

Exploring Challenges and Opportunities with Market Heat Maps * **

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Building on earlier work by Banerjee and Duflo (2007), this paper uses survey data from six countries in order to shed further light on one aspect of the economic lives of the poor: their access to markets. It develops a framework that could be used to map market inclusiveness, and then applies this to a number of markets that are critical to reducing poverty and achieving the Millennium Development Goals (MDGs). These “market heat maps” help to illustrate the extent of the challenges and in some cases reveals potential opportunities in growing more inclusive markets in water and financial services.

What Are Market Heat Maps?

Market heat maps are simple illustrations of the extent to which the poor engage with markets: how inclusive of the poor the markets are. They provide a graphic representation of access to goods and services in selected sectors—education, water, microfinance, etc.— by the poor, along with information on how these goods and services are being provided. A greater share of poor consumers being reached is analogous to more “heat” (more color in the figure). Less heat (lack of color) indicates that a larger share of the poor are excluded. When focused on the demand side, these market heat maps show the nature and extent of consumer access to key goods and services that are important for human development across spatial dimensions in a particular country as well as the presence (or lack thereof) of various agents on the

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supply-side. When considering the production side, they also illustrate how inclusive markets are for the poor as producers (as entrepreneurs or as providers of labor inputs).¹

What do they Add?

There is already a rich literature and extensive practice in poverty mapping.² So far, geographic poverty mapping has mostly been used by actors from the public and not-for-profit sphere who leverage it to highlight the geographic variations in poverty, to design and target their interventions, to pinpoint and coordinate priority areas of their operational programs and activities, to determine where to best allocate their budget, to monitor and evaluate their operations, and to increase transparency and social accountability.³ Amongst others, geographic poverty mapping is applied in the areas of poverty reduction operations, infrastructure provision and coordination in humanitarian crises (see box 1). While poverty mapping is often used by many actors to amend the coordination of their own activities, it can also help improve the visualization of the spatial dimension of current development issues amongst external actors, including a broader public audience.

¹ The analysis here draws on Acosta *et al.* (2008) as well as UNDP's *Market Heat Map Database* [www.growinginclusivemarkets.org].

² See, for instance, *Poverty Mapping*, a joint initiative by FAO, UNEP and the CGIAR - and partners – [www.povertymap.net], and the World Bank's "poverty mapping" website [<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTPA/0,,contentMDK:20219777~menuPK:462078~pagePK:148956~piPK:216618~theSitePK:430367,00.html>].

³ Elbers *et al.* (2007), for example, find that poverty maps could improve government targeting schemes aimed at reducing poverty. For further discussion on poverty mapping, please refer to Davis (2003).

Box 1. Examples of Geographic Poverty Mapping Initiatives

WaterAid's water supply and sanitation mapping initiative

The UK-based international charity WaterAid uses geographic mapping to illustrate the spatial dimension of water supply and sanitation. The maps present information on the availability and quality of water resources, as well as access to and demand and use of water and sanitation services. While helping to increase public accountability for basic service delivery, the maps can also facilitate the implementation of aid instruments at the local level. WaterAid has used different forms of water supply and sanitation mapping in sub-Saharan Africa and Asia (ODI 2007).

For more information, see ODI (2007) and www.wateraid.org.

Peace and Equity Foundation's poverty mapping exercise

The Peace and Equity Foundation in the Philippines uses poverty scanning exercises to pinpoint the priority areas of its poverty reduction program. A 2003 exercise—based on data on development indicators such as income, health and education—helped identify 28 priority provinces in the Philippines. In some cases, the Foundation also conducts poverty mapping exercises at the city level in order to further specify the geographic as well as thematic focus of its operations.

For more information, see www.peacefdn.org/poverty.php.

UNHCR's and Google Earth's outreach programme

The UN Refugee Agency (UNHCR) uses the virtual mapping programme Google Earth to provide an illustrative insight into some of the world's major displacement crisis and the agency's humanitarian work to help the refugees. The outreach programme takes internet users on a virtual reality journey in remote areas of Chad, Iraq, Colombia and the Darfur region in Sudan. Satellite maps, photos and videos inform about the daily life of refugees and displaced people in those areas, the impact of the crises on neighboring countries, and UNHCR's operations. The programme might also serve as a logistical planning tool for UNHCR to better coordinate operations on the ground (Batty 2008).

For more information, see www.unhcr.org/events/47f48dc92.html.

The use of poverty mapping might also be of interest for private for-profit actors who could gain useful insights into the economic activities of the poor, especially those living in remote areas where information is often not available. The intention here is to

contribute by developing a tool that complements geographic poverty mapping with a mapping of the market engagement by the poor. The same databases, including those from household, labor force, and other types of surveys, are tapped to construct market heat maps. Their value-added is essentially the combination of information in a visually compelling way. Compelling because it allows for a quick read in terms of market inclusiveness and would contribute to:

- *Revealing unmet demand for the poor as consumers and unrealized opportunity for the poor as producers.* A market heat map shows visually the extent to which potential consumers for certain goods and services have (or have not) been reached. It informs to which degree markets are inclusive for different consumer groups, for example, the poor and non-poor. This information can be translated into opportunities that have yet to be realized for expansion and innovation in product and service delivery. In addition, the market heat maps illustrate how the poor are marginalized on the supply side of different markets. This reflects unrealized opportunities, not only for the poor themselves, but also for a society as a whole.
- *Assessing market inclusiveness.* Market heat maps can be structured to shed light on market inclusiveness along various spatial dimensions, such as geographic regions, urban vs. rural dichotomies, etc., depending on the focus of interest. Specifying the marginalization of the poor in markets along spatial dimensions provides value-added of pinpointing unrealized opportunities.
- *Clarifying the supply structure.* An additional aspect of the market heat map is that it can also illustrate the supply structure. It can give information on the presence (and relative market shares) of different types of suppliers. Suppliers can be differentiated in terms of ownership (public, non-governmental organizations, private), size (multinational corporations, micro, small, medium or large scale enterprises), or any other criterion that may be relevant.

How are they Constructed?

There are three key steps in constructing market heat maps: a) measuring total potential poor consumers; b) measuring the total poor consumers who have access; and c) measuring the different actors on the supply side.

- *Step 1.* The first step is to establish a measure for the total demand to be met in each market. There are a number of ways to approach this, because different possible metrics become relevant depending on the market being examined. As a starting point to reflect demand by the poor, one takes the total number of potential poor consumers in the market being examined.
- *Step 2.* The next step is to identify the extent to which potential poor consumers have access to the good or service in question. Access could be interpreted in a

number of ways, delving into issues such as geographic proximity and affordability. As a measure of access, the number of poor individuals or households that presently consume or use the good or service being analyzed is usually considered.⁴

- *Step 3.* A last step disaggregates the information in Step 2 by providing additional information on the relative shares of different agents comprising total current supply.

Market heat maps could be further specified along two dimensions: the exact population group and the specific markets to be analyzed. Several measurements of the size of the poor population could depend on the expenditure threshold used to define this population group. Here, the widely used international poverty line (\$2 in purchasing power parity a day) is considered to define the poor. Other cut-offs, depending on the intended purpose, can be used as well. However, as stated in Banerjee and Duflo (2007), using the \$2 a day threshold remains consistent with the focus on the most vulnerable population group, allows for international comparability, and also takes into consideration present data availability.

Regarding the markets to be analyzed, there are a few in particular that are important from a human development perspective. Development can be seen as the process of enlarging and expanding people's choices and freedom (Sen 1999). Several markets for which the poor's participation is expected to have a large and positive impact on human development include:

- Markets for goods and services that could be considered to help satisfy basic human needs and thus to directly improve their welfare and underpin their broader human capabilities (for example, access to healthcare, housing, water etc.). This is in line with the methodology for the construction of the Human Development Index.
- Markets for goods and services that could be crucial to opening up opportunities for the poor to enhance their standard of living, increase their income, and further expand their choices, in large part, through economic empowerment (for example, credit markets, insurance markets, markets for the application of information and telecommunications technologies (ICTs), labor markets, etc.).

⁴ Porteous (2005) notes the difference between access and usage—the number of people who choose to use or consume a product might be less than the total number of people with access to it. The idea here is to tap data on usage as a first approximation of access, though more detailed analysis of access and exploration of the different barriers would be ideal. See Beck and De La Torre (2006) for an analysis of access to financial services, and Melzer (2006) for an analysis of access to housing finance.

Applications

Improving Access to Safe Drinking Water: The Role of the “Other” Private Sector in Haiti

Water is a necessity of life, required for basic needs in nutrition, health, and sanitation. Access to safe drinking water plays an important role in reducing a number of health and sanitation concerns emerging from use of contaminated water, including waterborne and water-washed diseases (water-washed diseases occur when water is not available for washing and personal hygiene) such as typhoid, cholera, dysentery, and diarrhea.⁵ Its importance is enshrined in Millennium Development Goal (MDG) 7, which seeks to reduce by half the proportion of people without sustainable access to safe drinking water by 2015. The most recent estimates suggest that over 1 billion people still do not have access to improved water sources—an estimated 17 percent of total world population (UNDP 2006, p.33; World Bank 2007a, p.24).⁶ Progress towards achieving this goal has been uneven across the developing world, despite impressive inroads made by a number of countries.⁷ Whereas Sub-Saharan Africa has the lowest access to an improved water source in the world in terms of share of population (44 percent in 2004), most people without access to an improved water source live in the East Asian and Pacific region (406.2 million versus 314 million in Sub-Saharan Africa)⁸ Access to safe drinking water within some countries is also highly uneven, and reflects, in part, the stark inequality in access between the poor and the non-poor. In addition, rural areas also tend to lag behind urban areas in terms of water access. UNICEF (2006, p.32) reports that 92 percent of the population in urban areas in developing countries, and 70 percent of the population in rural areas, have access to improved drinking water sources.

Reflecting this general trend, a market heat map (Figure 1) illustrates data on access to water among Haiti’s poor population in different regions of the country. In this illustration, access to water includes access to private piped water (inside and outside the house and wells) and public piped water. Darker shades represent greater access. By presenting data on the providers of water services, the market heat map also reveals some interesting insights into the provision of drinking water in Haiti.

[Insert Figure 1...]

⁵ For instance, very rough estimates suggest that access to piped water into a house could diminish the risk of diarrhea by close to 70 percent in Ghana, while access to an improved water source is shown to cut the risk of infant mortality by 23 percent in Uganda (UNDP 2006, pp.43-44).

⁶ Figures for access to an improved water source refer to the percentage of the population with reasonable access (availability of at least 20 liters a day per person from a source within 1 kilometer of dwelling) to an adequate amount of water from such as a household connection, public standpipe, borehole, protected well or spring, and rainwater collection. Unimproved water sources include vendors, tanker trucks and unprotected wells and springs (UNDP, 2006).

⁷ Tanzania, Chad and Malawi are among the countries that have made most progress, with increases in drinking water coverage of 92 percent, 70 percent and 63 percent respectively in the 1990-2002 period (UNICEF and WHO 2004, p.11).

⁸ See UNDP (2006), p.33.

As one of the world's 50 least developed countries, Haiti ranks 146th out of 177 countries in the world in terms of human development (UNDP 2007, p.275). Latest available figures (for 2001) indicate that overall 78 percent of Haiti's population lives with less than \$2 a day (World Bank 2006, p.28; 2007a, p.60). In rural areas, about 86 percent of the population is poor according to such criteria. Poverty rates in urban areas vary greatly: in Port-au-Prince, 51 percent of the population lives with less than \$2 a day, while in other urban areas this figure climbs to 85 percent (World Bank 2006, p.28). Recent estimates on the regional pattern of poverty in Haiti (Table 1) reveal that poverty rates are lowest in the West region (60.8 percent), home of the country's capital Port-au-Prince, and highest in the North East region (94.2 percent). Nevertheless, even in the relatively less poor West region, poverty is extremely high by international standards. The \$2 a day poverty rate for the West region, the richest area in Haiti, is higher than that of any country in Latin America and the Caribbean (CEDLAS and World Bank 2008). Estimates on the distribution of the poor population within the country reveal that the poor population is mostly concentrated in the West region: almost 30 percent of the national poor live here. The poorest region, the North East, with a poverty rate of 94.2 percent, is home to only 4.7 percent of the national poor.

[Insert Table 1...]

Given daunting conditions associated with low economic growth, natural disasters, political instability, and poor governance, basic public services provision has failed to progress, and has even deteriorated in Haiti (World Bank 1998). The market heat map shows that access to piped water networks is generally very limited, with about a third of the urban poor and less than a third of the rural poor having access to this type of water source.⁹ Taking a closer look at regional access data is even more revealing. The market heat map indicates the existence of a possible business opportunity in the water market, even in Haiti's richest region, the West region, home to the capital Port-au-Prince. In this region, where almost one third of the country's total poor population lives and piped water access rates are relatively higher compared to other regions, only 18 percent of the poor population has access to piped water. The market heat map shows, however, that 45 percent of the population in urban areas of the country has access to water from trucks, bottled water, and water by bucket, which indicates that they are willing to pay for safe water. Possible business opportunities might also exist in other regions with even lower access rates, especially in rural areas.

The market heat map therefore helps to illustrate an interesting aspect focusing particularly on Haiti: due to the limitations of public water provision, as well as the lack of large private investment, other water providers seem to have stepped in, and a thriving water market has emerged to fill the gap. Some consumers have also resorted to investing in their own water sources, for example, by drawing their water from wells in association with community based organizations (IDB 2005). Small-scale private service providers (SPSPs) of water, mostly in peri-urban areas, play a major role in extending access to

⁹ The figures presented here could be slightly different from those quoted in other studies, mainly because of the different units of analysis and methodology.

water—delivering water by trucks, in bottled form, or by the bucket.¹⁰ Critically important services are thus provided to poor households, especially in urban areas.

Typically, when one contemplates alternatives to public sector provision of water, one thinks of large (foreign or domestic) private consortiums as the main investors in water markets in the developing world. However, as the recent literature is beginning to show, and figures like the one for Haiti could further reveal, there is a growing and important role played by the “other” private sector in water markets. In many parts of the world, water markets thrive where both the public sector and large private investors have been absent, deficient, or have failed to achieve universal access.¹¹ There are a number of challenges linked to the operations of the “other” private sector, including in some cases higher prices and heterogeneity in water quality, as well as limited access to formal sources of finance. Clearly, the public sector could play a key role to help address these challenges as well as oversee different aspects of the water market, even as it will be involved (directly as a provider or perhaps indirectly as regulator of private concessions) in the challenge of improving the efficiency and outreach of the piped water network.

Where country capacity is extremely weak, and where larger investors may be reluctant to engage for a variety of reasons, such as in Haiti, tapping the “other” private sector could offer a pragmatic way forward to help increase access to safe drinking water. Market heat maps like this could thus be especially useful to help reveal where such opportunities might be found.

Digging Deeper into Credit Access: Credit Supply in Guatemala

Increased access to finance could have a variety of positive impacts on the poor, by enhancing their ability to manage shocks (through microinsurance products), and by improving their opportunities to undertake investments (through credit) and build capital (through savings products).¹² Although growing more inclusive financial markets for the poor involves improving access to a broad range of financial products (for example, savings, money transfer services, insurance), the focus here is on credit. Credit could be used to expand or diversify income streams, increase investment, and smooth consumption, especially by mitigating the effects of negative shocks (that is, crop failure, sickness or deaths in the family, etc.). However, the poor often lack access to credit,

¹⁰ “Independent operator” is a term used to describe small private operators who provide complementary or alternative service to the dominant operator, whether this is public or private. The definition has been used to encompass associations or user groups, provided that they deliver services on a commercial basis. Independence refers to their source of water, which does not come from the network of a large organization (Valfrey-Visser *et al.* 2006).

¹¹ The annual number of water projects in the developing world involving the private sector shrank by 20 percent in 2006 compared to the year before (at 48 total projects), but still remained at a relatively high level compared to 1995 (that is, around 20 projects). Nevertheless, the number of cancelled and distressed private water contracts grew by 11 projects in 2006 alone (World Bank 2007b, pp.1-2). For a review of the recent trends in (large-scale) private sector participation in infrastructure investments in water in the developing world, see Harris (2003).

¹² See Littlefield *et al.* (2003) for a broad review of studies that suggest positive effects of microfinance towards reaching the Millennium Development Goals (MDGs).

which coupled with their vulnerability to shocks could push them into a vicious cycle of poverty, including through interruptions in human capital investments (which have implications on future income streams), and by diminishing their capacity to adopt new technologies (which limits improvements in productivity and household wealth).¹³

Credit providers that serve the poor include microfinance institutions (MFIs), credit unions, cooperatives, and an increasing number of commercial banks. Even though most low-income households in developing countries have no access to formal financial services, the burgeoning success of Grameen Bank in Bangladesh, BancoSol in Bolivia, and other microfinance innovators has led a growing number of financial providers to begin looking to serve this market. Honohan (2004) shows that in most countries the microfinance industry operates well below the efficient scale penetration rate of 2 percent of total country population.¹⁴ For those fortunate enough to be in regions where this growth is taking place, a number of different institutions are engaging in competition for certain low-income customers. While state-owned development banks, non-governmental organizations originated MFIs, credit unions, and cooperatives have played a role in this market for some time, many commercial banks and non-bank financial institutions are bringing additional competition. CGAP (2007) reports that in just 2 years, microfinance funding from international financing institutions doubled to reach \$2.3 billion in 2006, while private investments more than tripled to a total of \$2 billion. Where the provision of microcredit is profitable as a business opportunity (that is, lending to individuals with better credit rating or wanting larger loans), a zone of competition exists in which numerous providers of commercial financial services compete with each other as well as with subsidized and informal financial services.

To provide a better picture of the present state of access, market heat maps could be used to help illustrate the state of access across different regions within a country. Figures 2 and 3, for example, show access to credit in different regions within Guatemala, for both the non-poor (Figure 2) and the poor (Figure 3). Here, access to credit figures includes access to credit from formal sources, such as banks and microfinance institutions, as well as credit from informal sources, such as family and friends. Darker shades in the map represent greater access. These preliminary illustrations suggest that access to credit among the poor and non-poor tends to be higher in the South West regions of the country, nearest the Pacific coast, and in the political and economic center of the country (Guatemala City, in Guatemala Department). Some regions in Guatemala

¹³ A number of recent studies, notably those using randomized-control trials (RCTs), have helped clarify the links between access to finance and development. One RCT study in South Africa, for example, finds that expanding consumer loans to marginal customers (that is, those who would normally be turned down for loans) led to measurable benefits in the form of increased employment, reduced hunger, and reduced poverty (Karlan and Zinman 2007). A similar study on small-scale fishermen in India suggests that the easing of credit constraints speeds up the adoption of technology (in this case, fibre-reinforced plastic boats that are cost and fuel efficient), enhancing productivity and contributing to economic growth (Gine and Klöner 2005).

¹⁴ In Pakistan, for instance, one reason for low penetration rates might be that microfinance is widely regarded as a social service rather than a financial one. A recent study reveals that there are only 700,000 micro-borrowers out of a population of 160 million people. Largely limited to development funds from donors, only two microfinance providers out of hundreds surveyed are sustainable (Duflos *et al.* 2007, p.1).

with high poverty rates, like parts of the Northern and South-Eastern Departments, also tend to have comparatively less access to credit among both the poor and the non-poor (see also Table 2).

Introducing a geo-spatial analysis of the poor's access to certain goods and services is critical, given important geographic facets in the pattern and determinants of poverty itself. Many poor rural villages in Guatemala remain fairly isolated due to a road network that is still largely underdeveloped. Guatemala's road network is about 1.2 kilometers per 1000 people. Compare this to Costa Rica (a country with half the population of Guatemala), with a road network of about 11.1 kilometers per 1000 people (World Bank 2003, p.107). A full 13 percent of total households in Guatemala do not have access to motorable roads—and this figure rises to almost 20 percent for households in the North-Western, North-Eastern, and North regions, which are also among the poorest in the country (ibid, p.11). The indigenous people in Guatemala are also more physically isolated when compared to the general population—this is an important fact considering that the poverty headcount index among indigenous groups in Guatemala is about 76 percent (and the extremely poor about 27 percent), which is much higher than comparable figures for the non-indigenous population, at 41 percent (and about 8 percent extreme poverty) (ibid, p.11). Cultural and historical factors along with geography could clearly be linked not just to the patterns of poverty, but also peoples' access to goods and services and the market.

[Insert Figures 2 and 3 and Table 2...]

Figures 2 and 3 present even more information on market access, and specify whether market access was provided by market actors, the government or even through informal sources in rural and urban areas. Market heat maps focusing on access to credit can thus reveal important additional information on the percentage of the households in a respective country that are still unserved, while at the same time they allow scanning the landscape of actors that are currently serving the different target groups. The market heat map for Guatemala signals that access to credit is generally low and that poor households remain for the most part excluded in its credit market.¹⁵ The role of formal credit sources still seems very limited, and although rural poor households seem to have better access to loans compared to urban poor households, informal credit sources in rural areas seem to account for much of this trend.¹⁶ A closer look at the actual use of credit in Guatemala provides additional information and might strengthen the case for a possible business opportunity. While only 19 percent of non-poor urban borrowers spend their loans on

¹⁵ Here, data on actual usage of credit is taken as a proxy indicator for market access; however, individuals may choose to self-exclude themselves from these markets for a variety of reasons. Hence, one way to interpret the figures on those without credit is to refer to them as upper bound indicators of the share of the population with no access to credit markets.

¹⁶ The share of informal rural credit in other developing countries, such as, for instance, Pakistan is also high (73 percent in 1985) (Qureshi *et al.* 1996, p.6). The NHDR/PIDE Survey 2001 (a sample survey of seven districts of Pakistan) shows that 85.7 percent of the rural poor in Pakistan obtain their loans from shopkeepers and friends/relatives (41.7 percent and 44 percent respectively) (Hussain 2003, p.174). Clients in Pakistan report that effective interest rates charged by moneylenders are generally around 300 percent per year (Duflos *et al.* 2007, p.9).

investment (rather than consumption), 55 percent of rural poor borrowers invest their loan into (agricultural and other) business (Figure 4). It seems that if formal credit is expanded for the rural poor, and the distribution of spending is kept the same, the loans will most likely be invested rather than consumed.

[Insert Figure 4...]

Clearly, more detailed context-specific analyses is required in order to understand the nature of credit demand among the poor, and the market heat maps presented here could serve, in part, as a basis for expanding our understanding of these markets. Perhaps more importantly, they could also help guide a number of important research questions. Will better access to microfinance help the poor to lift themselves out of poverty? Or, depending on the design of credit products offered, will increased access primarily enhance the poor's welfare—but not necessarily make them un-poor? Could formal longer-term bank loans rather than short-term informal loans help the poor invest their resources in a possibly more productive way, such as through land acquisition and business start-up? What role could formal banking institutions and MFIs play in enhancing access and in introducing financial products that are most useful for the poor? A deeper analysis of these and other questions could guide policy makers, business and civil society actors in exploring ways to make financial markets more inclusive for the poor.¹⁷

Leveraging ICTs to Improve Banking Access: The Potential for M-banking in South Africa

Access to ICTs could contribute to economic growth and human development in a variety of ways, notably by facilitating commerce and trade (Grace *et al.*, 2004; Braun and Torero, 2006). Improving access to ICTs is also part of Goal 8 of the MDGs which also involves making the benefits of new technologies— especially ICTs—more widely available.

Mobile phones could be used to improve access to ICT-related services in the developing world. According to recent estimates, the number of mobile phone subscribers in low and middle income countries is already far higher than in high income

¹⁷ A recent paper by Bebczuk (2008) attempts to answer some of these questions for the case of Latin American and Caribbean (LAC) countries. It claims that: (a) Limited financial inclusion does not simply follow from unfair discrimination against the poor, but to a great deal from a low demand for financial services and scarce access for the population at large (supply-side constraints have a second-order importance); (b) Despite the impressive progress of microfinance in recent years, stakeholders should avoid over-optimism, suggesting that, while a potentially powerful tool to fight poverty, microcredit must be carefully targeted, and granted by highly specialized intermediaries under commercially-oriented criteria; (c) Although financial inclusion is a social matter, the private sector has provided more and better responses than the public sector; furthermore, these private programs have proven to be quite profitable; and (d) Recent experiences in several LAC countries hint that governments can play a decisive role in coordinating financial inclusion initiatives, leading normative changes, and supporting innovative banking outreach strategies without engaging directly in credit allocation.

countries, and the gap between developing and industrial countries in terms of mobile phone density has been shrinking (ITU, as quoted in World Bank 2007c). Access to mobile phones could generate a positive impact on poverty and inequality reduction, by enhancing its users' ability to effectively engage in market exchange. Farmers, fisher folk and other rural entrepreneurs with mobile phones, for example, could enhance their access to market information, helping them obtain the best possible price for their goods as well as save on costs related to acquiring this information had they not had a mobile phone.¹⁸

New applications of mobile telephony could also be used to enhance the efficiency of the public sector in its provision of certain types of services, notably in remote rural areas which may not be so easily reached by most physical infrastructure networks. It might also be possible to leverage mobile telephony-related technologies in order to re-organize the production and provision of some products—such as those related to financial services—in such a way as to lower their costs of provision and make them more accessible for the low-income population. The development of mobile banking (m-banking), which involves the use of a mobile phone or another mobile device to undertake financial transactions linked to a client's account, seems to hold promise in this regard. Studies by Porteous (2006, 2007) and Ivatury and Pickens (2006) suggest that the wide and growing use of mobile phones in developing countries, and the power of the various actors involved in the provision of financial services through this channel—mainly network operators and banks—, could help to bank the “unbanked”.

Market heat maps could shed further light on access rates for mobile phones notably among the poor. Figures 5 and 6 illustrate the access to mobile phones among the non-poor (Figure 5) and among the poor (Figure 6) in rural and urban areas as well as in different provinces in South Africa.¹⁹ Darker shades in the maps indicate higher access rates amongst the respective income group. The market heat map suggests that mobile phone access rates are higher for both the poor and the non-poor in the regions in the West (Northern Cape, Western Cape) and East of the country (Northern Province Limpopo, Mpumalanga, and Kwazulu Natal), varying between 41 and 80 percent in almost all of the provinces in these geographical areas. Mobile phone access rates in the Eastern Cape, a province with a relatively high poverty rate (Schwabe 2004), are low (ranging from 0 to 20 percent) for both the non-poor and the poor. However, the relatively high density of population centers and built-up areas in those provinces with lower mobile phone access rates for both the poor and the non-poor (for example, Eastern

¹⁸ For example, Jensen (2007) examined the effects of access to mobile phones by fisher folk in Northern Kerala in India during the period from 1996 to 2001 and found that fishermen with mobile phones were able to call ahead to markets to find out where their catch would fetch the best prices. The proportion of fishermen who ventured beyond their home markets jumped from zero (situation of near autarky) to 30-40 percent as soon as mobile phone coverage became available. Their profits also rose by 8 percent on average. Because of the more appropriate matching of demand and supply for fish, waste was completely eliminated (that is, previously excess fish supply were often thrown away in some markets) (Jensen 2007, p.883; 890; 896).

¹⁹ Here, data on personal usage of a mobile phone are used as a proxy indicator for access. Again, estimates for people without access to mobile phones could be interpreted as an upper bound indicator for the share of people without access to mobile phones.

Cape, Free State, and North-West) suggests that these provinces are highly populated and, hence, that there might be a potential business opportunity for providers of mobile phone services to serve many of those who still lack access to mobile phones.

[Insert Figures 5 and 6...]

Due to lack of data availability, the market heat map does not contain information on suppliers of mobile phone services. South Africa has 4 main mobile services providers, including industry leader VODACOM (with almost 60 percent share) and the remaining distributed among Cell C, MTN, and Virgin Mobile SA. More detailed information on their subscribers (as well as whether or not they are poor or non-poor, or in rural or urban areas) is not presently available.²⁰

Once again, the market heat maps are not only useful to help illustrate general market access patterns—one might also be able to glean some important links between these and some of the possible underlying factors behind poverty itself. For instance, inequality and poverty in South Africa could be linked to the historical disadvantages faced by the country's black population. Indeed, estimates suggest that the poor are concentrated in former homelands in the provinces North-West, Eastern Cape, Kwazulu, and Limpopo, in the peri-urban areas and the townships (Schwabe 2004). In many of these areas, the inclusiveness of markets for the poor in general—including mobile phone markets in particular—could tend to be relatively low.

Addressing these historical inequalities, translated in part in the lack of access to key markets that could potentially empower the poor, is the challenge. To this end, market heat maps could provide valuable additional information on some key market opportunities for financial services providers. More specifically, these could help to reveal the potential overlaps between those with mobile phone access, but remain unbanked, which comprise opportunities for leveraging mobile phones to provide m-banking (mobile banking) services. Estimates for South Africa indicate that such an opportunity possibly exists in this country. In South Africa, more urban and rural poor people have mobile phones than are banked, which suggests that if banking services were to somehow be cost-effectively provided through mobile phones, then perhaps some traction could be achieved in terms of banking the unbanked. An important additional point to make here is that these opportunities exist in the poorer sub-section of the market.

In urban areas in South Africa, 43 percent of the poor adult population has access to a mobile phone while only 32 percent of the adult population in this income category is banked. In rural South Africa, 31 percent of the poor have a mobile phone, while only 19 percent of them are currently banked (calculations based on FinScope 2006). An estimate of the precise intersection of the poor who have mobile phones, and among them those who do not have bank accounts, reveals an opportunity to leverage mobile phone access in order to bank the unbanked in South Africa: about 24 percent of the urban poor, and 21

²⁰ For further information, see Business Monitor International (2008).

percent of the rural poor. Estimates of the precise intersection in three other countries reveal that this potential market could be large in those countries as well (see figure 7):

- Botswana: about 30 percent of the urban poor, and 10 percent of the rural poor;
- Namibia: about 12 percent of the urban poor, and 6 percent of the rural poor;
- Zambia: about 42 percent of the urban poor, and 7 percent of the rural poor.

[Insert Figure 7...]

A departure from more traditional “brick and mortar” provision technologies for financial services could help make these services much more affordable for the poor. Private sector innovations to leverage “soft ICT networks” are already being applied in a number of countries and also in South Africa.²¹ Furthermore, with the expected increase in mobile phone penetration rates, as prices of handsets and services further decline and as secondary markets for handsets develop (as they have in countries with high mobile phone penetration rates like the Philippines), opportunities to bank the poor by leveraging mobile phones could emerge in a growing number of countries.

²¹ For instance, Celpay allows individuals and companies in the DRC and Zambia to manage their bank account via mobile phone or the internet (Catheu 2007). In addition, M-Pesa is a new mobile payment solution that allows customers in Kenya to use the mobile phone for simple financial transactions. In South Africa the startup mobile banking provider Wizzit is targeting the unbanked offering a transaction banking account accessible via mobile phone and debit card. The company, which operates as a division of the South African Bank of Athens, was launched in December 2004 (Ivatury and Pickens 2006).

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Table 1
Poverty Patterns in Haiti (2001)

Region	Poverty Headcount Ratio US\$2 a Day Poverty Line (in Percent)	Percentage of the National Poor Living in Region
North East	94.2	4.7
North West	90.5	6.2
Centre	88.4	7.8
Artibonite	88.1	15.6
South	87.5	9.7
Grand Anse	87.2	9.6
South East	84.3	6.6
North	84.1	11.1
West	60.8	28.8
National	78.0	100.0

Source: Based on microdata from the ECVH as quoted in CEDLAS and World Bank (2008).

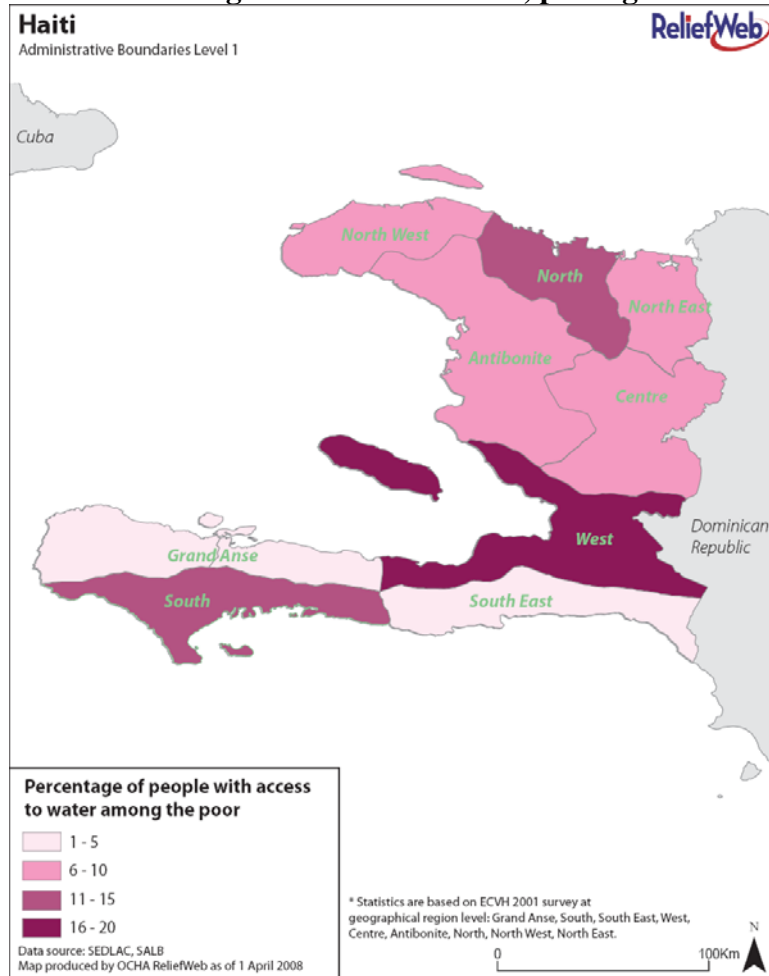
Table 2
Poverty Patterns in Guatemala (2000)

	Incidence of Poverty Headcount Index (Percentage of population)			Contribution to National Poverty	
	Percentage of National Population	All Poor	Extreme Poor	Percentage All Poor	Percentage Extreme Poor
Total Guatemala	100.0	56.2	15.7	100.0	100.0
By Geographic Area					
Area	38.6	27.1	2.8	18.6	6.9
Urban	61.4	74.5	23.8	81.4	93.1
Rural					
By Ethnicity					
Non-Indigenous	57.6	41.4	7.7	42.4	28.3
Indigenous	42.6	76.1	26.5	57.6	71.7
Kaqchiquel	8.9	62.6	13.6	9.9	7.7
K'iche	9.4	64.4	19.1	10.8	11.5
Q'eqchi	6.5	83.5	38.0	9.6	15.6
Mam	8.3	89.7	34.2	13.2	18.0
Other	9.5	83.6	31.3	14.1	19.0
Indigenous					
By Region					
Metropolitana	21.7	18.0	0.6	6.9	0.9
Norte	8.1	84.0	39.1	12.1	20.1
Nor-Oriente	8.2	51.8	8.9	7.6	4.7
Sur-Oriente	8.8	68.6	20.1	10.7	11.3
Central	10.7	51.7	8.7	9.8	6.0
Sur-Occidente	26.5	64.0	17.0	30.1	28.6
Nor-Occidente	12.9	82.1	31.5	18.8	25.9
Peten	3.3	68.0	12.9	4.0	2.7
By Gender of Household Head					
Male	85.3	57.6	12.3	87.5	90.8
Female	14.7	47.8	8.4	12.5	9.2

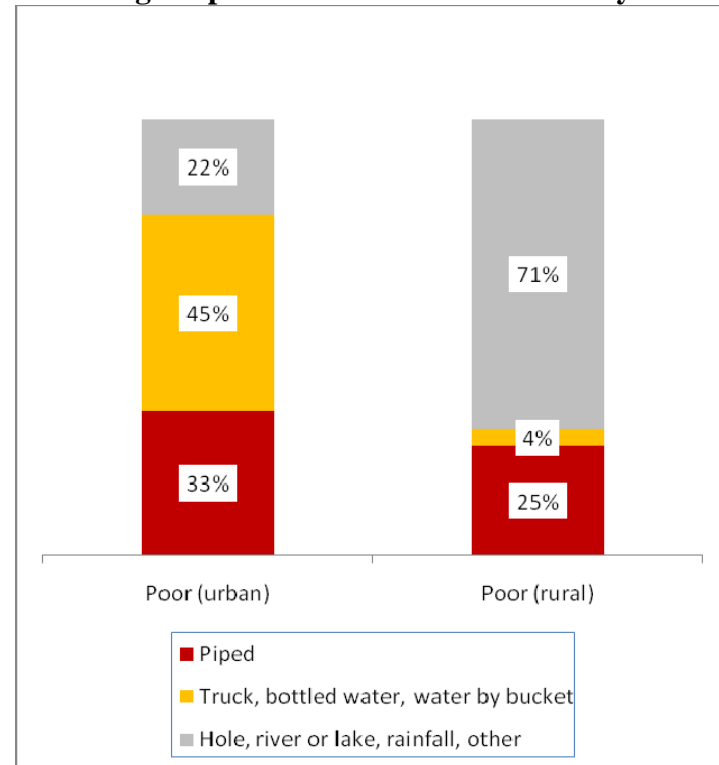
Source: World Bank (2003, p.11).

Figure 1
Market Heat Map for Access to Water in Haiti (2001)
(Poor households)

Percentage of Poor households, per region



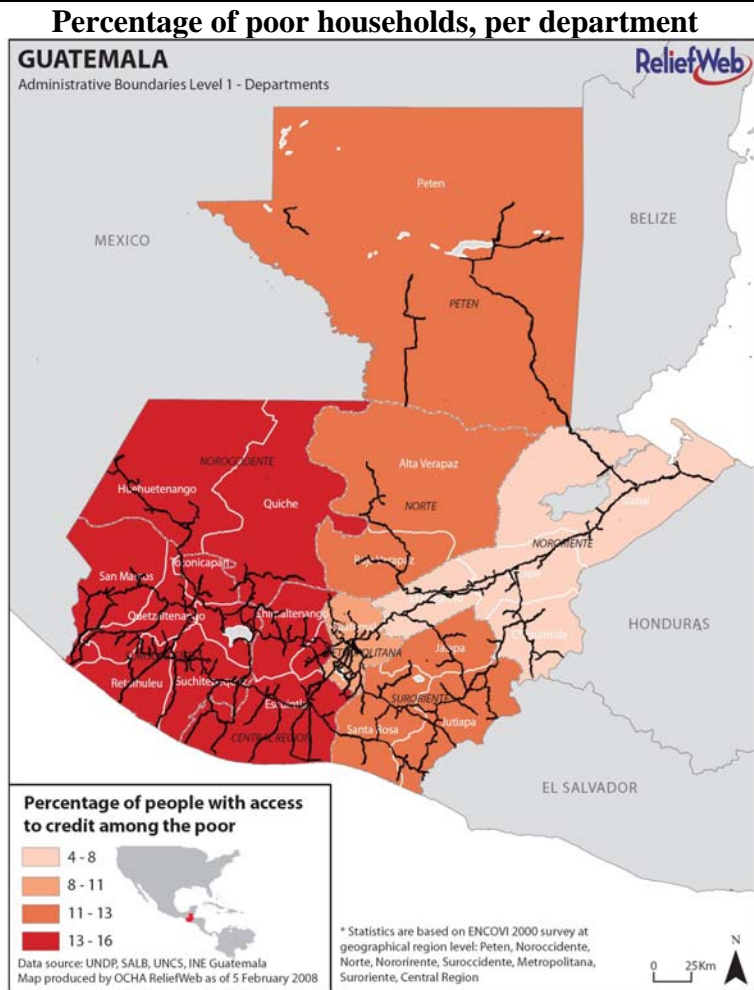
Percentage of poor households with access by source



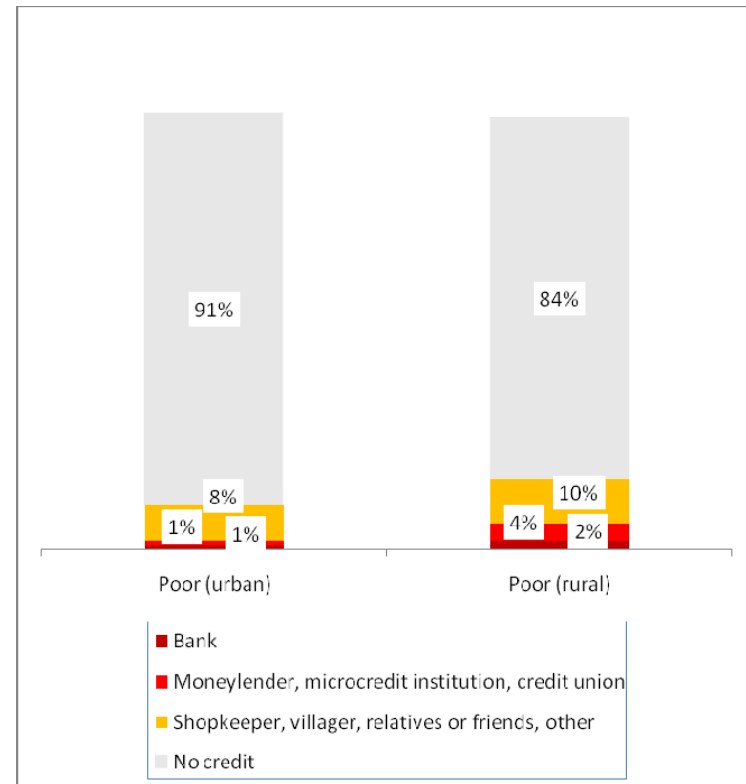
Note : The regional map shows data on access to piped water. Estimates for piped water in the figure refer to private piped water (inside and outside the house as well as wells in the house) and public piped water.

Source: Based on Institut Haïtien de Statistique et d'Informatique (2001).

Figure 3
Market Heat Map for Access to Credit in Guatemala (2000)
(Poor households)



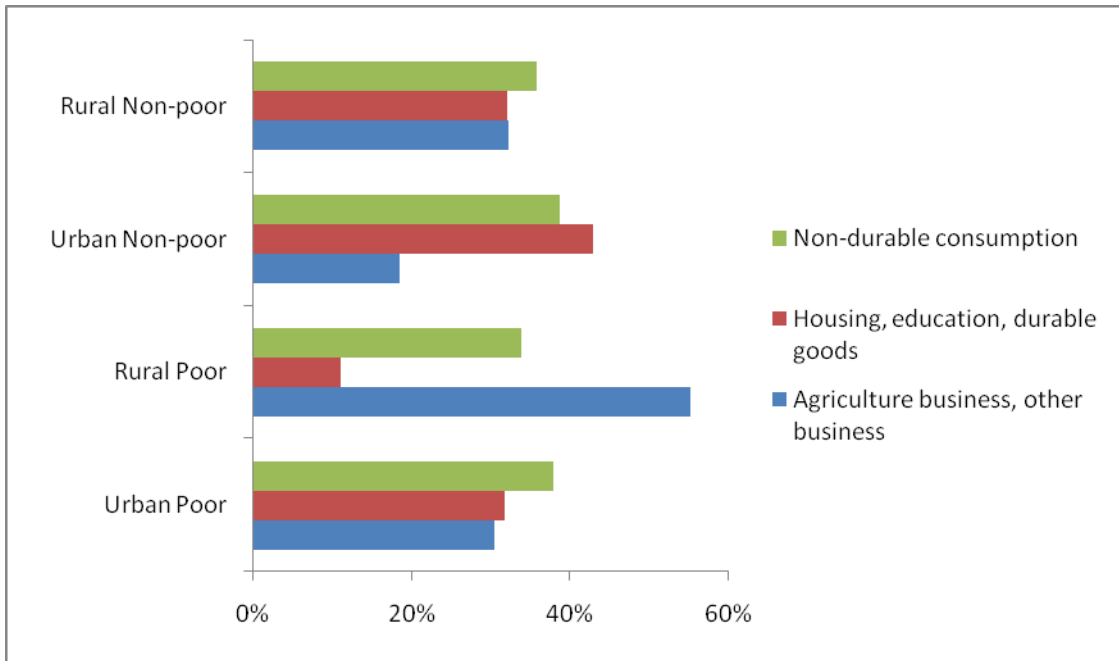
Percentage of poor households with access by source



Note: Black lines in the map represent asphalt roads (see Henninger and Snel 2002, p.20).

Source: Based on Instituto Nacional de Estadística de Guatemala (2000).

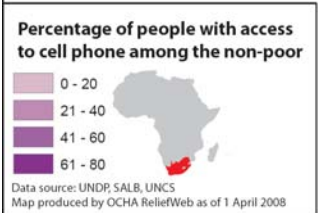
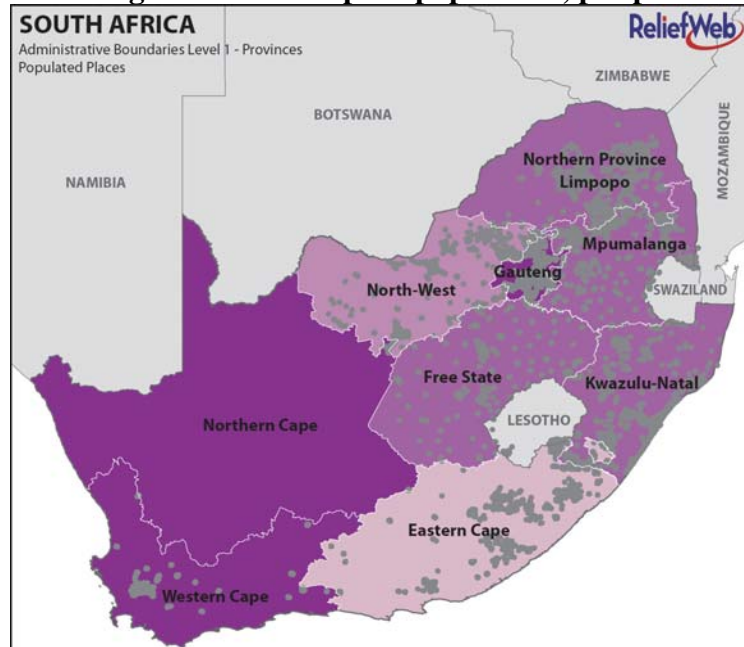
Figure 4
A Possible Opportunity: Estimates of the Use of Credit in Guatemala amongst the Poor and the Non-poor (2000)



Source: Based on Instituto Nacional de Estadística de Guatemala (2000).

Figure 5
Market Heat Map for Access to Mobile Phones in South Africa (2006)
(Non-poor population)

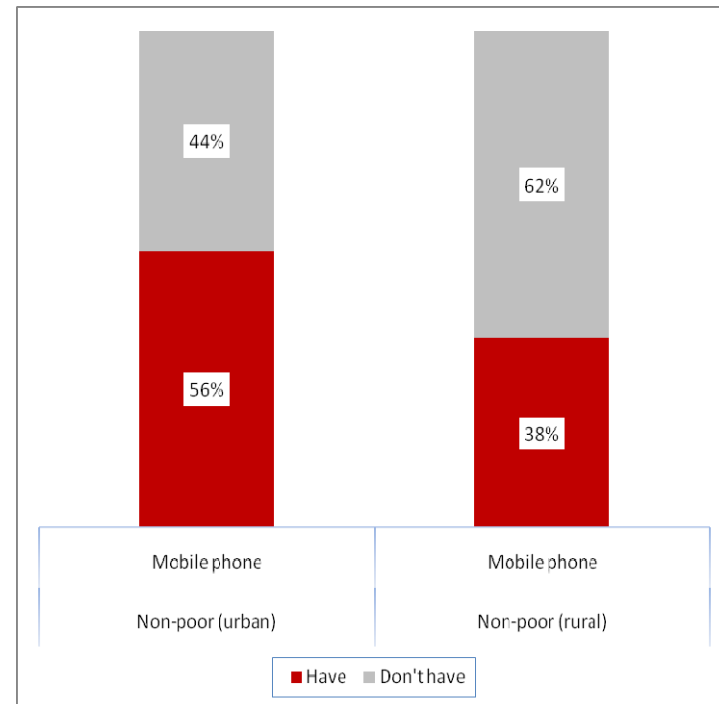
Percentage of adult non-poor population, per province



* Statistics are based on FinScope 2006 survey at geographical region level: Northern Province, Mpumalanga, Gauteng, Kwazulu-Natal, Free State, North-West, Eastern Cape, Northern Cape, and Western Cape

Geographic Coordinates WGS84

Percentage of non-poor adult population



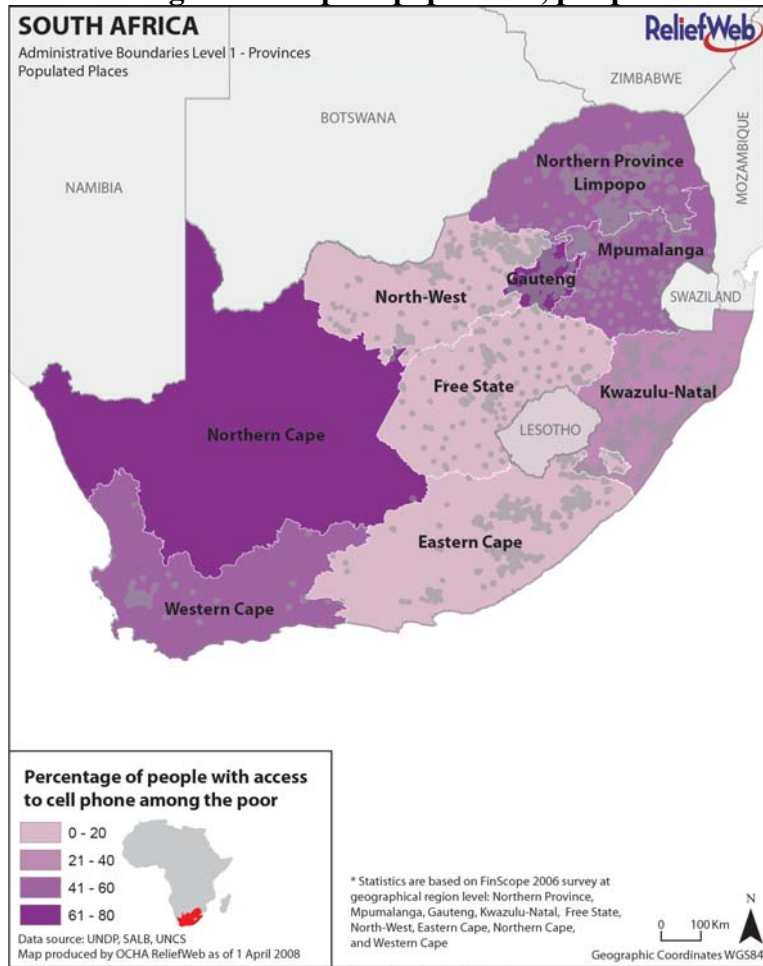
Note: Grey spots in the regional map represent population centers, built-up areas.

Estimates for mobile phone access are taken from the survey category “personally make use of...”, answer “pre-paid cell phone”.

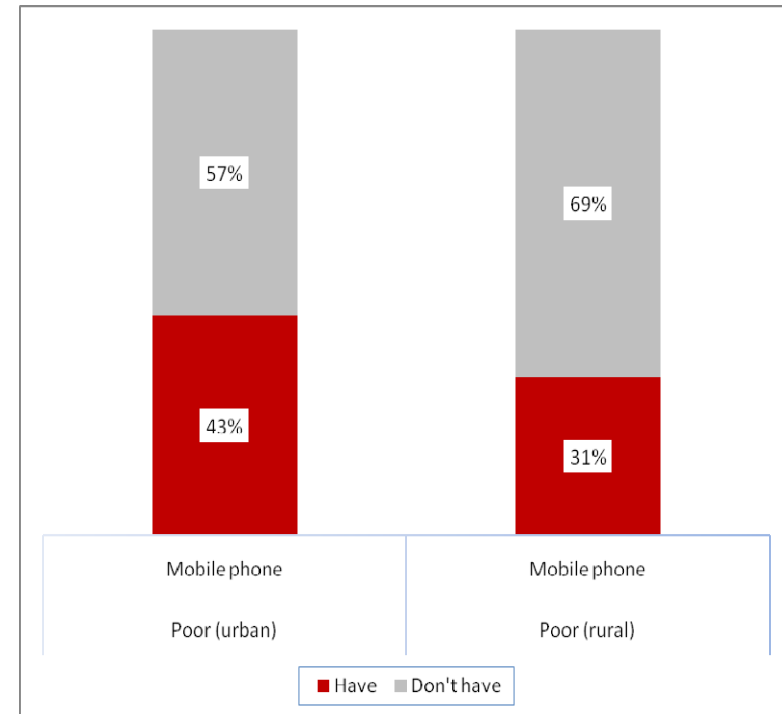
Source: Based on FinScope (2006).

Figure 6
Market Heat Map for Access to Mobile Phones in South Africa (2006)
(Poor population)

Percentage of adult poor population, per province

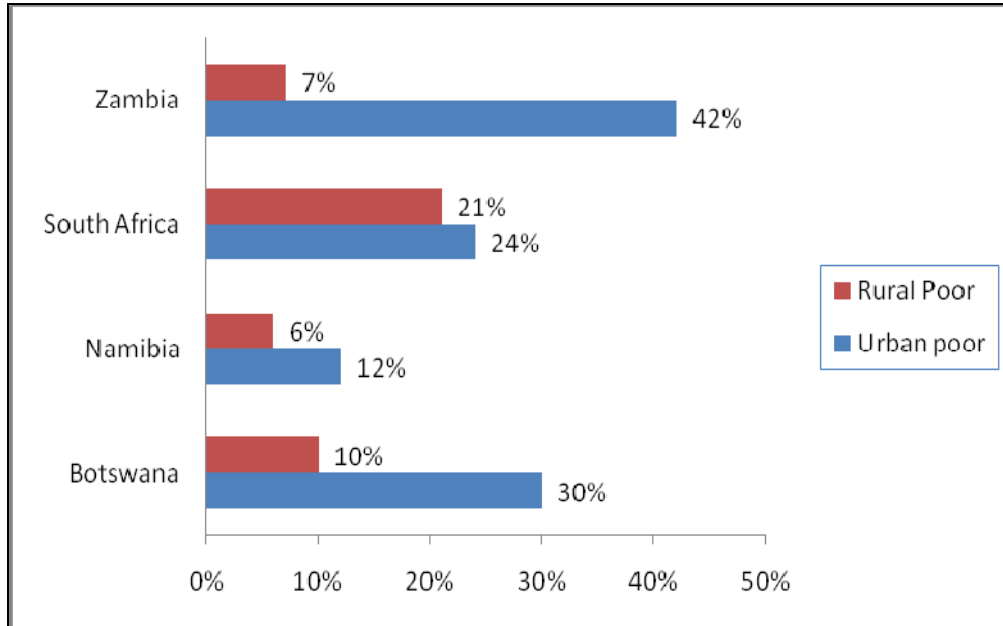


Percentage of poor adult population



Note: Grey spots in the regional map represent population centers, built-up areas.
 Estimates for mobile phone access are taken from the survey category “personally make use of...”, answer “pre-paid cell phone”.
Source: Based on FinScope (2006).

Figure 7
A Possible Opportunity: Estimates of the Precise Intersection of the Poor who have Mobile Phones and among Them Those Who Do Not Have Bank Accounts in Botswana, Namibia, South Africa, and Zambia (in percentage)



Source: Based on FinScope (2004a; 2004b; 2005; 2006).