



# Understanding Demand, Driving Innovation

## Smallholder Households and Financial Services

Carlos E. Cuevas and Jamie Anderson

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### **Abstract**

This paper serves as background for the CGAP Smallholder Diaries and national surveys of the smallholder sector. It highlights the prevalence of smallholders among the world's poor, and the substantial reliance on agriculture in low-income countries, hence the importance of increased productivity of small farms. The paper also reviews the many factors that influence rural poverty and the wellbeing of smallholder households, and their connection with demand for financial tools of various kinds. The shortcomings of rural financial markets to serve smallholders over time are examined along with the promise of digital financial services, and other innovative mechanisms, to expedite the alleviation of those limitations.

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## INTRODUCTION

While there has been renewed appreciation for how reaching smallholder households could drive financial inclusion, little is known about this unique, yet massive client group. Even data on the very number of smallholder households worldwide are fraught with caveats and nuance. Information about how they manage their financial lives and the tools they want and need to do so is even more difficult to find, and this search for information is further complicated by the many different ways of defining who a smallholder is.

This Working Paper draws on existing literature and recent developments in both financial inclusion generally and smallholder finance specifically. It is intended to place the CGAP Smallholder Diaries and national surveys of the smallholder sector, as well as other demand-side research with this client group, within the larger ecosystem and long history of related research and experience.<sup>1</sup> The paper is being released as the CGAP Smallholder Diaries report on Mozambique, Tanzania, and Pakistan is published (Anderson and Ahmed 2016); hence, the references to these specific countries in this background paper, as well as the cross-references to Anderson and Ahmed (2016) on topics that are treated more extensively in that paper.

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## NUMBER OF RURAL SMALLHOLDERS IN POVERTY

“There are an estimated 450 million smallholder farming households (representing 2 billion people) relying to various degrees on agricultural production for their livelihoods. They represent the largest client segment by livelihood of those living on less than \$2 a day.” This summary statement presenting CGAP’s Financial Innovation for Smallholder Families initiative is partially based on a Food and Agriculture Organization (FAO) publication (Lowder, Scoet, and Singh 2014) and previous estimates by Dalberg (2012) and Christen and Anderson (2013). The orders of magnitude for the number of smallholder families vary across different sources and methods (see Box 1), but a range between 400 million and 500 million is generally accepted, using the threshold for “small” as less than two hectares of farmland.<sup>2</sup>

There are several implications of this dominance among the poor. Targeting smallholders in poverty reduction programs seems an obvious assurance that the program is dealing with a large segment of the poor, but formulating effective programs remains a challenge, hence the importance of segmenting the broad smallholders client group. In addition, understanding the root causes of poverty among each of the smallholder segments is essential to formulate effective poverty alleviation interventions.

### **Box 1. Estimates on the Number of Smallholder Households in Low-Income Countries**

Though smallholder families are a dominant component of the world’s poor, their exact numbers and characteristics have only been approximated. The following is a summary of some key estimates.

- Lowder, Scoet, and Singh (2014). These FAO estimates find at least 570 million farms worldwide, of which more than 500 million can be considered family farms. More than 475 million farms are of less than 2 hectares in size. The main source for this study is the FAO (2013) 2000 Census of Agriculture, although numerous national censuses are also referenced.
- Christen and Anderson (2013). This paper compiles extensive references to conclude that the range of smallholder farms of less than 2 hectares is between 400 million and 500 million, encompassing between 1.5 billion and 2.5 billion people living in these households.
- Dalberg (2012). This report takes its 450 million smallholder farmers estimate from FAO and UNDESA sources.
- Wyman (2007). An earlier estimate placed the number of smallholder farmers at 610 million, the largest livelihood-based segment, representing about 37 percent of all the working-age poor, under \$2 a day per person. The definition of smallholder in this source, however, is not clear. Further, the count refers to “working age poor” not households, so it cannot be contrasted against the preceding estimates.

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<sup>1</sup> Key sources on the diaries methods and findings are Collins, Morduch, Rutherford, and Ruthven (2009) and Bankable Frontier Associates and Digital Divide Data (2014). Other references indicated as appropriate.

<sup>2</sup> A brief discussion of the issues associated with using hectares to categorize farm size is included later in this paper.

Rural populations account for the majority of total population in most low-income countries, and overall rural people account for 55 percent of the total population in low-income countries worldwide (IFAD 2010). Though urbanization is reversing the relative importance of rural areas in Latin America and the Caribbean and the Middle East and North Africa, rural areas remain dominant as place of residence and occupation in all other regions and in most low-income countries. Further, agriculture typically represents a large share of poor countries' total employment. Employment in the primary sector (agriculture and mining) declines as countries' income levels increase.

Globally, agriculture accounted for 35 percent of employment in 2009 (ILO).<sup>3</sup> While the share of agriculture in total employment has been declining, it remains high in Sub-Saharan Africa (SSA) (about 59 percent) and South East Asia and the Pacific (at 44 percent, same year).<sup>4</sup> Specific to the countries of interest in this work, the share of employment in agriculture in Mozambique was estimated at 75 percent in 2007 (Finmark 2012), although the same source states in its executive summary that about 69 percent of the population in Mozambique is rural and reliant on agriculture (estimate also for 2007).<sup>5</sup> In Pakistan the share of agriculture in total employment reported by ILO was 45 percent (2008, latest available), while it reached 72 percent in Uganda (2013, same source).<sup>6</sup> The Uganda Bureau of Statistics estimates that share at 76 percent.

LSMS-ISA data indicate that a majority of households in low-income countries are considered "agricultural." For example, 85 percent of households in Tanzania are considered agricultural, meaning that they cultivated land, reared livestock, or managed fisheries (Derksen-Schrock et al. 2012).<sup>7</sup> While defining a rural household as "agricultural" in the sense that it practices agriculture in some form—crops, livestock—seems rather straightforward, there is no clear consensus on what makes a household "reliant" on agriculture (or "agriculture dependent" in other versions). The latter involves some assumption about the importance of the agriculture practice in overall household income and more generally in its well-being broadly defined, as well as the household members' own perception of their identity. This can vary from pure (or below) subsistence and source of shelter (housing value) to a substantial share of agriculture in total household revenue in commercial holdings. Pingali (2010) has cogently summarized this spectrum of possibilities (see Box 2).<sup>8</sup>

**Box 2. Who Is the Smallholder Farmer?**

"So as we talk about smallholders and smallholder agriculture, who is the smallholder? ... a smallholder, she could be anyone of different types of farmers. She could be a subsistence farmer eking a living out of a tiny plot of land. She could be a post-Green Revolution farmer trying to sustain the productivity gains that were made during the Green Revolution. She could be a commercializing farmer that's trying to link up to the value chain, the value chain that connects to the local markets, the regional markets, and even the global markets" (Pingali 2010).

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<sup>3</sup> ILO- ILOSTAT definition: The *employed* comprise all persons of working age who during a specified brief period, such as one week or one day, were in the following categories: (a) paid employment (whether at work or with a job but not at work); or (b) self-employment (whether at work or with an enterprise but not at work).

<sup>4</sup> The share of agriculture in total employment in developed economies was 3.7 percent in 2009; 1.5 percent in the United States (2013, ILO Country Profiles).

<sup>5</sup> A possible explanation for this apparent contradiction is the inclusion of fisheries in the 75 percent estimate, likely to be a relatively large employment source in Mozambique that does not necessarily involve residence in rural areas.

<sup>6</sup> No sector shares reported for Mozambique or Tanzania on the ILO site.

<sup>7</sup> LSMS-ISA identifies households that are engaged in agricultural activities using the following criteria: "if the household head or any member of the household cultivated any land, raised or owned any animals, or produced any agricultural by-products from their farm and/or livestock" (Klapper and van Oudheusden, 2015, p. 4).

<sup>8</sup> Smallholder plots do exist in many areas designated as "urban" due to their population size or density. The vast majority of smallholders, however, live in rural areas.

Smallholders also represent an increasingly important component of global food supply, with large companies increasing their reliance on smallholders to secure reliable product supply (Dalberg 2012). Case study evidence mainly from IFC's work supports the notion of an increasing reliance on smallholders by large companies (IFC 2014; Vaena and Gaeaneotes 2014). In certain sectors, smallholders may represent the vast majority of local supply; for example, a recent study of the dairy value chain in Pakistan reports that about 80 percent of the dairy cattle are in herds of fewer than five cows and account for 60 percent of total milk production (AgriFin 2015).<sup>9</sup> Further, as indicated in the Anderson and Ahmed (2016) paper on the CGAP Smallholder Diaries, own production accounts for a large share of household consumption ("in-kind" household revenue), up to 100 percent in the case of pure subsistence farming.

On the other hand, over-reliance on smallholders as key sources of massive increases in production has been criticized as misguided. Further, the argument goes, the focus on smallholders may indeed hinder poverty reduction. Fast labor productivity growth, a crucial ingredient in large-scale production increases, may require an approach that integrates smallholders with large-scale commercial enterprises (Collier and Dercon 2009). Nonetheless, small farms "are getting more numerous and smaller than ever ... account for large shares of the total agricultural area and output ... [and include] half of the world's undernourished people and the majority of people living in absolute poverty" (Hazell 2011).

In a dynamic context, as economies grow, agriculture evolves from being dominant in contribution to GDP and employment to becoming less important for driving growth and employment. In this process, small farms begin to lose ground to larger and more capitalized farms able to capture scale economies. Rising per capita incomes and urbanization further accentuate the comparative advantage of large, commercial farms capable of supplying high-value products (Hazell, Poulton, Wiggins, and Dorward 2007). Hazell concludes that prioritizing smallholder agriculture needs to be maintained, and only reduced "once the transformation of a country is well underway, [at which point] the focus should shift to larger farms and high-value products" (Hazell, Poulton, Wiggins, and Dorward 2007, p. 6).<sup>10</sup>

A reasonable summary of the foregoing arguments is that in low-income countries with a high proportion of the population in agriculture, low economic growth rates, and scarce employment opportunities outside of agriculture, poverty reduction must rely on the growth of agricultural productivity. Large numbers of smallholders in these scenarios make them a main source of food security, for their own household and the country as a whole, and a priority sector for the provision of the infrastructure, technology, effective institutions, and incentive systems that smallholders need (Pingali 2010). It also makes this client group a priority for improving its access to and use of adequate financial services.

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#### THE MULTIPLE VARIABLES ASSOCIATED WITH RURAL POVERTY AND THE WELL-BEING OF SMALLHOLDER HOUSEHOLDS

While the focus of CGAP's smallholder initiative is smallholders' demand for financial services and the innovations that may fill current gaps in the supply of those services, a number of other factors impinge on the ability of smallholders to prosper and likely influence the attributes smallholders seek in financial services.<sup>11</sup>

**Limited land and assets holdings.** The "smallness" of the farm seems an obvious constraint, albeit some argue that smallness is not the problem, but rather the failure of the state to provide the right conditions "that allow smallholders to flourish" (Pingali 2010, p. 3). The fact that land is not homogenous makes it difficult to define a universal threshold to define "small" in terms of land area. As an illustrative example, two hectares could be (and often is) defined as a threshold for "small," but if two hectares in the Red River valley near Hanoi produce three crops of rice a year, while two hectares in the northern highlands of Viet Nam produce only one rice crop a year

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<sup>9</sup> Pingali (2010) cites the "white revolution" in India that made it the largest dairy producing country in the world, based on women producing milk with one or two cows.

<sup>10</sup> High-value export crops in this dynamics may yield further economic growth (Hausmann, Hwang, and Rodrik 2005).

<sup>11</sup> Main sources for this section, among the many available, are Gollin (2014) and Hazell (2011). Others referred to as appropriate.

(likely a lower yield than the irrigated land in the valley), then should the “small farm” definition for the northern highlands be adjusted to at least six hectares?

Further there is the issue of land measurement. Most low-income countries do not have an official cadaster of land plots and farm properties, hence farm size statistics rely on self-reported areas by the farm owner/user. A recent study comparing self-reported against more accurate GPS area measurement found that self-reported area systematically differs from GPS land measurements. Interestingly, smaller-scale farmers tended to overestimate their land size, by as much as 100 percent for very small plots, while farms with GPS area above two acres tend to underestimate the actual (GPS) size when self-reporting (Carletto, Gourlay, and Winters 2013). These biases have implications for estimates of land productivity, and indicate that smaller-scale farmers tend to underestimate their productivity and larger-scale landholders do the opposite, overestimating their productivity.<sup>12</sup>

**Land productivity and labor productivity.** Smallholders farm land “more intensively than large farms resulting in high levels of productivity per unit of land” (Gollin, 2014). Indeed, there is a large body of empirical evidence that supports the existence of an inverse relationship between farm size and land productivity. This apparent higher efficiency of small farms relative to large farms is obtained at the cost of lower output per unit of labor. The use of family labor in small farms solves many incentive issues associated with agricultural labor markets, such as shirking and the costly monitoring of hired labor. Family labor supply is flexible, internally motivated, and usually compatible with off-farm employment.

While small farms do not equate to family farms (family farms can be quite large), it seems clear that most small farms are family farms. Their choice of technology will be driven by the relative costs of labor and capital and, where capital is scarce and expensive, small farms use labor-intensive practices. The other side of this coin is that, in labor-surplus economies, small farms absorb substantial numbers of workers, primarily family labor, but including some measure of (poor) landless rural labor.<sup>13</sup> As countries grow and labor becomes more expensive, however, the long-term viability of small farms weakens.

**Limited access to markets.** Market access for smallholders’ products is usually through intermediaries, meaning low prices and uncertainty, or in relatively small volumes into local markets. Low volumes to sell, variable quality, limited storage, high transaction costs (mainly for transport), and limited market information are among the factors that create a disadvantage for small farms in marketing their usually limited and seasonal surpluses. Further, as demand for high-value products increases as economies develop, smallholders are not well-positioned to meet the often exacting standards associated with these products. Even with the emergence of direct procurement by large supermarket chains from farmers, large farms are better placed to meet quality standards and present lower transaction and monitoring costs for buyers (Reardon, Timmer, and Minten 2010).

Smallholders’ limited access to input markets, formal sector credit, and insurance is well documented (Hazell 2011 and GIZ 2011). The issues associated with financial services are addressed in detail below. Use of modern inputs has traditionally been a constraint to smallholders, even when heavily subsidized input delivery by public agencies or agricultural development banks were in place, as these programs were plagued with deviation and elite or political capture, thus limiting their effective reach to small farms. Private-sector suppliers, the main providers after public programs phased out, understandably favor large commercial farms. Further, small, local input suppliers—often more inclined to serve smallholders—are limited by their ability to acquire and sell large quantities, usually due to their own constraints in accessing finance.

**Traditional, outdated practices.** The negative effects of limited access to modern inputs are compounded by the scarcity (or outright nonexistent) of quality technical support to make improved technologies available and induce their adoption. Access to improved technologies and productive assets has been found essential to enhance smallholder market participation, and their avoidance of semi-subsistence poverty traps (i.e., a situation in which they operate with rudimentary production techniques, limited assets, and low or no participation in markets that

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<sup>12</sup> Consider the production value of one ton of maize, for example, and the calculation of its yield (i.e., yield = production/land area). When the maize production is divided by a larger, self-reported land size (e.g., two acres), the yield is 0.50 ton per acre (production/land area = 1 ton/2 acres = half-ton per acre). When the same maize production, however, is divided by the actual, smaller GPS size (e.g., 1.5 acres), the yield is 33 percent higher (production/land area = 1 ton/1.5 acres = 0.67 ton per acre).

<sup>13</sup> Hazell (2011) refers to this state as “a ‘win-win’ proposition for growth and poverty reduction.”

prevents them from acquiring better techniques and basic assets that enable their market participation, which can offer a gateway out of the trap) (Barrett 2008).

While the generation of technology has been successful (e.g., the Green Revolution), its delivery has been the main issue due to low local capacity and weak extension systems. Improving delivery is deemed a top priority and the use of public–private partnerships to that effect (e.g., the Alliance for a Green Revolution in Africa [AGRA]) and reliance on producer organizations (when properly governed and managed) are considered positive steps in that direction. In addition, research and development to tackle more difficult problems, such as drought resistance and pest tolerance for crops of importance to low-income households (e.g., cassava, millet, sorghum, coffee), is strongly advocated as the next major step (Pingali 2010).

**Limited access to infrastructure and a range of services.** Deficient or nonexistent infrastructure, especially roads, transport, irrigation, and organized markets, are prevalent in areas where smallholders prevail. Along with limited market information, these factors conspire to limit small farms’ productivity and their ability to market any surplus they may have. In addition, the list of variables associated with rural poverty and smallholders’ well-being would not be complete without recognizing the limited access to education, health services, clean water, and sanitation. The will to satisfy basic needs, especially in education and health, influences demand for specific financial tools, in addition to those related to production and consumption activities.

**Managing multiple and unstable sources of income, and coping with risks.** The Smallholders Diaries paper (Anderson and Ahmed 2016) documents in detail the findings on sources of income and risk-mitigation mechanisms (among other findings) from the financial diaries work in Pakistan, Tanzania, and Mozambique, and relates these to the existing knowledge on income sources and risk mitigation. Highlights of the paper are included here, but the reader is encouraged to see the Smallholder Diaries paper for a complete coverage, including the fresh field evidence from the three countries.

- Smallholder families have multiple sources of cash income—agricultural production, casual labor (often in agriculture), and nonagricultural sources—and rely to a significant extent on in-kind income from their own agricultural production.
- Exposure to and potential damage of production-related risks are high for less commercialized smallholders, while market-related risks grow in relevance with the level of commercialization.
- Traditional risk management techniques in agriculture such as crop and livestock diversification, staggering planting dates, and (importantly) income source diversification are therefore prevalent among less commercialized farmers. The relevance of financial tools to cope with risks increases with the level of commercialization. Participating in well-functioning value chains contributes to risk mitigation.

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## SMALLHOLDERS AND FINANCIAL SERVICES OVER TIME

The shortcomings of rural financial markets are well documented in the literature.<sup>14</sup> In short, rural financial markets are fragmented and imperfect, have been historically riddled by government intervention leading to financial repression, and then left behind when financial liberalization followed to eliminate repression. Informal finance, notably input suppliers, traders, and contract farming, dominates financial transactions among rural dwellers. Member-owned financial intermediaries or organizations, such as financial cooperatives, self-help groups, and rotating savings and credit association (ROSCAs) have some relevance, albeit with a mixed record of outreach and sustainability. Current conventional wisdom is that market-friendly government interventions are required to create or support institutions that perform effective rural financial intermediation. Innovations that reduce transaction costs and improve risk-reducing information flows are seen as conducive to better functioning markets in rural areas. The main elements in this summary are briefly discussed below, and can be seen as a progression over time from the 1950s to the current period.

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<sup>14</sup> A comprehensive review, including theoretical and empirical models of rural financial markets, is found in Conning and Udry (2007); other sources cited as appropriate.

**Fragmented and imperfect rural financial markets.** Market fragmentation is observed when different segments of borrowers are sorted across different lenders and engage in contracts under different terms and conditions, as a function of the borrowers' characteristics. In part, fragmentation in rural financial markets is associated with the significant occurrence of bilateral contracts, as between farmers and moneylenders, relatives and friends, and informal insurance arrangements with landlords, or as part of the functioning of ROSCAs. Financial repression resulting from heavy government intervention is likely to contribute to fragmentation through elite capture when those able to obtain subsidized credit establish yet another set of (distorted) terms and condition for loans otherwise similar in nature and purpose to those demanded by excluded farmers.

**Government intervention.** Directed credit from state-owned banks, interest-rate ceilings, credit-allocation mandates, and other "heavy" forms of intervention characterized most of the 1950s to 1970s in many developing countries. However well-intentioned, the negative effects of these policies in terms of discouraging private financial intermediation in rural areas, high arrears with attendant losses in state-owned banks and fiscal drain consequences, and political capture (e.g., high lending volumes in election years) have been thoroughly documented.<sup>15</sup> These policies are part of what is typically labeled "financial repression."<sup>16</sup>

Financial liberalization policies of the 1980s and 1990s, aimed at correcting the effects of financial repression, brought innovations mainly to urban and nonfarm rural activities, leaving farming behind—and especially smallholder farming. Most state-owned agricultural banks were shut down or drastically reformed, so even the rural elites they served were now forced to look elsewhere for sources of finance. Private providers cautiously, if at all, reached out to these elites, but what little outreach there had been to smallholders disappeared.

**Informal finance.** In its many forms, informal finance has been prevalent even during periods of heavy government intervention in rural financial markets, and even more so thereafter. Moneylenders, input suppliers, traders, and landlords are common (and stable) sources of liquidity; relatives and friends perform this role on a reciprocity basis (i.e., they are sometimes a source of funding and some other times users of the excess liquidity that the farmer may have). Savings groups and ROSCAs attract rural dwellers (usually women) able to make small regular contributions toward obtaining a lump sum via borrowing (as in savings groups) or when their turn comes (as in ROSCAs). Contracts in informal finance are usually "state-contingent" in Udry's terminology, meaning that their terms can be adjusted if unexpected circumstances occur either for the borrower or the lender (e.g., crop failure, medical emergencies); terms and conditions depend heavily on the quality of information lender and borrower have about each other.<sup>17</sup>

**Market-friendly interventions.** "In order for a robust set of intermediated financial instruments to be available to rural households, governments must do more than simply get out of the way of private lenders" (Conning and Udry, 2007, p. 76). The importance of macroeconomic stability, a conducive environment for contracts, property rights, secured transactions, and regulatory and supervisory systems that ensure a smooth functioning of financial markets is broadly recognized. Of particular relevance for smallholder finance are regulations that establish agent banking, and tiered "know your customer" (KYC) requirements conducive to setting up affordable small-balance accounts. Further, so called market-friendly interventions have been advocated that entail capacity building of financial institutions, temporary "smart" subsidies to enable financial institutions to penetrate new market segments, and public support of information systems and platforms that enable safe and low-cost transactions (e.g., factoring and reverse factoring platforms).<sup>18</sup>

**The promise of innovations.** The introduction of electronic means of transaction, notably mobile-phone banking, holds promise as an effective mechanism to financially include smallholder farmers. What seems to remain a challenge is the extent to which these electronic means of transaction are truly accessible to rural people,

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<sup>15</sup> Conning and Udry (2007) provide a good summary. Extensive analysis and critique of these policies can be found in Adams, Graham, and Von Pischke (1984).

<sup>16</sup> In addition to interest rate caps and government control of banks and financial institutions, financial repression encompasses high reserve requirements and other capital market restrictions. Under these policies, savers earn negative real interest rates, and governments can issue debt at low interest rates.

<sup>17</sup> A comprehensive source is Adams and Fitchett (1992). Udry's work in northern Nigeria (1994) was instrumental in documenting and analyzing the state-contingent nature of informal contracts.

<sup>18</sup> See De la Torre, Gozzi, and Schmukler (2007).

especially women, in developing countries. A rather typical pattern, for example, is that mobile penetration in a country, say Tanzania, would be about 80 percent on the aggregate, but only 25–30 percent in rural areas, and about half of that among rural women. Even in relatively high-income economies, such as Mexico, signal coverage in marginal rural areas is nonexistent or unreliable, and therefore the cost-effectiveness of electronic platforms is undermined by the need to do transactions offline, and batch-synchronize them in nearby towns where the signal is reliable. Ethiopia, with less than one-tenth of Mexico’s per capita GDP, performs government transfer payments in just about the same way.

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## EXPLORING THE PROMISE OF DIGITAL FINANCIAL SERVICES AND SMALLHOLDER HOUSEHOLDS

There are fundamental questions of whether mobile phones are accessible and usable for smallholder farmers, which influences the role that they may (and may not) play in household economics.<sup>19</sup> A crucial factor in the ability of rural dwellers generally and smallholders in particular to access mobile phone services is the “connection penetration rate” in rural areas (using GSMA terminology): It does not make much sense to purchase a mobile phone, however cheaply, if it cannot be used. In SSA, GSMA reports rural connection penetration rates that are systematically much lower than rates in urban areas. Vodacom Tanzania, for example, reported a 25 percent rate in rural areas compared to an 80 percent rate in urban areas (GSMA 2014b). Thus, though SSA reports a 65 percent overall penetration rate and “has been the fastest growing region over the last five years in terms of both unique subscribers and connections” (GSMA 2014a), that growth has been driven largely by urban use.

Many factors influence the decisions of mobile network operators (MNOs) to expand their service networks. Population density, general literacy, and associated demand for voice/text services, plus the willingness and capacity of governments to provide the basic infrastructure (either as public good or in public–private partnerships), are reasonable propositions to explain MNO coverage decisions.<sup>20</sup> Rural smallholders are unlikely to be prime targets for MNOs unless pressure to expand beyond market-saturated urban areas becomes overwhelming or targeted subsidies are in place (e.g., Vodacom Tanzania with a private foundation grant to serve rural areas). As average revenue per subscriber in SSA has fallen sharply between 2008 and 2013, expanding services to rural and low-income segments of the population becomes “a significant challenge for operators” (GSMA 2014a, p. 10).

A related question is whether the advent of advanced devices (smartphones) and associated huge increases in internet-related data use, occurring mostly in urban areas, may discourage MNO expansion into underserved areas with only 2G capability, and therefore more limited fee-based use. With the exception of MNOs that already have a large network, the business case for broadening geographic coverage, as opposed to deepening urban services, may be less appealing than before.

There is also a gender dimension to highlight: women in low- and middle-income countries are 21 percent less likely than men to own a mobile phone (GSMA 2014b). An emerging rule of thumb is that the rural connection penetration rate in a given country in SSA is roughly one-third of that country’s overall rate, and a working estimate of women’s access to that connectivity in rural areas is about three-fourths of the rural connection penetration rate.

Relative to SSA, South Asia presents a much more favorable scenario of mobile penetration in rural areas. Table 1 summarizes findings on mobile phone ownership and access to a mobile phone (one’s own or borrowed) in Bangladesh, India, and Pakistan (Sultana 2014). The similar penetration rates of urban and rural, especially in the “own or can borrow” category, hint at the importance of population density in rural areas, typically much higher in

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<sup>19</sup> See Mattern and Tarazi (2015) and Grossman and Tarazi (2014) for further discussion on the role and relevance of digital financial solutions for smallholder households.

<sup>20</sup> A GSMA report on the Philippines, “one of the fastest growing economies and mobile markets in Asia,” relates the impressive growth of the mobile market to “... a youthful, literate population, a large proportion of English speakers, a rapidly growing economy and increasing foreign VC investment” (GSMA 2014c). This sounds almost like a checklist of what smallholder households in SSA are not.

South Asia than in SSA, as a key driver of MNO coverage. Table 1 also shows a gender gap in access to a mobile phones that is much less pronounced than in SSA, though the gap in ownership is still large.

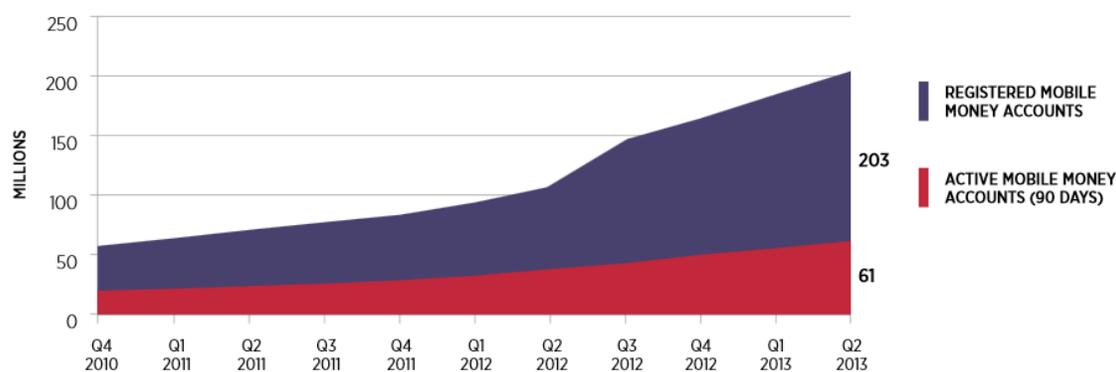
**Table 1. Mobile phone access in Bangladesh, India, and Pakistan**  
Percentage of individuals 15 years old and older, 2014

	Total	Urban	Rural	Male	Female
<b>Bangladesh</b>					
Own	58	69	53	72	44
Own or can borrow	95	95	96	96	95
<b>India</b>					
Own	50	64	43	68	31
Own or can borrow	85	91	82	89	81
<b>Pakistan</b>					
Own	59	62	58	80	38
Own or can borrow	80	82	78	88	70

Source: Sultana (2014).

Mobile money accounts in the context of financial inclusion must consider both uptake and use. GSMA reports that just about 30 percent of registered mobile money accounts were active in June 2013 (i.e., having performed at least one transaction within the past 90 days) (Pénicaud and Katakam 2013). Moreover, while the number of registered mobile money accounts shows substantial growth between 2010 and 2013, the trend for active accounts is much less impressive (see Figure 1).

FIGURE 1. NUMBER OF REGISTERED AND ACTIVE (90 DAYS) MOBILE MONEY ACCOUNTS WORLDWIDE (JUNE 2013)



Source: Pénicaud and Katakam (2013).

An important consideration when looking at mobile banking is that owning (or having access to) a mobile phone is just one-third of the story. Two other components are required: (1) agents, i.e., a cash-in and cash-out place, be it individuals (MNO agents), retail stores, or small, local shops; and (2) a digital transactions platform that enables and executes the digital transfers initiated (or received) by the mobile device, and connects them to an authorized bank or nonbank value storage. Use of a mobile banking account may depend heavily on whether these two components are in place. The experience of UTL in Uganda helps illustrate this point (see Box 3).

### **Box 3. Learning by Doing: Uganda's UTL Experience**

Uganda Telecom (UTL), a small MNO in Uganda, has experimented with a few pilot approaches to reach smallholder households and agribusiness. To that effect, it launched M-Sente, a USSD-based mobile wallet. A first experiment, partnering with the Uganda Coffee Farmers Association, aimed at reducing the delay in paying farmers for their coffee (usually eight to ten weeks) and minimizing the need to handle cash. In the one cooperative chosen for the pilot, only one-third of the 500 farmers/members had a mobile phone, and only about two-thirds had ever used it to make a financial transaction. Moreover, the cooperative had no computer, no internet access, and weak mobile connectivity. From the trilogy mentioned above—mobile, agent, and platform—only the agent (the cooperative) was there, while the mobile phones and platform (including signal strength) had to be patched up. Even then, 200 of the 500 farmers registered with M-Sente, and only 50 payments were made in the first attempt.

A second pilot with the Sugar Corporation of Uganda worked much better because the business had access to a working computer and the internet. In addition there was an information technology graduate in the circle of employees and their families who provided key support. Given that about one-half of the employees did not have a phone, offering low-price phones helped to get most everyone on board and fully “mobilize” salary distribution through M-Sente.

Source: Anderson, 2015 Uganda BTOR.

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## OTHER INNOVATIVE MECHANISMS TO REACH SMALLHOLDER HOUSEHOLDS

As indicated earlier, informal finance mechanisms dominate the supply landscape for smallholder households. In the formal market, agricultural credit as a proportion of total bank credit to the private sector is about 7 percent in Uganda, and even less than that in both Tanzania (6 percent) and Mozambique (5 percent) (Nathan Associates 2015). It is safe to assume that this credit goes primarily to commercial large farmers and agribusiness.

For all its convenience, informal finance is far from fully adequate, and in some settings not readily available to smallholders. Typical ways for smallholders to keep quasi-liquid assets, such as contributions to ROSCAs, loans to others, or short-term investments in livestock, are exposed to default and losses. Desertion in ROSCAs, late repayment of informal loans, and high mortality/thefts of small livestock are common.

In the formal sector, microfinance institutions (MFIs) mainly in South Asia and in Latin America have introduced “cash-flow friendly” lending mechanisms that allow for small and flexible payment schedules. Adaptation of these mechanisms to rural settings where cash flows could be even more volatile, and where large lump sums can be needed or received associated with crop cycles, has been introduced by some MFIs (IFC 2014).

Bank credit to smallholders has been historically very limited. Short-term credit secured with fixed property is the traditional product some smallholders can obtain as long as they have title on the fixed property. Use of movable property and receivables as collateral, including warehouse receipts, is still highly limited by legal systems that do not enable such contracts. Factoring (of receivables) and leasing are still difficult to implement in many countries that lack the appropriate legal environment. Further, even when legal systems are conducive to using these collateral substitutes, banking regulations may maintain provisioning and risk-asset weighting rules on loans not secured with fixed property that impinge on banks' willingness to lend against movable property and receivables, arguably the most accessible types of security for smallholders.

Product-linked financing is feasible in well-structured value chains where the off-taker/aggregator (buyer) assumes the role of bank agent. The quality and stability of the relationship between the off-taker/aggregator and the smallholder producer (supplier/seller) is likely to be reflected in the terms and conditions of the producer contract and bank financing for both producer and aggregator. The so-called golden handcuffs depicting the smallholder producer as a disadvantaged partner needs to be evaluated against the expanded outreach of formal finance that the value-chain arrangement entails when buyers are indeed expanding the reach of financial service providers (FSPs).

Of the relatively recent developments in inclusive finance in low-income countries, agent banking and electronic banking (mobile and card-based) are likely to especially benefit smallholder households, given the effect these developments have on transactions costs of both delivery and use. Further, the interaction of these developments with the advent of value chain finance creates an enabling environment for cross-selling of services, a factor especially appealing to suppliers that compensates for the low profitability of certain services such as credit, with revenue from fee-based services such as bill payments and money transfers.<sup>21</sup>

While no hard evidence seems to be available to verify the effects on smallholder access to finance of agent banking developments, such as in India (banking correspondents) or Mexico, one could expect that smallholder families are better off as a result of these developments.<sup>22</sup> Proximity does reduce use costs. The question of “trust” still remains a critical factor in smallholder farmers’ decision making about financial transactions. Regulatory reforms in both India and Mexico that require agents to meet certain standards are conducive to create an environment of trust that potential new clients appreciate.

The complementarity (or lack thereof) of finance with nonfinancial services has long been a matter of debate. At one end of the spectrum, there have been the “minimalists” such as the Accion International group lending programs in Latin America and elsewhere in the early 1990s that would exclusively focus on credit, with no other services included in its work with the groups; at the other end, a number of combined or bundled programs that encompass credit and education/literacy, health, and/or technical assistance have tried to make the point that credit only is not sufficient to alleviate poverty among the target groups. BRAC and many Grameen-style interventions are examples of this model. Relatively recent programs, such as One Acre Fund and myAgro, focus primarily on “in kind” finance in the form of improved seeds, fertilizer and other inputs, and technical advice directly connected with the crops/livestock being funded (e.g., targeted training and linkage to products and services). With bundles that include income protection and crop insurance, and involve active vendor participation (e.g., myAgro), these programs have shown promise in their initial stages. Questions of scalability and sustainability remain to be explored and documented.

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## IMPLICATIONS FOR POLICY AND PRACTICE

This paper has provided an overview of the “state of knowledge” in smallholder farmer status, behavior, and connection with financial tools, informal and formal. Some implications for both policy makers and practitioners are outlined below.

**Policy makers.** Smallholder families are crucial targets in poverty alleviation interventions. Understanding the segments inside the general smallholder category is essential to design effective interventions. This review, and preliminary findings from the smallholder financial diaries, suggest that (a) categorizing smallholders is highly context specific; (b) relying primarily on land area as a segmenting variable can be misleading, and a poor predictor of the ability of the smallholder farmer to have a marketable surplus; and (c) access to markets and interactions with local traders of inputs and outputs are important factors in the financial lives of smallholder farmers. A clear understanding of these day-to-day relationships, and the opportunities they may entail for innovation in financial

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<sup>21</sup> A leading value-chain finance bank in Mexico articulated this advantage by underscoring that smallholder farmers receiving value-chain credit would go back to being “financially excluded” once the loan was repaid; hence, the importance of making other services available to them via agent banking, the agent being the agribusiness partner or another suitable agent, for the client to remain “included.”

<sup>22</sup> See Dias, Staschen, and Noor (2015) for a review of supervision issues associated with agent banking.

transactions and the generation of reliable information, seems a logical next step in gathering intelligence to address smallholder finance.

Financial services can help in different ways to improve smallholders' well-being, yet making them available and affordable to the rural poor is difficult. Agent banking and mobile banking seem to be preferred avenues, but these mechanisms face limitations in rural areas that urban-focused policies tend to ignore. Policies that attempt to improve the use of mobile banking among smallholder households need to address severe rural–urban discrepancies in access and effective use. This paper finds, both in existing literature and in preliminary findings from the smallholder diaries, that poor signal coverage of mobile networks and low connection penetration rates, especially for women, are prevalent in rural areas. Further, there seems to be an important gap between basic access to a mobile phone and the smallholder user's ability to perform transactions with it (using SMS functionality).

Much is also yet to be accomplished in improving the enabling environment. Legal and regulatory frameworks ought to enable the use of movable property and receivables as collateral, provide for reliable agent banking mechanisms that make service delivery sustainable and their use affordable and practical, and allow for expeditious contracting and contract enforcement. Supporting innovation with smart subsidies remains an open door for market-friendly government interventions.

**Financial service providers.** A number of innovations are being tested, and new approaches are emerging that could sustainably reach smallholders and the varied segments that comprise this enormous client group. “Keep your eyes open” is the main message from this review. The points above on categorizing smallholders are particularly relevant for FSPs as well. FSPs serving smallholders either directly or through value-chain finance approaches will benefit from the financial diaries findings as these provide new insights on the attributes smallholders value in financial products and services. The ability of FSPs to cross-sell, in particular, could be substantially enhanced by the refined knowledge emerging from the diaries.

Information technology is increasingly making a difference to reduce transaction costs in the “last mile” of service delivery. Introducing technology further upstream, e.g., digitizing supplier delivery records at the off-taker/aggregator level could make an even more impactful difference in terms of profitability and portfolio expansion. As with all the innovations outlined here, successful applications of technology are rooted in understanding consumer demand, and in this case carefully differentiating among 500 million smallholder households and their specific demands for financial tools.

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