FINANCIAL SERVICES ASSESSMENT

Community-Level Economic Effects of M-PESA in Kenya: Initial Findings

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JUNE 2010

Financial Services Assessment project can be found on the web at http://www.fsassessment.umd.edu/

ABOUT THE PROJECT

The *Financial Services Assessment* project is designed to examine the impact of financial services on the lives of poor people across the developing world. This project is funded by the Bill & Melinda Gates Foundation, which is committed to building a deep base of knowledge in the microfinance field. The IRIS Center at the University of Maryland, College Park, together with its partner, Microfinance Opportunities, will assess a diverse range of innovations in financial services. The results of this project will shed light on the design and delivery of appropriate financial products and services for the poor and the potential to scale up successful innovations to reach larger numbers of low-income households.

FUNDING

The Financial Services Assessment Project is funded by a $6 million grant from the Bill & Melinda Gates Foundation.

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ACKNOWLEDGEMENTS

The authors thank the *Financial Services Assessment* staff at the IRIS Center and Microfinance Opportunities for their input at crucial points to conduct the study within the timeframe. Special thanks to Dr. Dennis Wood and Diana Rutherford for their advice and feedback at various points during the study, and Marie Anne Sliwinski for program managerial support. Thanks are also due to Harshika Errangani and Munara Murat for their assistance with data entry, and Aron Lenett and Chiara Tanzi for their help with formatting and desktop research.

The authors also wish to recognize the contribution of local research assistants in Kenya who conducted individual interviews and focus groups. Richard Amwayi, Andrew Otemba, Gustavus Muli and Sarah Mwendwa showed diligence and excellence in implementing focus groups with local communities about the outcomes of M-PESA on community. Ebby Angawa, Daniel Kitili and Robert Kheyi provided translation and research assistance and contributed to interviews.

Pauline Vaughan, Rita Mwachandi, Waceke Mbugua and Adnan Adnan took time out of their busy schedules to meet with us on several occasions. They provided invaluable assistance with agents, locations and other information that made our research possible.

The authors appreciate the representatives of the educational and health-care providers and other organizations who provided information on their institutions' usage of M-PESA. Thanks also go to the M-PESA agents and employees who agreed to participate in the study, and to all the participants of focus groups and the administration that made such research possible.

The authors owe a debt of gratitude to PACT-Kenya for being our local affiliate and finalizing our clearances. Special thanks go to Titus Syengo, Anthony Mueke and Loise Maina of PACT-Kenya for their support, follow-through and legwork on our behalf. Their collegiality facilitated this study. Finally, we are especially grateful to Janet Mumo and the staff of the Kitui Development Centre for their aid in facilitating the field research. KDC was our home in Kitui, and it provided much needed advice, resources and staff.

ABSTRACT

M-PESA an agent-assisted, mobile phone-based, person-to-person payment and money transfer system, was launched in Kenya on March 6, 2007. This study is the first of its kind to explore the economic effects of M-PESA in Kenya at the community level. The findings from the first stage of the study indicate that M-PESA affects the economic outcomes of community members, both users and non-users of M-PESA, through direct and externality effects, and identify 11 economic effects within the broad categories of local economic expansion, security, capital accumulation and business environment after 2.5 years of M-PESA's use in these communities. The research also shows that effects were not visible in all the study communities and among all the population segments within the communities; they tended to be influenced by gender and geographic location of the communities. Also, the effects were not always perceived as mutually exclusive, but as interwoven with each other to produce overall community effects.

OTHER NOTES

The exchange rate during the research period was 75 Kenyan shillings = 1 U.S. dollar.

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ACRONYMS

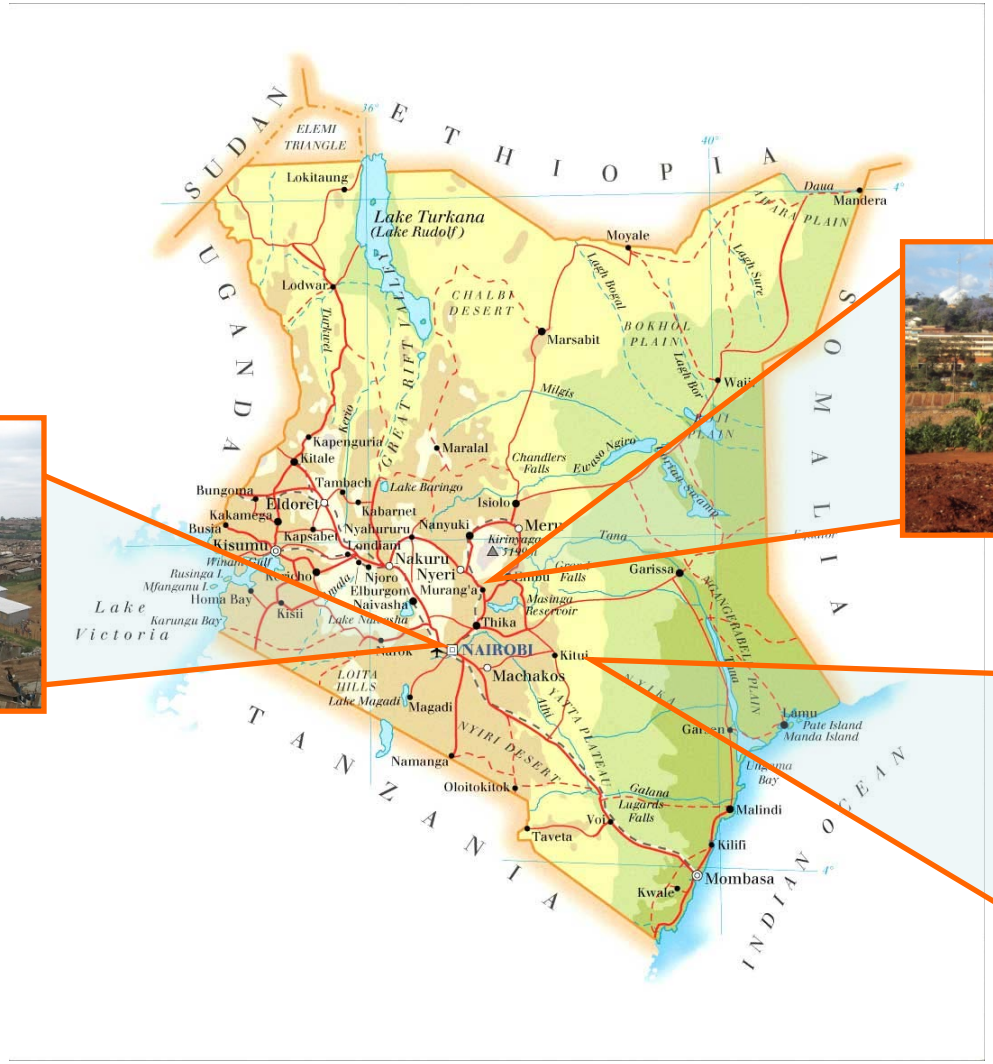
BMGF	Bill & Melinda Gates Foundation
DOI	District Officer I
FGD	Focus Group Discussion
FSA	Financial Service Assessment (the overarching project name)
FAO	Food and Agriculture Organization
GHI	Global Hunger Index
GOK	Government of Kenya
KDC	Kitui Development Centre
KSH	Kenya shilling
KII	Key Informant Interview
KWP	Katitika Water Project
M-PESA	Mobile money, an e-money transfer system pioneered by Safaricom, Kenya's largest mobile service provider.
NGO	Nongovernment Organization
PRA	Participatory Rapid Appraisal
SACCO	Savings and Credit Co-operative Organization
UN	United Nations
USAID	United States Agency for International Development
WFP	World Food Programme
WWP	Wikililye Water Project

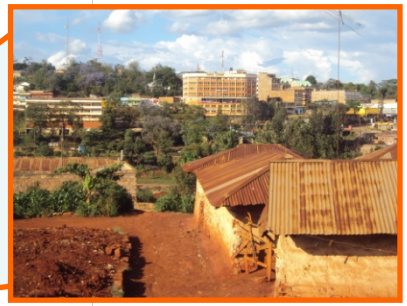
STUDY DEFINITIONS

Business environment	Factors affecting business operations. This study considers ease in transactions and quality control as attributes of business environment.
Capital accumulation	Refers to acquisition of financial (e.g., savings), human (e.g., education and health) and social (e.g., cohesion) capital.
Local economic expansion	Refers to expansion in the number of local businesses, improved and increased money circulation, improved and increased employment opportunities and availability of goods and services.
Risk	The probability of something happening in the future – good or bad; the likelihood of an occurrence of an event and the associated loss by the event or loss caused by the event.
Security	Three types of security are referenced in the study: security of food, physical and money.
Money security	Refers to ability to accumulate cash and keep it secure from theft.
Physical security	Refers to deterrence of pickpocketing and muggings.
Food security	Physical and economic access, at all times, to sufficient, safe and nutritious food to meet dietary needs and food preferences for an active and healthy life.
Matatu	A minibus or van used to carry passengers. Matatu's commonly provide a transfer service to send money from one area of the country to another.
Effects	Changes occurring to M-PESA users and non-users in the community that are direct and spillover effects of M-PESA.
Community	Geographic boundaries and M-PESA clusters
Deep-dive methodology	Deep-dive methodology is a framework combining quantitative and qualitative methods to elicit in-depth information from the same subject. It can be considered as a series of data-gathering efforts from the same subject where we tailor queries (quantitative and qualitative) to gather in-depth insights to know how they behave and explain why they behave that way.
Externality/spillover effects	A positive or negative impact on a party not involved in a specified economic/social transaction or act; the effects that accrue to non-users of M-PESA due to others' use of M-PESA.

STUDY AREAS

Kibera





Murang'a

Kitui

EXECUTIVE SUMMARY

M-PESA, an agent-assisted, mobile phone-based, person-to-person payment and money transfer system, was launched in Kenya on March 6, 2007. It allows users to store money on their mobile phones in an e-account and deposit or withdraw money in the form of hard currency at one of M-PESA's numerous agent locations. Since its inception, M-PESA has picked up remarkably quickly, covering the majority of geographic areas of the country. It aimed to attract 250,000 customers in its first year, and reached that milestone in only four months. About 1 million customers registered with M-PESA by the end of year one. By August 2009, over 7.7 million Kenyans (about 38 percent of the adult population) had become registered users of M-PESA, far exceeding projections. As of January 2010, that number was over 9 million. The monthly value of person-to-person transfers was over KSH 26 billion (approximately U.S. $330 million) in December 2009. There was also a phenomenal growth in the number of agents, from 7,000 in March 2009 to almost 17,000 in January 2010. These agents are located throughout urban and medium-to-large market centers in the country.

Given the remarkable outreach and use of M-PESA, many policymakers and donors are interested in supporting similar initiatives that can help produce a more inclusive and efficient financial sector that provides a broad range of financial services. Before advocating the relatively new system for other areas, donors and policymakers need to clearly understand the value proposition of M-PESA in its potential to affect households and communities at different socioeconomic levels. Specifically, they need to understand if and how M-PESA affects households and communities.

STUDY OBJECTIVE

This study is the first of its kind to explore the economic effects of M-PESA in Kenya at the community level. Several studies exist on M-PESA, and many others are under way that focus on examining the effects of M-PESA at the household level and that aggregate the household effects to make conclusions about community effects. These studies seldom extend the inquiry to capture spillover and ripple effects caused by the presence and use of M-PESA to fully understand community effects.

This study is intended to help fill in that gap, since the sustainability of M-PESA may depend on achieving communitywide impact. Our study captured community effects that occurred via direct and indirect economic effects realized by the users of M-PESA and that accrued to non-users through the presence of M-PESA and users of M-PESA. In other words, we focused on communitywide economic effects caused by the presence and use of M-PESA for all residents in the community. We also captured social effects to the extent they influence economic effects.

The study is being conducted in two stages. This report is based on the first stage, which was exploratory and not exhaustive in nature. At this first stage we explored the following questions:

1. Are there indications of M-PESA's economic effect at the community level?
2. If so, what are the economic effects of M-PESA in a community?
3. What observable factors could potentially influence these community level effects?

Examining the net effects of M-PESA on the communities and relative magnitudes of identified effects was beyond the scope of this study.

STUDY METHODOLOGY

From September to December 2009, IRIS staff members and locally-hired staff carried out fieldwork in Kenya. The study was conducted in three districts: Kibera and Murang'a in Central Province and Kitui in Eastern Province. The districts were chosen to represent Kenya's population, economic activities and M-PESA agent distribution as well as for logistical considerations.

Within each of the three sampled districts, we selected three locations in which to carry out the study. The selection was based on:

- Geography
- M-PESA agent clusters
- Urban or rural nature of the location

The goal was to get a mixture of rural and urban populations, so we selected two districts (Murang'a and Kitui) that have a large percentage of the population in rural areas and a significant town center, and one district (Kibera) comprised of an urban settlement in Nairobi. The M-PESA website only listed agent locations by province or city, not by district or other midsize divisions, which made it difficult to obtain agent information or directly factor agent locations into our strategy. Over 3,000 agents are located in Nairobi, over 1,000 agents reside in Central Province, and around 800 exist in Eastern and North Eastern provinces combined.

To address the study questions, we used a "deep-dive" methodology[1] with inductive methods to gather primarily qualitative information and a very limited amount of quantitative data. We used this information to explore the possible direct effects and externalities that can occur for a community due to M-PESA. The information was collected through:

- 12 semi-structured key informant interviews (KIIs) with financial service providers,
- 58 unstructured market watch surveys,
- 26 focus group discussions (FGDs) using an effects ranking tool and 215 mini-surveys using structured questionnaires with the participants of 22 of the above mentioned 26 FGDs.
- 7 case studies with agents
- Literature reviews were also carried out as a source of secondary data.

The multiple sources of information allowed us to triangulate the data to examine our study questions.

KEY FINDINGS

M-PESA's economic effects at the community level are now observable for both users and non-users of M-PESA, through direct effects and externalities,[2] respectively.

The four overarching economic effects at the community level are in the areas of local economic expansion, security, capital accumulation and business environment.

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[1] Deep-dive methodology is a framework combining quantitative and qualitative methods to elicit in-depth information from the same subject. It can be considered as a series of data-gathering efforts from the same subject where we tailor queries (quantitative and qualitative) to gather in-depth insights to know how they behave and explain why they behave that way.

[2] An externality is a positive or negative impact on a party not involved in a specified economic/social transaction or act; the effects that accrue to non-users of M-PESA due to others' use of M-PESA.

These four effects are composed of 11 community-level sub-effects, by order of importance, that illuminate M-PESA's potential role in supporting economic activities in the communities. These include the following (overarching effect in parentheses):

1. Money circulation—(local economic expansion)
2. Transactions ease—(business environment)
3. Money security—(security)
4. Food security—(security)
5. Human capital accumulation—(capital accumulation)
6. Expansion of businesses—(local economic expansion)
7. Social capital accumulation—(capital accumulation)
8. Employment opportunities—(Local economic expansion)
9. Financial capital accumulation—(capital accumulation)
10. Physical security—(security)
11. Quality control—(business environment)

Not all 11 sub-effects were visible in all of the study communities and among all of the population segments. Also, the effects were not always perceived as mutually exclusive, but as interwoven to produce overall community effects.

Overall, the highest-ranked effect by the focus group participants was increased money circulation, due to a greater volume of money flowing into and out of the communities and a faster flow of money within the community to boost local consumption. However, its importance varied by gender, with men considering it No. 1 and women ranking it No. 3.

Business expansion was noticed primarily in terms of growth of existing businesses rather than new business startups. Existing businesses were able to expand to meet growing local demand for goods and services, which was in part driven by increased money circulation through M-PESA and lower transactions costs for vendors using M-PESA to obtain their stock. This business expansion also tended to be related to food security elements identified in the communities in terms of increased volume and variety of food available and timely availability of agricultural inputs in local markets.

Increased employment opportunities were mostly referenced in direct relationship to the M-PESA's shops. Although the increase was relatively small, given the high level of unemployment in the areas, it was very noticeable to the community members. Also, in some cases, existing businesses expanded employment with the addition of M-PESA windows within their shops.

Men identified physical security, in terms of reduced mugging and thefts, as an effect of M-PESA. Women viewed improved money security—in terms of ability to accumulate cash and keep it secure from theft—as the most important type of security effect associated with M-PESA.

People in agrarian areas identified food security as a more important effect than those who live in urban areas. This was mentioned in terms of increased agricultural productivity, improved access to nutritious food and a variety of foods and better access to agricultural inputs on time. Interestingly, rural women placed more importance on food security than rural men, while urban men placed more importance on it compared to urban women. As mentioned above, increased money circulation and expansion of local markets are also related to the food security effect identified in the communities.

Men and women consider human capital accumulation—in terms of education and health—an important positive community-level effect associated with M-PESA. However, aggregate data from all three study districts showed no clear consensus on the direction of M-PESA's association in creating or nurturing social and financial capital in the community. Nonetheless, respondents in Kibera, a slum in Nairobi, identified M-PESA positively with financial capital accumulation since residents linked it to business expansion and a better business environment.

In addition to the 11 community sub-effects identified above, the IRIS staff also visited a pilot project that sought to expand M-PESA's utility. Shortly before the study began in September 2009, M-PESA partnered with a private company to provide clean water in one of our study districts. While the Katitika Water Project (KWP) in Kitui District is not located within the communities selected for the study, it is an important breakthrough in enhancing the functionality of M-PESA in directly addressing the basic human need for water in arid areas, and also community-level governance and project sustainability issues. We therefore visited the project to obtain an overview of it. The project uses a variation on M-PESA's "bill pay" function to allow rural communities to access safe water from an automated water system. Over time, the project is intended to become community-owned, providing residents with a valuable asset. Our initial interviews identified three primary community effects of the KWP. The first is higher agricultural productivity in terms of new kitchen gardens and tree nurseries. Second, local business expansion was seen in new water-based businesses such as brick making and in existing businesses such as dairy cattle farming. Third, community members spoke of improved health in terms of fewer waterborne diseases and increased ability to practice good hygiene.

CONCLUSIONS AND NEXT STEPS

The findings from our first stage of the study clearly suggest that M-PESA affects the economic outcomes of community members, both users and non-users of M-PESA, through direct and externality effects.

The community effects are observable in four major areas: (i) local economic expansion in terms of money circulation and local employment, (ii) physical, financial and food security, (iii) financial, human and social capital accumulation, and (iv) business environment in terms of transactions ease and quality control. The magnitudes of the effects at the community level are influenced by gender and geographic location of the communities. For example, people in rural areas ranked food security as a more important effect than those who live in urban areas. Food security was mentioned in terms of increased agricultural productivity, improved access to nutritious food and a variety of foods, and more timely access to agricultural inputs. Interestingly, rural women placed more importance on food security than rural men, while urban men placed more importance on it than urban women.

In particular, food and water security appear to be complex and interwoven with many other effects, such as transactions ease, and to have considerable multiplier effects, especially in rural economies. Therefore, we propose for our next stage of the study to examine in detail M-PESA's effects on food and water security. In these two complex areas, we intend to capture the flow mechanisms that facilitate obtaining the effects to clearly understand the role of M-PESA in affecting sustainable community-level outcomes. While our study is limited to the Kenyan context, we hope at the end of Stage II to draw generic lessons on agent-assisted mobile systems and how they can change and improve communitywide economic impacts in developing countries.

STUDY BACKGROUND

The *Financial Services Assessment* project, undertaken by the IRIS Center at the University of Maryland, College Park and Microfinance Opportunities, is assessing the impact of grants provided by the Bill & Melinda Gates Foundation to microfinance organizations for the design and development of innovations in providing financial services in developing countries. The research will assess the impact of new financial products, services and delivery systems on outreach and client welfare.

The *Financial Services Assessment* project addresses issues such as access to financial services and the role of the enabling environment. Through the use of quantitative surveys and qualitative studies, the research examines if and how the financial innovations affect access and use of financial services by the poor and impact client and community welfare. In this way, the research helps reveal the value proposition of innovations: the unique added value of the innovations to the poor through the financial service providers.

In 2009, the Bill & Melinda Gates Foundation commissioned studies on M-PESA's effect at household and community levels in Kenya.

The research findings of the study are disseminated through a series of topical reports that highlight different aspects of the study. Collectively these studies will allow us to understand the outcomes of M-PESA. This paper, written based on the first round of study in Kenya, is one of several topical papers in the series.

I. INTRODUCTION

This study is first of its kind to explore the economic effects of M-PESA in Kenya at the community level.

M-PESA is an innovative agent-assisted, mobile phone-based person-to- person payment and money transfer system. M-PESA literally means "mobile money"; *pesa* is the Swahili word for money or cash. It is marketed as a quick, easy and safe way to transfer small amounts of money from one person to another. Users can store money on their mobile phones in an electronic account and can deposit or withdraw money in the form of hard currency at one of M-PESA's numerous agent locations. They can also send and receive money from other users and in some cases can pay bills (e.g., electric) directly to a participating company through M-PESA's bill pay function.

> From your M-PESA account you can access the following services:
>
> 1. **Deposit cash to your account.**
> 2. **Send (Transfer) money.**
> 3. **Withdraw money.**
> 4. **Buy Safaricom Airtime.**
> 5. **Pay Bills.**
> 6. **Manage your M-PESA Account.**
>
> *From Safaricom's website: http://www.safaricom.co.ke/index.php?id=747*

Safaricom, Kenya's largest mobile phone operator, launched M-PESA in March 2007.[3] Since then, M-PESA has picked up remarkably quickly, covering the majority of geographic areas of the country. Within four months of its operation, over 250,000 clients, set as a target for year one, became customers (Hughes and Lonie, 2007). About 1 million registered with M-PESA by the end of the first year. By August 2009, about 2.5 years after startup, over 7.7 million Kenyans (about 38 percent of the adult population) had become registered users of M-PESA, far exceeding the projections. [4]As of January 2010, that number rose to over 9 million. By December 2009, the monthly value of person-to-person transfers was over KSH 26 billion (approximately U.S. $330 million). There was also a phenomenal growth in the number of agents, from 7,000 in March 2009 to almost 17,000 by January 2010. These agents are located throughout urban and medium-to-large market centers.

Given the remarkable outreach and use of M-PESA, many policymakers and donors are interested in supporting such initiatives to achieve goals of an inclusive financial sector that is efficient and provides a broad range of financial services. But, before advocating expansion of the system to other areas and since the system is new, donors and policymakers want to understand the present and potential socioeconomic outcomes of M-PESA on households and communities.

Many studies exist, and others are under way, that examine effects of M-PESA at the household level (Brewin, 2008; Morawczynski, 2008a, 2008b, 2009; Camner and Sjoblom, 2008; Jack and Suri, 2009). These studies are generally based on surveys and case studies conducted among users and non-users of M-PESA and aggregate the effects to make conclusions about community effects. They seldom extend the inquiry to capture spillover and ripple effects caused by the presence and use of M-PESA to fully understand community effects.

This study is intended to help fill that gap, since it is important for M-PESA to have a communitywide outcome in order to be sustainable. In our study, the first stage of a two-part effort, we capture community effects that occurred via direct and indirect economic effects realized by the users of M-PESA and that accrue to

[3] Safaricom is part of the Vodafone group. It began in 1997 and currently holds almost 80 percent of the market share in Kenya (Jack and Suri, 2009).

[4] Kenya has a population of roughly 38.5 million (2008 World Bank) and within two years of startup, over 9 million Kenyans (about 25 percent of the population) have become registered users of M-PESA.

non-users through the presence of M-PESA and users of M-PESA. In other words, we focused on communitywide economic effects caused by the presence and use of M-PESA for all residents in the community. We also captured social effects to the extent they influence economic effects. Since the study is intended to explore community effects of M-PESA, it attempts to only lay out the identifiable community effects after about three years of operation of M-PESA in Kenya. Based on the findings from this study, we intend to examine in detail the major two or three effects of M-PESA in terms of community development in Stage II.

At this first stage, we addressed the following questions:

1. Are there indications of M-PESA's economic effect at the community level?
2. If so, what are the economic effects of M-PESA in a community?
3. What observable factors could potentially influence these community level effects?

We define communities spatially in our study based on political districts and M-PESA clusters.[5] To address the study questions, IRIS developed a "deep-dive" methodology[6] with primarily inductive methods and qualitative tools to explore the possible direct and externality effects that can occur for a community due to M-PESA. While our research method was primarily inductive, we postulated that the types and magnitude of effects may vary by gender, by geographic location (rural or urban), and types of economic activities in the area that influence the placement.

The deep-dive method[7] included focus group discussions, case studies and key informant interviews to gather information from group and individual perceptions. We gathered primarily qualitative data, some of which could be transformed into quantitative data, and some quantitative data from all respondents, and we employed observational techniques to understand the terrain. We triangulated the qualitative, quantitative and observational information to understand effects at the community level.

In Section II below, we discuss our sampling framework and study areas. This is followed by the research methods for the study and our findings. A more in-depth look at M-PESA's relationship to food security is discussed, and the new M-PESA-aided water point in Katitika village is examined both for its potential effect on food security in the area, and for M-PESA's more general effect on the community. Our summary of study findings and suggestions for future research conclude the paper.

[5] The concept of community is deceptively simple. How communities define themselves can, at times, be radically different from how state-level administration chooses to define the boundaries of communities. Anthropologists often approach this notion from a "network" (social, economic, political) perspective where communities define themselves and indicate their own boundaries. For this study, that approach was impractical because a) we wanted to get a more representative sampling of community, and when communities "self-select" this becomes more difficult to accomplish; b) asking informants to identify their communities can be a long and contested process, and we felt the gains from using this method would not outweigh the time lost and the possible lack of representativeness.
[6] See Section II for details on the deep-dive method.
[7] Deep-dive methodology is a framework combining quantitative and qualitative methods to elicit in-depth information from the same subject. It can be considered as a series of data-gathering efforts from the same subject where we tailor queries (quantitative and qualitative) to gather in-depth insights to know how they behave and explain why they behave that way.

II. STUDY LOCATIONS AND TOOLS

From August to December 2009, the research team obtained the required research permit from the government, received appropriate introductory letters from M-PESA, and recruited and trained its local field team. Additionally, the team solidified relationships with three communities in which to conduct research, including obtaining official approval and informal buy-in, developed and piloted tools and procedures and carried out data collection. A research team of two IRIS Center staff members together with local staff carried out fieldwork in Kenya from Sept. 20 to Dec. 17, 2009.

A. STUDY LOCATIONS

The study was conducted in three districts: Kibera and Murang'a in Central Province and Kitui in Eastern Province (see Table 1 below).

There are eight provinces in Kenya and more than 250 districts within these provinces[8], so it was important that we selected provinces and districts that were representative of Kenya's population, economic activities and M-PESA agent distribution, and logistics. We reviewed the poverty atlas to make sure we included areas that represent the poverty incidence in Kenya.[9] We also looked at the economic activities in these provinces. While Central Province was primarily agriculture-based, Eastern Province is based on trade and livestock rearing. We wanted to get a mixture of rural and urban populations within these study districts. To do this, we selected two districts that have a large percentage of the population in rural areas, but still have a significant town center. While Kibera District has no rural population, we chose it as the third study location due to the above stated reasons, and because previous studies had indicated that there was a large number of M-PESA transactions and remittance sending. Agent information was difficult to obtain since the M-PESA web site only lists agent locations by province or city, not by district or other midsized divisions. This made it challenging to directly factor agent locations into our strategy, but we did learn that there are over 3,000 agents in Nairobi, over 1,000 agents in Central Province, and around 800 in Eastern/Northeastern Province.

In Murang'a and Kitui the town centers became key when locating M-PESA agent clusters. We knew from an earlier reconnaissance trip that Kibera, Murang'a town and Kitui town had ample M-PESA outlets to choose from. We then used locations with agent clusters to select sublocations and villages in each of the three study districts. In each case, we attempted to locate at least one M-PESA branch outside of the main urban center in order to look for similarities and differences in community effects between urban centers and their rural counterparts.

[8] According to the *Daily Nation*, July 13, 2010, there are 254 districts. During redistricting in 2009 so many new districts were created that some Kenyans derogatorily called the new district commissioners "*matatu* officials." *Matatu* are the privately owned minibuses that dominate Kenya's roadways.
[9] For example, rural poverty ranges from 30 to 40 percent among those selected districts in Central Province, and from 43 to 70 percent in Eastern Province.

Table 1: Study Area Description

ITEMS	DISTRICTS		
	Kibera	Murang'a	Kitui
Population	222,000-1,000,000[10]	400,000	600,000
size (square km)	2.5[11]	930	21,000
Poverty Rate (% below poverty line)	41[12]	39[13]	69[14]
Major economic activity	Casual labor	Farming	Farming, livestock rearing, trading, casual labor
No. locations (total)	n/a[15]	9[16]	17[17]
No. sublocations (total)	10[18]	30	64[19]
Sampled No. of locations	3	3	3
Sampled No. of sub-locations	5	3	3
Sampled No. of villages	7	7	8

Kibera

Kibera is a slum in Nairobi, Kenya's capital city. It is one of the largest slums in Africa (Morawczynski and Miscione, n.d.), though population estimates have ranged anywhere from 222,000 to 1 million. The government of Kenya owns the land, although many landlords rent out housing or sublet to other tenants. Kibera is still technically referred to as an "informal settlement," but many inhabitants have lived most of their lives there and often in the same small home.[20] Many

[10] Population figures for Kibera vary widely. According to Mike Davis (Planet of Slums, New York: Verso, 2006) Kibera's population is estimated to be 800,000. UN-Habitat ("Africa on the Move: An Urban Crisis in the Making," submission to the Commission for Africa, December 2004) estimates the population to be between 750,000-1,000,000. Stephano Marras, based on a door-to-door survey process in one village in the Kibera slums, estimates the population of Kibera to be more like 220,000-250,000. http://www.afronline.org/wp-content/uploads/2009/06/kibera_mapping_the_unmapped.pdf

[11] Kenya Water for Health Organization, http://www.kwaho.org/loc-d-kibera.html

[12] This figure is drawn from the World Bank's "Geographic Dimensions of Well-Being in Kenya: Where are the Poor? From Districts to Locations." (Volume One)

[13] District Environmental Action Plan, 2006-2011, UNDP, Poverty Environment Initiative Project and the National Environment Management authority. 2007.

[14] Food Security District Profile based on 2005 data. Poverty ranges from 39% in urban centers to 70% in rural areas. http://www.kenyafoodsecurity.org/dps/eastern/kitui.pdf

[15] Information on what constituted a location in the Kibera slums was contradictory, although 4 locations was a commonly cited number.

[16] Locations and sublocation information were obtained from the District Commissioner and Division Officer of Murang'a District.

[17] This is according to District Officer I of Kitui District. Before the redistricting at the end of 2009, there were 21 locations, now three are part of another district, and one location has become a division.

[18] This figure is according to the Population Council's report on "Adolescence in the Kibera Slums of Nairobi, Kenya." http://www.popcouncil.org/pdfs/AdolKiberaSlums.pdf

[19] According to the Kitui district chiefs and assistant chiefs' register. The number could change slightly with redistricting.

[20] Generally, residents cannot have tenure (there are some Nubians who are said to have tenure, but most were never officially granted ownership) and most of Kibera is unserviced, although many residents have illegally spliced electric lines in order to provide electricity for their homes. According to a news article posted on Terra Viva, a study that interviewed 120 landlords in Kibera found that 57% were either politicians or government officials. Since the settlement is technically illegal, landlords are not obligated to provide services (water, sewage, et cetera). http://www.ipsnews.net/riomas10/2608_3.shtml

residents have migrated from rural locations across Kenya in the intention of finding employment and being able to send money back to their communities. Some end up purchasing land in their villages with the hopes of going back, but increasingly residents are finding themselves making Kibera a more permanent home. Houses are roughly 12 feet by 12 feet in size and primarily consist of mud walls plastered over with sticks and boards or in some cases concrete, with corrugated tin roofs. Kibera comprises a diverse population with large numbers of Luhya, Luo, Kikuyu, Nubian and other ethnic groups.[21] It is a city within a city and has its own markets, churches, schools, health services and bus routes, and is even demarcated as a location containing four sub-locations (per communication with District Officer I, 2009).

Since Kibera is technically still classified as an informal settlement, it does not conform to the standard administrative units (i.e., region, district, division, location, sublocation and village) because location and sub-location are often overlapping. However, within Kibera division we selected three locations—Kibera, Lainisaba and Saran'gombe—and elected to work in seven villages within them.

Murang'a

Murang'a District is in the Central Region of Kenya, about 85 kilometers northeast of Nairobi. The district covers 930 square kilometers, with a population of roughly 400,000; 39 percent live below the poverty line (District Environmental Action Plan, 2006). It is primarily populated by the Kikuyu people. The majority of residents are subsistence farmers, although many also raise cash crops (e.g., tea and coffee). Much of the district has a high agricultural potential, thanks to two rainy seasons.

We selected Kiharu Division and chose three locations—Gikundu, Mbiri and Township—for our study that included Murang'a town, and also had a number of villages that were still accessible in the rainy season. We selected seven villages across three locations for inclusion in our study.

Kitui

Kitui District lies about 200 kilometers east of Nairobi. It is a large, semi-arid area and has a crop failure rate of 60 percent. The district covers 21,000 square kilometers and has a population of roughly 600,000; 70 percent live below the poverty line (Food Security in Kenya 2006). It is primarily populated by the Kamba people. Kitui only has one productive growing season, and the majority of residents practice subsistence farming. The district periodically receives food relief from the government of Kenya, United Nations-World Food Program and other nongovernment organizations.

In Kitui we elected to conduct research in Central Division and selected Katulani, Mulango and Township locations. Our selection was based on including Kitui town and a number of villages that were accessible in the rainy season. We selected eight villages within the locations.

B. STUDY TOOLS

The deep-dive methodology developed by IRIS is a framework combining quantitative and qualitative methods to elicit in-depth information from the same subject. It is a series of data-gathering efforts on the same subject in which we tailor queries (quantitative and qualitative) to gather in-depth insights to know how households or individuals behave and explain why they behave that way.

[21] After the Kibera riots during the presidential election of 2008, many Kikuyu left Kibera. One of the IRIS research team's drivers had owned a hardware shop in Kibera for more than 10 years. During the riots it was burned to the ground. He quickly relocated his family and has been a driver ever since. When asked by one of the IRIS team members whether he would consider opening another shop in Kibera, he laughed and said, "No, I have done enough there. It is time for something new."

The methodology can be applied to a randomized control sample or a non-random sample. [22]

For our study, we first used primarily qualitative (inductive) tools to understand the situation and context and then used some quantitative tools to collect some data and again used some qualitative tools with the same subject to understand why they report such data and the context in which we find the behavior. This approach was especially fruitful with M-PESA agents.[23]

To address the key questions of if and what effects are observed with M-PESA at the community level, we carried out research in Kibera, Murang'a and Kitui districts. Primary data were collected through key informant interviews, case studies of M-PESA agents, market vendor surveys and focus group discussions (FGDs) and mini-surveys with users and non-users of M-PESA (see Table 2 for details). Additionally, literature reviews were carried out as a secondary source of data to gain a better understanding of what research has already been conducted.

Table 2: Summary of Research Tools

Method / Tool	With whom?	For what?	How many?
Focus group discussions (FGDs)	Participants from Kibera, Kitui and Murang'a	Community Effects Ranking	255 users and non-users of M-PESA over 26 FGDs
Mini surveys (structured interviews)	Focus group participants above	Collect individual information about the participants and to get information on M-PESA usage within FGDs	215 users and non-users of M-PESA; 24 FGDs
	Katitika Water Project (KWP) users and non-users.	Collect information on the use and effects of the KWP.	22, including users and non-users of KWP
Key informant interviews (KIIs) (semi-structured interviews)	School principals and health-care providers in Kibera, Kitui and Murang'a districts.	Gather targeted information on M-PESA's effect on human capital (school fees and health services)	18 informants

[22] Contrast this with quantitative surveys that focus only on closed-ended questions conducted a few times over the lifetime of the subject (where they often cannot explain why such behaviors exist) and purely qualitative ones (where we cannot measure or generalize much). Qualitative studies alone can also be highly subjective if questions are not posed well and if sampling is a matter of convenience instead of design.

[23] We initially conducted a series of interviews using a structured three-page questionnaire with shop workers at local M-PESA outlets, as well as simple one-page daily transactions log sheet to understand the cash flow affected through the introduction of M-PESA and also the types of transactions conducted through M-PESA in the area. We then followed up with case studies with some of the participating agents in order to learn more about how and why they moved into the M-PESA market and their views on how M-PESA affects their communities.

Method / Tool	With whom?	For what?	How many?
	MFIs and banks in Kibera, Kitui and Murang'a districts.	Collect targeted information of M-PESA's effect on the local business environment	12 informants
	KWP committee in Katitika village in Kitui District.	Gather in-depth detail about how the water project came in and what changes they have identified in their community since the introduction of the KWP, as well as future community plans.	7 informants
Market surveys (semi-structured interviews)	Kalundu Market (Kitui town), Kitui; Wikililye, Kitui; Katulani, Kitui; Murang'a Town, Murang'a; Kambirwa, Murang'a; Saran'gombe, Kibera; Lainisaba, Kibera; Mashimoni, Kibera, Kichinjio, Kibera	Collect information about the local economy and M-PESA's effect on it.	58 vendors
Case studies	M-PESA agents and sub-agents, and a manager in Kibera, Kitui, and Murang'a districts.	Collect information about local economy and M-PESA's place in it.	4 M-PESA agents; 2 M-PESA sub-agents; 1 M-PESA shop manager

Effects Ranking Focus Group Discussions

We designed the "modified Attribute Ranking FGD tool" to capture M-PESA effects and rank them by importance. The IRIS Center's local research teams used the tool to facilitate discussion of the different attributes and effects of M-PESA at the community level. Once effects had been identified, participants were asked to rank responses from most important to least important for the community. Participants were not limited in the number of effects they could identify, and each effect was probed to gain a better understanding of why participants felt it was indeed an effect of M-PESA. The categories, however, were not explored exhaustively for the magnitude since it was beyond the current scope of the study.

To rank effects, we conducted 26 discussions equally divided into male- and female-only focus groups (see Table 3 below).

Table 3: Number and Gender Breakdown of the FGD Participants

EFFECTS-RANKING FGD		Kibera	Murang'a	Kitui	Total
Number of focus groups	Men's groups	5	3	5	13
	Women's groups	3	5	5	13
Number of participants	Men	49	29	45	123
	Women	31	51	50	132

The separation by gender was necessary, since we found after piloting that in mixed groups women did not actively participate. In all, 255 users and non-users of M-PESA participated in these 26 focus groups. Effects-ranking focus groups were conducted in all three districts. FGDs were carried out by two local IRIS research teams, each consisting of a FGD moderator and scribe. The local research teams, prior to the study launch, were trained by IRIS staff and through an intensive MicroSave tools training course.

Each focus group discussion consisted of seven to 12 participants of the same gender. Participants were selected with assistance from local leaders, administrators, and in some cases, key informants. Planting season in Murang'a and Kitui districts made organizing FGDs particularly challenging, since residents needed to be in the fields for long stretches of the day. Additionally, the local research teams and local leaders did their best to include at least two non-users of M-PESA in each focus group.[24]

Image 1: Women's Focus Group Discussion

Mini Surveys

Before each FGD, a short survey using a structured format to collect basic information such as demographic details and M-PESA use was administered to the participants. These mini surveys help establish the profiles of the

[24] In about two FGDs conducted in Kibera, we could not include non-users due to logistical reasons. But we collected information on perceptions of non-users on M-PESA from the users included in the two FGDs. Also, we individually talked to some non-users in Kibera to check for validity of information we obtained from users on their perspectives on M-PESA's effect in the community. Therefore, we believe that the quality of information we obtained in Kibera from these FGDs was not compromised due to non-inclusion of non-users in two of the eight FGDs conducted in Kibera.

respondents in FGDs and to compare them to community characteristics to ensure that our participants were diverse along key demographic variables (e.g., age, education, gender).

There were three FGDs where the survey was not administered, totaling 32 people (20 women and 12 men) who did not provide biographical information. An additional eight FGD participants did not fill out the survey. In total, IRIS' local research teams collected 215 mini surveys.

Short surveys were also used to collect information about the community effects of the Katitika Water Project (KWP) on users and non-users. IRIS staff and local research teams interviewed 22 community members about the community effects of the KWP.

Image 2: Filling Out Mini Surveys

Key Informant Interviews

IRIS staff carried out 37 key informant interviews using semi-structured questionnaire guidelines with MFIs, banks, school principals, health-care professionals and the Katitika Water Project committee. We probed into the community effects that the FGDs had identified to gather more detailed information on how M-PESA use is affecting communities.

Market Watch Surveys

These interviews looked into M-PESA's effect on local economic expansion and the business environment and augmented FGD participants' perceptions. We interviewed 58 market vendors from at least one medium or large market center in each of the study districts.[25] Merchants primarily included vegetable and livestock sellers, but also incorporated workers in used clothing shops, a pharmacy, a hardware store and a couple of general stores. Some of the vendors owned shops, while others rented stalls or space in the marketplace, and still others were hawkers roaming the markets for potential customers.

[25] Thirty-three market watch surveys were conducted in Kitui, ten in Murang'a, and fifteen in Kibera.

Image 3: A Market in Kitui

Case Studies

Deep-dive case studies were used to get a rich account of how and why agents and sub-agents started M-PESA outlets, the climate that facilitated their move into the M-PESA market and their views on how M-PESA affects their communities. IRIS staff carried out the case studies using semi-structured interview guidelines with six owners and one manager of the participating M-PESA shops. Of these seven, four were M-PESA agents, two were sub-agents and one was the chairman of a SACCO which owns an M-PESA shop. The participants were chosen based on their presence in the study area and willingness to participate. Additionally, case study participation was requested only if the owners were local to the study area.[26] The case study participants were selected from the initial 25 participating M-PESA shops in order to deepen understanding of and to identify what motivated and facilitated the owner's entrance into the M-PESA business.

[26]Many M-PESA outlets are directly owned by an individual or company that hires managers and other employees to work in the shops. For the purposes of this research that examines local community effects, we conducted case studies only with owners who were local to the community. We did not attempt to interview company headquarters or owners based elsewhere.

III. COMMUNITY EFFCTS OF M-PESA – STUDY FINDINGS

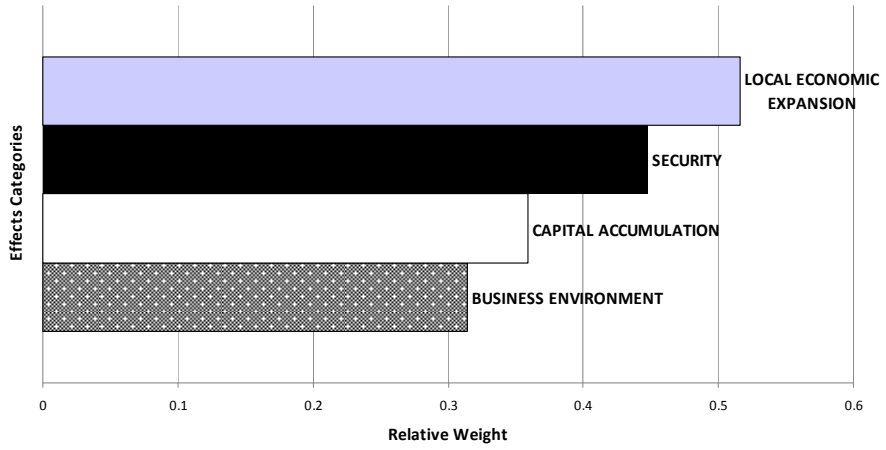
This section presents the analysis of what FGD participants said are the most important community outcomes of M-PESA, triangulated with information gathered from key informant interviews, market watch surveys, observations and case studies.

We define "effects" for this study as changes (either positive or negative) accruing to M-PESA users and non-users in the community that are attributable as direct and spillover effects of M-PESA.[27]

A. MAJOR COMMUNITY EFFECTS OF M-PESA

At the end of this research, 44 effects of M-PESA were identified through FGDs, and confirmed through key informant interviews, case studies and market watch surveys. The effects fell into four categories of community-level effects: local economic expansion, security, capital accumulation and business environment (see Figure 1 below).

Figure 1: Ranking of the Categories of M-PESA's Effects on Communities



We formulated each of the above four overarching categories from 11 components identified at the community level (Figure 2). As an example, under Social Capital Accumulation, communities identified M-PESA's effect on their communities as "weakening social bonds," "strengthening social bonds," "increasing men's drinking" and "increasing social interaction." Once those were ranked and added together under Capital Accumulation, participants identified human, financial and social capital. And under Social Capital Accumulation, they were weighted to

[27] The idea of outcomes was often quite challenging for participants to grasp, and a common response was to begin listing attributes of M-PESA instead of impacts. For example, someone might say that M-PESA saves time. The researchers would then probe for why this was important and what it meant for the community.

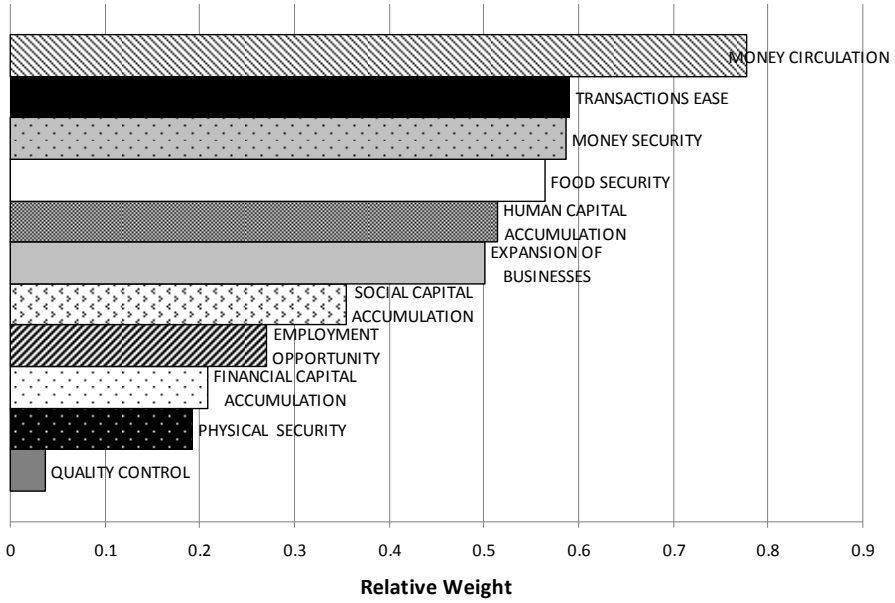
give an overall impression of their importance in relation to other effects. Figure 2 shows the ranked order of effects and their relative weight. It is at the sub-levels of these community effects that M-PESA's role in supporting inclusive and efficient financial services for users and spillover effects on non-users, especially the poor, is illuminated.

The sub-effects in order of importance as ranked by the participants:

1. Money circulation—(local economic expansion)
2. Transactions ease—(business environment)
3. Money security—(security)
4. Food security—(security)
5. Human capital accumulation—(capital accumulation)
6. Expansion of businesses—(local economic expansion)
7. Social capital accumulation—(capital accumulation)
8. Employment opportunities—(Local economic expansion)
9. Financial capital accumulation—(capital accumulation)
10. Physical security—(security)
11. Quality control—(business environment)

The relative weight of the rankings is shown in Figure 2 below.

Figure 2: Weighted Ranking of the 11 Sub-Effects of M-PESA on Communities



A brief summary of each sub-effect is detailed below, showing how they contribute to overall effect. A more comprehensive discussion of M-PESA's effect on food security follows.

B. COMPONENTS OF M-PESA EFFECTS

1. LOCAL ECONOMIC EXPANSION

Participants in FGDs noted an increase in local economic activity in their communities. They identified money circulation, expansion of businesses, and greater employment opportunities as the central effects of local economic expansion.

a. **<u>Money circulation</u> was the most highly ranked of all the effects. It was consistently identified as having the most important outcome**

on communities due to a faster flow of money within the community to boost local consumption and a greater volume of money flow. The perceived importance of money circulation as a community effect varies by gender. Men viewed money circulation as the most important impact of M-PESA on communities. Women ranked it No. 3, and closely linked it with transactions ease and money security.

A woman (FG 22) says increased money circulation "has led to business expansion due to higher profit income from the business and many people having cash, [therefore] business people have expanded their business."

An M-PESA shop owner in Kitui: Retail shops are moving into the areas where he puts his shops and the shops near his outlets have seen a rise in business. He claims if his M-PESA shop does not have money on market day, many people and vendors cannot purchase/sell their goods because so many customers and vendors come to the market with money stored on their M-PESA accounts for safe keeping, but then need the cash in order to conduct their business.

The increase of money volume and velocity on the community was wide-ranging. FGD participants, key informants and many M-PESA agents said they noticed more cash in the community due to more money flowing via remittances into rural areas, and that this gives a general boost to local economies. The increased speed of money transactions appeared to put cash in communities' pockets when they most needed it. The higher and faster circulation in turn positively affected expansion of businesses, food security and human capital accumulation (e.g., more people were able to pay school fees on time).[28]

Moreover, many M-PESA users talked about receiving "rescue money" if they run out and get stranded somewhere or if they need more cash to purchase something in the market. They could text friends and relatives and quickly receive the money they needed. FGD participants mentioned that the ease of sending rescue money to friends in need has strengthened friendships and increased social interaction.

b. **Expansion of businesses ranked No. 6 for M-PESA's impact on communities.** FGD participants spoke mainly of existing business expansion, rather than more businesses opening in the community, although many mentioned the increase of small, informal businesses such as vegetable sellers and the women who make foodstuffs for sale (e.g., *mandazi*, *samosa*). Community outcomes of M-PESA use on the expansion of businesses included more goods and services available in the marketplace, more competition among businesses, more options in the marketplace for consumers and lower transaction costs for getting goods or services locally.

In Murang'a, a managing director of an M-PESA outlet said he has seen an expansion of businesses due to M-PESA, namely fish buyers and a woman who buys cakes and sweets using M-PESA and sells them to area hotels. In Kitui, an M-PESA subagent said in the small, but booming shopping center where she operates, she has seen more meat vendors and more bars where people can use money obtained through M-PESA. Additionally, an employee of a major financial institution noted that banks and other financial institutions have M-PESA windows because they need to "innovate or die." They use M-PESA in their main halls to increase foot traffic so that more people become familiar with them and their services. It provides an opportunity for cross-selling.

c. **Employment opportunities were mostly referenced in direct relationship to the M-PESA kiosks, not with expansion of local businesses above.** Generally, the M-PESA outlets in our study hired one to three employees. Communities' enthusiasm for the relatively insignificant

[28] Speed refers to the pace with which money arrives in the community after being requested. The increase in volume refers to an increase in the amount of money in the community. But the speed with which money moves within the community may be the same as before M-PESA.

rise in employment speaks to the level of unemployment in some of these areas; even one position is believed to positively impact the community. For instance, the manager of a Matatu SACCO added that more than 100 people applied for two new positions at its M-PESA shop.[29]

In Murang'a, an M-PESA shop owner said he has been able to expand from three to 22 shops, hiring many people, and creating new jobs in his community. In Murang'a there are many M-PESA shops, and he said all provide employment opportunities.

One other area of employment referenced primarily in rural areas, was the ability to hire more labor at the time it was most needed. Particularly in Kitui District, where land is not arable and rains are less predictable, more and more people make their livings from casual labor for at least part of the year. The effect of expansion of the local labor market due to availability of money on time that is facilitated by M-PESA affects both users and non-users of M-PESA in the community.

2. SECURITY

Focus group participants identified three categories of security: physical, money and food security. Gender differences were notable in both physical security and money security.

a. **Only men identified physical security as an important effect of M-PESA.** Men in Kibera in particular were especially focused on this impact, as several focus group participants had been mugged in the past (as had one of our research assistants from Kibera). Women across the three research areas never mentioned physical security as an effect or a concern. It is possible that women are less likely to be in situations that are conducive to mugging (e.g., alone, out at night, carrying cash). However, while women may not fear for their physical safety, they and men were concerned about pickpocketing. The director of an organization in Kibera mentioned that pickpocketing has generally decreased in Kibera since M-PESA's arrival. He knew of businesswomen in the slums who keep separate SIM cards outside of their phones for M-PESA use, so that if their phone is stolen, they cannot be forced to give the thief their Personal Identification Number (PIN) (which would allow the thief access to funds).[30]

"Some of our people are employed by the (M-PESA) agents. Before M-PESA came some shop owners were just selling Safaricom scratch cards and phone accessories, but with the introduction of M-PESA they have had to employ one more person to deal with M-PESA." – FG29, Women's Group, Murang'a.

Though women did not identify physical security as a community outcome of M-PESA, they would also benefit from increased physical security and a lower crime rate.

A common theme was improved safety due to M-PESA because thieves have learned that few people now carry large amounts of cash. Many said this has led to a better quality of life in the community: Physical security not only affects individual members of the community, but also creates a better business environment in which all community members can prosper.

[29] A Matatu is a privately owned bus or minivan. The Matatu SACCO (Saving and Credit Cooperative Organization) is a credit union where membership is only open to Matatu owners.

[30] IRIS staff attempted to gather information on crime statistics from a local police post in Nairobi and then from a larger divisional office. In both cases, no one would speak on the record about whether they thought M-PESA had any effect on crime rates, although the divisional office would say that crime rates were down, but pointed out that rates fluctuate. Neither office said they had heard of thieves forcing someone to withdraw money from his or her M-PESA account.

Concern about physical security was not mentioned in FGDs alone. For example, the manager of an MFI branch in Kibera believed that use of M-PESA has reduced theft from members. Although the MFI does not function as an M-PESA agent, he noted that M-PESA shops have been installed near many of its branches and are widely used by its members to transfer loans into e-money. Previously, he heard of members being robbed of their loans, but said now the "cases are not there." The last time he heard of a branch member being robbed was in February 2009.

"Crime has reduced and people have gone into business because now they are not afraid of thugs." – FG10, Men's Group, Kibera.

"It has provided security because now thugs cannot access your money even if they steal your phone." – FG2, Men's Group, Kibera

b. **<u>Men and women saw money security</u> as an important outcome of M-PESA in communities, but women saw it as a more central effect than men.** Women commented often on M-PESA's ability to keep money safely stored on a cell phone, because it kept them safe from pickpockets, but even more importantly from their husbands. Women in all three study areas complained that when they had cash in pocket, their husbands (and sometimes other family members as well) would take their money. With M-PESA, women could either claim they did not have any money or could refuse to turn it over.

The ability to keep such transactions private was especially important to women and many female participants claimed M-PESA was the main way to keep their money secure. They said that privacy is important both for their ability to store money, and in controlling how, what and when the money would be spent. Many women also said they were not worried about thieves or thugs taking their money, while male participants voiced this concern.

"No one is aware when you have cash. It is only between receiver and sender." - FG10, Men's Group Kibera

"You don't attract attention when you have a problem. Now you can solve your financial problems secretly." FG21, Women's Group Murang'a

Money security was seen as not only affecting individual community members, but also as greatly benefiting local businesses. One example is a Matatu SACCO in Murang'a opening an M-PESA window. M-PESA is considered a competitor to Matatus; before M-PESA's launch, people sent money in envelopes on these minibuses to people in other towns. The manager said anytime there was an accident or some other mishap, drivers worried about the money being stolen, their safety being compromised, and reimbursing lost funds. Now drivers and owners prefer M-PESA because they say it has increased the drivers' sense of security and reduced theft, and actually increased their business.

One M-PESA shopworker in Kibera mentioned that small business owners and street vendors would often come to his store at the end of their business day in order to deposit part or all of their day's earnings so that they would not have to worry about carrying large sums of money home, thereby taking advantage of the security offered by easy cash-digital conversion. FGD participants, moreover, commented on the freedom of movement that they and their communities now experienced because of the easy cash-digital conversion. Many felt this freedom resulted in a more robust marketplace. Several vendors supported these sentiments.

c. **<u>Food security</u> was perhaps the most intriguing and interconnected effect of M-PESA to be identified by FGD participants in their communities**. Many participants noted that agricultural productivity has gone up — even in areas experiencing drought — because M-PESA enabled the fast transfer of capital when it was most needed. In instances of a farmer running out of seed or a family needing to hire casual labor, M-PESA facilitated the fast and safe transfer of funds to deal with expenses. Moreover, FGD participants also said that because M-PESA saved people time and money in transaction costs (e.g., transport to town, waiting in line at the bank), there were more time and resources available for farming.

"If I call, my son will send money immediately to purchase seed in case I finish seeds and am not through with planting. It's really promoting agricultural productivity." – FG8, Men's Group, Kitui

While many of these outcomes were at individual levels, there were also notable effects for the community, such as more agricultural inputs available in the markets because of increased productivity, more jobs available for casual labor and in a timely fashion, and more local buyers to then pay good prices for goods and services. Given the importance of food security in Kenya and the complex ways in which it occurs due to M-PESA, we discuss this effect in more detail in Section IV.

3. CAPITAL ACCUMULATION

Within capital accumulation, focus group participants identified three sub-effects: human, social and financial. Participants in all study areas found human capital accumulation to be a central community effect of M-PESA. There was less consensus in focus groups around social and financial capital than on human capital accumulation**.**

a. **<u>Human capital accumulation</u> ranked highly (number 5) overall as a community outcome of M-PESA.** Focus group participants frequently cited M-PESA as a means for helping them to pay school fees and get money for medical procedures. This appeared to help in school attendance and retention, and to seek medical consultation faster than they would have otherwise. Timely payment could also strengthen hospitals and schools, creating a more positive future for school and medical facilities and the potential for deeper outreach over time.

Subsequent interviews with school principals and health-care providers, however, indicated that while M-PESA users may withdraw money from their accounts (or have someone send money to their account), in most cases they must still withdraw the money in cash and then pay the health center or deposit the money into the school's bank account. In some instances, a principal or bursar who knew the parents well might allow them to send a child's school fees to his personal phone. But many principals said they actively discouraged this practice because of a lack of accountability and tracking ability. Thus, while study participants identified M-PESA as helping manage school fees and hospital bills, the utility was not usually a direct transaction between the M-PESA user and the school or clinic.

b. **<u>Social capital accumulation</u> was frequently mentioned in focus groups, but participants were split over whether the outcomes of M-PESA were primarily positive or negative for their communities**. For example, some participants said it strengthened social bonds by enabling people to be able to send money to each other when in need. Others commented that it weakened social bonds because now people had less need to return to the rural areas – they just send money to relatives there. Other FGD participants said men drank more with M-PESA because they could get money around the clock, but one woman said her husband drank less because he was less likely to spend the money on his phone than

in his pocket. When probed how M-PESA caused these outcomes, participants generally were vague.

A nurse at a local clinic in Kitui was able to use M-PESA to pay for a surgery she had in Nairobi since she could save for it on her M-PESA account. Additionally, while many clinics do not take direct M-PESA payments, many doctors, nurses and administrators felt that people were better able to get money quickly with M-PESA to pay for lab tests and treatments.

"If the kids keep coming home from school for money, it makes them lose interest in education and start engaging in unhealthy behavior like drug and substance abuse, [and] prostitution, among others." – FG5, Women's Group, Kibera

As discussed earlier, many FGD participants talked about receiving "rescue money" if they get stranded somewhere or if they need more money to purchase something in the market: They text friends and relatives and quickly receive that money. They said the ease of sending and receiving rescue money has strengthened friendships and increased social interaction.

c. **<u>Financial capital accumulation</u> ranked highly among the urban Kibera participants, who tended to focus on M-PESA's outcome on business and the business environment and its use in managing and accumulating small amounts of money.** One woman FGD participant said that it encourages a culture of savings: She and her friends are able to save more, and they value savings more. An M-PESA shop employee in Kibera said she has customers who get paid every day and come in to deposit 100 to 200 shillings (U.S. $1.33-2.67) per day rather than spend it. But then, she said, many withdraw the total amount at the end of the week.

Neither rural community in our study identified M-PESA as helping in financial capital accumulation per se, although there were discussions on whether M-PESA improved spending habits. Some participants said storing money on the phone makes them less likely to spend it. Others argued that money stored on the phone doesn't feel like "real" money, so it is easier to spend carelessly.

4. BUSINESS ENVIRONMENT

Within the business environment, two categories of outcomes were identified: transaction ease and quality control.

"Those who are living away from their families are taking longer before seeing their families."– FG25, Women's Group, Kibera

"People can help each other much faster, and this has encouraged friendship." – FG38, Women's Group, Murang'a

a. **<u>Transaction ease</u> was ranked as the second most notable effect of M-PESA.** This is not surprising, since M-PESA reduces the overall transaction cost of moving capital along a network and increases the flow of capital. While the amount of money M-PESA moves is relatively small among formal financial systems in Kenya, the number of transactions and volume of flow is increasing and covers larger segments of Kenya's population in terms of income, age and depth and breadth of access (Jack and Suri, 2009). This is good for the community because it has the potential to extend financial participation among community members.

"Easy access to money means easy access to basic needs." – FG41, Men's Group, Kibera

"Before M-PESA, I used to spend a lot for transport to acquire cash from town." – FG27, Men's Group, Kitui

"People used to travel to the rural areas to take money, but now it is easier to send and you save days which you can use to do more work and get more money." – FG25, Women's Group, Kibera

During key informant interviews, several MFI managers stated that credit and savings group members are using M-PESA to send their contribution when they are unable to attend meetings in person. This is seen as a positive effect, because no one has to waste time trying to get the contribution from the missing member. By encouraging on-time payment, M-PESA facilitates ongoing group lending. One manager stated some groups are even requiring members to send their contribution prior to the meeting, so that time does not have to be spent on financial collection. However, some participants expressed concerns that absenteeism may undermine the group cohesion and peer monitoring that are central to group-based programs. One of the MFIs interviewed banned direct loan repayment via M-PESA, because it does not want to disturb the group setting, which it views as an important component to the loan program to apply peer pressure on clients.

b. **<u>Quality control</u> was only mentioned as an outcome of M-PESA in women's FGDs in Kitui District. Women business owners said that while M-PESA saved them money by allowing them to send payments directly to their suppliers instead of traveling to Nairobi or another city, it also reduced their control of the quality of goods delivered.**

After being paid, suppliers put the goods on the next bus, and the business owners retrieved them from the bus station. On two occasions, women from Kitui District complained that because they had to rely on the supplier choosing the products for them, the quality of the products they received fell. This becomes a particular problem when transactions are not secured through formal contracts, and goods—especially perishable ones—cannot be returned to get the money back. However, it is likely that the demand for quality could prompt more formalized standards and higher quality control measures in the future. Quality might no longer be defined by "sight," but could entail a set of standards to ensure that vendors and business owners are getting acceptable quality goods. In this case, the current seemingly negative outcome of M-PESA use may in fact drive positive change. Thus, while presently quality control can be difficult when the suppliers select the goods, it also opens the possibility (and need) for more formalized standards.

"Quality control in business is low now. One can order for goods and be sent low quality of goods since you are not there." – FG31, Women's Group, Kitui

One effect that deserves a more in-depth discussion is food security because it has implications for how M-PESA can impact human development initiatives.

IV. M-PESA'S ROLE IN FOOD SECURITY

Recent food shortages in developing countries have highlighted the urgent need to develop sustainable solutions to ensure food security. An estimated 3.8 million Kenyans are highly or extremely food-insecure (USAID, 2009). According to the latest Global Hunger Index (GHI) more Kenyans are in need of emergency food aid today than 20 years ago, and Kenya has moved from a "serious" to "alarming" ranking on the GHI (von Grebmer, 2009). Most Kenyans facing food shortages are based in rural areas and in slums (Gachiri, 2009; Kinyua, 2004)[31]. Additionally, of Kenya's 576, 000 square kilometers of land mass, only about 16 percent has medium or high agricultural potential (Kinyua, 2004). Typical causes of Kenya's food insecurity are low agricultural productivity (often attributed to low/sporadic rains), inadequate access to capital and land, inadequate infrastructure and high population pressure, along with the current global economic crisis (Kinyua, 2004; Ngumbi, 2008).

For the purposes of our study, we define food security as "when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life" (FAO 2003). This definition is particularly useful, given its implicit emphasis on access and consumption and production of food.

Recall that in the discussion above, food security was ranked by FGD participants as the fourth most important outcome of M-PESA. The top three effects (money circulation, transaction ease and security of money) were expected findings and mirror M-PESA's marketing campaign: fast, safe, easy and affordable. While important in their own right, these effects together tend to produce, through direct and ripple effects, an environment that can foster improved food security for the wider community—a priority for human development initiatives. M-PESA's attributes facilitate quick, easy and safe money transfers, that at the household level, could help families with farming needs to pay for inputs. At the community level, M-PESA's outcomes are interwoven with both M-PESA user and non-user households. Since individual farmers who receive remittances through M-PESA can now pay for casual labor, there are more jobs in the community; since individual farmers who receive remittances through M-PESA can pay for seeds in a timely fashion, there is higher agricultural productivity, which in turn means more food moving through the markets. Additionally, because more money is circulating locally, and faster, many vendors order more food in advance and pay for it on time, facilitating higher agricultural productivity, food availability and variety. Local market expansion could then provide even more local employment. All of these elements could potentially lead to improved food security in the area.

LOCAL AGRICULTURAL PRODUCTIVITY

Participants said they were seeing a noticeable increase in agricultural productivity in their communities and often had experienced this increase themselves. Unlike money circulation, transaction ease and security of money, the link between agricultural productivity and food security is not straightforward. But it is highly likely that those three top effects produce an environment that can facilitate improved food security.

By increasing volume and velocity of money in communities, M-PESA appears to increase the likelihood of a farmer being able to pay for casual labor at the time it is most needed and plant more of their fields. FGD participants repeatedly mentioned the ability to get money fast to use for farm-related expenses. Many also expressed the sentiment that M-PESA has increased money circulation in the village.

[31] The Global Hunger Index is based on a 100-point scale. The closer to zero, the more food secure a country is seen to be.

"Nowadays it is hard to find somebody without cash in his pocket (phone)." - FG19, Men's Group, Kitui District.

"This season, seeds were not a problem. Somebody could send cash earlier and get to buy seeds immediately. Also, when in need one can request someone to cultivate or weed and get paid through M-PESA." - FG34, M-PESA non-user in Men's Group, Kitui

The ability to hire labor when it is most needed also creates outcomes at the community level, since a larger labor force and more available work benefit all.

A Murang'a subagent for M-PESA mentioned that many of her customers receive money quickly and plant early and fully. In the past, they might have missed the best quality seeds and/or might not have money in time to fully plant their fields. Another M-PESA agent from a medium-size market center 20 minutes outside of Kitui town chimed in that shopkeepers and business owners are using M-PESA to buy seeds from Kitui town and have the seeds delivered to their shops to sell. Increased availability of seeds in the shops benefits all community members, not just M-PESA users, because it makes such seeds available to everyone, so that everyone benefits individually as does the entire agricultural economy.

Through lowering transaction costs - lower transport costs, and saving time by not having to wait in lines or go to town to retrieve/send money (i.e., the elements of transaction costs) - FGD participants said that they had more time and money to spend on productive agricultural activities. Increased time has meant that farmers now spend more time in the fields and, according to many participants, this has enabled them to plant their fields more fully, hire more labor when needed most, and in a couple of cases, farmers and school principals mentioned it gives children more time in school because the household becomes less dependent on children's labor in the fields. Having more children in school also improves the financial situation of the schools that benefits the entire community.

Security of money appears to enable farmers to store small amounts of money for when they need it, which women in particular claimed helped on the farm. Women were pleased with M-PESA's ability to keep money transactions and cash storage private. Multiple times women in the FGDs remarked that when people know you have received money everyone comes calling. Additionally, women commented that with M-PESA their husbands were less likely to know how much or whether they were storing money and this enabled them to save more and to have more control over spending.

A tomato vendor from Katulani (in Kitui) added that he sees people go to the M-PESA shop first and then come to the retail shops to make purchases thus the increasing volume of business for the retail stores and benefiting users and non users alike. Moreover, he said M-PESA customers do not have to carry their money in cash form anymore; they are able to use their cell phones to store the cash safely until arriving at the market. He says that his business has doubled since the M-PESA shop moved into the shopping center leading to expansion of local economies. M-PESA, by impacting flows of capital, security of money, and transactions, seemingly tends to facilitate a conducive environment necessary for ensuring food security.

Study participants did not see the effect of M-PESA on food security uniformly. In general, rural women placed more weight on food security than rural men, while urban men placed more emphasis on food security than urban women (see Figure 4).

Women in Kibera, the slum, tended to focus on outcomes relating to business expansion and did not mention agricultural productivity in any of the FGDs. Kibera men, in contrast, focused more on food security. This could possibly be because they were more likely to be supporting families in the rural areas through remittances for farming or farming more land in the rural areas. This difference

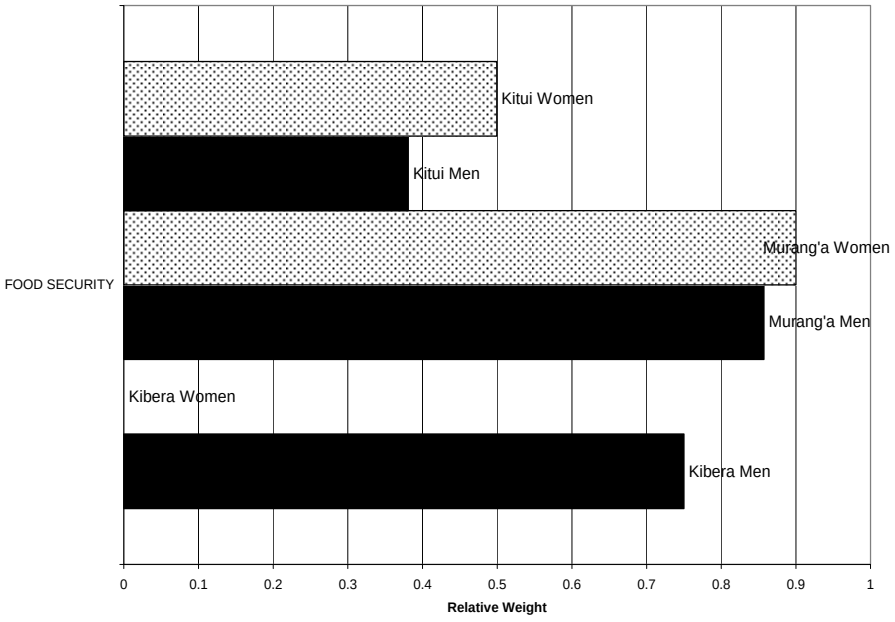
could be due to men having more ties to rural areas and planning to return there, while perhaps Kibera women are more likely to stay in the city or to move to their husbands' villages, where they have no personal ties.[32]

"Farming is the most important activity in our village. [Before M-PESA] we used to spend a whole day going to look for money from Murang'a for farming and sometimes days to go to Nairobi to pick money from our husbands for farming." - FG16, Women's Group, Murang'a District

"[With M-PESA] we were able to access money easily to purchase farm inputs and to pay anyone that we may be hiring. It has also given us enough time to spend in the farm because we do not need to travel to Murang'a or Nairobi or wait for many days to get money." - FG13, Men's Group, Murang'a District

Residents of Murang'a, a predominantly farming district, felt food security was a major community effect of M-PESA, but women participants weighted it slightly higher than men (see Figure 3 below). In Kitui, an arid area dependent on livestock and trading, women also rated M-PESA as having a more important effect on agricultural productivity than men. However, residents of Kitui generally ranked agricultural productivity as an effect of M-PESA lower than the more productive agricultural area (Murang'a). It may be that in Murang'a, the high rate of productivity enabled farmers to see more benefits clearly, while in Kitui mitigating factors (drought, food aid) may have suppressed the food security effect in agricultural productivity.

Figure 3: Gender and District Emphasis on Agricultural Productivity



[32] Patrilocality is still common among many of Kenya's ethnic groups, so that when a woman marries she relocates to her husband's residence or family homestead. Additionally, when one family member migrates to the city, it is most often the male head of household, while wives and children remain in the rural areas.

CONSUMERS' PURCHASING POWER IN THE LOCAL MARKETS

The majority of vendors surveyed claimed they have more customers now because people have more money at their disposal and are spending it locally instead of traveling to urban markets.[33] This improves money circulation within local economies. This echoes themes discussed in the focus group discussions as well.

Two owners of general stores in a small shopping center outside Murang'a found that their business has improved since an M-PESA shop opened in the area and people started receiving more money easily. They say more money is remaining in the area because people can now receive and spend their cash here instead of in Murang'a town.

"I have more customers than before because some [receiving] cash through M-PESA are buying more vegetables than before." - Vegetable seller, Kitui

"People use the money more where they withdraw." - Retail shop owner, Murang'a

FOOD AVAILABILITY AND VARIETY

M-PESA is perceived to lead to savings in transport costs for vendors, who then have more money to stock goods, and having a greater variety and volume of goods benefits the entire community. Many sellers outside of the urban centers said they now save in transport costs because they are able to send cash via M-PESA to their supplier, who then ships the items to them as needed.

Additionally, a larger customer base increases demand, so vendors reported buying larger and diverse quantities of stock. More stock means more food availability in the marketplace, again benefiting all community members—users and non-users of M-PESA. Additionally, FGD participants and other interviewees relayed that "there is no hunger now," referring to both the availability of food in the market place, but also their ability to buy it.

EFFECTS ON VENDORS IN THE LOCAL MARKETS

While shopkeepers from all areas of the study reported M-PESA affecting their businesses, rural shopkeepers were most vocal in their praise. Over 80 percent of the 58 market vendor survey respondents reported that they personally use M-PESA, and approximately 60 percent stated that they use it in some way for their business. Of that group of 35 respondents, 21 reported that they use M-PESA to purchase stock and have it delivered to them, rather than travel to pick it up. In many cases, the savings have allowed vendors to roll more money back into their stock for customers. The externality effects of these benefits accruing to users of M-PESA is seen in increased and diverse availability of food in the market (see discussions above).

Two separate owners of general stores in a small shopping center outside Murang'a claim to keep more stock of greater variety than previously in their stores.

Interestingly, none of the vendors interviewed reported that they previously sent money for goods via some other financial service provider, so this is an area where M-PESA is providing a new service rather than drawing customers away from another service provider.

In addition to using M-PESA for their own businesses, numerous shopkeepers and vendors reported that M-PESA has played a role in their business community and the wider community. This effect was most acutely visible to shopkeepers

[33] Or in Kibera's case (since it houses several urban markets), locals are spending more money close to home.

and vendors in the small shopping areas within our research area where an M-PESA location had opened in the past year.

"I am saving a lot because I am not using transport cost like before to buy and sell goats. [M-PESA has] increased financial security. I am not spending more, because after selling I deposit into my account. Also no one is aware when I have money." - Livestock Vendor, Kitui

Less than six months after an M-PESA shop opened in Kambirwa, outside of Murang'a town, all neighboring shopkeepers attested to its value to the area—even if they did not use it personally. All of the vendors said people now spent more money locally. In Katulani, a small town about a half-hour drive from Kitui town, market vendors said the new M-PESA location had changed how local residents receive and spend money. Although none of the vendors we spoke to were M-PESA customers, all believed that the new M-PESA shop had increased their business. The M-PESA shop employee in Katulani also reported that market days tend to be his busiest days. Self-reported shop data that we collected from the Katulani M-PESA shop is also consistent with this observation (see Haas, Plyler and Nagarajan, 2010).

The above findings clearly show the potential of M-PESA in ensuring food security in our study locations. Nonetheless, more research is needed to map the channels through which M-PESA affects food security, and identify factors that may facilitate achieving food security through M-PESA.

In an attempt to address this gap, we discuss in the next section a recent innovative initiative that uses M-PESA to deliver clean water. It is making inroads in rural communities that can potentially contribute to food security at that community level. While this is not within our study areas above, the project began operation in our study district, Kitui, in September 2009. We intend to study this in more detail during the next stage of our research.

V. WATER SECURITY: COROLLARY TO FOOD SECURITY IN KENYA

Recent studies caution that many countries will become severely food-insecure in coming decades due to competition over increasingly limited water resources. This has raised awareness of the pivotal role that water plays in food security, and the realization that improving access to water may become exceedingly difficult, especially for agriculture purposes. Water shortages threaten to reduce global food supply by more than 10 percent in the next 25 years (USAID 2007). There is now an urgent need to increase water sources and to produce more "crop per drop" so as to develop more sustainable livelihoods per unit of water to improve food security.

Image 4: Collection of Water from M-PESA Point

Source: IRIS Center

Kitui, our study district that is a semi-arid region in Kenya, over the last year alone has been severely affected by poor rain, an outbreak of waterborne disease, significant shortfalls in maize production and breaks in the food aid pipelines. Kitui's current food production is 6,661 metric tons, with food demand reaching 82,839 metric tons (USAID, 2009). Moreover, water shortage has become acute for both drinking and irrigation purposes, with the average distance to the nearest water source 5 kilometers away (ibid).

Katitika, a small, dusty village in Central Kitui where even cacti struggle to survive in the dry season, is a 45-minute drive over rutted dirt roads from Kitui town. Katitika has the distinction of being the home of a new water point, nicknamed *maji ya compiuta* (literally, computer water). Now villagers from Katitika have access to a close and clean source of water, using M-PESA's bill-pay function.

The Katitika Water Project (KWP) was initiated on Sept. 4, 2009, as a collaborative project between Safaricom and Grundfos (a worldwide pump manufacturer) in Katitika, Kitui District.[34] Grundfos decided to provide services in this region due in part to M-PESA's ability to help collect timely payments. The KWP uses M-PESA's bill-pay function to allow rural communities to access safe water from an automated water system. Communities could access a safe, steady and convenient water supply by depositing money from their personal M-PESA accounts onto key bobs, which are then inserted into the water system to release water.[35] The project is perceived to become a valuable asset to the community that it will fully own in three to four years, according to projected demand (see Figure 4 for details).

M-PESA's Bill Pay Utility
Registered M-PESA customers can pay their Safaricom Advantage (Postpay) statement and bills for services received from M-PESA partners (currently 65 partners onboard) right from their mobile phone, using the bill pay function.

To Add Money to Katitika Water Project Key Bob:

- Select Pay Bill from the M-PESA menu on mobile phone
- Enter 'business number' of the Katitika Water Project
- Enter the 'account number' of the key bob you wish to add money to (each individual user has their own account)
- Enter the amount you wish to pay (between 100 – 35,000 KSH)
- Enter your M-PESA PIN
- Confirm details and press OK*

(*You automatically pay a 15 KSH transfer fee which is subtracted from your M-PESA account.)

The key bob must then be inserted into a slot on the back of the water pump and the transferred money will then upload onto the key bob. At the front of the pump there is another slot and when inserted (see Image 4) water is disbursed.

Image 5: Bill Pay for Water Project

Source: Iris Center

[34] The KWP project is the third of its kind following the first is in Matuu in Machakos District that was initiated around June of 2009. See http://www.grundfos.com/web/homeke.nsf

[35] Key bobs look like small round key chains (see picture) that contain account information and are inserted into the machine to get water and also to update credit that has been sent via M-PESA.

It is important to note that M-PESA itself is not creating community effects, but is facilitating an environment that can produce (and multiply) ample outcomes at the community level. M-PESA has the potential to facilitate community effects through its easy, quick and secure transfer of money through "water money" remittances and bill pay facility. These features have attracted a private company, Grundfos, to expand into an area where it previously hesitated to go because of the lack of transparency and issues with timely repayment of its investment loans. It is a two-step process: M-PESA attracts private companies into these areas to set up the water supply. Then once the water is present, community effects could occur because of the water itself.

Image 6: M-PESA's Key Bob

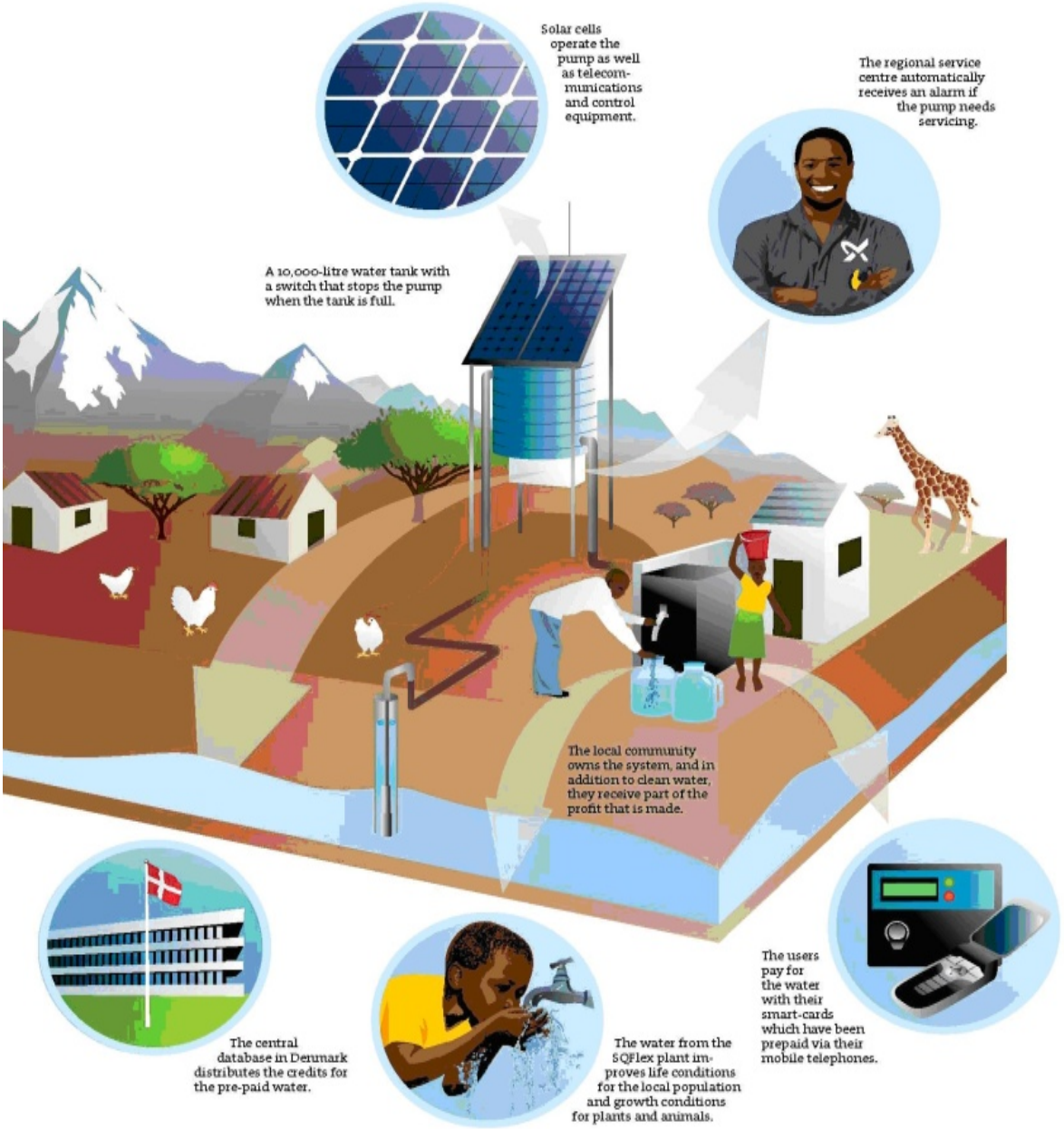
Source: IRIS Center

The externality effects of M-PESA are likely to be in providing a mechanism for good governance (i.e., transparency, on-time payment) that can reduce fraud and increase financial sustainability of water projects, compared to those that are currently in use (e.g., Wikililye Water Project in Kitui[36]), and thus help ensure water security. For example, many traditional water projects such as the Wikililye Water Project (WWP) need an attendant to collect the fees and dispense the water. In many cases this has limited the hours and access to water, as well as produced cases of fraud in which an attendant under-reports fees for water or charges extra for community members to gain access. M-PESA offers a solution to these governance issues for the community and for the owner of the water supply.

M-PESA also encourages private companies like Grundfos to invest in communities' water supply because water remittances can make water profitable. Increased volume and velocity of money enable more people to access and register for key bobs and smoothes consumption of water resources. Companies need assurance that they can reach scale through paying customers. Water remittances have made sure an adequate supply of capital (that can be obtained quickly) is in the community. Twelve of the 22 community members who we spoke to received water remittances, usually from a family member in urban locations.

[36] The project, started in 2007, is a community-run, fee-based water system. It serves approximately 1,100 people. A local NGO in Kitui supplies water through bore holes in four or five villages, manned eight to 10 hours a day.

Figure 4: Depiction of Maji ya Compiuta (Computer Water)



Source: Grundfos, Gmagazine, Feb 2009

Some community members were initially skeptical of the proposal from M-PESA and Grundfos. In the past, a hand-pump system had only worked for a month and a half. All of the kitchen gardens and tree nurseries that they had planted quickly shriveled and died. With innovations in service, early users of the water point benefited from signing up at the beginning because access to water became easier—they even sold the water to non-users at a profit. The water committee has been purposely building demand by withholding from the non-believers for a period of time (i.e., period between sign-up time and distribution of key bob) to

show how much users are benefiting. With many people using the M-PESA-aided water service and seeing the effects, more people have signed up for the service. According to the water committee, about 140 people have key bobs and another 50-100 have registered and are waiting for their key bobs. This could lead to the project becoming a communitywide service, improving project ownership and reducing free rider effects. Our preliminary inquiry shows three possible primary effects due to the water project: increased business expansion, agricultural productivity/food security and health (leading to human capital accumulation).

BUSINESS EXPANSION

There appear to be potential for improved local job opportunities. Our initial inquiry showed that, in Katitika, very few villagers can afford a rain catchment system. Before KWP, villagers had to go to Tiva River, an hour and a half away by foot. The KWP has brought a close and ample supply of water, which according to the KWP committee has yet to reach its maximum capacity in utilization. It is perceived to provide a cheap and consistent source of clean water for the community. By using M-PESA to quickly and conveniently purchase water, villagers reported saving time, which enables them to start up water-dependent businesses, such as brick making, dairy farms, kitchen gardens or tree nurseries. This has potential to create local jobs. Moreover, water committee members all said they spend their spare time in farming activities. A men's group has started terracing projects around the community, which also increases local job opportunities.

The good quality of the KWP water seems to attract people from other villages as well. As a result, the water committee now plans to start a bottled water business, and some villagers have already capitalized on the borehole's water quality by selling water in surrounding areas at 15 KES per jerrycan (12 KES more than what they pay at the pump). This can help the project to become profitable, allowing the community to more quickly repay the loan to Grundfos and own the project. [37]

One of the heavy users of the KWP (especially in the dry season) owns a retail shop, a bar/restaurant, flour grinding mill and dairy cattle. She uses 40 jerrycans of water per day, half of which goes to her dairy cattle. Before the KWP, she paid someone to bring the jerrycans from the river at 20 KES per jerrycan, totaling 800 KES per day. Now, she sends her house person with the ox cart to KWP and buys all of the dairy farm and household needs for 120 KES per day—a savings of 680 KES per day, for an average savings of 20,400 KES per month (equivalent of U.S. $272). She uses the money saved to expand her businesses. She is planning to buy more dairy cattle and is thinking of adding a salon to her business portfolio.

[37] According to Grundfos representatives, the Katitika Water Project has not reached a point where capacity cannot keep pace with demand. As part of Grundfos's standard procedure, sustainable borehole yield is assessed to match capacity and demand and they said none of their seven water projects have acceded capacity.

"Most of the time people are using [KWP] for their farms." - Male farmer, Katitika

"The farming hours have increased." - Female farmer, Katitika

"There are increased kitchen gardens almost in every household." - Female farmer, Katitika

"We have many vegetables within the village. We no longer import vegetables from [Kitui] town." - Male farmer, Katitika.

"[KWP has] increased the availability of vegetables in the market." - Male farmer, Katitika

"[KWP has] reduced the spread of diseases." - Male farmer, Katitika

"It has increased hygiene in the community." - Female farmer, Katitika

"The health of our children has improved. The health of the population has improved. We have been calling a physician to treat our children, but have stopped that now." - Male teacher, Katitika

"[Since KWP] I have not heard of typhoid." - Male shopkeeper and farmer, Katitika

AGRICULTURAL PRODUCTIVITY

In Katitika, many residents said that a main effect of the KWP was the availability of more fresh produce in the community, since many kitchen garden owners sell vegetables in the local market. Kitchen gardens and tree nurseries were previously rare in the community, due to the lack of rain and proximity to water sources. More recently, however, many of these agricultural ventures are springing up among Katitika residents who can use M-PESA to access the KWP for a close, timely and reliable water source: Eight kitchen gardens and 14 tree nurseries have been planted since the project began in September 2009. One resident said drought vegetables are the most expensive, so this is what they now grow. Increasing the supply of vegetables can help make them affordable for all community members.

HEALTH SINCE THE INTRODUCTION OF KWP

Since the KWP began, community members also said that the health of community members has improved.

Waterborne diseases are a constant concern for Kitui residents. According to Kitui District's October Drought Monitoring Bulletin (Office of the Prime Minister, 2009), 254 people were diagnosed with cholera, and three of them died in 2009. Residents of Katitika also indicated that overall nutrition, especially among children, has improved and this has meant more time in the fields or at school.

With people using the M-PESA-aided water service and seeing the benefits, the Katitika Water Project committee has now received more than 100 new applications for key bobs. This could lead not only to the project becoming a communitywide service, but also to cheaper costs of service if the water table can support higher demand. Indeed, a water committee member commented, "We can even go down to two shillings and still pay [our loan] and bring money into the community because the demand is there."

The project is at its early stages of operation. In our next stage of research in Kenya, we will explore the network externality effects of this project as it expands and compare them to traditional water projects using water attendants to clearly understand the community effect of M-PESA.[38]

[38] A network effect (also called network externality) is the effect that one user of a good or service has on the value of that product to other people. When a network effect is present, the value of a product or service increases as more people use it.

VI. SUMMARY, CONCLUSION AND NEXT STEPS

STUDY SUMMARY

This study is the first to explore the economic effects of M-PESA in Kenya at the community level. The study is being conducted in two stages. This report is based on the first stage of this study which was exploratory and not exhaustive in nature.

At this first stage we explored the following questions:

1. Are there indications of M-PESA's economic effect at the community level?
2. If so, what are the economic effects of M-PESA in a community?
3. What observable factors could potentially influence these community level effects?

From September to December 2009, IRIS staff members and locally-hired staff carried out fieldwork in Kenya. The study was conducted in three districts: Kibera and Murang'a in Central Province and Kitui in Eastern Province. The districts were chosen to represent Kenya's population, economic activities and M-PESA agent distribution as well as for logistical considerations.

Within each of the three sampled districts, we selected three locations in which to carry out the study. The selection was based on:

- Geography
- M-PESA agent clusters
- Urban or rural nature of the location

The goal was to get a mixture of rural and urban populations, so we selected two districts (Murang'a and Kitui) that have a large percentage of the population in rural areas and a significant town center, and one district (Kibera) comprised of an urban settlement in Nairobi. The M-PESA website only listed agent locations by province or city, not by district or other midsize divisions, which made it difficult to obtain agent information or directly factor agent locations into our strategy. Over 3,000 agents are located in Nairobi, over 1,000 agents reside in Central Province, and around 800 exist in Eastern and North Eastern provinces combined.

To address the study questions, we used a "deep-dive" methodology[39] with inductive methods to gather primarily qualitative information and a very limited amount of quantitative data. We used this information to explore the possible direct effects and externalities that can occur for a community due to M-PESA. The information was collected through:

- 12 semi-structured key informant interviews (KIIs) with financial service providers,
- 58 unstructured market watch surveys,
- 26 focus group discussions (FGDs) using an effects ranking tool and 215 mini-surveys using structured questionnaires with the participants of 22 of the above mentioned 26 FGDs.
- 7 case studies with agents
- Literature reviews were also carried out as a source of secondary data.

[39] Deep-dive methodology is a framework combining quantitative and qualitative methods to elicit in-depth information from the same subject. It can be considered as a series of data-gathering efforts from the same subject where we tailor queries (quantitative and qualitative) to gather in-depth insights to know how they behave and explain why they behave that way.

The multiple sources of information allowed us to triangulate the data to examine our study questions.

KEY FINDINGS

M-PESA's economic effects at the community level are now observable for both users and non-users of M-PESA, through direct effects and externalities,[40] respectively.

The four overarching economic effects at the community level are in the areas of local economic expansion, security, capital accumulation and business environment.

These four effects are composed of 11 community-level sub-effects, by order of importance, that illuminate M-PESA's potential role in supporting economic activities in the communities. These include the following (overarching effect in parentheses):

12. Money circulation—(local economic expansion)
13. Transactions ease—(business environment)
14. Money security—(security)
15. Food security—(security)
16. Human capital accumulation—(capital accumulation)
17. Expansion of businesses—(local economic expansion)
18. Social capital accumulation—(capital accumulation)
19. Employment opportunities—(Local economic expansion)
20. Financial capital accumulation—(capital accumulation)
21. Physical security—(security)
22. Quality control—(business environment)

Not all 11 sub-effects were visible in all of the study communities and among all of the population segments. Also, the effects were not always perceived as mutually exclusive, but as interwoven to produce overall community effects.

Overall, the highest-ranked effect by the focus group participants was increased money circulation, due to a greater volume of money flowing into and out of the communities and a faster flow of money within the community to boost local consumption. However, its importance varied by gender, with men considering it No. 1 and women ranking it No. 3.

Business expansion was noticed primarily in terms of growth of existing businesses rather than new business startups. Existing businesses were able to expand to meet growing local demand for goods and services, which was in part driven by increased money circulation through M-PESA and lower transactions costs for vendors using M-PESA to obtain their stock. This business expansion also tended to be related to food security elements identified in the communities in terms of increased volume and variety of food available and timely availability of agricultural inputs in local markets.

Increased employment opportunities were mostly referenced in direct relationship to the M-PESA's shops. Although the increase was relatively small, given the high level of unemployment in the areas, it was very noticeable to the community members. Also, in some cases, existing businesses expanded employment with the addition of M-PESA windows within their shops.

Men identified physical security, in terms of reduced mugging and thefts, as an effect of M-PESA. Women viewed improved money security—in terms of ability to accumulate cash and keep it secure from theft—as the most important type of security effect associated with M-PESA.

People in agrarian areas identified food security as a more important effect than those who live in urban areas. This was mentioned in terms of increased

[40] An externality is a positive or negative impact on a party not involved in a specified economic/social transaction or act; the effects that accrue to non-users of M-PESA due to others' use of M-PESA.

agricultural productivity, improved access to nutritious food and a variety of foods and better access to agricultural inputs on time. Interestingly, rural women placed more importance on food security than rural men, while urban men placed more importance on it compared to urban women. As mentioned above, increased money circulation and expansion of local markets are also related to the food security effect identified in the communities.

Men and women consider human capital accumulation—in terms of education and health—an important positive community-level effect associated with M-PESA. However, aggregate data from all three study districts showed no clear consensus on the direction of M-PESA's association in creating or nurturing social and financial capital in the community. Nonetheless, respondents in Kibera, a slum in Nairobi, identified M-PESA positively with financial capital accumulation since residents linked it to business expansion and a better business environment.

In addition to the 11 community sub-effects identified above, the IRIS staff also visited a pilot project that sought to expand M-PESA's utility. Shortly before the study began in September 2009, M-PESA partnered with a private company to provide clean water in one of our study districts. While the Katitika Water Project (KWP) in Kitui District is not located within the communities selected for the study, it is an important breakthrough in enhancing the functionality of M-PESA in directly addressing the basic human need for water in arid areas, and also community-level governance and project sustainability issues. We therefore visited the project to obtain an overview of it. The project uses a variation on M-PESA's "bill pay" function to allow rural communities to access safe water from an automated water system. Over time, the project is intended to become community-owned, providing residents with a valuable asset. Our initial interviews identified three primary community effects of the KWP. The first is higher agricultural productivity in terms of new kitchen gardens and tree nurseries. Second, local business expansion was seen in new water-based businesses such as brick making and in existing businesses such as dairy cattle farming. Third, community members spoke of improved health in terms of fewer waterborne diseases and increased ability to practice good hygiene.

CONCLUSIONS AND NEXT STEPS

The findings from our first stage of the study clearly suggest that M-PESA affects the economic outcomes of community members, both users and non-users of M-PESA, through direct and externality effects.

The community effects are observable in four major areas: (i) local economic expansion in terms of money circulation and local employment, (ii) physical, financial and food security, (iii) financial, human and social capital accumulation, and (iv) business environment in terms of transactions ease and quality control. The magnitudes of the effects at the community level are influenced by gender and geographic location of the communities. For example, people in rural areas ranked food security as a more important effect than those who live in urban areas. Food security was mentioned in terms of increased agricultural productivity, improved access to nutritious food and a variety of foods, and more timely access to agricultural inputs. Interestingly, rural women placed more importance on food security than rural men, while urban men placed more importance on it than urban women.

In particular, food and water security appear to be complex and interwoven with many other effects, such as transactions ease, and to have considerable multiplier effects, especially in rural economies. Therefore, we propose for our next stage of the study to examine in detail M-PESA's effects on food and water security. In these two complex areas, we intend to capture the flow mechanisms that facilitate obtaining the effects to clearly understand the role of M-PESA in affecting sustainable community-level outcomes. While our study is limited to the Kenyan context, we hope at the end of Stage II to draw generic lessons on agent-assisted mobile systems and how they can change and improve communitywide economic impacts in developing countries.

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ANNEX A: COMPOSITION OF EFFECTS RANKING FOCUS GROUPS

Annex Table 1: Composition of Kibera Effects Ranking Focus Groups

ID No. of Group	Male	Female	Total No. of Participants
FG2	9	0	9
FG4	10	0	10
FG5	0	9	9
FG6	9	0	9
FG10	9	0	9
FG25	0	10	10
FG41	0	12	12
FG44	0	12	12
Totals	**37**	**43**	**80**

Annex Table 2: Composition of Kitui Effects Ranking Focus Groups

ID No. of Group	Male	Female	Total No. of Participants
FG8	8	0	8
FG11	0	9	9
FG19	7	0	7
FG22	0	12	12
FG27	12	0	12
FG30	10	0	10
FG31	0	11	11
FG34	9	0	9
FG35	0	11	11
FG36	0	7	7
Totals	**46**	**50**	**96**

Annex Table 3: Composition of Murang'a Effects Ranking Focus Groups

ID No. of Group	Male	Female	Total No. of Participants
FG13	9	0	9
FG16	11	0	11
FG21	0	9	9
FG28	9	0	9
FG29	0	11	11
FG33	0	8	8
FG38	0	12	12
FG39	10	0	10
Totals	**40**	**40**	**79**

ANNEX B: CHARACTERISTICS OF FGD PARTICIPANTS

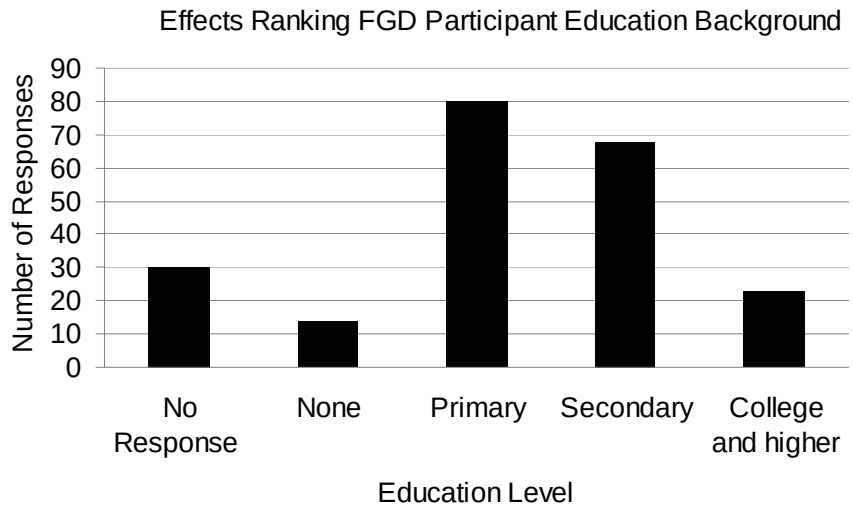
Basic information was collected from focus group participants to get a sense of how representative our sample was of the general Kenyan population. There were 215 respondents (3 FGDs did not fill out the surveys totaling 32 people, and 8 other FGD participants were not surveyed). Education, age range, and user status are listed in figures and tables below.

The highest percentage of focus group participants finished primary school, followed by secondary school attendees. A smaller percentage had not gone to school or had gone on to college or some other post-secondary education. In all cases, respondents were asked whether they had *completed* that level.

Annex Table 4: Education Level of FGD Participants

ducation Level	Number of Responses	Percent of Total
No Response	30	14
None	14	6
Primary	80	37
Secondary	68	32
College and higher	23	11
Total	215	100

Annex Figure 1: Education level of FGD Participants

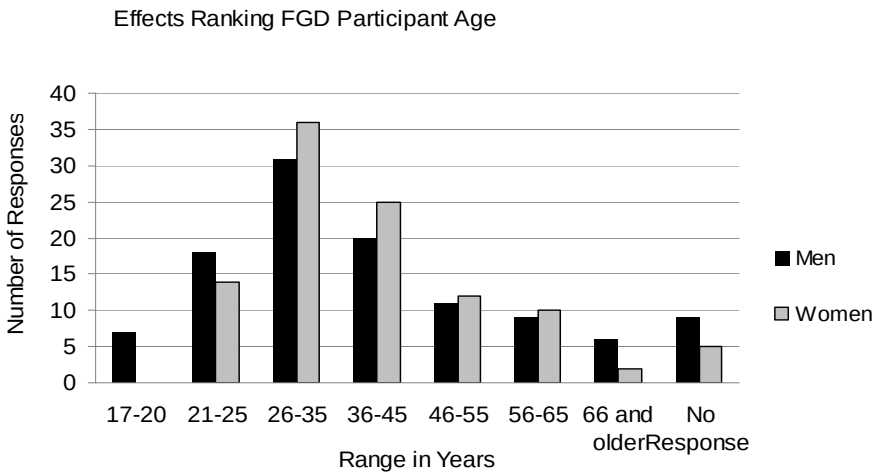


Men and women between the ages of 26-35 were the most highly represented among FGD participants. Women were underrepresented in the 66 and older and 17-20 categories.

Annex Table 5: Age Range of FGD Participants

Range in Years	Men	Women	Total	Percent of Total
17-20	7	0	7	3.3
21-25	18	14	32	14.9
26-35	31	36	67	31.2
36-45	20	25	45	20.9
46-55	11	12	23	10.7
56-65	9	10	19	8.8
66 and older	6	2	8	3.7
No Response	9	5	14	6.5
Total	111	104	215	100

Annex Figure 2: Age Range of FGD Participants



Women and men in our sample were roughly equal (71 percent of men, 75 percent of women) in whether they were M-PESA users.

Annex Table 6: M-PESA Use among FGD Participants, by Gender

	Men	Women	Total	Percent of Total
M-PESA User	70	87	157	73
Non User	23	25	48	22
No Response	6	4	10	5
Total	99	116	215	100

Annex Figure 3: M-PESA Use among FGD Participants