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***Mobile Phone Adoption and Use in Rural Kenya:
Preliminary Findings from a Village Census***



Hybrid Technologies Project Working Paper #1

by Laura L. Murphy, PhD

This is the first working paper from the research project: “Hybrid Technologies in the Era of HIV and AIDS: The Hoe and the Mobile Phone in Rural Africa” (Murphy, PI). Contact lmurphy2@tulane.edu for more information.

Photo captions

Left: Mango seller in Webuye town.

Right: Christine, Village Resident, Phone Owner, Bean Grower, and Widow and OVC Support Group Leader

Abstract

This working paper summarizes empirical findings from a 2007 comprehensive survey (census) of a village in Marakaru sub-Location, Bungoma District, Kenya. The project census is only one component of fieldwork in an ongoing study to document and appreciate how mobile phones are being used by rural men and women to make a living, organize their personal and communal lives, and deal with the reality of HIV/AIDS. In this rural area, phones are owned by 15% of households, are often the first and only telephone being used, and mobility is often a secondary feature. Voice is more useful and appreciated than text messaging. Rural households use phones for personal, community and work/farm-related activities, but the boundaries between strictly economic and non-economic activities are blurred since farm livelihoods involve multi-residence families and household labor to cultivate crops and raise income. Convenience and time-saving are top benefits to phone owners, and the high purchase and running costs the most common complaints. More users would like to own phones, but lack the cash to buy phones or pay for airtime. Common handsets (Nokia and Motorola), popular features (voice), benefits (convenience) and problems (cost, damage) are summarized for phone owners. Non-phone owners would generally like to have mobile phones, but lack cash. The working paper is considered preliminary because census data (household and individual-level data) are still being cleaned, integrated and analyzed. It is intended to share information about the study and findings with colleagues, research assistants and the study team (in the US and Kenya) to facilitate writing and analysis. Future working papers and articles will summarize findings from in-depth interviews, design issues, theoretical implications, and policy implications.

Author's Biosketch

The author, Laura Murphy, PhD, is Clinical Associate Professor in the Department of International Health and Development (with a joint appointment in the Stone Center for Latin American Studies) at Tulane University. She has worked on population, environment and development issues on three continents over two decades. After undergraduate training (BS Mechanical Engineering, Values, Technology, and Society) the author worked with the Indonesian Environmental Forum and other agencies out of Jakarta (1983-1988) and in Kenya (1988-1991) on rural development. She helped start www.populationenvironmentresearch.org (2000-2002). At Tulane University, she teaches Population-Environment, Development Theory, and other courses. Her current research focuses on the implications of the African HIV/AIDS epidemic for rural livelihoods, and the social shaping of technologies such as the mobile phone and kitchen gardens. Research has been funded by the John D. and Catherine T. MacArthur Foundation and the National Science Foundation.

Acknowledgements

This study was made possible through the collaboration of residents of the study site and the cooperation of staff of ACE-Africa (Bungoma). The 2007 fieldwork was funded by a grant from the National Science Foundation (NSF) Science and Society Program award (project number: SES 0621013, September 2006 – May 2008). The research project is entitled: "Hybrid Technologies in the Era of HIV and AIDS: The Hoe and the Mobile Phone in Rural Africa." Numerous residents of the study village provided encouragement to the study aims and their willingness to participate in study activities is appreciated. Thanks to the census/survey fieldwork team for data collection, entry, and cleaning, Peter Khaemba for facilitating and translating in-depth interviews, Billy Bramwell for assistance with group discussions. At Tulane, Crystal Watley conducted the comprehensive literature review on the global mobile phone industry, and Bibi Al-Ebrahim for help with data analysis. Thanks to BMM for digitizing the village sketch map.

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I. Introduction: Mobile Phones in the Developing World

Mobile phone use has expanded rapidly in Kenya and throughout sub-Saharan Africa (SSA), at a pace faster than elsewhere even in the developing world. Mobile phones outnumber conventional landlines 18 to 1, accounting for more than 90% of all connections (GSMA, 2007). With over seven million subscribers, mobiles penetrate 19% of the market. Networks reach throughout the country, even into rural areas where just a few years ago, signal gaps were common. Developed for businessmen and women of developed countries in the 1980s, the “mobile phone” has made its way into remote pastoral and agricultural communities in Africa in less than a decade. From urban origins in Nairobi, Johannesburg and Lagos, the cellphone has dispersed into rural areas. Farmers, herdsmen, widows, Lake Victoria fishermen, and boda-boda drivers (bicycle taxis) have joined the cellular world (BBC). Masai, draped in trademark red shukas (blankets), now pose for Safaricom advertisements.

According to most journalistic, industry, and academic accounts on mobile phones in the developing world, mobile phones are appreciated for their economic benefits, providing jobs, making money for businesses, creating new enterprises, and facilitating money transfers. (PANOS, 2004; Vodafone, 2005). New “public” community pay phones built around cellular signals and fixed wireless phones provide phone services and income to the operator; informal shops sell electricity from car batteries or power cord strips to charge handsets. Kiosk operators selling prepaid airtime minutes through low-denomination scratch cards, valued under a US\$1.00. Academic studies document the economic benefits of mobile-phone owning, while excessive taxation of handsets and airtime hampers industry growth and stifles competition, say other researchers (GSMA, 2007).

In the midst of continental enthusiasm for growth and job-creation, rural users are quietly going about their lives, and as it suits them, adopting, rejecting, adapting and altering phones for their particular concerns; but few researchers are paying rigorous attention to mobile phone adaptive usage in rural, agricultural settings. Academic, independent studies of mobile phones in rural settings exist for Jamaica (cite), and occasionally, Nokia or Safaricom market researchers foray into up-country market towns to discern customer preferences, identify new niches and test out their marketing strategies, keeping their results under wraps. Some applied research by development and technical assistance agencies (Grameen, Kiwanja.net) identifies technical and infrastructure barriers, and tests pilot projects – phone-based micro-finance, village phones, text-message, solar charging, hand crank phones are among the novel ideas, some of which are taking off (phone-based banking).

Yet, despite the vigor and dramatic pace of change: very little research has been undertaken in the public domain to document the reality of poor African users, to appreciate the diverse social and human developmental impacts of phones and their larger significance to users whose daily work involves tilling the soil with hand tools.

This working paper summarizes empirical findings from 2007 fieldwork in a large village in Luhyia (Bukusu-speaking) western Kenya, part of an ongoing study to explore and appreciate how mobile (cellular) phones are being used by rural men and women to make a living, organize their personal and communal lives, and deal with the reality of HIV/AIDS. (The fieldwork was conducted with the support of an NSF grant on the “Hybrid Technologies” project.) The village-level interviews constitute a larger case study of the social shaping of technology in an African village, in which phones and ICT and kitchen gardens are seen as the outgrowth of demographic, environmental, economic and political change, shaping livelihoods, poverty, human development outcomes, and the experience of the HIV/AIDS epidemic. Future data collection, it is hoped, will provide information about changes over time; meanwhile, the current data thus present a portrait of mobile phone uptake and use in 2007.

This paper aims simply to document recent findings from the project-led **census** of households, building insights from group discussions and observation. (In addition, 15 in-depth interviews with current mobile phone owners were completed in July 2007, but those will be addressed in the next working paper.) Specifically, the paper will

- reveal levels and recent trends in adoption of mobile phones in this rural setting,
- share survey data from a village on features used and perceived benefits,
- share insights from rural owners/users about problems and barriers to uptake.

Figure 2. Charles (with phone, Nokia) and Bill (the cow)



II. Study Site and Methodology

This study is an academic effort, not associated with any mobile phone company, government agency. It thus helps fill a glaring gap in studies of rural life in Africa (characterized by a dearth of research that is not related to specific development or health projects, social marketing campaigns, or commercial marketing ventures). A single village is mapped, studied, and appreciated in greater detail than is normally the case for research on “information and communication technologies.”

This study helps fill a gap in mobile phone research, which is generally population level survey research (lacking the information about the village, groups, history, etc. and the consequent rich detail and context), such as the Vodaphone survey (or LSMS, DHS and other standard surveys); judgment samples of individual users and interviews (i.e., lacking the breadth of a specific community context and/or comparison group of non-users/owners), as is true with much applied research; group discussions only (without the personal, idiosyncratic stories of individuals), the case for some market research; or anecdotal observations, true of some journalistic accounts which shape popular images of mobile phone usage.

This study, instead, combines different field data collection techniques (census, interviews, and observational data) and literature review, to comprise a case study of mobile phone use in a sub-Saharan African Village affected by HIV/AIDS and typical of the small, mixed-farming sector (Endnote 1). Fieldwork was conducted in a single large village in Bungoma District from late January 2007 through August by a team of trained Kenyan (Bukusu-speaking) enumerators, translators and field guides. Several techniques gathered information on mobile phones, which are linked to household survey data.

First, a census of the study site catchment area (a large village about 15 sq km.) gathered basic information on households, phone ownership, HIV/AIDS, livelihoods (income-earning activities), land, and assets for all households residing in the geographic area. The household survey instrument was pre-tested in January 2007 in Bungoma towns and rural areas (outside the study site) before being translated (Bukusu) and administered in the study site.

During the census (February-March 2007), individual interviews with an adult from each household gathered basic information on mobile phones: handsets, service providers, functions used, who they call, cash expenses on airtime and charging, perceived benefits, and problems (for current owners). Pretests and prior discussions with key informants revealed that mobile phones in rural households in western Kenya, while widely shared with other family members, neighbors and friends, are generally controlled by a primary owner. The phone does not belong to the family/household, but a specific person. Thus, the primary owner was specifically sought out in households that were identified

through the village census as having at least one household member who owns a phone. This sometimes required several call-backs, in the case where members work away much of the time. Related, parallel information about mobile phone “ever use” and perceived benefits and costs was gathered from an adult respondent for non-phone owning households.



Figure 3. Tulane team in the field (2005)

Secondly, group discussions (GD) were held with a group of male phone owners, and separately with female phone owners and users from the village itself (i.e., drawing from the census respondents). These provided insights into (mis)perceptions around mobile phone industry, service providers, and economics, as well as complementary information on problems and issues with handsets faced by rural users. The group discussions and survey responses helped formulate guidelines for individual in-depth interviews (IDI) of about an hour each with 15 villagers selected to represent different classes of phone owners/users (i.e., male, female, young, old, well-educated or not, HIV/AIDS-affected or not, and different livelihoods). These interviews, undertaken in July 2007 are still being analyzed so are not discussed in detail here. Furthermore, various trials were conducted of a daily diary of phone use with several of these individuals, but the phone use daily diary proved difficult to administer on a larger scale so provides only anecdotal evidence of use patterns and special issues in design of handsets, which will be discussed in another paper. A parallel survey of shops and services in local market towns of Mayanja, Chwele, and Bungoma documented numbers and types of kiosks and shops involved in airtime sales, charging, sales and repair services, as well as the range of costs for services as of mid-March 2007.

Figure 4: Tulane team in the field (2007)

Participant observation (PO) techniques include working with local residents using their own phones, and direct field experience by the PI/author in organizing the research team. This hands on experience provided invaluable depth of knowledge about issues mentioned by respondents in handset design, battery life, power and battery charging, topping up of airtime, using SIM cards, signal access, accessing Mpesa, and technical issues; as well as the rising visibility of phones, masts, and industry billboards.



Finally, the study covers topics beyond the mobile phone, and as such fieldwork included (1) in-depth interviews with village elders around the history of the village, (2) interviews with home-based care workers around HIV/AIDS care and treatment (Endnote 2), (3) conversations with outside key informants on current health and development projects and organizations, and (4) a village sketch map (Figure 5b), building on a 2005 participatory map (documenting features, landmarks, community centers, etc.). These empirical data from the village are also complemented by government planning reports, historical archives and colonial documents for the region, plus academic literature and news reports on mobile phone industry and rural ICT. The study is not complete: once the field data are sufficiently analyzed, selected key informants in the ICT industry will be interviewed to link village level findings with government and industry trends (i.e., Safaricom and Celtel, Nokia and Motorola; around market niches, regulatory barriers, technical trends).

In sum, the project census provides representative data on uptake and use of the technology for a village, and are summarized here. Other interview data provide greater depth of information around specific uses, significance and relevance of phones for rural life in 2007. These combined sources allow us to document (in this paper), analyze, and appreciate (in future papers and articles) how the mobile phone integrates into village lives, acknowledging the broader social and economic context of agriculture-based livelihoods, chronic poverty and AIDS, and poor infrastructure.

Study Site

The village, located in northern Bungoma District, lies on the boulder-strewn foothills (elevation 4000 feet) of Mt. Elgon. Settled since the early 1800s, the first Bukusu-speaking clans lived communally in fortified compounds to protect themselves from wild animals and Masai raiders.

Based on the project census, the current population is now over 5000 people in nearly 900 households, reflecting rapid and sustained population growth since world war II, due to high fertility (large families are still common) and more recently in-migration: 31% of households arrived in the village in the past 10 years. Land size is thus decreasing: farms average under 3 acres. Education levels are low: 68% of household heads no more than primary school education. Housing is simple mud and thatch for the majority of homesteads, and like most Kenyan villages, the site lacks electricity and paved roads.

Livelihoods are dominated by own-farm production of cash and food crops. Favorable rains provide two growing seasons supporting maize, beans, sweet potatoes, cassava, yams, tomatoes, kales, onions, and local green vegetables and fruits. Coffee, tobacco, and sunflower are principally cash crops. Cattle used to be more common, but herds are small now because (notes one informant in 2005) “when your child needs fees for secondary school, you part with that animal very fast.” Farming is complemented by wage work, the sale of home-made products, small businesses, trading, remittances, donations, and exchanges of labor or services and goods.

Figure 5 Study Site location in Kenya, Village Sketch Map (AT THE END)

Community facilities include three (overflowing) primary schools, three small markets comprised of simple kiosks, grain mills, and beer-halls. Water comes from one functioning borehole (built mid-1990s), seven public wells, seasonal springs and a small stream. Over 20 distinct community organizations exist: these are small, informal savings clubs, youth clubs, registered AIDS-oriented support groups, OVC and widow support groups, and a community development organization. No large non-governmental organizations (NGOs) have a significant presence in the village, but several national and international NGOs have managed projects which reach individuals and groups in the village.

The village lacks Kenya TelKom landline or community-managed wireless public phone (“simu ya jamii”). The nearest public phone (wireless simu ya jamii) is found in Mayanja, a one hour walk, and/or 20 Ksh bus fare. The nearest landline is in Chwele, a walk plus Ksh 40 fare round-trip.



Figure 6: Scene in the Village

The growing population faces a generalized HIV/AIDS epidemic. HIV arrived in the village in the 1990s, and by now HIV/AIDS is estimated to have affected about 20% of households counted in the census (see endnote 2). This is not a measure of current adult infections, a rate which is bound to be much lower, although we lack figures for the village. Instead, this figure represents local experiences of the epidemic, which are cumulative, multi-dimensional and concentrated (i.e. in households). It accounts for current known infections, chronic illness lasting over a month, patients on anti-retroviral therapy, AIDS-related deaths, and/or orphans. The orphan situation is perceived to be very serious. Locally as elsewhere, more female than male current infections are increasingly observed. Meanwhile, care and treatment options are minimal: the nearest health facility is seven kilometers away, a one-hour walk. Residents rely on lay home-based care workers, traditional birth attendants and herbalists/traditional healers, and community-based support groups.

III. Census Findings: Phone Ownership, Use and Problems in a Bukusu Village

Mobile Phone Ownership

A few years ago, only a handful of mobile phones were known in this agricultural community: a rapid assessment in 2005 listed 6 handsets known to local key informants, a figure which is approaching 200 now. By March 2007, according to project census data, these nearly 200 handsets are owned by 15% of village households (128 of the 842 who participated in the census). The first phone arrived in 2000. Over 70% of these owners procured their first handset within the last three years, and 32% (41 households) own more than one phone, with four handsets the maximum.

These owners are mostly male heads of household who is the primary user (owner) of the “first phone” for 78% of households. The spouse is owner in 18% of households and grown offspring in 7%. For the “most recently acquired” handsets, sons and daughters and other relatives make up 13% of owners, reflecting subtle shifts in ownership as phones diffuse from older to younger generations.

About here (BELOW) Table 1. Characteristics of phone-owning households

Mobile phone owners (MPO) in the village tend to differ from non-mobile phone owning households (non-MPO) (Table 1). MPO households tend to be better educated (35% have secondary or higher education) and wealthier. They own more land (median of 3 vs. 1.75 acres), better homes, more cows, and more producer assets (a higher percentage own an ox-plough, wheelbarrow, and chemical sprayer than non-MPO households). They own more consumer items, too: radios, lanterns, and improved stoves are more common among MPO households. They also include many more newer residents, with heads reporting a median of 16 years in the village. This does not mean they are substantially younger, however, as the median age is 35 years among MPO vs. 36 among non-MPO households.

Phone owners are slightly more likely to work as accountants, teachers, shopkeepers, carpenters, and traders: 21% of household heads regularly work away rather than on the farm (vs. 5% of non-MPO households). Livelihood activities such as buying & selling crops (89%) and running a business (43%) are disproportionately represented among MPO households. More often they have household members working away and sending remittances (24%) which are “important” or “very important” sources of income for 78% of these remittance-receiving households. In contrast, for non-MPO, casual work for daily wage (about Ksh 150 per day, or US\$2.00) or by selling locally produced charcoal, pottery, and sisal rope are more common.

Technologies: Handsets and Service Providers

Respondents were asked about the “first phone” the household acquired (which is sometimes the only one), as well as “the most recently acquired” (for those with two phones) and “other phones” (41 of 128 households have more than one). Respondents were then asked about the make, model, service provider and other details.

About here, Table 2. Mobile Phone Technology in the Village: Handsets and Service Providers

Nokia and Motorola are the leading handset makers in the village, each reported by 37% of respondents and account for 74% of all handsets. These market leaders are followed by Siemens (11%) and other brands (Sagem, Sony Ericson, Alcatel, Bird). “First” phones were more commonly Nokia (42% vs. 32% buying Motorola the first time). Motorola is evidently capturing more of the market.

The median purchase price was Ksh 3500 for newer handsets (bought since 200_). Purchase prices ranged from Ksh 1000 (which was clearly for used or secondhand handsets) to a high of Ksh 35,000 for a new model. Brand new phones are evidently getting easier to acquire as prices drop: 68% of “first phones” were purchased new, vs. 76% of newer phones. Used handsets make up 15% of “first” phones acquired and 11% of newer phones are used handsets. Cost is still perceived to be high (see Problems and discussion of costs of phone use, below), but in fact handset prices for this rural setting are low compared to the range of prices of new handsets in Nairobi or even Bungoma town.

Users tend to purchase a “SIM” card (SIM stands for Subscriber Information Module) from one or both of the major cellphone network providers for dedicated use in their own handset. Two main service providers in Kenya now are Safaricom (the current market leader) and the transnational Celtel (formerly KenCell). In 2005, the only signal reaching the village was Kenyan-owned KenCell, now owned by CelTel, reflected in 59% of service provider on “first phones”. In July 2005, the KenCell network signal did not reach the interior of the village, although it was the dominant provider for Western Kenya. (Also, Safaricom charged much more for voice calls from Safaricom to the competitor, Celtel and to TelKom landlines.) Only one respondent has a SIM card only, but no working handset. (Sometimes, according to in-depth interviews, users whose phone lacks battery power will borrow a friend’s handset and insert his/her own SIM card).

Figure 7. Cellphone Billboard & Masts in Rural Kenya



By 2007, with the erection of many cellphone signal towers (masts) across the country, both Safaricom and Celtel are accessible throughout the village, and 20% of “second phones” (i.e., acquired more recently, since 200X) are accompanied by dual SIM cards, one for each provider. Exclusive Celtel users make up only 44% of the newer phones. Generally, network coverage for both providers is good, and few geographic gaps in signal affect either provider (based on direct observation during survey

fieldwork). (Night-time, the networks reportedly suffer with heavier usage, according to some interview respondents, but this was not experienced during fieldwork.)

Note: In 2007, Telkom, Kenya's national phone service launched its own competing wireless cellphone based telephone service but this was not yet in use in the village.

Technologies: Functions and Features Used

Voice & Text

Voice calls are regularly made and received by over 90% of owners (Table 3). Flashing is used by over 83% but local informants consider it rude. Text messaging (Short Messaging Service/SMS) was reported by about 75% of survey respondents: but more users receive than send text messages.

Text messaging is much cheaper than voice calls. By early 2007, Ksh. 5 would pay for a ~150 character message, vs. Ksh 15-25 per minute for voice calls (price per minute ranges, depending on the tariff and time of day and whether to a landline or another mobile number). Even so, texting is much less popular than voice calls. This was surprising for this rural setting where cash/income poverty is widespread. Group and individual interviews reveal that text message is less attractive than voice calls not because of illiteracy *per se*, nor issues with dictionaries; but because voice calls provide immediate feedback and response to the caller. Users report feeling uncertain about whether the text message ever arrived, and the reluctance of other parties to text back. Of course, accessing and using the text-messaging feature on handsets can be difficult (some brands more than others, related to menu, interface and T9 or tap entry mode). It can be difficult or fussy for many users, involving accessing different menu items, buttons, and dictionaries (i.e., English, Swahili, and with/without predictive text). It is difficult to use with Bukusu (longer words, spelling uncertain). Most owners don't receive, read or understand instruction books (that in any case come only with new, in the box, phones).

Phone owners, however, expressed interest to know more about text messaging. Several in-depth interviewees, during the course of the fieldwork, specifically asked for and received assistance on using the feature, and then seemed to adopted text messaging (but how much, how often and to whom is not known).

Table 3. Functions and Features used About Here

Other Functions

Other reasonably popular features are the Alarm, Calculator and Games, all of which were reportedly used by about half of respondents (current phone owners). *Sambaza* (Safaricom's proprietary airtime sharing service, using text messaging) is common among those with Safaricom service: receiving airtime (79/128 total) is slightly more common than sending (52/128). *Mpesa* (*Mobile – pesa/money*) the much-applauded new mobile phone money sending service offered by Safaricom, was known by only two respondents at the time of the survey, as it had only just been launched (in January 2007). (Since the survey it has spread and is evidently becoming known in the village, and in the nearby district capital of Bungoma, Mpesa agents report a booming business.) Internet use is reported by 4 respondents (using GPRS technology). "News services" were reported by 7 owners.

Loading Up: Airtime and Power

Village users –indeed most users in Kenya and sub-Saharan Africa generally—are entirely prepaid subscribers. They rely on top-up cards (scratch cards) or equivalent electronic vouchers (as well as receiving airtime through Sambaza service offered by Safaricom). Charges apply to calls (and texts) made, but not received.

Small denomination cards introduced recently are popular: 62% rely on the Ksh 40 (Celtel) or Ksh 50 (Safaricom) scratch cards introduced in early 2007 (Figure 8, Scratch Cards). With voice calls costing from Ksh 12 to Ksh 25 per minute, the smaller value cards allow a 3-5 minute call or 10-15 text messages. About half also regularly buy Ksh 100 cards. Less common: 9% buy the Ksh 250 card, and none Ksh 500 or 1000 denominations.

Few (6%) buy scratch cards daily; most purchase airtime top-up weekly or several times a week (38%). Respondents tended to buy scratch cards in kiosks in market towns (Chwele, Mayanja, Bungoma) since no kiosks in the village (at the time of the census) regularly carried charge cards. Since the villages require a half hour walk and Ksh 20 bus ride, running out of airtime is a typical complaint for many respondents. Monthly total expenditures on airtime alone (i.e., apart from paying for charging the battery at kiosks) range from Ksh. 50.00 to Ksh. 6500.00. The higher figure is one heavy user, a trader/ businessman, with a phone in constant use. The lower figures represent a phone user making a call every few days or weeks, keeping the phone basically just to receive calls (and paying only to keep the battery charged).



Figure 8. Cast-off (Used) Scratch Cards around Kiosk

Seemingly small amounts on airtime can reflect significant expenditures for many households in relation to other costs they face, and the opportunity costs for cash (Table 4). For example, a small Ksh 50 airtime card used up in a single call would buy staple maize porridge to feed a family for a few days. The price of a new handset could pay for a couple bags of fertilizer. (Further analyses linking household and individual phone interview data will link phone use with household assets and livelihoods and reveal something about the proportion of income spent on mobile phone use.)

Table 4. Costs of Running a Phone vs. Other Rural Costs

Batteries & Charging

Lacking electricity, village phone owners charge their phones outside the village, through small, informal sector kiosks or through other venues. Charging shops proliferate in either Mayanja (most common) or Chwele, nearby market towns, as well as in the district capital (Bungoma). Mayanja has electricity supporting hundreds of small kiosks. Chwele was not connected to the national electrical grid as of the time of the survey (Feb-March 2007), but was expected to be soon as the town is the new West Bungoma district capital. Chwele supported dozens of small charging kiosks with generators, batteries, or solar.



Figure 9. Phone charging kiosk

Charging involves taking the handset and dropping it off at an often kiosk, where for a typical price of Ksh 20 (up to Ksh 30 for shops running off of generators), the phone will be plugged into a power strip for several hours (Figure 9). Careful owners label their phones and their batteries to distinguish them from others for fear of having their original or authentic battery replaced with an inferior knock-off brand. Handset owners report that they tend to patronize the same kiosk whether they know the shop owner.

This effort of charging is extensive, especially for those who are not close to the road and public transport. It involves not just the cash expense, but the travel to the town, the time consumed in travel, and the inconvenience of leaving the phone for several hours (dropping and picking it up again). According to phone use diaries and direct observation, a weekly charging outing consumes half a day and Ksh 60 (transport plus charging). This cost is per trip, and owners can make up to 2-3 trips a week to charge their phone. Such outings to charge phones are often tied to visits to markets/shops. A phone that is much in use can spend a full day in a kiosk in a market center regaining the charge used on the other days, out of commission.

In addition to using commercial kiosks, 18-19% also charge at “home” (which might include the owner’s other residence outside the village), as well as office or a church outfitted with electricity. Home charging systems in the village tend to comprise solar panels and batteries purchased from Bungoma or Eldoret electrical shops, and are of poor quality.

To accommodate to lack of regular electricity, users conserve battery. Over half of owners reportedly keep the phone on “most of the time,” during the day and turn the phone off “at night.” During fieldwork, however, many day time attempts to reach phone owners for follow up discussion and invitations to group and individual interviews met with many instances of *safari mteja* (the subscriber cannot be reached: the phone was turned off intentionally, or the battery ran out).

Many complaints arose around poor quality battery (often due to using second-hand phones and old batteries) and lack of duration of charge. Even new models of ultra-low cost handsets for the developing world (Motorola c113, c119, the new Moto F3 and the Nokia 1110i) --which advertise long-life battery—seem unable to last a week even with the occasional use by these informants.

Clearly, the intersection of poor battery quality, low battery life/duration of charge, and lack of electricity supply to the village are major inconveniences to local users. Survey responses and focus group discussions alike highlighted the frustration around lack of charge (‘jaza’) and inconvenience and financial costs of getting the battery re-charged once or twice a week. When asked about “problems”, the practical challenges and economic costs of charging the handset battery figured high.

To save battery, airtime and accommodate to local conditions—lack of infrastructure, exposure to the elements—rural users have accommodated in a variety of ways. Popular adaptive uses/behaviors around “mobile” phones in the village have emerged. Users will:

- leave it at home (when have no charge, no airtime, worry of loss or damage in the fields)
- leave with a shop to charge (thus precluding use/access)
- turn it off (to save battery, but lose messages and miss calls)
- swap SIM cards (when the battery dies, into another handset—but cause inconvenience in having to restart the borrowed phone)
- swap batteries with another user (again, causing inconvenience in having to restart)
- avoid using extra functions such as games, alarm, music, etc. (to save battery)

Talk over Text: Rural uses of mobile phones

In the West, mobile phones are increasingly used for purposes unrelated to telephonic communication, reflecting the convergence of mobile digital music, web-browsing, and data processing technologies. In the village study site, however, the mobile phone is first and foremost, a telephone. For many, it is the first and only phone they have used (and may be the only phone they will ever use.)

Who do they talk to, and why?

Respondents asked about their most recent calls: who they called (or texted), for what purpose, and where the recipient is located. Most calls are made to small towns within Bungoma district and even within the village itself. For short distances within a rural district (mobile to mobile), these calls essentially replaced making a short bus journey, bicycling, or even walking. Second most common locations were farther away: Rift Valley towns (Kitale, Eldoret, Nakuru) and within Western and Nyanza provinces (i.e., Kisumu, Kisii), and (rarely) Nairobi and Mombasa. In these cases, the mobile phone replaces transport, sending messages by matatu, sending letters through the post, and landline communication, and probably email for some more sophisticated callers.

Respondents were further asked about why/to whom they make calls/texts, i.e., listing names of individuals called for personal matters, business/professional uses, community activities, and “other” reasons, and giving examples of what they communicated about.

Personal calls are most commonly made to spouses, parents and siblings to send greetings and “to see how they are faring.” Household and farm affairs, such as raising or sending school fees, arranging the sale of cattle, and organizing the new round of planting were often counted as personal affairs rather than “business/work” activities, reflecting the blurred boundaries between private and family life and the economic arena, inescapable in a farming village. Often, however, voice calls and messages have no stated practical aim and are admittedly just about staying in touch.

Business-related calls are made for organizing/arranging sales of goods, purchase of stock or inputs, arranging work-related meetings or other activities, and communicating with employers and colleagues (i.e., calling in sick). Respondents reporting significant business use of the phone are engaged in a range of occupations such as buying and selling produce or livestock to working as an accountant or teacher, and work with local NGOs and CBOs (administration, outreach, home-based care).

Popular press and development studies research alike emphasize their use by rural people—farmers and pastoralists—to gain access to the market, based on the assumption that mobile phones are primarily serving an economic function. Indeed, calls are made to find out about prices, goods, and arrange sales of maize, sunflower and other cash crops. These calls, however, are not obviously the most common uses of voice or text communications nor for many phone owners do they seem to be more important.

Community-related uses of phones are also common. They use phones to organize meetings, group activities, and ask pastors and other spiritual leaders for prayers and guidance. Among the uses of phones for “community” concerns, reaching church leaders and fellow congregation members are most common, followed by communication with members of secular self-help and community groups. Residents manage voluntary activities such as HIV/AIDS care, support for an orphan /vulnerable child, and income-generating activities using phones.

Surprisingly popular is use of the mobile phone to enter contests and reach talk radio hosts (by voice and text). Several respondents regularly enter competitions and call radio shows. This never emerged in pretests, was not often talked about in conversations with users, and given the concern for cost would seem to be judged a frivolous expense. Finally, accessing the internet (through GPRS technology which was installed on masts in 2006 (?) remains rare in this village, but the feature was in fact reported by two respondents. Special handsets are needed, and the owner has to activate data functions on the phone (this requires reaching Safaricom or CelTel customer service, which is problematic for any user nationwide!)

Benefits and Problems: Phone-owning households

Survey respondents, including individuals from phone-owning (MPO) and non-MPO households, were asked about benefits and problems of phones (and asked to list the top three). Their spontaneous, non-prompted responses are tallied in Tables 5 (MPO) and 6 (Non-MPO households). Further discussions with groups of men and women phone-users yielded additional insights that are included here. Phone-owners recognize a longer list of practical benefits compared to Non-MPOs (below), tending to value convenience, time- and travel-saving more than non-owners.

Among phone owners (Table 5), the top perceived benefits are practical: “convenience” (80%), “replace transport” (71%), for an “emergency” (65%), to “save time” (52%), and for “organizing one’s life” (46%). About 43% benefit from “staying in touch” with friends and relatives, and 34% specifically appreciating the benefits of the mobile phone over regular postal services. Problems mentioned spontaneously by owners highlight the cost of maintenance and operation (35% reporting airtime and 15% charging costs a problem) followed by network or signal access (14%). In addition to these results from the census, which reflect the spontaneous off-hand reports of owners during an interview, separate group discussion and prompting (among male and female phone owners) resulted in the accumulation of additional important concerns facing mobile phone owners: (1) the handset can be easily damaged (by dropping, exposure to rain, water); (2) the screen is not generally readable outdoors; and (3) changing SIM cards is difficult (i.e., for owners using multiple providers, or when loaning out the handset to another person).

Local users adopt accessories such as clips, strings and cases to help prevent damage, wear, and theft. Covering it with a plastic sheath, while it prevents dirt and some moisture from getting in, however, seems to make it hard to see the screen, especially to read messages.

Benefits and Problems: Non-Phone-Owning Households

Of the 720 households in the village currently NOT owning a mobile phone (Non-MPO), only 38% (n=326) reported having “ever used a mobile phone” at all. Telephone technology is still new, and mobile phone technology truly cutting edge.

Among the non MPO households that have actually used a mobile phone at some prior time, 85% (n=277) had borrowed a handset from a friend or relative. Another 5% had used a community phone, called a “simu ya jamii” in Kenya, which can only be used for voice calls; this is a surprisingly small percentage given the attention in literature on Community Phone applications of cellular technology in developing countries.

Among those non MPO households who had ever used a mobile phone, the last time they used a mobile phone, most were to make or place a voice call (90%). Another 7% received a voice call, while

only 3% sent or received a text (SMS) with borrowed/rented handset (note: Simu ya Jamii used by many of these respondents do not allow text-messaging).

Table 6. Benefits & Problems, Non MPO

Among non-owners, over 90% of households report the cost of handsets and airtime as the major barrier to acquisition. Other, far less important reasons given for not having acquired a phone were handset complexity (i.e., problems in navigating menus) and problems of hearing/sight in using phones. Women mentioned their lack of control over spending money and concern over husband's reaction if the wife were to procure a phone first.

"Perceived problems" about phones that were mentioned spontaneously by respondents in non-phone owning households also related mostly to cost (in Table 6): 60% cite "lack cash" and 45% "spend too much" and 30% "costs too high". Interestingly, 11% of these respondents from non-MPO households also report worries about "cheating" or lying (i.e., school exams, extramarital affairs). Phone – owning individuals, it seemed, worried less about cheating than their neighbors who don't yet have phones. This issue arose in group discussions and individual, in-depth interviews, and several respondents could provide colorful examples of marital problems caused by "mis-use" of phones.

IV. Discussion

The profound, long-term significance for rural communities and social structures in rural Africa of new mobile phone technologies –voice, text, data, and financial communications -- will take years to discern. Meanwhile, the technologies are rapidly changing (new handsets, rural electrification GPRS to EDGE data transmission, and M-pesa mobile "banking") and mobile phone spreading: so that by the time of writing, mobile phones have probably penetrated to more households (from 15 to 20% perhaps), with many owning newer, better low-cost handsets rather than battered secondhand phones, and with more phones being used for text messages. These census findings from one community provide a rich snapshot of the situation in early 2007, and in combination with other data from interviews and industry reports, will help us understand how a range of "typical" users in a village perceive, use, adapt to, and value mobile phone technologies in their lives.

First, summarizing the unique village census findings on rates of adoption in a village: About 15% of households own a phone, rising rapidly since 2005, but lower than (say) South Africa. Not surprisingly, most phones are owned by better-off, better educated households, which exist even in this relatively remote village. Their total **financial costs** remain high for rural poor (although prices and running costs are dropping across the board). The initial investment in a handset is significant: it could be a bag of fertilizer which would increase maize yields substantially. Furthermore, handsets break and need care and repair, not to mention constant charging and airtime. A phone can consume hundreds of shillings in a week (in battery charging and airtime), not insignificant in an economy where 20 Ksh feeds a family for days. Choosing to be a phone owner and user is a serious decision to join the digital cellphone world. More rural users would like to join this exclusive group. Households that don't own a phone yet are hampered mostly by the relatively high cost of the package: handsets, airtime and charging. Far less important is its perceived irrelevance, i.e., "not having anyone to call." Only a minority are specifically put off by the perceived complexity of phones. In other words, cost far outweighs relative complexity or lack of relative advantage as a barrier to adoption.

Given that costs is a barrier to using phones, what is surprising is the prevalence of (expensive) **voice** calls over (cheaper) **text messaging**. This gap in use is partly due to lack of technical skill, and the cumbersome interface (especially on older phones with small screens, made harder to read when encased in thick vinyl protective covers). Furthermore, when the recipient does not have/her handset

turned on, does not know how to read and reply to text messages, then text messaging simply does not communicate. Many rural users do not leave their handsets on all the time, and might not have them close by, but stored away inside the house (especially in the case of women working in the fields). Voice calls, however, give immediate and direct feedback: whether or not the recipient has the phone turned on, or not; whether or not he/she answers the call. Voice calls can thus alleviate frustration rather than adding to it with uncertainty. The infrequency of text messaging is a concern for organizations (commercial or NGO) aiming to reach rural users by SMS: many messages will not be read. Text messaging techniques, however, will likely spread fast once more users are comfortable entering, storing, and retrieving messages. Not only the cost, but the battery/power savings will convince users of their benefits. Users also need to be more familiar with different ring tones distinguishing messages from voice calls.

For the rural poor, mobile phones are thus first and foremost **phones**: mobility of the handset per se is less important than their ability to function as telephone, linking people across space. They replace personal transport and face-to-face meetings, and replace post, much more than they supplant email, internet, or landline (all of which require travel to a major city, rather than the local market towns). Games and listening to music are peripheral functions for users, if used at all: they run down the battery. Mobile “banking” services will probably take off, but have not yet, and still tie users into the market towns to gain access to the agents who actually handle the cash/transmission services.

Among these users, **non-economic** uses seem to dominate phone contacts, texts, and calls. Personal/family, community-group, and spiritual uses of mobile phone communications are popular. Phones in the village are not solely economic or business tools, and are not yet leading to dramatically visible new entrepreneurial activities or the economic empowerment of rural producers who can now gain access to current market prices or contact buyers. They are instead valued for their ability to enhance communications of many sorts with family, friends and associates. Users—especially women—feel connected, avoid frustration, have a sense of peace of mind. Economic (farm sales, inputs, work) and non-economic, family and school-related uses of phones blur boundaries: business and farm associates are also family members. Maize cultivation is the major economic activity for most households: it provides food for the household, and cash income when any surplus is sold. Arranging to plant maize often involves calling a relative for seeds, and also exchanging family news. Extended family structures comprise valuable social capital. Phones can nurture this important asset across geographic distances (i.e. within Bungoma District) that are not perceived to be far, but are costly for busy rural people to span on foot, by matatu, and bicycle taxi.

Phones are thus viewed quite positively by most people: rarely is a rural user concerned about his/her work intruding on his home life, as would be the case for many an urban sophisticate with phones and computers on the desk and at home. Occasionally, phones are seen to enable cheating or lying (in relationships). From a standpoint of human development, phones definitely enhance a wide range of rural users’ “capabilities” (Sen, 1999; UNDP 1990). These capabilities reflect valued freedoms that are much broader than strictly economic benefits of getting produce to markets and negotiating a fair price.

Phones save lives (i.e., getting help in an emergency), improve health (through HIV/AIDS support groups and access to treatment and local remedies), and care for children (organizing schooling, housing and health care, especially for AIDS orphans). They enhance users’ abilities to form meaningful bonds (“affiliate”) with other people (i.e., just “staying in touch”), whether family, neighbor, or social group such as community organization or church congregation. They help people feel connected and to belong to a group, even providing a sense of being important to an organization or cause by owning and using one’s phone for the group. By saving time, they can allow for leisure and play, and peace of mind that comes from knowing what is happening. “Convenience” is thus the top-ranking benefit for rural

users who lack any viable alternative to reaching correspondents. These positive associations far outweigh negative social impacts of phones, such as concerns for etiquette (the rudeness of “flashing” when a caller has no money), and the potential for cheating and lying.

Aside from the uses by actual phone owners, industry analysts and development literature emphasize the economic linkages and business potential of mobile phones. They can be used to support farm-related cultivation, harvesting and sale; as well as provide new ways of making a living (selling phones, repairs, airtime, accessories, or running a “public” phone). Indeed, the project’s baseline assessment of mobile phone-related businesses in nearby market towns (in March 2007) revealed hundreds of tiny establishments, usually small kiosks in the nearest towns (Mayanja, with electricity, and Chwele). Most are small suppliers of airtime (mostly) and charging services (common), as well as some dealing with phone accessories (plastic cases, strings, clips, spare batteries) and handling repairs. The small denominations of airtime they sell provides miniscule profit margin (conversely, the sale of Ksh 1000 cards is lucrative to the retailer, but they are only bought and sold in Bungoma town, and only in larger stores). It is unlikely that occasional airtime sales of Ksh 40 or 50 cards common in the rural areas can alone sustain these small businesses. Airtime cards are often sold to attract other custom or as a convenience to regular clients. Most airtime or charging services are thus offered alongside other services, ranging from bicycle repair supplies, to milk, to medicines and seeds.

The rapidly changing industry, as well as trends in rural electrification, administrative decentralization and micro-finance will see changes in the rural industry. Bungoma District was split into 4 districts in early 2007, entailing electrification of Chwele, new district headquarters in various small towns (Chwele, Kimilili). Mpesa and other mobile banking services rolled out in 2007, and are just reaching the village. These involve registered agents in towns who are connected by computer to Nairobi central financial operations. Consolidation of phone services and banking will likely occur, and many small kiosks will be nudged out of mobile phone business and either out of business, or back into their work of fixing bike tires, selling groceries, and supplying agricultural inputs.

V. Conclusions

The mobile phone is one of the more remarkable global technologies penetrating into “traditional” rural Africa. While it is receiving a great deal of journalistic and industry attention, we know actually know little about how phones are being used on a daily basis in any given village: how widespread they are, how they are being used and what they mean to people. Studies of mobile phones have tended to deal with primary urban markets, and most have been industry rather than academic research.

Juxtaposing these findings with those resulting from research in conventional developed-country settings, we observe differences. Mobile phones in the developed world (cellular phones) extend the workday and even the work-week, intruding upon personal and family time and space. They allow for diverse forms of digital data management on the move, not just voice calls –sometimes calls are not important. They generate new challenges for etiquette and ethical behavior. They don’t offer the dramatic benefits (and costs) that phones bring to rural African lives. In the study village: they are still not widespread (15% penetration by household) but are increasingly recognized as vital tools to organize the maize planting, raise school fees, and help multi-residence couples/families stay in touch. Livelihoods are based in agrarian and informal sector activities that can benefit from telecommunications—the mobile phone offers an alternative to bus and foot transport, not the landline. The “leapfrogging” from face-to-face or letter to cellular communication is definite and unstoppable.

Designed for individual business consumer use in affluent and well-developed Finland, the US, Germany, Japan, Korea, these small digital devices depend on a reliable electrical grid, yet are being adapted into “resource poor” settings where there is no electricity. The study site and local market towns provide inadequate electrical infrastructure which limits the use of handsets. These conditions influence the way the mobile phone is being adopted: i.e; for strategic, immediate voice communications with household members (managing a farm), the extended family (sending remittances from Bungoma, Eldoret, and Mombasa), as well as work associates and fellow members of community-based organizations. Phones are used to coordinate voluntary activities that are critical for social support, access to care, emotional and spiritual affiliations, and practical training, such as: HIV/AIDS support groups, youth groups, and church congregations.

This working paper summarizes only one set of data, the comprehensive household-level survey (i.e., a village census) from an interdisciplinary case study. The research aims to address questions about adoption and usage in a village as part of a larger study of rural technology change. Additional analysis will link survey findings with individual in-depth interviews (Working Paper #2) to shed more light on village use, sharing, and the larger significance of phones to rural lives. As well, the survey data can tell us about population and health characteristics and links to rural livelihoods and technology change in a village. Additional interviews will reveal influences of industry and government policies as barriers to (or factors in) the adoption of these new technologies and related products.

Endnotes

1. Study Site Census

The Bungoma field site was selected in 2005 during another study of technology change in rural, AIDS-affected Africa. Communication with a local NGO (ACE-Africa, working in the area) led to identification of the village from a fairly hard-hit region (i.e., Bungoma District) that has received little attention. Local innovations in kitchen gardens and many other arenas in response to the epidemic were reflected in the study village. Fieldwork in 2005 mapped the village, identified HIV/AIDS affected households, and documented gardens innovations. At this point, 6 Mobile Phone handsets were known in the village, the only service provider was KenCell (later CelTel), and signal coverage did not span the whole village. The second round of data collection in 2007 (funded by NSF) was comprised the entire village catchment area with a household survey, thus providing a census of households and mobile phones. A simple household level questionnaire was developed, translated and administered from February 3 through March 10, 2007 by trained, Bukusu-speaking enumerators. They interviewed a responsible adult male or female head for every family grouping that “eats from the same pot” within the catchment area. These numbered 878, including 29 cases of non-response due to the family being away, incapacitated, or refusing to participate. A household roster gathered standard data on age, sex, education. Other questions enquired about livelihood activities, land, crops, tools, housing, and assets. The census effort included an “individual-level” questionnaire to investigate mobile phone use among adult owners identified through the household-level instrument, gathering information around handsets, SIM cards, expenses on charging and airtime, benefits, problems. Non-phone owning households were asked about reasons for not owning, ever use of a mobile phone, and perceived benefits and problems.

The research was approved by the Tulane University Institutional Review Board (IRB) and received research authorization from the Kenyan Ministry of Education, Science and Technology (MOEST). All participants were invited to take part using approved oral consent procedures, and interviews and activities were conducted in Bukusu or Swahili, translated by local research assistants.

2. HIV/AIDS Data

Several proxy measures of HIV/AIDS were used, rather than expensive biomarker data. The household roster asked for information about health status and chronic illness (lasting more than a month) and symptoms of weight loss, fever, rash, and diarrhea associated with such cases which are associated with HIV/AIDS. Orphans and foster children can be identified in household rosters. Discussions with local home-based care workers (2005, 2007) enabled a separate tally of affected households, perceived trends in infections, access to anti-retroviral treatment and applications of mobile phones by these lay health care workers in their HIV/AIDS outreach. Finally, Focus Group Discussions (four by the time of writing) talked with men and women about different aspects of HIV/AIDS.

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Table 1. Characteristics of Mobile Phone Owning Households

| Characteristics | Mobile Phone Owning Households, N=128 | Non-Mobile Phone owning household, N=720 |
|---|--|--|
| Demographic and Socio-Economic | | |
| Age of head of household | Median 35 years (17-72) | Median 36 (14-87) |
| Education (% household heads achieving this level) | 12% beyond secondary 23% secondary complete 18% some secondary 21% complete primary 25% none or some primary | <1% beyond sec. 5% secondary complete 11% some secondary 24% complete primary 59% none or some primary |
| % HH "HIV/AIDS affected" | ~20 | ~20 |
| Length of residence in village (years) | 16 years median (0 - 65) | Median 21 (1-87) |
| Assets | | |
| Median land area owned | 3 acres (range, 0.5 to 33) | 1.75 (0-53.5) |
| Mabati or tile roof (not thatch), % households | 79 | |
| # rooms in house | median=3 rooms | Median = 2.5 rooms |
| Own any cattle | 77% | 52.5% |
| Own ox-plough, wheelbarrow, chemical sprayer | 39, 37, 37 % | 21, 6, 15 % |
| Own improved stove (jiko) | 28 (n=37) | 13 (n=90) |
| Own a working radio | 57 (n=74) | 38 (n=271) |
| Own a lamp | 75 (n=98) | 42 (n=297) |
| Bicycle | 70 (n=92) | 51 (n=361) |
| Car | 5 (n=7) | <1 (n=3) |
| Livelihood Activities | | |
| | <i>% reporting any (% say "Important" or "Very Important")</i> | |
| Daily activity "regularly work away" | 21% | 5.5% |
| Eat crops/produce from own farm | 92 | 89 |
| Sell crops from own farm | 31 (81) | 30 (71) |
| Wage/casual work | 23.5 (80) | 45 (68) |
| Run a business | 43 (88) | 36 (78) |
| Trade/sell crops | 89 | 80 |
| Sale of locally made pottery, charcoal | 25 (88) | 40 (70) |
| Remittances | 24 (78) | 20 (63) |
| Pension | 8 (57) | 3 (96) |
| Exchange goods | 50 (89) | 50 (70) |
| Communal activities, merry-go-round | 53 (93) | 47 (89) |
| Donations from unrelated people | 6 (55) | 9 (59) |
| Sublet land | 21 (78) | 19 (80) |
| Other activity | 5 (67) | <1 (67) |

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Table 2. Phone Technologies used in the Village: Handsets and Service Providers

| Phone Technologies | N (%) First Phone Acquired (N=128) | N (%) Most Recent Phone N = |
|--|---|------------------------------------|
| Handset | | |
| Nokia | | |
| Motorola | | |
| Sagem | | |
| Sony Ericsson | | |
| Alcatel | | |
| Bird | | |
| Other | | |
| Price range for phones | Ksh 1000- 15,000 | Ksh 1500-35,000 |
| Recent models of handset (purchased 2007): | Nokia 1110, Motorola C119, Moto F3 | |
| Oldest handset still in use: | | |
| % handsets NOT WORKING | 30 (25%) | 4 (10%) |
| Lowest price paid for handset in 2006/7 | | |
| Most expensive handset in 2006/7 | | |
| Service Providers Used | | |
| Safaricom | 39 (32%) | 15 (37%) |
| Celtel (formerly KenCell) | 72 (59%) | 18 (44%) |
| Both | 12 (10%) | 8 (20%) |

Table 3. Technologies used in the Village: Important Features and Frequency of Use by Handset Owners

| Functions and Features | Frequency of use (N=128 phone owners) | Comments |
|-------------------------------|--|---|
| Voice calls | Over 90% (121 make and 123 receive regular voice calls) | Most commonly used function on phones. Costly but get immediate feedback. |
| SMS/text messaging | Used by over 75%: 95 place and 109 (85%) have received texts | Often don't get feedback, difficult to use |
| Flash | 83% (106) flash others, 83% (107) receive | Flashing is widely considered to be rude. |
| Sambaza | 40% (52) send airtime, 62% (79) receive airtime | Useful for Safaricom subscribers only. |
| Alarm | 54% (69) | Time/date function mentioned once. Use of alarm implies use of phone as a clock/watch. |
| Calculator | 48% (62) | Popular among those who have it. Not all handsets have it. Some calculators difficult to use. |
| Games | 50% (64) | Avoided as they run down the battery |
| Mpesa | 2 know the service | (Only started in January 2007; reached Bungoma in late Feb 2007) |
| News (by text) | 9% (12) | |
| Internet/web/email | 2 users | |

Notes: Respondents were asked: What are functions/features of the phone do you use?

Table 4. Costs of using a phone in comparison to other rural expenses

| | |
|---------------------------------------|--|
| Ploughing an acre of land: | Ksh 1,200 (ox-plough team, plough, and driver) |
| One bag of commercial DAP fertilizer: | Ksh 2,000 |
| Bus fare to Nairobi (roundtrip): | Ksh 1,500 |
| “Goro-goro” (2 kilo) of maize: | Ksh 15-20 |
| Daily wage, farm labor: | Ksh 150 |
| Thatching a roof (grass, labor) | Ksh 750-1,000 |
| New Hand hoe: | Ksh 250-350 |
| Cheapest New handset, 2005: | Ksh 6-7,000 (est.) |
| Cheapest New Moto or Nokia, 2/2007: | Ksh 3,000 |
| SIM card, 2007: | Ksh 100 (Safaricom), Ksh 50 (CelTel) |
| SIM card, 2004: | Ksh 1,000 |
| 3 minute voice call, 2005: | Ksh 75-100 |
| 3 minute call, 2007: | Ksh 36-75 |
| Smallest prepaid scratch card, 2005: | Ksh 250 |
| Smallest prepaid card, 2007: | Ksh 40 (Celtel), 50 (Safaricom) |

Table 5. Benefits and Problems among Current Mobile Phone Owners (N=128)

| | <i>Number of Households (%)</i> |
|--|---------------------------------|
| <i>Most Common Benefits Expressed by Phone Owners</i> | |
| Convenience | 103 (80%) |
| Replace Transport | 91 (71%) |
| Emergency | 82 (64%) |
| Save time | 67 (52%) |
| Help organize life | 59 (46%) |
| Stay in touch | 55 (43%) |
| Replace Posta | 44 (34%) |
| <i>Most Common Problems Expressed by Phone Owners</i> | |
| Lack cash to buy airtime | 33 (35%) |
| Costs to charge | 22 (18%) |
| Network/signal problems | 18 (14%) |

Notes

1. Number of respondents from N=128 Phone Owners (among N=842 respondent households in the village catchment area) who mentioned this benefit or problem spontaneously.
2. In addition to these results from the census, group discussion among a selection of male phone owners resulted in the accumulation of the following most important concerns with mobile phones: (1) the handset can be easily damaged (dropping, water), (2) the screen is not readable outdoors, (3) changing SIM cards is difficult (i.e., with multiple providers).

Table 6. Benefits and Problems Perceived by Non-Phone Owners (N= 720)

| <i>NON PHONE OWNERS</i> | <i>N, %</i> |
|----------------------------------|-------------|
| <i>Perceived Benefits</i> | |
| Convenience | 520 (72%) |
| Emergency | 475 (66%) |
| Save Transport | 391 (54%) |
| Save time | 188 (26%) |
| <i>Perceived Problems</i> | |
| Lack cash | 434 (60%) |
| Spend too much | 322 (45%) |
| Costs too high | 215 (30%) |
| Can use to cheat/lie | 77 (11%) |
| Menu/interface* | 65 (9%) |
| Flashing | 12 (2%) |

Notes

1. Menu/Interface problems include issues with the language, understanding how to use or access the dictionary for text-messaging features, and small or fussy buttons.
2. Of these 720 households currently NOT owning a mobile phone, 326 (38%) reported having “ever used a mobile phone”. Among these prior users, 277 (85 %) had borrowed a handset from a friend or relative and 5% used a community phone (“simu ya jamii”). Among them, the last time they used a mobile phone: 90% placed a voice call; 7% received a voice call with borrowed/rented phone, and only 3% sent or received a text (SMS) with borrowed/rented handset.

