that are part of the sample because the listing phase otherwise deemed them qualified.

TABLE 17. Informal and formal financial mechanisms

	Financially included (%)	Own bank account (%)	Own mobile money account (%)	Own NBFI account (%)	Access to informal savings Groups (%)
Farming for Sustenance	6	0	5	1	25
Battling the Elements	24	3	21	3	23
Diversified and Pragmatic	36	5	34	6	24

Sample: Smallholder farmers by segment

use of mobile money accounts could set examples for other farmers. Therefore, the collective reach of efforts to engage these smallholders in more advanced mobile money use might extend far beyond the people within the segment.

A pragmatic approach to finances

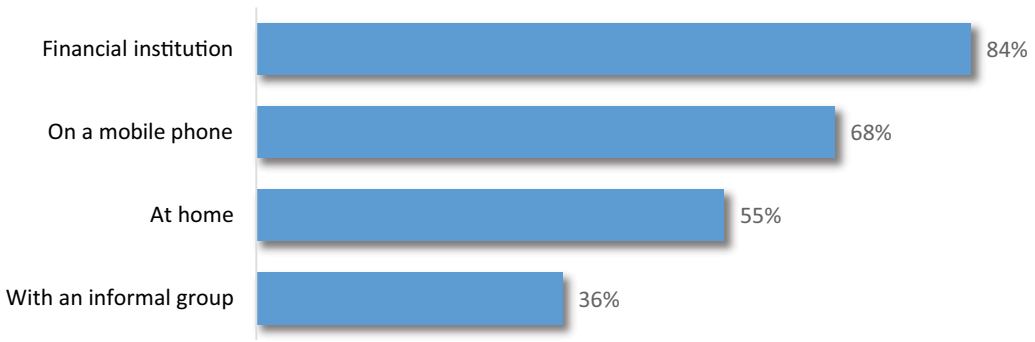
In the Diversified and Pragmatic segment, all households have access to a mobile phone (100 percent) and are aware of mobile money (83 percent). It then follows that mobile money accounts are the most popular formal financial mechanisms in this segment.

Six percent of smallholders in this segment have NBFI accounts; 5 percent have bank accounts. Only 7 percent have ever used a bank. Similarly, 9 percent have ever used an NBFI. More than one in five (24 percent) have used informal savings mechanisms such as a moneylender, merry-go-round, VSLA, or savings collector (Table 17).

More than eight in 10 (87 percent) have saved money for something in the past 12 months; 43 percent of the segment have two or more savings channels. A majority believe saving for specific purposes (e.g., school fees, regular expenses) is very important. Saving to cope with a death in the family was ranked the least important (44 percent), below marriage/dowry payments (57 percent). Saving for future expenses was most important (94 percent). This segment also sees the need for the household to invest in the farm, home improvement, education, business, and health.

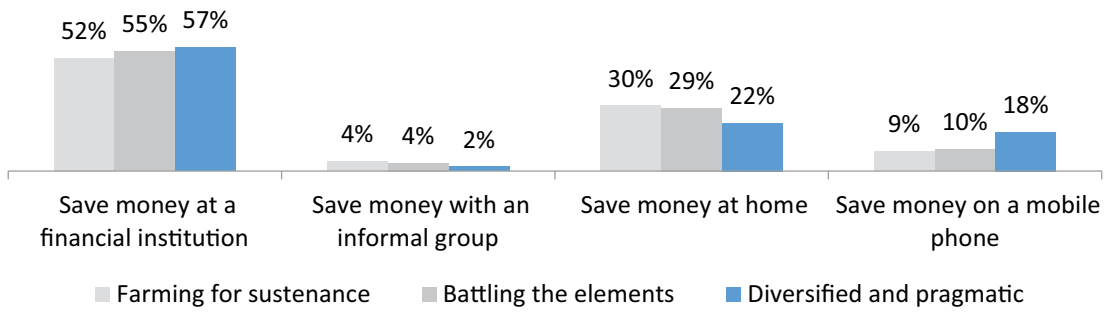
Similar to all other groups, those in the Diversified and Pragmatic segment find saving at a financial institution to be very important (84 percent) (Figure 132). This is followed by saving on a mobile

FIGURE 132. View saving money through different mediums as very important



Sample: "Diverse and pragmatic" households, n=858

FIGURE 133. Perceived most important medium for saving money



Sample: Smallholder farmers by segment

phone (68 percent); saving money at home is a distant third.

A plurality (57 percent) say saving at a financial institution is the most important savings medium for their household, reflecting the need to keep their money secure. A notable portion chose "saving money at home" or "on a mobile phone" over saving with an informal group (figures 132 and 133).

Segment 4: Options for Growth: Stable, optimistic, and building various paths for the future

Smallholder households in the Options for Growth segment make up 5 percent of the smallholder population in Côte d'Ivoire; this segment is the smallest group. This segment's most significant characterizing elements are a higher level of financial inclusion and a skew toward older heads of household, which, taken together, distinguishes them from the other segments. They have access to financial tools and to a range of livelihood opportunities. They feel more empowered than do members of the other groups.

Though they are optimistic, there still is room for growth. Their optimism conveys that they have improved their current situations largely because of their net incomes. Furthermore, it may not be farming income alone that helps stabilize their households—agriculture is only one of these households' diverse revenue streams.

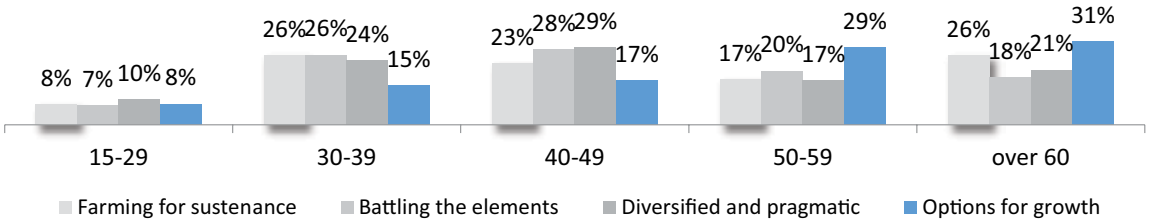
SEGMENT SYNOPSIS

Smallholders in the Options for Growth segment stand out because they have high level of financial inclusion and they skew toward older heads of household. They are comparatively newer to farming, see their future in farming, derive enjoyment from it, and are keen to expand their agricultural activities.

A majority of households in the Options for Growth segment have had their agricultural activities seriously affected by unexpected events, though they were resilient, thanks to their savings, when disaster struck.

The Options for Growth segment has greater access to financial tools and external support. With two-thirds of this segment financially included, this group offers hope that smallholder households can put their livelihoods on a path toward greater stability and growth.

FIGURE 134. Age distribution of household head



Sample: Smallholder farmers by segment

Demographics: A majority of these households are headed by farmers who are older and mostly poor.

More than three-quarters of the heads of household in the Options for Growth segment are over 40 years old (77 percent) (Figure 134). They are more concentrated in the Gbokle region (29 percent), with smaller portions having a presence in the Tonkpi, Lôh-djiboua, Marahouse, and Guemon regions.

Sixty-three percent live in extreme poverty (below $1.25 a day). It may seem counterintuitive that a portion of a segment called Options for Growth falls below the poverty line. However, the drive for individual upward mobility and, with that, financial services (off of which the segmentation model was built), can cross the poverty line. This results in lower-income groups with tendencies and attitudes similar to those of higher income groups.

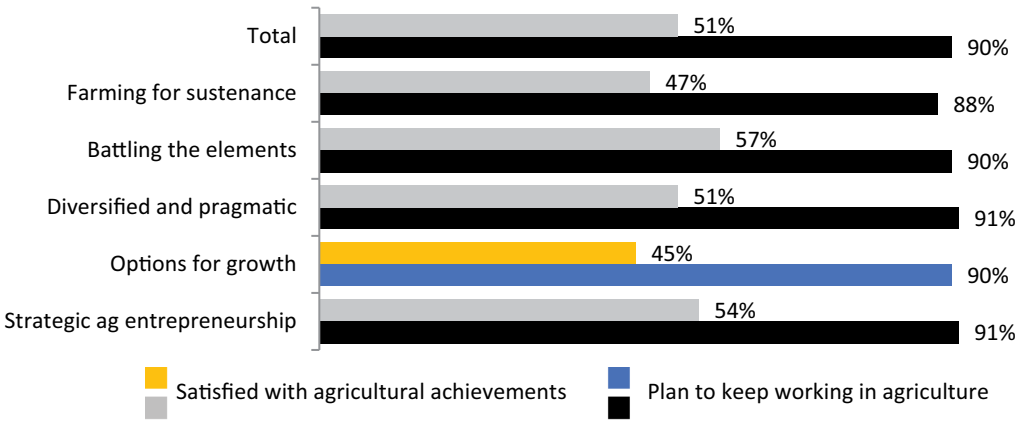
Farming: Experience, income, and crops

The Options for Growth segment is comparatively newer to farming: 41 percent have been farming for 10 years or less. This segment of smallholder households sees farming as their future, and nine in 10 (90 percent) intend to continue working in agriculture. They derive great enjoyment from it (90 percent), and almost all would like to expand their agricultural activities (99 percent).

Have a desire to expand their agricultural activities

That said, full-time employment could also be very attractive. While a vast majority say they want to expand their agricultural activities (99 percent), close to six in 10 say they would welcome full-time employment (57 percent). Less than half (45 percent) of this segment are satisfied with what their agricultural work has achieved (Figure 135),

FIGURE 135. View of success in agriculture vs. willingness to continue working in it



Sample: All smallholder households who participate in agricultural activities by segment (n=2,949)

exacerbating this contradiction. This is can also be interpreted as a potential call to action. If this segment cannot be successful in agriculture and discovers other options, then they may change direction. The question becomes, "What do they need to stay in farming?"

The mean land size[38] for Options for Growth farming households is 5.0 hectares for owned land and 2.6 hectares for rented land. On average, these farmers grow 11 crops each year, eight of which they grow to sell.

Options for Growth households tend to have more sources of income (52 percent have three or more), and can therefore rely on more than just agriculture for revenue:

- Nearly one-third (31 percent) generate income from earning wages from occasional jobs
- 15 percent run a business in retail or manufacturing (selling or making goods)
- 9 percent have salary or wages from a regular job

Agriculture still generates income for most (97 percent get income from selling crops, 29 percent from livestock), and it tends to be the largest reported source of income. It is also the source of income most vulnerable to unexpected events.

More than nine in 10 (93 percent) smallholder households in the Options for Growth segment have had their agricultural activities seriously affected by an unexpected event, and 44 percent experienced two or more unexpected events in the three years before the survey. Moreover, this group experiences both environmental events and human/manmade issues:

- 81 percent experienced a weather-related event
- 32 percent were affected by pests or disease
- 17 percent were affected by a family member's or family worker's health-related issues
- 21 percent were affected by theft and accidents such as fire

The Options for Growth segment is also one of the most enabled by savings when disaster strikes. Forty-seven percent turned to their savings. Close to one-third (32 percent) had no specific response to the shock. This group also had other resources during times of disaster:

- 13 percent took a loan
- 4 percent took a temporary job

Financial attitudes

Much higher financial inclusion

Two-thirds (66 percent) of the Options for Growth segment of smallholder households are financially included, which is 30 percent higher than the Diversified and Pragmatic segment. While this segment is a small portion of the overall population, it is also one that

38 The land size measurement comes from the household survey where multiple members of the agricultural household offer up their recollection of various dynamics so as to capture full dynamics instead of relying on just one member's knowledge of the household. An aggregate estimate of this measure was then created and appended to the segmentation, which is based on participant responses to the individual questionnaire (asked of just one randomly selected household member). These data are weighted accordingly and land size numbers are calculated using combined data (own land and rent land are calculated by choosing the largest land size among all members in each household), the base is the household. The data excluded those who had responded with more than 10 hectares, as they were treated as outliers that are part of the sample because the listing phase otherwise deemed them qualified.

TABLE 18. Informal and formal financial mechanisms

	Financially included (%)	Own bank account (%)	Own mobile money account (%)	Own NBFI account (%)	Access to informal savings (%)
Farming for sustenance	6	0	5	1	25
Battling the Elements	24	3	21	3	23
Diversified and Pragmatic	36	5	34	6	24
Options for Growth	66	13	63	13	21

Sample: Smallholder farmers by segment

offers hope as they more financially included and are better educated.

Mobile money accounts are the most common formal financial mechanism among those in the Options for Growth segment. Nearly two-thirds (63 percent) of smallholder farmers have a mobile money account, and 71 percent can access mobile money either through their own or through someone else's account. Ninety-two percent of smallholders in the Options for Growth segment had heard of mobile money before the survey.

Equal proportions of smallholders in the Options for Growth segment have either an NBFI account or a bank account at 13 percent each (Table 18). Nearly half of these smallholders (47 percent) have been inside a bank, eight times more than have those in the Farming for Sustenance segment.

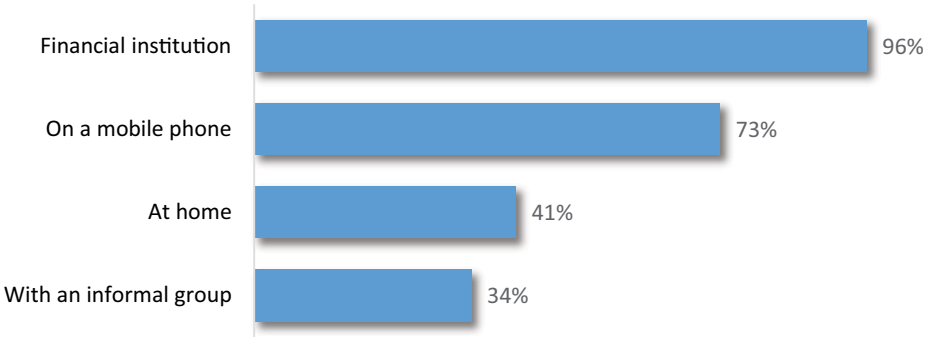
One-fifth (21 percent) have used an informal financial institution.

Apart from access to financial mechanisms, there is deep acknowledgment in this segment of the importance of various financial behaviors, such as saving. Nearly all smallholders in this group (99 percent) feel it is very important to save for future purchases and for unexpected events (92 percent). Many also find it very important to save for school fees (92 percent). Perhaps due to their tendency to experience shocks, most also find it very important to save for regular purchases (92 percent). There also is a strong belief in the importance of investing in the farm—98 percent of smallholders in this segment consider it very important.

A vast majority of smallholder households in the Options for Growth segment consider saving at a financial institution or on a mobile phone "very important." In fact, more consider saving at a financial institution or on a mobile phone "very important" than saving at home or with an informal group. When asked to choose which is most important, smallholders mostly choose a formal financial channel, and primarily a financial institution. Saving on a mobile phone came in second. This suggests that the segment sees the value proposition in the formal sources that other segments have not yet discovered (figures 136 and 137).

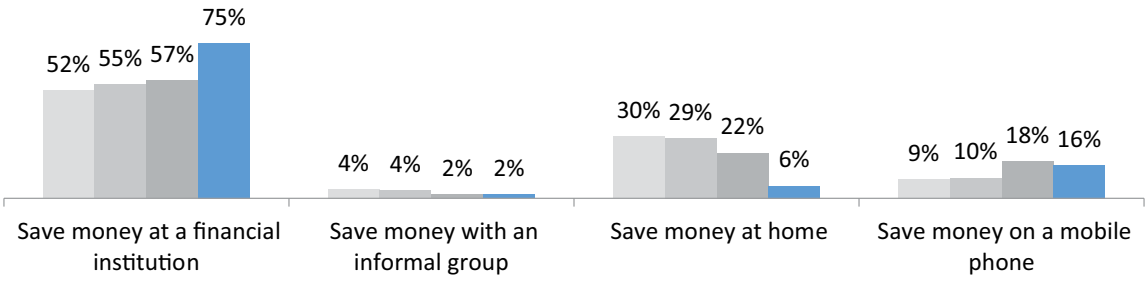
39 Caution: Small segment size limits analysis. Proceed with caution in extrapolating findings.

FIGURE 136. View saving money through different mediums as "very important"



Sample: "Options for growth" households, n=100

FIGURE 137. Most important medium for saving money



Sample: Smallholder farmers by segment

SEGMENT SYNOPSIS

The Strategic Agricultural Entrepreneurship segment includes households that appear to be actively engaged in building their agricultural work, with some indications of success or at least progress. The segment is more enabled than the others and has a higher income, more education, greater access to emergency funds, and more financial mechanisms at their disposal. They have been impacted by the realities of farming, and have been able to rely on their savings or other resources to get through tough times.

They have big aspirations that include a future in agriculture. They enjoy agriculture and want to expand their agricultural activities. That said, full-time employment could also be attractive to most in this segment. Despite intending to continue working in agriculture, most smallholders in this segment are not satisfied with what their agricultural work has achieved; this is the most unsatisfied among all the segments.

This group can be a model, or a use-case, for carrying meaningful messages or examples for growth to other smallholder segments.

Segment 5: Strategic Agricultural Entrepreneurship: Actively engaged, empowered, and expanding their agricultural activities[39]

The Strategic Agricultural Entrepreneurship segment makes up only 15 percent of smallholder households in Côte d'Ivoire. They have emerged from life's events empowered, enabled, and perhaps even succeeding, and they have a distinct profile as it relates to their agricultural activities.

Demographics: This is the most affluent group among the five segments. At the same time, 11 percent are living in extreme poverty (below $1.25/day). The segment comprises relatively fewer farmers over 60 years old compared to the other segments, and these households are found mostly in the Marahoue and Lôh-djiboua regions.

The heads of household in the Strategic Agricultural Entrepreneurship segment are evenly distributed across two age groups: 30–39 years old and 40–49 years old (27 percent and 29 percent, respectively) (Figure 138). Only 13 percent are over 60 years old. More than four in 10 (38 percent) heads of household in this segment are under age 40, which is a sizable youth population.

The segment is mainly distributed across the two regions, Marahoue at 12 percent, and Lôh-djiboua at 11 percent. This is also the least impoverished segment, with 52 percent living below the poverty line. Few smallholder households in this segment live in extreme poverty (earning under $1.25 a day).

***Farming**: Experience, income, and crops*

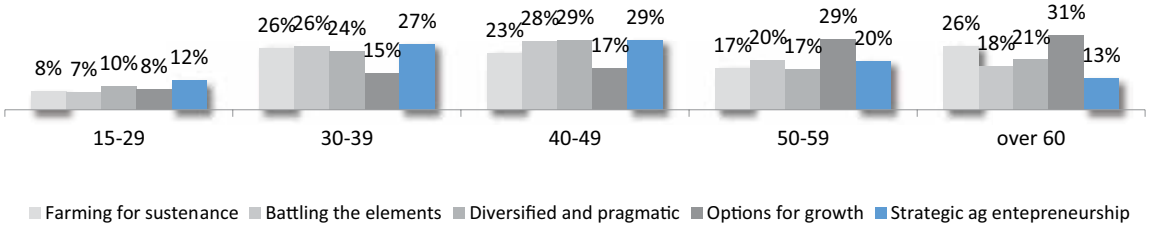
The Strategic Agricultural Entrepreneurship segment is the least experienced among the five segments. Only 59 percent have more than 10 years of farming experience. Most (20 percent) of these households have two to five years of experience. Nine in 10 intend to continue working in agriculture (91 percent) (Figure 139), showing similar intentions as other segments. Nearly all enjoy agriculture (97 percent), and many would like to expand their capabilities (97 percent), like the other segments. That said, full-time employment would be attractive to almost two-thirds of this segment (62 percent). More than half of smallholders (54 percent) in this segment are satisfied with what their agricultural work has achieved (Figure 139).

Most smallholders in this segment want to expand their agricultural activities but find them unsatisfying, and would also consider alternatives outside of farming. This suggests entrepreneurial tendencies. The question becomes, "What can be done to feed the entrepreneurial spirit of this segment, and expand their reach and influence in agriculture in Côte d'Ivoire?"

More sources of income

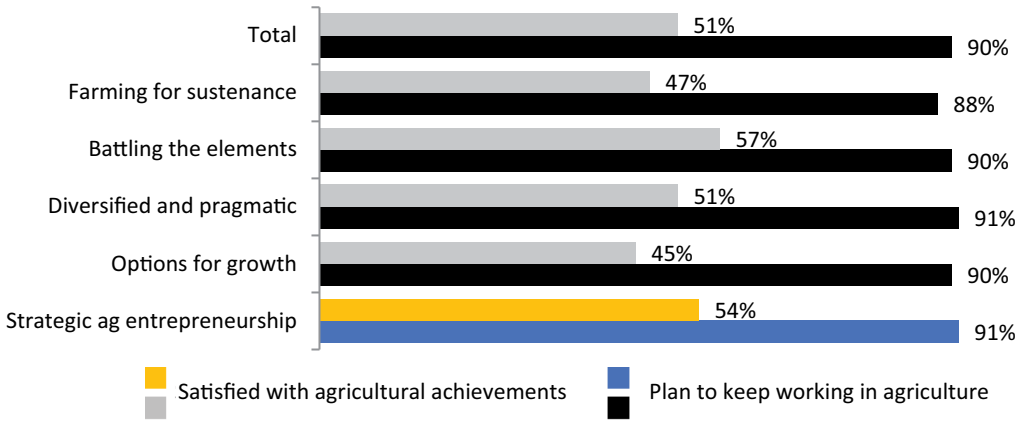
Compared to the other segments, a smaller portion of the Strategic Agricultural

FIGURE 138. Age distribution



Sample: Smallholder farmers by segment

FIGURE 139. View of success in agriculture vs. willingness to continue working in it



Sample: All smallholder households who participate in agricultural activities by segment

Entrepreneurship segment generates income from livestock (15 percent) and growing crops, fruits, or vegetables (93 percent). Larger portions also generate income from earning wages from a regular job (21 percent), earning wages from an occasional job (15 percent), and running a business in retail or manufacturing (13 percent). This suggests that agricultural pursuits are key components of a larger and diversified income strategy.

On average, those in the Strategic Agricultural Entrepreneurship segment grow the fewest types of crops each year (7.29) compared to the other groups. They tend to sell on average five of the seven crops they grow (4.84). They also own (average of 3.5 hectares) or rent land (average of 2.2 hectares).[40]

Nearly seven in 10 (70 percent) Strategic Agricultural Entrepreneurship smallholders have been seriously affected by a weather-related event (e.g., drought, floods, late rains) in the past three years. Pests and disease and accidents or theft also affected them (39 percent), but not as much as weather. Other outside elements, such as market price fluctuations, political unrest, their own health issues, or a death, were barely mentioned. More than a third (36 percent) show a wider range of coping mechanisms and options at their disposal; they have no specific response as to how they coped with these events.

Financial attitudes

Overall, 29 percent of smallholder households in Côte d'Ivoire are financially included. The majority (68 percent) of smallholder households in the Strategic Agricultural Entrepreneurship segment are financially included. Nearly two-thirds of the smallholders in this group (64 percent) have mobile money accounts, the highest of all the five segments.

40 The land size measurement comes from the household survey where multiple members of the agricultural household offer up their recollection of various dynamics so as to capture full dynamics instead of relying on just one member's knowledge of the household. An aggregate estimate of this measure was then created and appended to the segmentation, which is based on participant responses to the individual questionnaire (asked of just one randomly selected household member). These data are weighted accordingly, and land size numbers are calculated using combined data (own land and rent land are calculated by choosing the largest land size among all members in each household), the base is the household. The data excluded those who had responded with more than 10 hectares, as they were treated as outliers that are part of the sample because the listing phase otherwise deemed them qualified.

Seventy-three percent have access to a mobile money service, and nearly all (94 percent) have heard of mobile money. Bank account and NBFI account ownership are at 18 percent and 11 percent, respectively (Table 19). Fifteen percent have used an informal group at some point in their lives. Experience with informal financial mechanisms varied, but, overall, use is relatively low for this segment:

- VSLA, 8 percent
- Other informal saving network or ROSCA, 8 percent
- Money guard, 1 percent

Importance of saving

Smallholder households in the Strategic Agricultural Entrepreneurship segment consider saving to be important. Nine in 10 households (91 percent) have saved money in the past 12 months, and most are using more than one savings channel. More than half (58 percent) have two or more savings channels at their disposal.

Most (94 percent) feel it is very important to save for future purchases, unexpected expenses (87 percent), and school fees (86 percent). There is also emphasis on investing in the farm (93 percent). Smallholders in this segment consider saving with a financial institution and on a mobile phone to be much more important than saving at home or through an informal channel (Figure 140). This shows that the group values the functions of a formal account.

Market Implications

Smallholder farming in Côte d'Ivoire is defined by a collection of attitudinal, behavioral, and circumstantial factors. This segmentation model shows the unique points within each segment through a dynamically nuanced perspective that can be leveraged for positive market interventions.

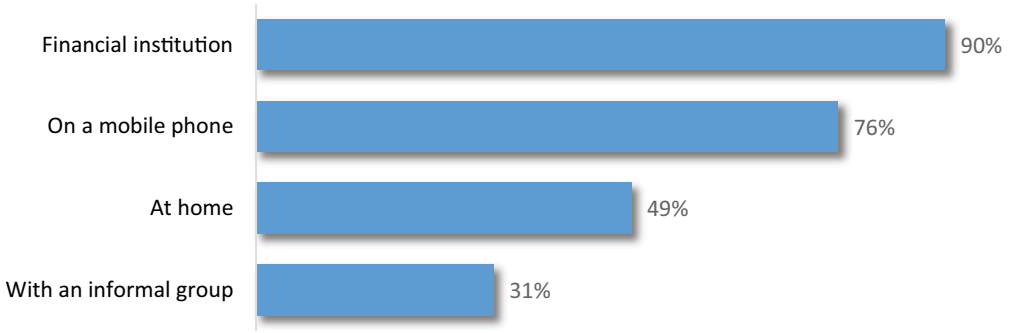
As a whole, the five segments of smallholder households behaviorally characterize smallholder households across Côte d'Ivoire. The Farming for Sustenance segment dominates the landscape (38 percent), showing that movement in

TABLE 19. Informal and formal financial mechanisms

	Financially included (%)	Own bank account (%)	Own mobile money account (%)	Own NBFI account (%)	Access to informal savings (%)
Farming for Sustenance	6	0	5	1	25
Battling the Elements	24	3	21	3	23
Diversified and Pragmatic	36	5	34	6	24
Options for Growth	66	13	63	13	21
Strategic Agricultural Entrepreneurship	68	18	64	11	15

Sample: Smallholder farmers by segment

FIGURE 140. View saving money through different mediums as very important



Sample: "Strategic agricultural entrepreneurship" households, n=359

the marketplace really must be through advancing portions of this massive group into the financial fold.

- The **Farming for Sustenance** group is the most dominant segment and the most vulnerable farming household. Smallholders in this segment show a high number of years in farming. They want their children to continue in agriculture; however, they themselves could be interested in full-time, off-farm employment. They live off what their farm produces, and because they are highly vulnerable, they stand to gain the most from financial and agricultural mechanisms that can facilitate their daily labor and mitigate the range of risks they face.
- The **Battling the Elements** segment is the third largest segment; it makes up 16 percent of smallholder farming households in Côte d'Ivoire. These households face many of the same limiting circumstances as those in the Farming for Sustenance group, but this segment includes much of the younger generation—the future of farming. They are optimistic and committed to farming, have better access to emergency funds and are active savers.
- The **Diversified and Pragmatic** segment makes up 26 percent of Côte d'Ivoire smallholder households. This segment is moving away from vulnerability and toward a path of stability. Perhaps what is most important about this group is its large size, which suggests plenty of use cases and models in the marketplace for emerging from vulnerability. Its size is also important in level-setting expectations as to what financial and agricultural mechanisms mean for a less-entrenched household.
- The **Options for Growth** segment comprises 5 percent of the smallholder population in Côte d'Ivoire. Their most significant characterizing elements are their higher level of financial inclusion and their skew toward the older age group of household head, which together distinguish them from the other segments. They have access to financial tools and a range of livelihood opportunities, and they feel more empowered than the other groups.
- The **Strategic Agricultural Entrepreneurship** segment makes up 15 percent of smallholder households in Côte d'Ivoire. These households are keen on building their agricultural activities, with some indications of success or at least progress. They are more enabled than the other segments, have a higher income, more education, greater access to emergency funds, and access to more financial mechanisms.

To foster greater financial inclusion, agricultural stability and growth, and overall economic well-being, there needs to be a specific approach to each segment. This segmentation highlights several agricultural and digital financial implications stakeholders should consider.

Agricultural Implications

Implication 1: The future of farming lies within the younger generation, who will not prosper by perpetuating the limitations that their parents experienced.

The Battling the Elements, Diversified and Pragmatic, and Strategic Agricultural Entrepreneurship segments hold some lifetime value. The relatively small proportion of young smallholders tend to fall within these three segments. Older farmers in the other two segments (Farming for Sustenance and Options for Growth) want their children to continue in farming.

Central to perpetuating youth in farming is putting them within reach of financial services (savings accounts, loans) and agricultural mechanisms (insurance, payment options, value chains, contracts) to help them cultivate their land in a way that sustains their households.

Implication 2: Smallholders' desire to remain in farming might require strategic resourcing and planning to get the most out of their farming activities

The Farming for Sustenance households lack income diversification, with crops being their single biggest source of income. They tend to depend almost exclusively on their own agricultural outputs. Given that smallholder household heads in this segment are older, they see the continuity of their efforts through their children, who would potentially open up agricultural activities to contemporary farming methods in the future. This fuels their desire to continue in farming.

The Battling the Elements, Diversified and Pragmatic, and Strategic Agricultural Entrepreneurship segments intend to continue working in agriculture, generally enjoy it, and would like to expand their agricultural activities, which makes them an appropriate target for agricultural finance.

The Options for Growth segment is comparatively newer to farming. Smallholders in this group see their future in farming and intend to continue working in agriculture. They derive great enjoyment from it, and almost all would like to expand their agricultural activities.

Being able to remain in farming and flourish, however, will require more advanced thinking around methods for diversifying income sources to include nonagricultural income and/or income from a specific collection of crops where there is a market value.

What people grow, when, and how much will need to be proportional so that the effort and the costs of growing justify the yield.

Digital Finance Implications

Implication 1: High mobile phone ownership among smallholders means mobile money can drive financial inclusion among smallholders in Côte d'Ivoire

Across the segments, there is high access to and ownership of mobile phones in the households. Overall, 29 percent of Ivoirian smallholder households are financially included, and mobile money accounts are the most commonly held accounts among smallholders. This suggests an opportunity to foster

more advanced use of mobile money among smallholders who already have accounts and are using them. The audience size and digital capabilities of the Diversified and Pragmatic, Options for Growth, and Strategic Agricultural Entrepreneurship segments might help fuel expansion of merchant payments, digital savings, and/or bill pay, setting an example for the other segments. It also suggests there are use cases for farmers who are not yet financially included. Mobile money can be leverage as a method to address a household's financial needs.

Implication 2: Perceived eligibility and ability to access mobile money providers is still a barrier

Across the segments, mobile money awareness is greater than its use, indicating that there are still some barriers to entry. In this case, the barriers are more about perceived eligibility and ability to access mobile money providers, which suggests a need to build meaningful awareness (awareness of how to use the product and services available) that goes beyond conceptual awareness (only aware of the product). Awareness and knowledge is an initial step, and one that should not be overlooked, to getting more smallholders financially included, particularly from the Farming for Sustenance segment.

Implication 3: Saving channels can be digitized

The propensity to save is high across all smallholder household segments in Côte d'Ivoire. These households find it appealing to save in formal institutions and on their mobile phones. Saving also tends to be through more than one channel and for specific purposes (e.g., school fees, regular expenses, the future, etc.). This provides smallholder households an opportunity for digitization and innovation.

Cultivating the segments

The agricultural and financial implications show that there is a need for more tailored approaches to supporting the smallholder farming population in Côte d'Ivoire. This will require tending to the segments that struggle and cultivating those that are more stable and already financially included—keeping smallholders, especially youth, satisfied and a productive part of the agricultural sector.

In Côte d'Ivoire, multiple strategies that are combined to best position financial and agricultural mechanisms for meaningful uptake and use within a population will be required. Ultimately, this will give providers the opportunity to better calculate their approaches and potential returns, and will give stakeholders who are shaping this sector the knowledge necessary to better direct resources to their targeted needs.

7. DESIRES AND ASPIRATIONS: SMALLHOLDER HOUSEHOLDS SEE THE IMPORTANCE OF SAVING AND INVESTING IN FINANCIAL INSTITUTIONS

The National Survey of Smallholder Farmers in Côte d'Ivoire included a series of questions on what financial and agricultural tools farmers consider relevant in their agricultural and financial lives, what they want and need, and how that differs from what they have now. This section analyzes the desires and aspirations of smallholder households across the country as a tool for identifying where financial and agricultural mechanisms can be most relevant, and what farmers think they want (or need) the most. This analysis of the smallholder population in Côte d'Ivoire presents the overall picture, as opposed to focusing on any one behavioral segment, largely because many of these desires and aspirations span the population.

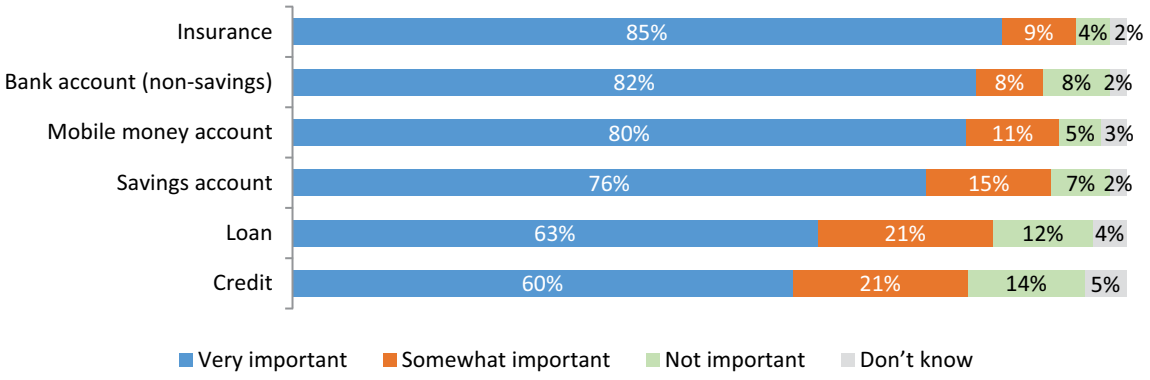
Smallholder households know the importance of saving, investing in financial institutions

There is a relatively high level of perceived relevance among all smallholder households in Côte d'Ivoire of all financial products, most notably insurance and bank and mobile money accounts. More than eight in 10 say insurance, a bank account (nonsavings), and a mobile money account are "very important." Loans and credit are comparatively less important,[41] but still highly appealing to the majority (Figure 141). The findings are similar when you ask smallholder farmers about the perceived relevance of these financial products to their agricultural activities (Figure 142).

This perceived relevance of financial tools for either their households or their agricultural activities carries through to the importance of saving. When asked where they should save, a majority of smallholder farmers believe it is very important to save at a financial institution and even on a mobile phone (Figure 143). There is a great opportunity here as the inherent importance of savings is already present for Côte d'Ivoire smallholder farmers. Saving with an informal group and savings collector received the lowest level of importance.

A majority of smallholder farmers feel it is very important to save for future

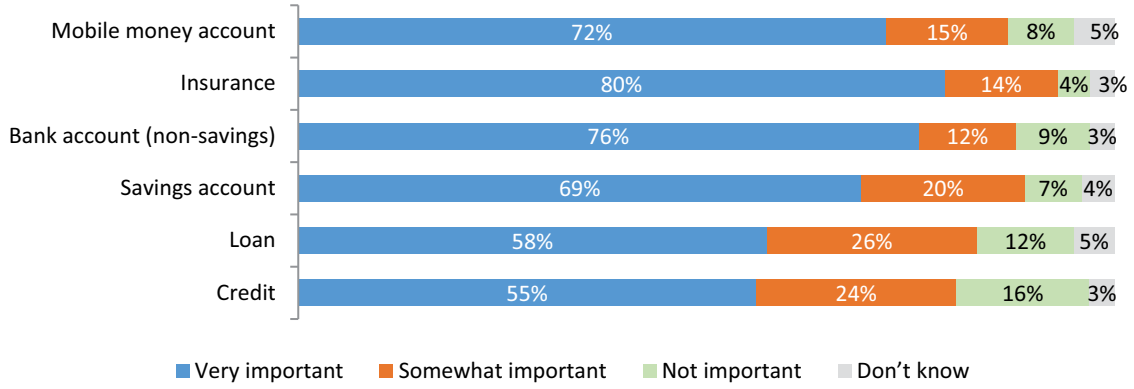
FIGURE 141. Regardless of what you have, how important is it to your household to have the following?



Sample: Smallholder households, n=3,019

41 A loan is what is received directly in the form of cash from informal and formal financial services; credit is not in the form of cash (e.g., a farmer may go to an agriculture vet and receive inputs to pay for them later, after harvest).

FIGURE 142. How important is it to your agricultural activities to have the following?



Sample: Smallholder farmers, n=2,949

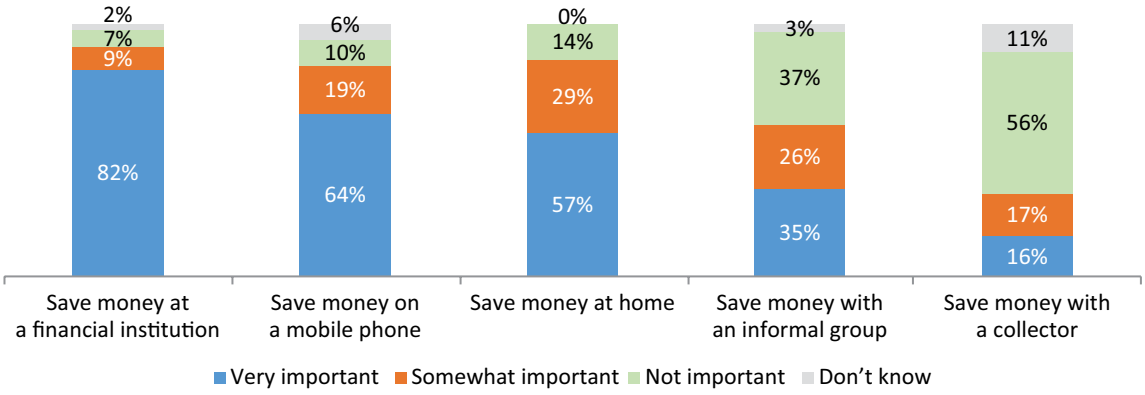
purchases, an unexpected event, regular purchases, and school fees, in that order (Figure 144). Looking at the trend, smallholder farmers tend to save for a planned future purchase. They also recognize that having a safety net for unexpected events, such as illness, is important. When asked what they need to save for the most, they chose a planned future purchase as it may be just out of reach at the time, followed by unexpected events (Figure 145).

Smallholder farmers demonstrate that trust, purpose, and ease of access are important factors to consider while saving. Storing money in a place they trust, which can be easily accessed in case of an emergency with minimal risk of loss, is important to them. Not all smallholder farmers agree that when money is in an account, it is working for them. In fact, 22 percent disagree with that concept, and 24 percent aren't sure. Additionally, smallholder farmers are somewhat divided on whether saving money in an account is easier than storing it somewhere else (Figure 146).

These desires do not always translate into practice; however, if the desire is present, it offers an opportunity to appeal to what is important to the consumer.

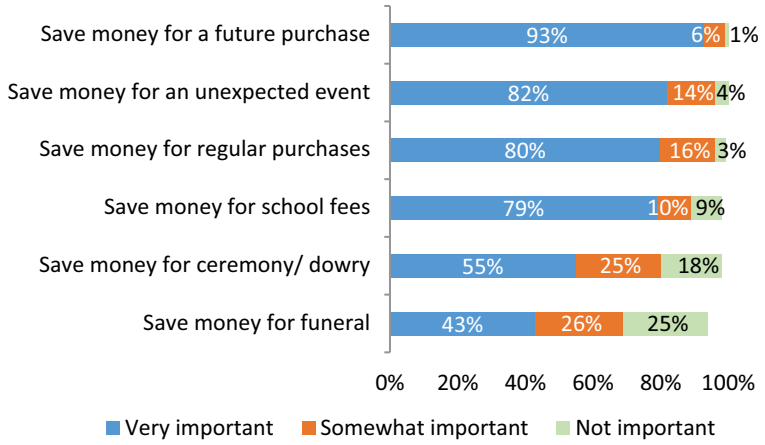
Smallholder farmers in Côte d'Ivoire place the highest level of importance on investing in their farms, which is consistent with other countries where smallholder farmers were surveyed. A strong majority feel it is very important to invest in a future educational opportunity (Figure 147). When it comes to what they

FIGURE 143. How important is it for your household to save at each of the following?



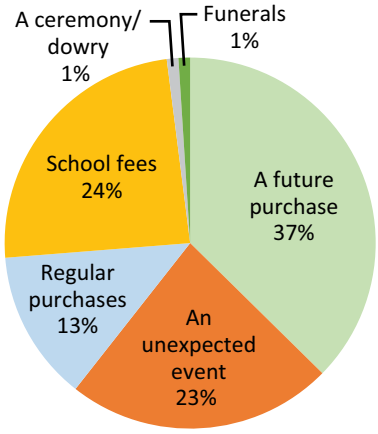
Sample: Smallholder farmers, n=2,949

FIGURE 144. How important is it for your household to save for each of the following?



Sample: Smallholder farmers, n=2,949

FIGURE 145. Which of the following do you feel your household needs to save for the most?



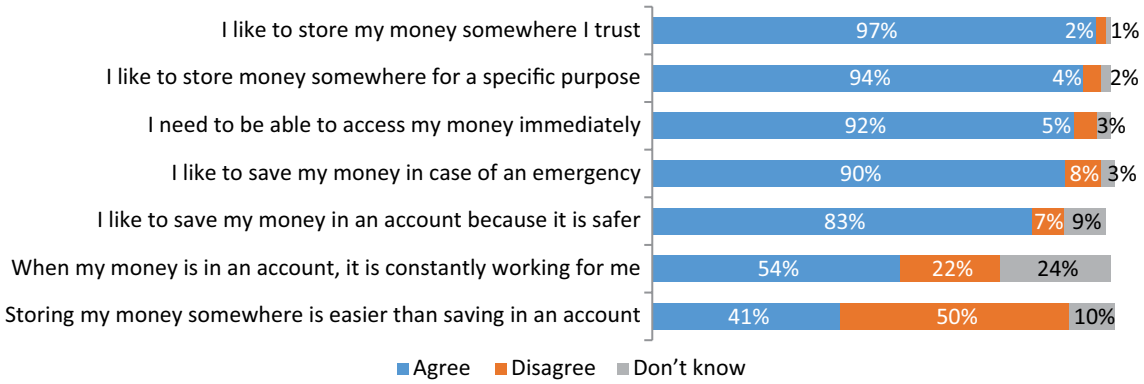
Sample: Smallholder farmers, n=2,949

need to invest in the most, a clear majority of smallholder farmers said their farms, indicating the importance of the farm to their livelihoods, which has an immediate effect on them (Figure 148).

Desires and Aspirations: Smallholder households prefer to borrow from banks, but lack critical enabling factors

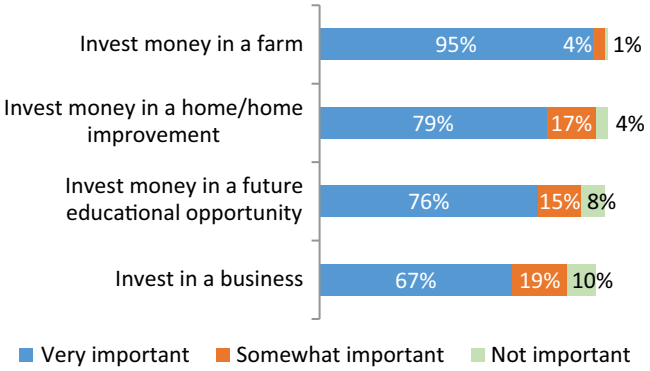
Smallholder farmers in Côte d'Ivoire recognize the importance of borrowing from formal institutions like banks versus borrowing from family and friends (Figure 149), which come in third as the most important source for borrowing money. MFIs/cooperatives come in

FIGURE 146. Do you agree or disagree with the following statements?



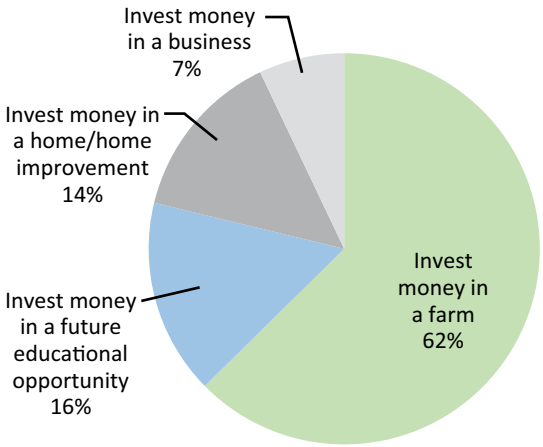
Sample: Smallholder farmers, n=2,949

FIGURE 147. How important is it for your household to invest in each of the following?



Sample: Smallholder farmers, n=2,949

FIGURE 148. Which of the following do you feel your household needs to do the most?

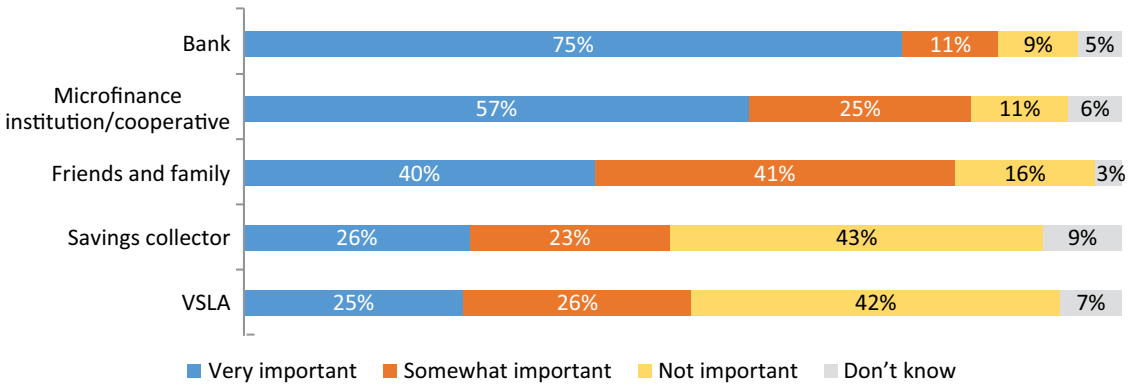


Sample: Smallholder farmers, n=2,949

second, and savings collectors and VSLAs come in fourth and fifth, respectively.

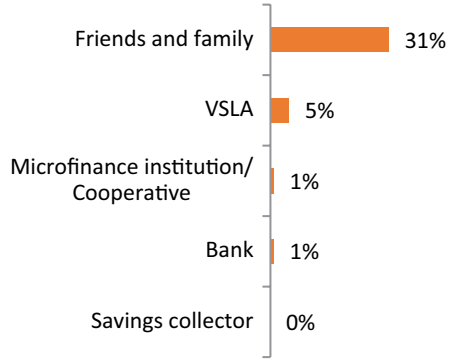
These stated preferences do not translate into habit, because most smallholders go to friends and family first when attempting to borrow (Figure 150). Moreover, they would prefer to go to friends and family in the future, if they had a need to borrow, with more than eight in 10 smallholder farmers saying they would go to friends and family first, when the need arose. It is also notable that close to seven in 10 would go to a bank (Figure 151). VSLAs are also avenues for smallholder farmers' recent borrowing activities, but in terms of future borrowing, they come in second to last, which could mean that

FIGURE 149. For your agricultural activities, how important to you is it to borrow from each of the following?



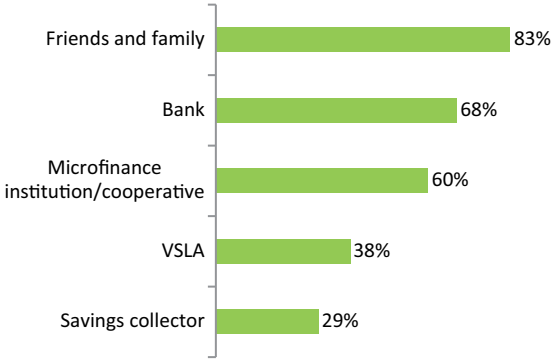
Sample: Smallholder farmers, n=2,949

FIGURE 150. In the past 12 months, have you attempted to borrow from any of the following?



"Yes" answers
Sample: Smallholder farmers, n=2,949

FIGURE 151. If the need arose, would you attempt to borrow from any of the following?



"Yes" answers
Sample: Smallholder farmers, n=2,949

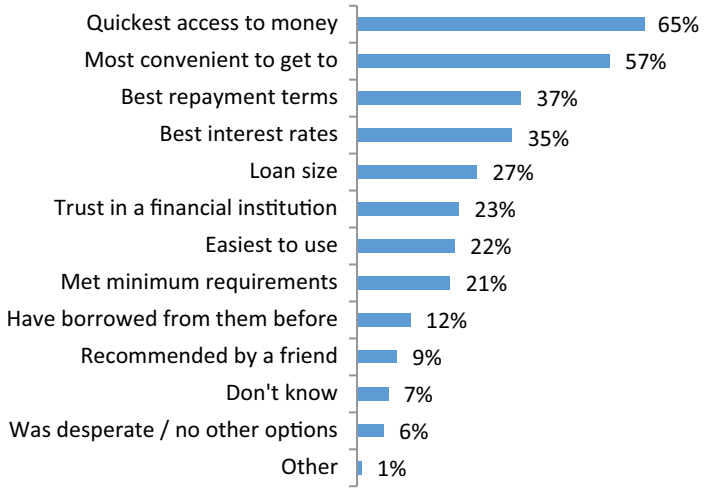
the experience was not satisfactory. Conversely, only 1 percent have borrowed from banks recently (coinciding with the 5 percent of smallholder farmers who own a bank account). Nevertheless, most would like to borrow from banks in the future. This also may highlight the lack of physical presence of formal financial institutions and the barriers of conditions imposed for accessing to a loan.

Smallholder farmers consider quick access, convenience, repayment terms, interest rates, and the amount of money that can be borrowed to be important factors when they need to borrow money (Figure 152). Given the small percentage of smallholders who currently have a loan (4 percent), these criteria may not have been met (Figure 153). The top reasons for borrowing money focus on farmers' business or agricultural activities, in that order; the only other major reason is in the case where they need to pay for emergency expenses (Figure 154).

Desires and Aspirations: There is high interest in plans for inputs and school fees

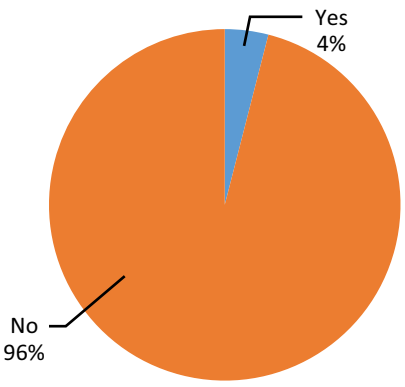
Smallholder farmers consider savings, credit, and payment plans for inputs

FIGURE 152. What factors would you consider when you want to borrow money?



Sample: Smallholder farmers, n=2,949
Multiple responses allowed

FIGURE 153. Do you currently have any loans?



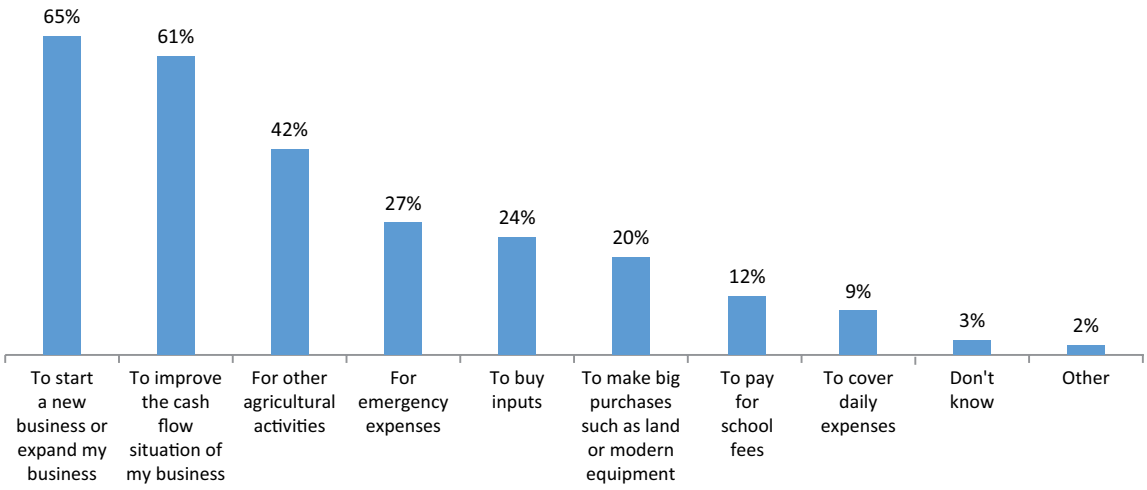
Sample: Smallholder farmers, n=2,949

and school fees to be important to their agricultural activities (Figure 155). Comparatively, prepaid cards and mobile money accounts have less recognized importance. While financial practices and top interests orient smallholder farmers toward informal financial mechanisms, a number of formal financial products resonate as important for this group. This presents an opportunity to build meaning and relevance for more formal financial mechanisms.

Very few smallholder farmers have any of these products currently, with the highest percentages at 3 and 4 percent (Figure 156). For those who do not currently have these products, but want them, the highest demand is for payment and savings plans for inputs, highlighting how important these are to smallholders' agricultural activities. School fees present an important opportunity; slightly more than two-thirds (68 percent) of smallholder farmers want a product that gives them a credit plan to address school fees. This comports with what we know about the smallholders' economic cycle. Income ebbs and flows with the agricultural cycle, and payments can be due regardless of whether or not any crops are producing and/or generating income at that time.

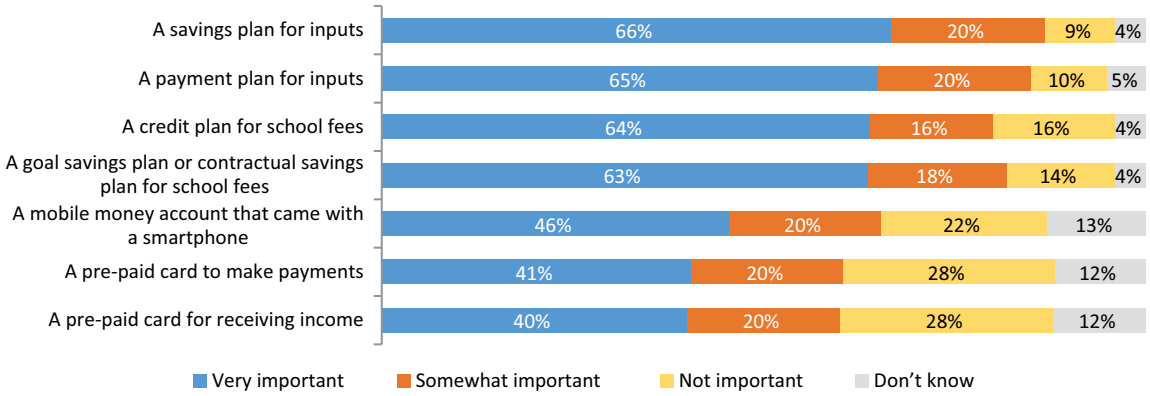
Smallholders place moderate to high importance on loans that come with a particular service or accounts. Close to seven in 10 report that, compared with other products, a loan that came with an insurance plan is the most important to their agricultural activities. This is followed closely by a loan that comes with a bank or MFI account, a loan that can be accessed through a bank or MFI account, one that can be accessed through a mobile money account, one that can be accessed through a mobile money account but linked to a bank or MFI account, and a loan that came with a mobile money account, respectively (Figure 157).

FIGURE 154. What would be the main reasons for borrowing money?



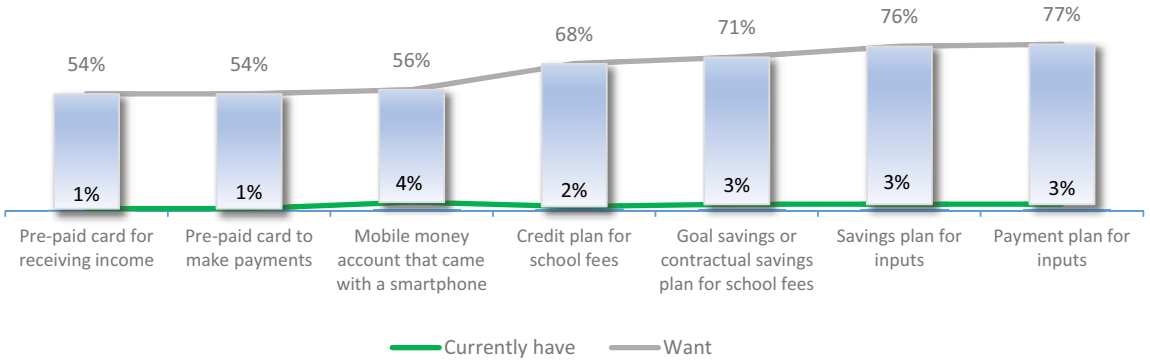
Sample: Smallholder farmers, n=2,949
Multiple responses allowed

FIGURE 155. How important is each of the following products to your agricultural activities?



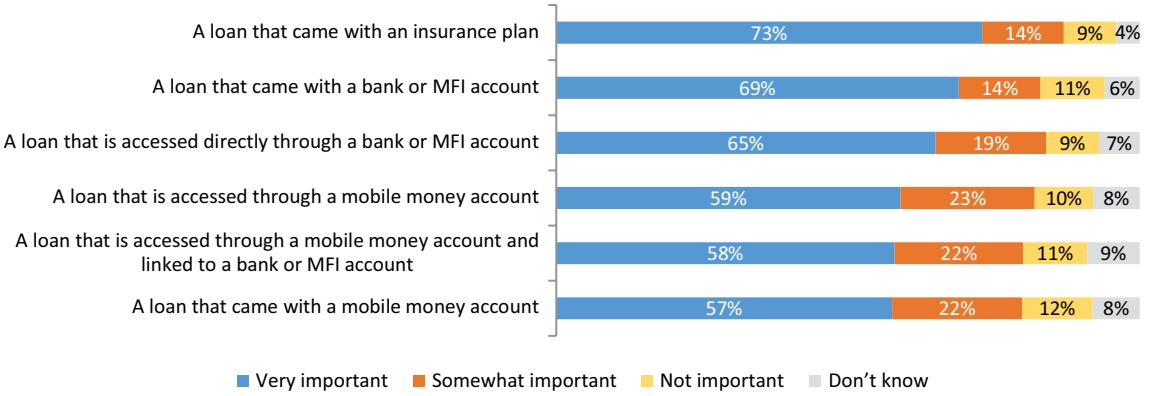
Sample: Smallholder farmers, n=2,949

FIGURE 156. Do you currently have any of the following products for your agricultural activities? Do you want to have any of the following products for your agricultural activities?



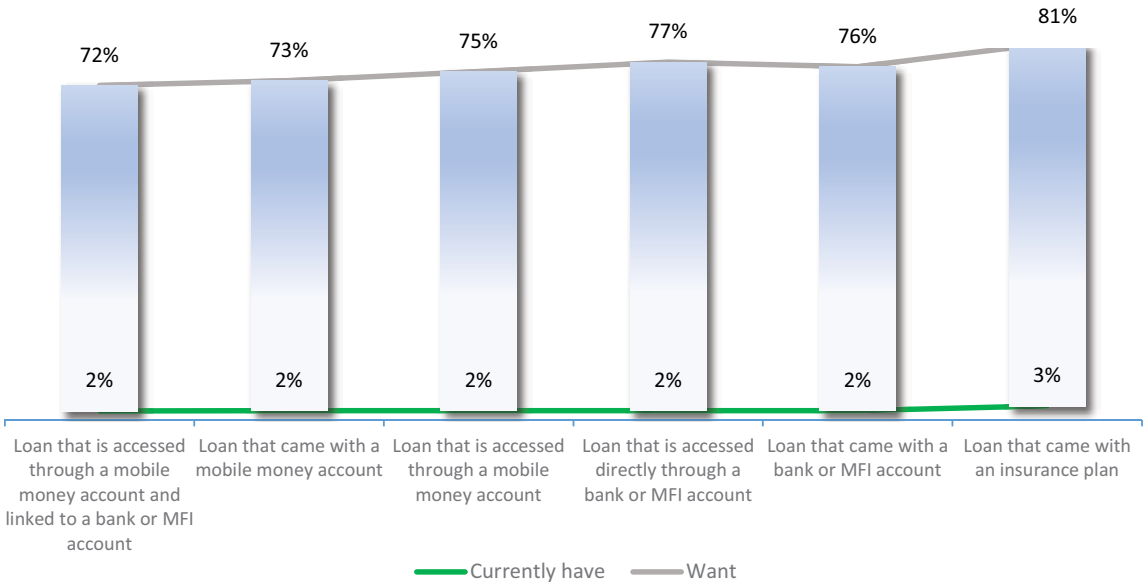
Sample: Smallholder farmers, n=2,949

FIGURE 157. How important is each of the following products to your agricultural activities



Sample: Smallholder farmers, n=2,949

FIGURE 158. Do you currently have any of the following products for your agricultural activities? Do you want to have any of the following products for your agricultural activities?



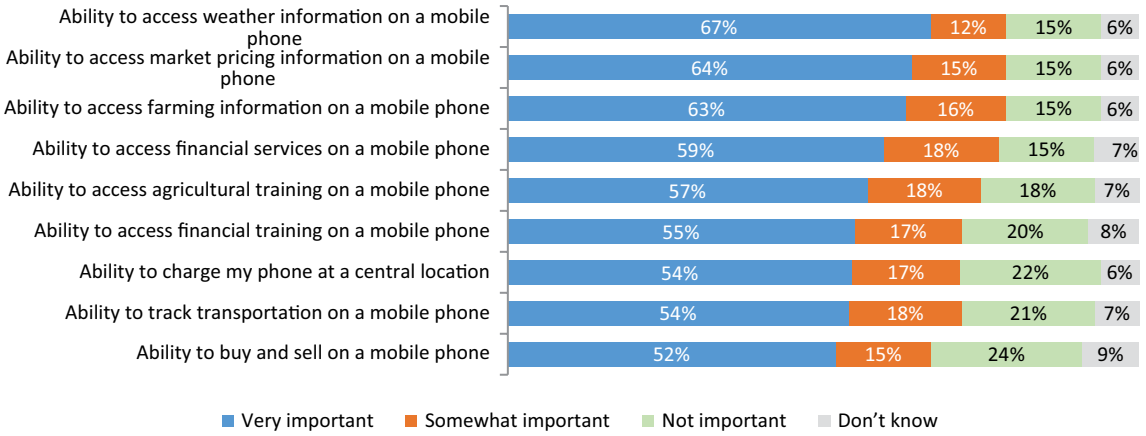
Sample: Smallholder farmers, n=2,949

Only single digits of smallholder farmers currently have any of these loans, yet large numbers say they want them even though they do not currently have an account. (Figure 158).

Desires and Aspirations: Mobile products conjure interest

Smallholder farmers in Côte d'Ivoire can see the importance of leveraging their mobile phone as a tool for agricultural activities. Close to seven in 10 say the ability to access weather information would be very important. More than six in 10 say access to market pricing and farming information would be very important. Close to six in 10 say access to financial services and agriculture and financial training are important (Figure 159). The lowest ranked activity is the ability to buy

Figure 159. How important is each of the following abilities to your household's agricultural activities?

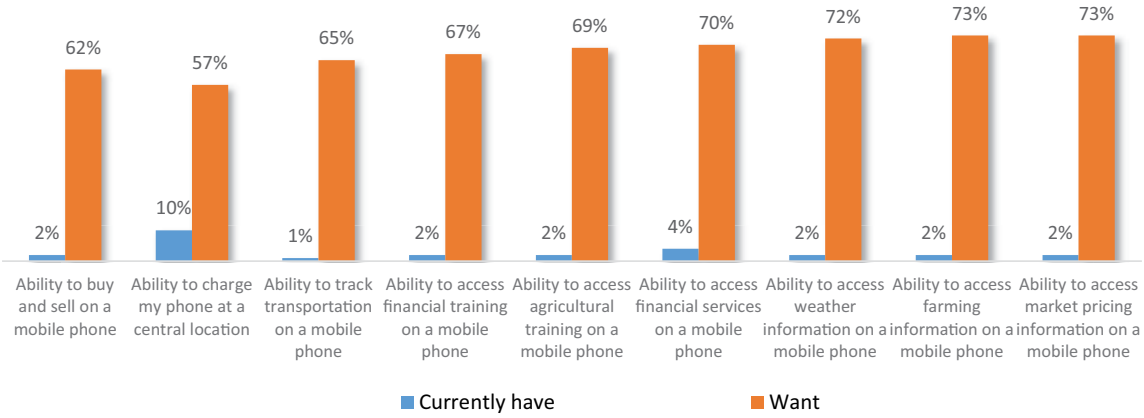


Sample: Smallholder farmers, n=2,949

and sell on a mobile phone; this may be because it may be difficult to visualize this process.

In Côte d'Ivoire, most smallholders lack the ability to access most of these services, including the ability to charge their phones at a central location (Figure 160). Generally, up to seven in 10 stated that they would want to have these abilities on a mobile phone.

Figure 160. Do you currently have any of the following abilities for your agricultural activities? Do you want to have any of the following abilities for your agricultural activities?



Sample: Smallholder farmers, n=2,949

8. CONCLUDING OBSERVATIONS

Côte d'Ivoire holds one of the strongest digital finance markets among WAEMU countries, and this strength can bode well for bringing more smallholder farmers within reach of financial services that can facilitate their agricultural activities and household living conditions.

The purpose of this working paper was to provide a foundational assessment of the core findings of this study, which included a deep and robust nationally representative survey and segmentation of smallholders. The data from the survey build on existing information from a national perspective by addressing a number of inquiries and explorations pertaining to the agricultural and financial landscape of smallholder farmers in the country. This includes, but is not limited to, market size, value chain assessments, product positioning, target audience profiling and recruitment, marketing strategy and messaging, and benchmarking and tracking for future growth.

Six critical challenges were identified within the smallholder population in Côte d'Ivoire:

- An examination of the demographics of smallholder households in Côte d'Ivoire shows that the households are led by men, are older, and lack formal education.
- Their relationships with other value chain actors are predominantly cash based and do not seem to cultivate trust since all purchases are paid immediately.
- Infrastructure is poor in terms of access to markets and in terms of network services. Although a majority of smallholders have a mobile phone, access to a quality network seems to be a factor for those who do not own a mobile phone and for those who do not use mobile money services. This contributes to the fact that those in rural areas show low numbers of access and use of financial services.
- Most smallholders depend on rice for consumption and on cocoa for income. This heavy dependence exposes them to great risk in the event that these two crops are affected by a negative natural or financial event. This vulnerability is compounded by the fact that many do not store these crops because they barely have any left over; they consume or sell the crops they harvest. Only small portions of the population have multiple income streams, and even then, farming is still the largest source of income.
- Financial inclusion reaches only a small portion of the population, despite the fact that nearly all of the adult population own a mobile phone, which therefore enables mobile money. Phone use is still basic, and awareness of mobile money is contained, both of which are barriers that need to be minimized to increase access to DFS.
- Formal channels to communicate new and relevant information to smallholder farmers are lacking. Access to formal channels, such as newspapers and agricultural extension workers, has never been experienced by the majority of smallholder farmers. They mostly rely on word-of-mouth and previous experience.

With those challenges, there are also opportunities:

- Smallholder farmers trust formal financial institutions, and they show some level of demand for formal financial services. This is hampered by the fact that they have limited exposure and access to these services. The most desired products are either payment plans or credit plans for inputs and school fees. These two desires can be a catalyst to provide tailored financial services and act as a point of entry to increase levels of financial inclusion.
- Smallholders are ready for financial inclusion, especially through mobile money. A majority have the necessary identification documents and have a mobile phone. Mobile-phone-driven products already hold some appeal because smallholders see a phone as a communications tool, and want to do more with it to foster their financial and agricultural lives. A prominent deterring factor is the low levels of education, which can be addressed by appropriate and tailored financial education.
- With better infrastructure, meaning better access to network services and other utilities, some of the fears noted as the main reasons for not using mobile money and having a mobile phone can be addressed. In addition, increased connectivity with a high level of security will build trust and acceptance of financial services transactions as a relevant resource for farmers.
- All providers (mobile money, bank, NBFI) can look at this market as one that holds opportunity because smallholder farmers desire financial mechanisms that help them save and obtain lines of credit, tend to prefer formal entities over informal, and also trust formal entities, even though most have not had direct experience with them.

Combined, the challenges and opportunities point to three big-picture implications:

- Mobile money has the potential to drive financial inclusion with better infrastructure and increased access to information. Because most smallholders believe they do not have enough money to enjoy financial services, implementing better financial education will contribute to increased use of financial services and an increase in the financial well-being of smallholder farmers.
- The observed lack of youth and women could influence the future of farming in the country. Retention and even recruitment of youth and women is a critical imperative for sustaining the country's smallholder agricultural sector. The ability to be able to farm, and farm well, benefits youth and women, the family, and the community, given the heavy dependence on agriculture. Increased access to formal education for youth and women will also deepen the type of information channels and tools that can be used to convey the knowledge needed to not only to improve agricultural practices but to develop good financial behaviors and a positive culture.
- Smallholder households need appropriate mechanisms to access information and services for planning their farming and financial activities. There is a need to design and develop specific products or a bundle of products. Insurance and savings mechanisms need to be provided to guard smallholders from catastrophic events that most experience and to help them to cover expenditures such as school fees. It is especially important for those households where much of their income depends on few crops.

ANNEX 1: METHODOLOGY AND DESIGN

The smallholder household survey in Côte d'Ivoire is a nationally representative survey with a target sample size of 3,000 smallholder households. The sample was designed to provide reliable survey estimates at the national level and for three zones (East Forest, West Forest, and Savane).

A. Sampling Frame

In preparation for the 2014 population census, the country was divided into 22,600 census enumeration areas (EAs). For the 2015 agricultural census, the National Statistical Office (INS) identified 18,321 EAs that contain agricultural households. The sampling frame for the smallholder survey is the list of these EAs containing agricultural households. The distribution of the population in these EAs is shown in Table 1.

B. Sample Allocation and Selection

To take nonresponse into account, the target sample size was increased to 3,333 households, assuming a nonresponse rate of 10 percent.

The total sample size was first allocated to the zones based on their population counts using the power allocation method. Within each zone, the resulting sample was then distributed to urban and rural areas in proportion to their population (Table 2).

Given that EAs were the primary sampling units and 15 households were selected in each EA, a total number of 223 EAs were selected (Table 3).

The sample for the smallholder survey is a stratified multistage sample. Stratification was achieved by separating each zone into urban and rural areas. The urban/rural classification is based on the 2014 population census. Therefore, six strata were created, and the sample was selected independently in each stratum.

In the first stage, EAs were selected as primary sampling units with probability proportional to size, the size being the number of households in the EAs. A household listing operation was conducted in all selected EAs to identify smallholder households according to the definition used in the survey, and to provide a frame for the selection of smallholder households to be included in the sample. In the second stage, 15 smallholder households were to be selected in each EA with equal probability. However, there was a deviation during the sample implementation.

C. Household Listing

The household listing operation was conducted in all selected EAs during 3–26 March 2016. For this purpose, Intermedia developed a manual describing the listing and mapping procedures. The manual included listing forms and screening questions used to identify smallholder households according to the agreed definition for the survey. This manual was used to train 32 listing

TABLE 1. Population in agricultural EAs

	Urban	Rural	Total
East Forest	175,754	737,410	913,164
West Forest	297,050	1,392,640	1,689,690
Savane	133,301	710,023	843,324
Total	606,105	2,840,073	3,446,178

Source: INS

TABLE 2. Sample allocation

	Urban	Rural	Total
East Forest	192	808	1,000
West Forest	234	1,099	1,333
Savane	158	842	1,000
Total	584	2,749	3,333

TABLE 3. Number of EAs to select (after rounding)

	Urban	Rural	Total
East Forest	13	54	67
West Forest	16	73	89
Savane	11	56	67
Total	40	183	223

teams in Abidjan. Each listing team consisted of one supervisor, one lister, and one mapper recruited from Ipsos's (InterMedia's local field partner) pool of enumerators. The training involved both classroom sessions and field practice.

The household listing was done on smartphones, which required Ipsos to develop a script in Dooblo SurveyToGo software for the listing forms. The script was field tested and validated before it was used for the listing operation.

Deviations in the Sample Implementation

After the EAs were selected and the EA maps were printed, it was necessary to reduce the number of EAs to be listed to 212 for budgetary reasons. Therefore, 212 EAs were randomly selected among the previously 223 sampled EAs and were finally included in the survey sample.

The smallholder survey in Côte d'Ivoire is part of the series in Mozambique, Uganda, Tanzania, Nigeria and Bangladesh. Fieldwork in other countries experienced a large number of failed call-backs where identified eligible households and household members could not be interviewed during the time allocated to fieldwork in each country. As a result, the final sample sizes fell slightly short of the target. For this reason, the number of households selected in each EA in Côte d'Ivoire was increased from 15 to 17 following the household listing operation in the 212 EAs retained in the sample.

D. Sampling Weights

The sample for the smallholder household survey is not self-weighting, therefore sampling weights were calculated. The first component of the weights is the design weight based on the probability of selection for each stage. The second component is the response rate at both household and individual levels.

The design weights for households were adjusted for nonresponse at the household level to produce adjusted household weights. Sampling weights for the Multiple Respondent data file were derived from adjusted household weights by applying nonresponse rates at the individual level to them. For the Single Respondent data file, the same process was applied after taking into account the subsampling done within the household.

Finally, household and individual sampling weights were normalized separately at the national level so the weighted number of cases equaled the total sample size. The normalized sampling weights were attached to the different data files and used during analysis.

E. Sampling Error

The sample design for the smallholder household survey is a complex sample

design featuring clustering, stratification, and equal probabilities of selection. For key survey estimates, sampling errors taking into account the design features were produced using statistical packages such as the SPSS Complex Sample module or STATA based on the Taylor series approximation method.

Questionnaire implementation. To capture the complexity of smallholder households, the survey used three questionnaires: the Household questionnaire, the Multiple Respondent questionnaire, and the Single Respondent questionnaire (see Table 4).

In each selected household, the Household questionnaire was administered to the head of the household, the spouse, or any knowledgeable adult household member, to collect information about household characteristics. Basic information, such as age, gender, education attainment, schooling status, and relationship with the household head, was

Table 4. Smallholder survey in Côte d'Ivoire: Questionnaire, respondents, and content

Questionnaire	Household respondent(s)	Sample size	Content
1. **Household**	Head of the household, spouse, or a knowledgeable adult	n=3,415	• Basic information on all household members (e.g., age, gender, education attainment, schooling status) • Information about household assets and dwelling characteristics to derive poverty status
2. **Multiple Respondent**	All household members over 15 years old who contributed to the household income or participated in its agricultural activities	n=6,659	• Demographics (e.g., land size, crop and livestock, decision-making, associations and markets, financial behaviors) • Agricultural activities (e.g., selling, trading, consuming crops, livestock, suppliers) • Household economics (e.g., employment, income sources, expenses, shocks, borrowing, saving habits, investments)
3. **Single Respondent**	One randomly selected adult in the household	n=3,019	• Agricultural activities (e.g., market relationships, storage, risk mitigation) • Household economics (e.g., expense prioritization, insurance, financial outlook) • Mobile phones (e.g., use, access, ownership, desire, and importance) • Formal and informal financial tools (e.g., ownership, use, access, importance, attitudes toward financial service providers)

collected on all household members. The Household questionnaire also collected information on whether each household member contributes to the household income or participates in the household's agricultural activities. This information was later used to identify all household members eligible for the other two questionnaires. Information on household assets and dwelling characteristics was also collected to derive the socioeconomic/poverty status of households.

The Multiple Respondent questionnaire was administered to all adult members in each selected household to collect information on their agricultural activities, financial behaviors, and mobile money use. In addition, in each selected household, only one household member was selected using the Kish grid and was administered the Single Respondent questionnaire.

The questionnaire was administered in French. Before the start of fieldwork, all three questionnaires were pretested in French to make sure that the questions were clear and could be understood by the respondents. At the end of the pretest, debriefing sessions were held with the pretest field staff, and the questionnaires were modified based on the observations from the pretest. Following the finalization of the questionnaires, a script was developed to support data collection on smartphones. The script was tested and validated before it was used in the field. The questionnaires are part of the user guide that accompanies the data set for this household survey.

Main Training, Fieldwork, Data Processing. InterMedia's local field partner recruited the interviewers and supervisors for data collection. Then, a centralized training was conducted in Abidjan from 31 March to 7 April 2016. This training included instructions on interview techniques and field procedures, a detailed review of the survey questionnaires, mock interviews between participants in the classroom, and a field practice with actual respondents in the areas outside the sampled EAs. Five independent, field quality-control staff (QC team), hired by InterMedia, also participated in the training and in the field practice.

Twenty-one interviewing teams collec ted data for the survey on smartphones between 15 April and 13 May 2016. Each team consisted of one supervisor and three to four interviewers. Three staff members from InterMedia's local field partner coordinated and supervised fieldwork activities in addition to the QC team. The QC team stayed with the survey teams during fieldwork to closely monitor them. During data collection, InterMedia received interim data from the field, which were analyzed for quality control and used to provide timely feedback to field staff. InterMedia checked the final data file for inconsistencies and errors, and corrections were made as necessary and where possible.

Response Rates. Tables 5 through 7 show household and household member response rates for the Côte d'Ivoire smallholder household survey.

A total of 3,415 households was selec ted for the survey, of which 3,109 were found to be occupied during data collection. Of these, 3,019 were successfully interviewed, yielding a household response rate of 97.1 percent.

In the interviewed households, 6,659 eligible household members were identified for the Multiple Respondent questionnaire. Interviews were completed with 5,706 eligible household members, yielding a response rate of 85.7 percent.

Among the 3,019 eligible household members selected for the Single-Respondent questionnaire, 2,949 were successfully interviewed yielding a response rate of 97.7 percent.

TABLE 5. Response rate for the household questionnaire

	East Forest	West Forest	Savane	Rural	Urban	Total
Households selected	1,041	1,332	1,042	2,886	529	3,415
Households occupied	962	1,217	930	2,641	468	3,109
Households interviewed	932	1,180	907	2,574	445	3,019
Household response rate	96.9%	97.0%	97.5%	97.5%	95.1%	97.1%

TABLE 6. Response rate for the multiple respondent questionnaire

	East Forest	West Forest	Savane	Rural	Urban	Total
Eligible household members	1,750	2,695	2,214	5,795	864	6,659
Eligible household members interviewed	1,604	2,196	1,906	4,948	758	5,706
Response rate	91.7%	81.5%	86.1%	85.4%	87.7%	85.7%

TABLE 7. Response rate for the single respondent questionnaire

	East Forest	West Forest	Savane	Rural	Urban	Total
Eligible household members	932	1,180	907	2,574	445	3,019
Eligible household members interviewed	910	1,149	890	2,510	439	2,949
Response rate	97.6%	97.4%	98.1%	97.5%	98.7%	97.7%

ANNEX 2: RANDOM FOREST

A Random Forest consists of a collection or ensemble of simple tree predictors, each capable of producing a response when presented with a set of predictor values.[40] For classification problems, this response takes the form of a class membership, which associates, or classifies, a set of independent predictor values with one of the categories present in the dependent variable. Alternatively, for regression problems, the tree response is an estimate of the dependent variable given the predictors. The Random Forest algorithm was developed by Breiman.

A Random Forest consists of an arbitrary number of simple trees, which are used to determine the final outcome. For classification problems, the ensemble of simple trees vote for the most popular class. In the regression problem, their responses are averaged to obtain an estimate of the dependent variable. Using tree ensembles can lead to significant improvement in prediction accuracy (i.e., better ability to predict new data cases).

Technical Details

The response of each tree depends on a set of predictor values chosen independently (with replacement) and with the same distribution for all trees in the forest, which is a subset of the predictor values of the original data set. The optimal size of the subset of predictor variables is given by $\log_2 M+1$, where M is the number of inputs.

For classification problems, given a set of simple trees and a set of random predictor variables, the Random Forest method defines a margin function that measures the extent to which the average number of votes for the correct class exceeds the average vote for any other class present in the dependent variable. This measure provides us not only with a convenient way of making predictions, but also with a way of associating a confidence measure with those predictions.

For regression problems, *Random Forests* are formed by growing simple trees, each capable of producing a numerical response value. Here, too, the predictor set is randomly selected from the same distribution and for all trees. Given the above, the mean-square error for a Random Forest is given by:

$$\text{mean error} = (\text{observed} = \text{tree response})^2$$

The predictions of the Random Forest are taken to be the average of the predictions of the trees:

$$\text{Random Forest Predictions} = \frac{1}{K}\sum_{K=1}^{K} K^{th} \text{ tree response}$$

where the index k runs over the individual trees in the forest.

Typically, Random Forests can flexibly incorporate missing data in the predictor variables. When missing data are encountered for a particular observation (case) during model building, the prediction made for that case is based on the last preceding (nonterminal) node in the respective tree. So, for example, if at a particular point in the sequence of trees a predictor variable is selected at the root (or other nonterminal) node for which some cases have no valid data, then the prediction for those cases is simply based on the overall mean at the root (or other nonterminal) node. Hence, there is no need to eliminate cases from the analysis if they have missing data for some of the predictors, nor is it necessary to compute surrogate split statistics.

40 See documentation on Random Forest Algorithm at http://www.statsoft.com/Textbook/Random-Forest.