MAPPING PROXIMITY
BRINGING PRODUCTS AND SERVICES CLOSE ENOUGH TO THE POOR TO BE MEANINGFULLY USABLE AND STILL KEEP THEM SUSTAINABLE FOR WSBI PARTNER BANKS

Working with savings banks to double the number of savings accounts for the poor
April 2013

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Improving proximity has always been a major feature of the Programme; it was the largest single feature of proposals made to secure funding and is fundamental to all but one of the ten projects chosen for support. Moreover, the evidence base that proximity matters to savings mobilisation is also well established. That said, just rolling out more proximate agent networks has not delivered a breakthrough in pro-poor savings mobilisation and it has become rapidly clear WSBI needs a more nuanced view of what constitutes sustainable proximity. This paper argues that breakthrough is still possible but probably with more of an urban/peri-urban focus than originally planned and that rural access really does depend on putting a low cost savings account at the end of the mobile money transfer business.

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Context for the paper: The background to this assignment is the WSBI Programme "Working with savings banks in order to double the number of savings accounts". This specific study relates to sharing lessons under the programme.

Participating partner banks: KPOSB Kenya, TPB Tanzania and PBU Uganda.

The author would like to thank the participating banks for their contributions in providing data and answering subsequent questions. This paper is a first draft for wider comment and the findings as presented here are new even to the participating banks. Comments are not only welcomed but actively sought.

WSBI

MAPPING PROXIMITY PURPOSE OF THE PAPER

The WSBI Programme aims to double savings accounts in the hands of the poor at ten participating savings banks. For all but one member improving proximity was a major element of the projects put forward for funding. As most of the proposals involved opening agency networks, deciding where to open agency outlets is the main focus in this paper. The techniques used here could nevertheless apply just as well to deciding where to put own bank staff into single-teller kiosks (e.g. within post offices) or mini branches (in busy market areas, etc). The aim is to use official data but move beyond the limits of official views on what constitutes a location to get to an understanding of how people cluster in their day to day life. Only by fitting in with the daily habits of their customers can members close both the physical and social gaps that stop people with real needs from using solutions with a real capacity to meet those needs.[1] In this paper, how this might be done is looked at only at a conceptual level – how many locations, how big and what type they are, what sort of network is likely to prove sustainable, etc. – and the focus is on lessons of relevance to a wider audience. Separately the detailed work behind these higher level findings is being provided to the three participating member banks to help them refine their own outreach strategies. Ultimately WSBI wants to develop this as a toolkit for use by any member (or indeed any institution with a genuine interest in serving a mass retail market), so a large part of this paper focuses on methodological issues.

Introducing the banks who have participated so far and the countries in which they operate

Although the aim of the paper is to create a better understanding of what constitutes proximity in any context, clearly it is still of interest to readers to know something of the countries and banks that have been involved so far. All three members involved are notional postal banks but in all three cases the traditional postal savings business is moribund and in one case (Uganda) had to be abandoned. They do, however, represent a range of possible responses to postal savings and as such their experience is relevant to other banks participating in the WSBI Programme and indeed the wider WSBI membership.

	KENYA POST OFFICE SAVINGS BANK	TANZANIA POSTAL BANK	POSTBANK UGANDA
Total deposits	$167 mn	$67 mn	$39mn
Pre-tax profit	$1.3 mn	$0.3 mn	$0.1 mn
Cost-income ratio	95%	95%	99%
Number of staff	786	392	420
Number own branches	92	32	29*
Postal as % total	2%	9%	0%
	2010 audited	2010 audited	2010 audited

* plus 3 mobile units

1 Mass retail banking: How savings banks in Africa, Asia and Latin America can provide usable services to the poor, WSBI Working Paper May 2012, www.wsbi.org/template/content.aspx?id=5820.

All three also operate in countries that between them represent a wide range of topography and population clustering. Kenya is perhaps the most diverse with the obvious differences between town and country but also marked differences between arid lands, highland locations, lakeside and the coast. This means there are some very sparsely populated areas but others where settlements cluster so close together it is hard to distinguish one from the other. Tanzania shows more of the pressures that arise from widely dispersed population centres whereas Uganda illustrates particularly acutely the issues arising from high density clustering. In both cases it is difficult to draw a link between where people live and the administrative structures that are laid over their clustering. Basic population and geographic statistics are shown below:

	KENYA POST OFFICE SAVINGS BANK	TANZANIA POSTAL BANK	POSTBANK UGANDA
Total population (mns)	40.5	44.8	33.4
Of which aged 0-14	42%	45%	48%
Official urbanisation	22%	26%	13%
Land mass (thou. km^2)	589	886	197
Crude density (per km^2)	71	51	170

Source: www.data.worldbank.org

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ABBREVIATIONS

CIESEN	Center for International Earth Science Information Network
ESBG	European Savings Banks Group
GPW	Gridded Population of the World
GRUMP	Global Rural-Urban Mapping Project
KPOSB	Kenya Post Office Savings Bank
PBU	Postbank Uganda
SACCO	Savings and Credit Co-Operative
TPB	Tanzania Postalbank
WSBI	World Savings Banks Institute

1. USING EAST AFRICA TO ILLUSTRATE THE PROXIMITY CHALLENGE

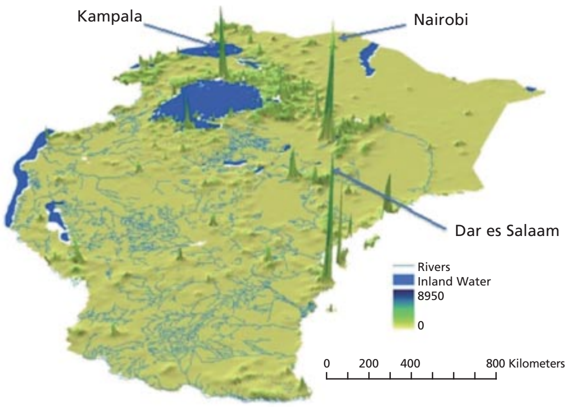
The three big countries of East Africa – Kenya, Tanzania and Uganda – capture many of the topographical challenges that face WSBI in its programme to double savings accounts in the hands of the poor. In some regions (e.g. southern Uganda or western Kenya) rural populations can cluster at densities typical of a small town in other regions. However, catchment areas in the denser rural regions often overlap so much that it is difficult to allocate the population concerned to one location rather than another nearby. In other parts of the same country, population centres can be so dispersed that even smaller ones can be granted town status just to contrast them with the empty space they are legally responsible for administering (Tanzania would be a good example of this). These three countries also represent the full range of economic challenges the WSBI Programme faces in the poorer (sub-Saharan) half of the countries covered.[2] Monthly household cash-flows in rural areas range from about $50~$60 for Tanzania and Uganda and up to $80~$100 in Kenya. In Tanzania and Uganda banking is clearly the preserve of households living above the wider international poverty threshold but in Kenya mass retail banking is becoming a real possibility for households living right down to the extreme poverty threshold.[3]

Improving proximity was fundamental to the proposals for funding under the WSBI Programme for all three members concerned and Kenya Post Office Savings Bank (KPOSB) was the first bank in the programme to actually start rolling out a card and point of sale enabled non-postal agent network and Tanzania Postal Bank followed with a mobile-enabled network of postal outlets. Uganda's focus was on card/PoS-enabled microfinance outlets (SACCOs in regional terminology). There are therefore some real results to show how proximity is changing as an effect of the investments being made under the programme. None of the rollouts have been as easy as expected and while the Kenya network is showing early signs of take up (in terms of transaction volumes and stabilised customer numbers)[4] the other two networks have failed to deliver the results anticipated of them. Clearly, improving proximity is more complicated than originally thought and this comes out in the analysis below.

Last but not least, all three projects have had to rollout against the background of one of the most dramatic changes in the landscape of access to happen in years, namely the growing dominance of mobile money as **the** platform for mass retail money transfer.

Understanding the proximity challenge

Figure 1: Population density across East Africa



The chart above is the best and the quickest way we have of visualising the proximity challenge in East Africa generally. It comes from the AfriPop project, which was initiated in July 2009 with the aim of producing detailed and freely available population distribution maps for the whole of Africa. AfriPop uses satellite imagery and official data as well as other evidence about how people cluster – e.g. away from swamps and closer to road networks. The algorithms underlying AfriPop predict where and how many people are living down at individual hectare level (i.e. down to 100x100 metre squares). On this map the really big centres (national capitals as flagged and some major regional centres as well) are all immediately visible as big spikes. So too are some of the larger county and district main towns. Equally visible are the big empty spaces that characterise north-east Kenya, northern Uganda and most of Tanzania. Across these empty spaces, centres are few and far between and show up as distinct bumps on the map. More complicated are the large areas around Lake Victoria where densities are well above rural background levels but spread fairly evenly over many hundreds of square kilometres and do not obviously spike in distinct centres.

2 Burkina Faso, Kenya, Lesotho, Tanzania and Uganda are the poorest five; the better off five are El Salvador, Indonesia, Morocco, South Africa and Vietnam.
3 The wider definition is $2.50-PPP per adult equivalent per day and the extreme definition (at which food insecurity becomes a real issue) is half this, but these are not real cash dollars out in rural locations – see reference (i) for more.
4 All three banks had been experiencing traumatic declines in active customer bases.

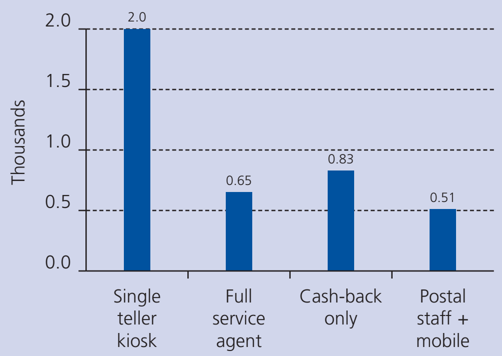
The ideal solution would be to let the mapped data cluster itself into areas of density sufficient to sustain an outlet and then reveal the name or names of the locations involved. That is being worked on but it is not yet available. What can be done is to list locations from any source and then have the geospatial data reveal how many people live within a given number of kilometres of each location. A modified version of this last approach is used in this paper.

Two immediate challenges arise that are discussed in more detail later in the paper but need to be understood from the outset. First, what is classed officially as a town may not map directly to the dense clustering that defines urbanisation as lived by ordinary people. Second, long lists of many thousands of locations can be put together but even with reasonable assumptions about catchment area size it is possible to end up with apparently more people living in these locations than the total population of a country. This is because of overlaps between catchment areas and the usual subdivision of wider city or town catchment areas into named sub-locations. The former affects credibility because the results of proximity mapping might not show all officially designated towns as genuine urban clusters. This can, however, be worked through; more difficult is handling overlaps and subdivision.

How big a catchment does an agent need?

Obviously this depends on the sort of agency being considered but the average number of users per M-PESA agent in Kenya (600-700) matches closely our own calculations (see chart below and supporting paper on sustainability[5]). The big difference is how tightly drawn the catchment area must be to yield those 600 - 700 clients. We do not think people will walk as far to deposit one or two spare dollars as they will to pick up (or send) a transfer that typically equals more than half a week's cash flow for a poor rural household. So we set our limit at 650 households (3,500 people) within a radius of 2 km of each location's centre.

Figure 2: Required customer numbers



Turning data into useable information for an outreach strategy

The starting point for each country was a long list of 4,000~6,000 locations where names and geographic co-ordinates could be found using sources described later in the paper. For each location, population within a one-, two-, three-, five- and ten-kilometre radius was calculated. It was then possible to separate out larger centres and attach specific and appropriate catchment radii to these – 10 km for cities and major towns, 5 km for smaller towns and large trading centres and 2 km for smaller rural trading centres and other rural clusters. Generally, because of the overlap problem these lists captured more than total national populations and very many of the locations had population densities below what is normally considered in sub-Saharan Africa to be the threshold density for rural clustering (300 people per square kilometre) below which you stop dealing with villages and get into very dispersed rural living.

The next stage was to take these long lists and isolate much shorter lists of non-overlapping locations that could unambiguously be represented as population centres. These had to have names and geo-coordinates that corresponded to visibly heightened density on population density maps. At the same time the catchment radii for rural locations had to be cut to 1 km to eliminate the overlap problem. This produced dramatically smaller numbers both for locations (low hundreds) and population linked to identified locations (from about 25% to 40% of total national populations). Clearly, these very tightly defined lists were not credible either.

The 1 km catchment radius used for village locations in the shorter list was in any case too tightly drawn for the business model we were trying to investigate (see box). The long list was revisited and any location above 300 people per square kilometre was rechecked.[5] It was immediately possible to exclude hundreds of locations as sub-locations within cities and main towns. That then left 1,000 to 2,000 rural locations in each country where smaller ones could be cross-checked against larger ones for overlaps and critical mass.

5 Below 300 km^2 catchments with a 2 km radius will not yield enough households to support a standalone bank agency – see box and linked paper on www.wsbi.org/uploadedFiles/Double_savings_accounts_(WSBI_only)/WSBI%20sustainability%20paper%20EN.pdf

For each of these, density within a central core with a one-kilometre radius was calculated and the same done for concentric kilometre wide bands radiating out from the centre. The density pattern was allowed to determine which locations could have larger catchment areas and which had to be kept small to avoid overlap. More specifically, catchment areas around denser cores were nudged up at the expense of nearby lower density locations. The impact of this differed region by region; in some, moving from a one- to a two-kilometre radius added nothing because of growing overlaps but in others it almost tripled the captured population.

The results of all this are summarised for each country below. The approach taken has been to tier locations from (1) the relatively urbanised core (which in the main paper gets split into cities/major towns and other larger 'urban' trading centres) on through (2) other distinct rural centres where a name and its geo-locators clearly coincide with enough of a spike or hump on a regional geospatial map to constitute a village or small regional trading centre and then on to (3) looser rural clusters where the average density within a 2 km radius is above the village threshold but the population is less obviously centred. The reason for this tiering is that the urban core (1 above) is obvious to everyone and the distinct rural centres (2 above) can be identified top-down using the techniques described in the main paper. Deciding where to locate among the looser rural clusters (3 above) requires, however, the sort of local knowledge that only a regional or divisional/district branch manager might have; only a decentralised agent recruitment strategy is likely to work, but this, too, carries risks.

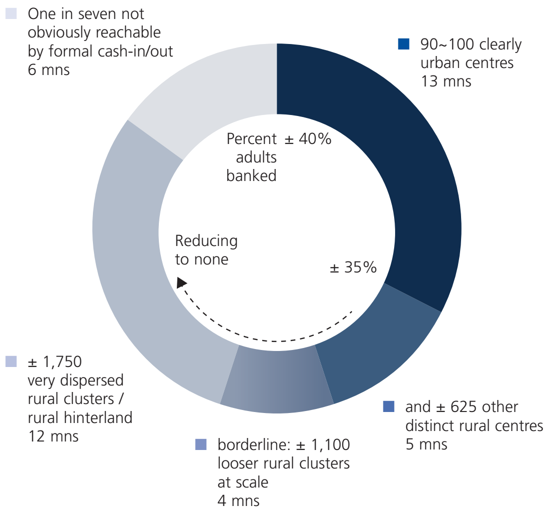
Beyond these three tiers we also show a fourth tier, almost all of which we are reasonably sure can only be reached via mobile money – these are people living a very dispersed rural lifestyle and densities can be as low as 50 per square kilometre such that a 600~700-household village type population is only captured within a 5 km radius, not the 2 km one we think appropriate for a savings bank agency.

Our conclusions regarding Kenya

The end result for Kenya is the chart on the right, which shows:

- About 30% of Kenyans live in just under 100 clearly urban catchment areas that relate to cities and main towns plus smaller county or larger divisional trading centres. The majority of these are already reached by the KPOSB branching model, but that alone will never be enough to make accessible savings a doorstep reality for poorer unbanked urban households.

Figure 3: Kenya – Summary profiling
40.5 million people in 2010; probably just over a thousand locations at the scale needed



- Another 20~25% of Kenyans seem to be living some sort of village life-style. Over half of these are rural Kenyans living in just over 600 rural trading centres or densely centred villages with catchment radii mostly 2 km but a few of the larger ones up to 3 km. These can be centrally identified and could support an agency but probably smaller than the sort originally planned by KPOSB. Next come 1,100 looser rural clusters that should really be split into two equal groups – those where, with a bit of local knowledge, it is possible to identify a 'centre' where an agent might be sited and those clustering in such an indistinct way that probably only mobile money agencies will work. We call these last two sub-groups the borderline and that is why the spilt is shown as a blurred boundary between darker and lighter grey.

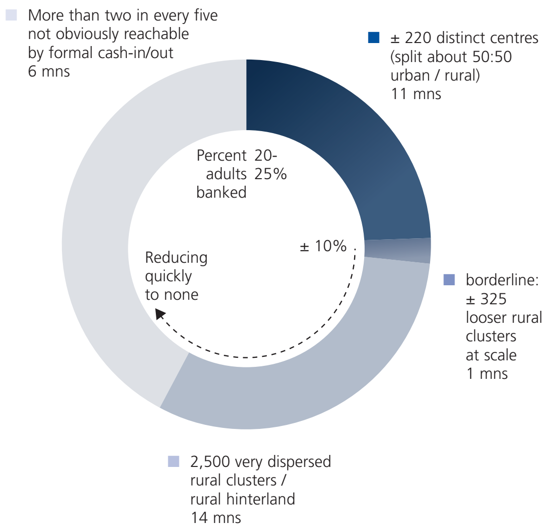
- Then come another 30~35% of Kenyans living within 5 km of 1,750 really dispersed rural locations that are not centred enough to count as villages plus those living in 2~3 km rings around the centred rural catchments described for the previous group. People in this group are able to and mostly do access mobile money but are beyond easy walking distance of a centre where one might put a bank agency.

- Finally, there are just under 15% of all Kenyans living below background rural densities of 50 per square kilometre (i.e. one household per ten hectares). These are not even within 5 km of a very dispersed cluster centre where they are likely to find an M-PESA agent, but they might be reached by informal sub-agents working under an established agent code.

The overall conclusion is that there are enough locations big enough to take the thousand-agent strategy originally proposed by KPOSB, but these alone are unlikely to deliver the significant breakthrough originally planned because they only account for under half the population. The focus will also be more urban than originally planned. There are unbanked urban adults still to reach, but they are mostly very poor and many of them are young adults still living in the parental home. Savings on the end of a phone, as already developed by the bank, are a priority for this group and would also open up otherwise unreachable rural households if pricing could be made more affordable.

Our conclusions regarding Tanzania

Figure 4: Tanzania – Summary profiling 45 million people in 2010 but only a few hundred locations at scale needed



Tanzania presents a very different picture:

- Barely 20% of the population is living within clearly urbanised catchment areas and these do not even capture all District centres. To capture all the District centres and get closer to the quarter of all Tanzanians classed as urban under official definitions requires bringing in three other types of location, including (a) all rural trading centres; (b) all of what would be classed as densely centred villages in other countries plus (c) most of the looser rural clusters that typically mark the borderline between locations that might support a bank agency model and those where access only looks possible via mobile money.

- Then comes about 30% of the population living in up to 2,500 really dispersed rural clusters plus those living in 2~3 km rings around rural trading centres and denser villages included for the previous group and are therefore (or should soon be) able to access mobile money but beyond easy walking distance of a centre where one might put a bank agency.

- Finally, there are the 45% (or very nearly so) of all Tanzanians who are living below background rural densities of 50 per square kilometre.

The overall conclusion is that focusing on getting service levels and usage in the 150 now connected post offices is the best way of reaching the targets set for Tanzania Postal Bank. Rolling out more agents, except on a very selective basis, is unlikely to deliver anywhere near as many new clients as improving urban outreach. There are in any case plenty of unbanked urban and peri-urban households that still need reaching, but a crucial part of doing this involves linking safe term savings to very liquid mobile money. This would then open up meaningful savings services to huge numbers of unbanked rural households as well.

Our conclusions regarding Uganda

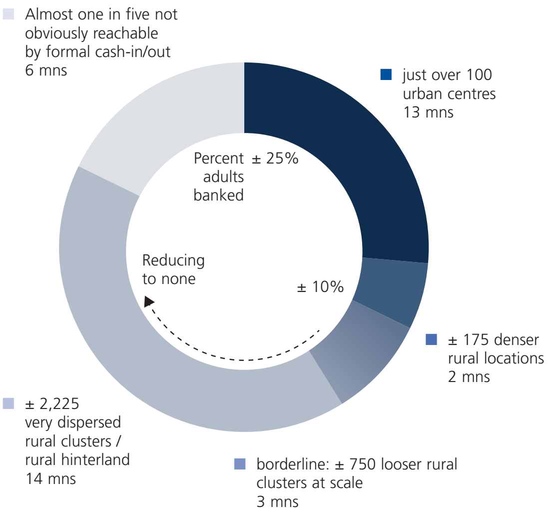
Uganda is an interesting mix of what we see in the other two countries:

- The degree of actual urbanisation in Uganda appears more significant (+/- 25% of the population) than official statistics suggest (15%) but adding in rural trading centres and more densely centred villages only pushes the clear reach of the bank agency model out to roughly one in three Ugandans, ahead of Tanzania (at most one in four) but behind what looks possible in Kenya (almost one in two).

- The borderline between locations where the bank agency model might work and only mobile money is viable appears very blurred in Uganda because locations overlap so much but we can identify 750 looser rural clusters where about 10% of Ugandans live that may or may not be reached by a bank agency model.

- This group is, however, dwarfed by the 45% of all Ugandans that live a very dispersed rural existence who are nevertheless so continuously and evenly spread that they are almost certainly within 5 km of the sort of location where a mobile money agency should work (but beyond the reach of the bank agency model).

Figure 5: Uganda – Summary profiling
33 million people in 2010 but well under a thousand locations at scale needed for agencies



- Only 20% of all Ugandans are living below background rural densities of 50 per square kilometre and are not obviously reachable via mobile money.

In Uganda regulatory constraints prevented a meaningful agency model of the sort originally planned, so the focus is now on linking up dispersed village level savings groups (VSLAs) to bank-based savings accounts via a very low-cost mobile phone transfer (group-member to account and vice versa). The chart above shows this is an obvious priority. Separately, the bank would like to develop a low-cost branch model for the 70-80 urban centres it does not currently reach, half of which are entirely unbanked. This too is an obvious priority for one of the most underbanked economies in sub-Saharan Africa.

What all this means for proximity at programme level

Turning to what this means for other agency strategies being rolled out under the WSBI Programme, four suggestions emerge:

- Standalone bank agent networks struggle to reach much more than a quarter to a third of the population except in highly urbanised economies. This is even true of agent models that get out into rural districts, because most rural communities seem much more dispersed than originally thought and there is a limit as to how far people can realistically be expected to walk to deposit a few spare dollars.

- Trading centres outside cities and towns are an obvious target and many of these seem to be unreached by branch-based banking, especially where they do not have an official designation as a town or divisional/district centre. Some may even be large enough to support multiple agencies but they are also the most obvious targets for commercial banks seeking to build agent networks.

- Even within cities and towns, the agent model run as a complement to existing branch networks has a real potential to make accessible savings a doorstep reality. Banking, however, already penetrates quite deeply into urban households so the clients likely to be reached will be poor and most probably second or third adults not in control of the whole household budget. What they can pay for the services they need is very limited (low cents per transaction).

- Beyond this, access is only really ever going to open up to everyone when a very low balance time deposit or flexible monthly savings plan can be set up, fed and ultimately paid out via mobile money. Experience is mixed as to whether clients will or will not pay twice (to the bank and the mobile money operator) for the privilege of accessing their own money. If, however, these products can be made fee-free, the potential for really significant breakthrough is huge.

2. PROXIMITY – THE STATUS QUO FROM MEMBER AND OFFICIAL PERSPECTIVES

2.1. Summary of outlet planning questionnaire

Decisions about where to set up new service outlets are of great strategic and operational significance, yet the tools and data used to support these decisions to date have been limited. Typically, post banks have been using a mix of ad hoc data sources to guide them in selecting new locations. The table below summarizes the responses from a quick survey conducted in 2011 of their approaches to outlet planning. The banks have all made significant strides since this survey was completed and current agent numbers in 2013 now stand at 500 for Kenya, 150 for Tanzania and 60 for Uganda.

The time taken from inception to operational can vary from 4 months to 2 years. Planning for new branch locations is infrequent, and on average one new branch is opened per year. In the push for opening new agency outlets, more planning will be required to select optimal locations for these new units.

The reasons most often quoted that determine good locations are:

- There are a lot of unbanked people in the area
- There are no other formal financial institutions in that area
- There is a lot of small business activity in that area

Data on population size is widely available from national bureaus of statistics, on locations of formal financial institutions are accessible from central banks. On small business activity, information from local administration offices are most commonly used. The granularity of such public data also makes it difficult to build a complete picture, as some information is available for urban centers (for example City Council business registrations) only, information about bank locations is available from individual bank websites in different formats and levels of detail rather than a single source, detailed population level information may not be released until after considerable delay by national bureaus of statistics. This information required to support decision making is not systematized, and not readily available on demand.

Table 1: Summary of outlet planning questionnaire

QUESTION	KENYA	TANZANIA	UGANDA
Number of outlets opened in past 3 years	Branches - 4 Agencies - 160	Branches - 3	Outlets - 9
Length of planning process for new outlet	Branches - 4 months	Sub-branches: 1-2 years	Not specified
Key reasons for opening last 3 outlets	Number of unbanked people in the area Business activity in the area	Population growth Number of unbanked people in the area	Number of unbanked people in the area Business activity in the area There are no other formal institutions in that area
Sources of information:			
Population	National census, health data	Statistics department	Uganda Bureau of statistics, world bank annual reports
Small business activity	Town councils, city councils, registrar of companies	Regional trade officers	Uganda Chamber of Commerce, Uganda Investment Authority, Private Sector Foundation of Uganda, FinScope studies
Competition	Central bank reports	Bank of Tanzania, mystery shopping	Bank customers, Media, Marketing agency, Bank of Uganda, Business intelligence
Infrastructure	Telecoms regulator, ministry of roads, ministry of energy	Regional statistics	Physical evidence through branch operations, Ministry reports – Min of Trade, Tourism and Industry, Media

Particularly worrying is that complete location information on Postbank branches and agencies had to be collated on request. Maintaining such internal information in a readily accessible and comprehensive manner is vital to ensuring managers and their supervisors can collate and link it to performance data that will then provide input into how operations could be further improved.

The Postbanks currently find it difficult to do so in a format that is easily accessible, manageable and updateable. This challenge means that, although inadequate systems can be maintained for small numbers of agents (say up to 200 or so), once a Bank starts to work with 250 agents or more, there is a real need for a much better system to maintain the information in an efficient and usable way. Basic systems should include unique identifiers for each agent, sketch maps of their locations, manager names and contact details, and qualitative details about the area it is located in and surrounding small businesses and possible market segments. Master lists should be maintained by named individuals with an appropriate change of command, so that different versions of similar information do not circulate within the organization.

2.2. Official sources of data

The national census bureau publishes detailed population data, but in some instances, the public versions remain in printed and bound formats. Access to detailed information in digital form requires persistence, and may only yield older census data rather than the most recent results. Supply-side data for financial providers can be sought from different regulated or licensed providers, but often requires hard work to assemble.

Population data

Typically population data can be agglomerated to different administration levels. First level administrations are the primary divisions under which the country is managed. In Kenya for example, these are counties; the government is currently engaging in a plan to devolve more power to county governments. Each county has a capital. In Tanzania, Level 1 is at a regional level, and again each region has a capital. In Uganda Level 1 is also called regional, but there are no administrative powers at regional level – it is simply used for classification. In a recent survey, the census bureau initiated a Level 2 classification, deemed sub-regional, which is also used for classification rather than administration. The power rests in the hands of district governments, which we deem a Level 3 classification. Each district has a nominated administration center, but the size of districts varies from 194 km^2 to 13,639 km^2, and their populations from 6,783 to 1,648,560.

In all three countries, there are city or town councils which manage the affairs of large settlements as well as rural councils (called county councils in Kenya for example). Their administrative jurisdiction never overlaps, and as cities and towns grow, their administrative areas are adjusted accordingly. Whatever a city or town council does not administer falls under the rural council.

As censuses are conducted once every ten years, the population of each country in each intra-censal year has to be predicted based on assumptions of growth. The projections are available from national statistical agencies but we use data from World Bank OpenData as this is available on a comparable basis across all programme countries.

Table 2: Administrative levels in East Africa

ADMIN LEVEL	KENYA	TANZANIA	UGANDA
Level-1	County (47)	Region (26)	District (112)
Level-2	Division (471)	District (129)	County (164)
Level-3	Location (2,345)	Ward (2,632)	Sub-county (946)
Level-4	Sub-location (5,890)	Enumeration area (Unknown)	Parish (4,704)
Level-5	Enumeration area (34,395)	n/a	Enumeration area (Unknown)

Sources: Compiled from information provided by National Census Bureaus

Table 3: Census dates and bureaus in East Africa

	KENYA	TANZANIA	UGANDA
Last census	2009	2012	2002
National Census Bureau	Kenya National Bureau of Statistics	National Bureau of Statistics	Uganda Bureau of Statistics
Website	ww.knbs.or.ke	www.nbs.go.tz	www.ubos.org

Sources: Compiled from information provided by National Census Bureaus

Table 4: Definitions of "urban"

COUNTRY	WHAT COUNTS AS "URBAN"
Kenya	Areas having a population of 2000 or more inhabitants that have transport systems, built-up areas, industrial/manufacturing structures and other developed structures
Tanzania	In the 2002 Population and Housing Census, the urban areas are defined as the localities that are identified as urban areas by the district authority. There is no clear and uniform definition applied by various districts in the country. Urban Areas classified as Cities, Municipalities or Townships
Uganda	Gazetted cities, municipalities and towns

Source: UN Demographic Yearbook 2009-2010

2.3. Definitions of urbanization

It is predicted that around 50% of Africa's population will be living in urban centers by 2050 [Source]. However, the definition of what constitutes an urban area is not definitive – every country decides on what they consider to be an urban area. In theory, this should include any major concentration of people who engage in non-agricultural activities and have a range of economic sectors. Dabaab in Kenya is a refugee camp in a generally sparsely populated area close to the Somali border is the country's third largest settlement – but is not classified as urban.

In 1969, the UN[6] listed a number of criteria that can be used to define an urban area. This includes:

- population size (of administrative area or settlement)
- population (or housing) density
- economic activity
- administrative status
- other urban characteristic(s)

In addition to the settlement itself, there is the issue of deciding the extent of the settlement – where does a capital city end and become rural, for example? In practice, these are lines used by urban councils to determine where their remit ends.

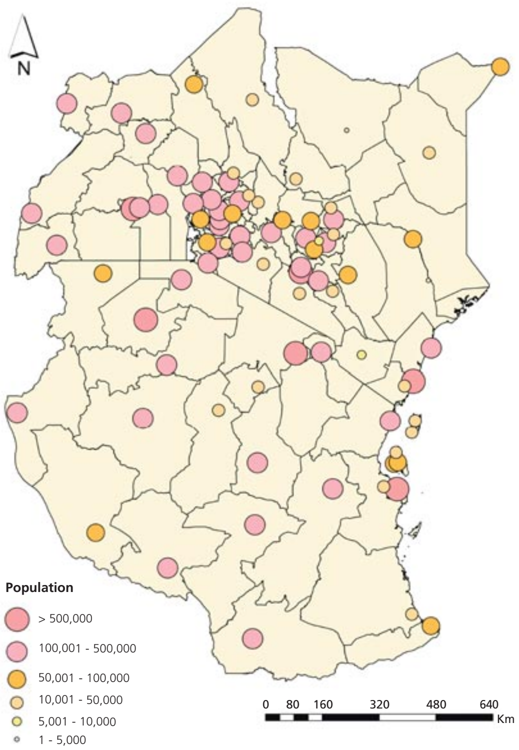
2.4. The challenges of using official data properly

There have been attempts by researchers to standardize on the density that constitutes "urban." For our purposes, we will use government definitions in each country. Typically, each first or second level administrative division has a capital that is classified as urban.

However, there are a wide variety of such administrative centers. The map in Figure 6 shows how the population of each Level 1 administrative center can differ widely across countries.

Postbanks may decide on their own working definitions of what counts as an important urban agglomeration, or may choose to categorize government definitions in ways that match commercial reality. Government recognized designations may lag behind reality if there are many informal settlements with growing populations which are densely concentrated. On the other hand, government centers may not directly match perceptions of urbanization (in cases where centers may be administratively important but not necessarily have all the requirements of a truly urban area).

Figure 6: Population sizes of administrative capitals



6 UN (1969), Growth of the World's Urban and Rural Population 1920-2000, New York: UN, Department of Economic and Social Affairs, (Population Studies 44).

3. PROXIMITY – THE APPROACH USED IN THIS PAPER

3.1. Introducing mapping

Maps enable us to represent a visual picture of various geographic elements – in particular, we can see where settlements are located and we can also see where populations live. This information is useful in helping financial institutions plan where to put new outlets. The sequence of maps below in Figure 7 demonstrates how we can drill down using geographic data to understand where unserved populations are.

The first set of maps shows a representational 'spike chart' for East Africa, with the big cities towering over the background population density levels. The second set shows Tanzania only, with the spikes of larger trading centers now more prominent. Finally, the third set of maps shows towns and trading centers.

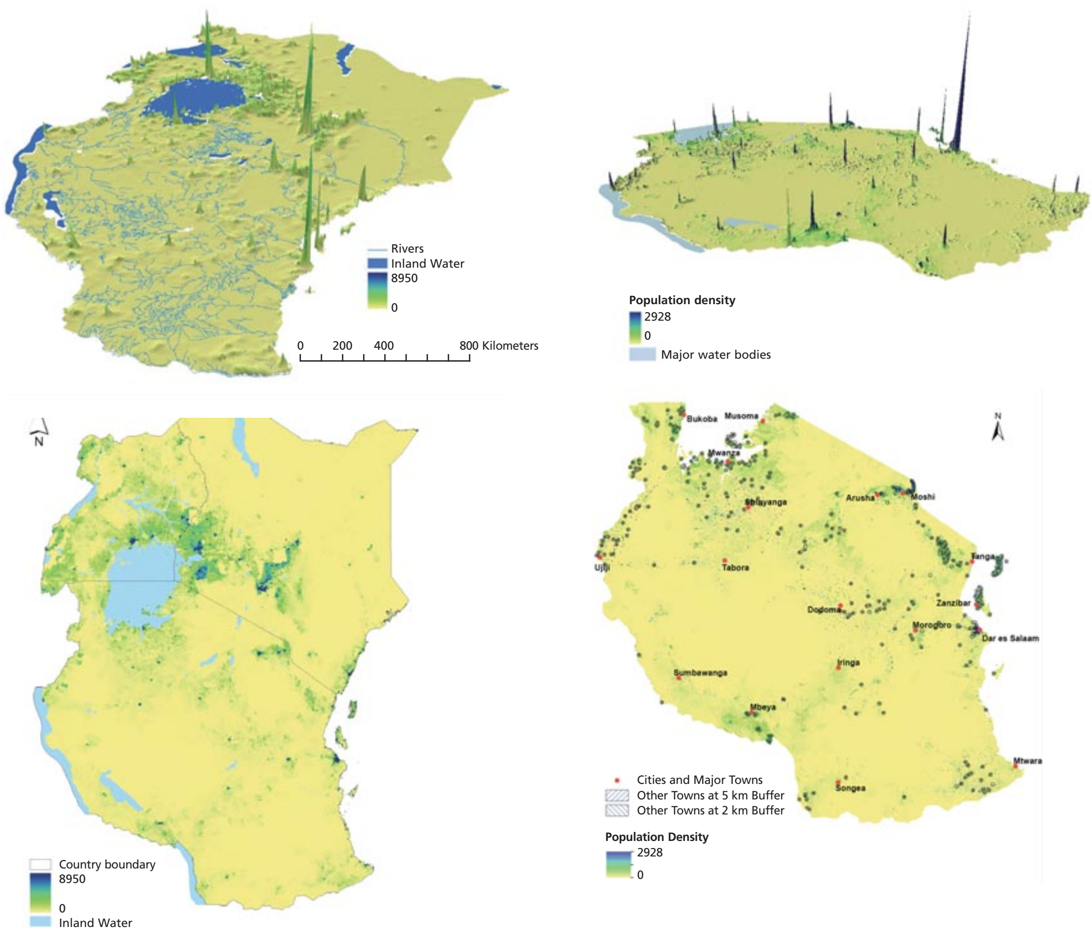
3.2. The public domain data used

There are many free sources of data that can be used to build information into maps. For Africa, the population data from www.afripop.org, and settlement information from www.fallingrain.com can be used. There are numerous sources online: www.africapolis.org that help to determine which settlements will grow. And of course, there is Google Earth which shows recent satellite imagery of specific locations worldwide.

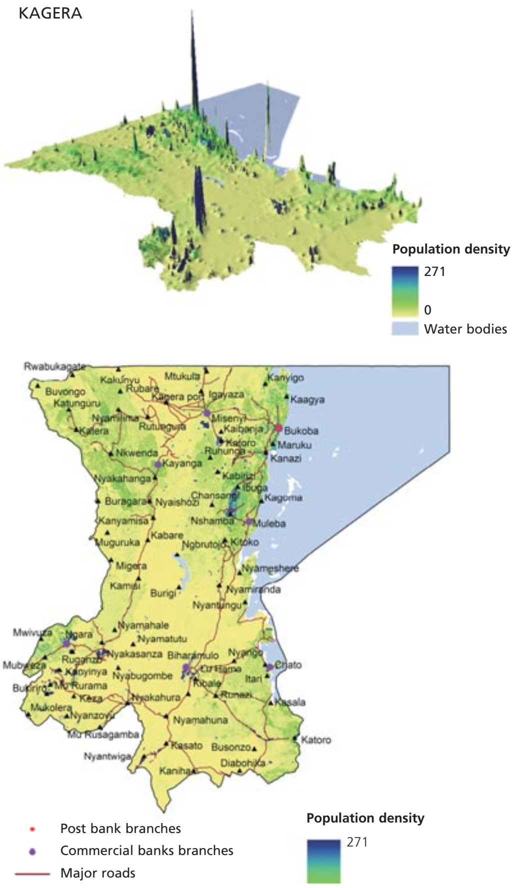
Figure 7: Population density map drilldown

East Africa ... showing capitals and regional centres

Tanzania ... showing cities, major towns and larger trading centres



Kagera Region, Tanzania … showing towns, trading centres and significant villages



3.3. Catchment areas and settlement types

However, there are a wide variety of such administrative centers. The map in Figure 6 shows how the population of each Level 1 administrative capital[7] can differ widely. In order to generate this map, we used our compilation of all settlements in East Africa.

We think people will walk up to 2 km to reach a financial outlet if there are no other alternatives available. This willingness is related to the amounts they are likely to want to transact at these times. In order to explore this, we defined different radii to use as catchment areas for each of the settlements in the longlist.

We generated maps to illustrate these circular buffers and discovered that for many small settlements with low population densities, these circular buffers overlapped significantly at radii of 2 km or greater.

We therefore extracted a shortlist of significant settlements[8]: city, large town, small town, or rural center, on which we applied increasing radii of 1, 2, 3, 5 and 10 km to determine the catchment population of the town. Using the Afripop data, we therefore generated a dataset with population sizes, restricting the radius to 1km for all the smaller settlements. Finally, we reclassified the settlements into 5 types:

1. **Cities and main towns.** We estimated populations for these based on a 10 km radius. This tended to be all the long-established towns and capital cities.

2. **Large trading centers.** We estimated populations using a 5 km radius. Where a center was too close to another center, we restricted the radius to 3 km in order to minimize the overlap between its buffer and a neighboring settlement's buffer and moved it down to the next group.

3. **Dense rural settlements.** We noticed several settlements that had relatively high population densities at 1 km and a slightly lower density in the 1 km donut beyond its center and in a few cases out another kilometer. We categorized these as rural, but relatively dense, and therefore potential locations for semi-formal financial service outlets such as bank agencies.

4. **Looser rural clusters.** There were also other clusters, at densities higher than the highly dispersed background rural population, to which we applied a radius of 2 km; but have no obvious centered concentration.

5. **Very dispersed rural.** Finally, a very large number of locations were identified where densities ranged between 10 and 75 households per square kilometer. These are too low to support any sort of agency within a catchment area radius of 2 km but within a wider radius of 5 km there would be enough households to support an M-PESA agency. On the same basis there is a rural hinterland at these densities to the denser and looser rural clusters identified above.

7 There are currently 112 districts in Uganda, all of these have administrative centers. The numbers of districts have mushroomed, up from 56 when the national census was last conducted in 2002. There are four regions (Central, Northern, Eastern, Western) but these do not have designated regional centers. Four regions are too few for interesting analysis, and 100+ districts too many. For the purposes of this paper, we are using sub-regions as the highest admin level. We use the biggest town in each sub-region as the administrative center, though these are not the officially designated.

8 We used different data sources to help us in our categorization. In Kenya, we used the 2009 census listing of urban areas (accessed through www.opendata.go.ke). Municipal councils were classified as main towns, and town councils as other towns. All other centers were classified as rural centers. In Uganda, we used the classifications provided in the town data available on www.ugandaclusters.ug. AA was classified as city, A and B were classified as main towns, C were classified as other towns, and all other settlements we identified were classified as rural centers. In Tanzania, we used the UN's Department of Economic and Social Affairs' UNITED REPUBLIC OF TANZANIA, Public Administration Country Profile (2004), supplemented by additional information from United Republic of Tanzania's Annual Assessment of Minimum Conditions and Performance Measures for Local Councils under the LGCDG System for FY 2007/08 (2007).

Beyond this, the population was regarded as attaching to no particular named, identified settlement center though of course new clusters are developing all the time, particularly along new transport routes.[9]

Table 5: Catchment areas and settlement types in East Africa

NUMBER OF SETTLEMENTS BY TYPE				
SETTLEMENT TYPE	**RADIUS APPLIED**	**KENYA**	**TANZANIA**	**UGANDA**
Cities/Main Towns	10 km	26	21	19
Large Trading Centres	5 km	68	35	89
Dense Rural Settlements	2-3 km	632	163	178
Looser Rural Clusters	2 km	1090	332	749
Very Dispersed Rural	2 km	1,741	2,525	2,231
All locations above background density		3,557	3,076	3,266

POPULATION (MILLIONS) BY SETTLEMENT TYPE				
SETTLEMENT TYPE	**RADIUS APPLIED**	**KENYA**	**TANZANIA**	**UGANDA**
Cities/Main Towns	10 km	9.7	7.7	6.5
Large Trading Centres	5 km	3.2	1.6	2.2
Dense Rural Settlements	2-3 km	5.3	1.5	1.9
Looser Rural Clusters	2 km	3.7	1.3	3.2
Rural Hinterland around above settlements/clusters	5 km less 2-3 already alloc.	6.3	3.8	6.0
Living in very dispersed rural locations	5 km	6.0	10.4	7.9
Total linked to settlements identified above		34.2 out of 40.5	26.3 out of 44.5	27.7 out of 33.5

MEDIAN POPULATION PER SETTLEMENT BY TYPE				
SETTLEMENT TYPE	**RADIUS APPLIED**	**KENYA**	**TANZANIA**	**UGANDA**
Cities/Main Towns	10 km	184k	199k	152k
Large Trading Centres	5 km	32k	29k	28k
Dense Rural Settlements	2-3 km	8.2k	9.0k	7.1k
Looser Rural Clusters	2 km	5.0k	4.5k	4.2k

POPULATION RANGE PER SETTLEMENT BY TYPE				
SETTLEMENT TYPE	**RADIUS APPLIED**	**KENYA**	**TANZANIA**	**UGANDA**
Cities/Main Towns	10 km	84k – 2.2mn	101k – 2.3mn	106k – 2.1m
Large Trading Centres	5 km	11k – 86k	11k – 78k	15k – 85k
Dense Rural Settlements	2-3 km	3.7k – 67k	3.6k – 76k	3.4k – 50k
Looser Rural Clusters	2 km	3.7k – 27k	3.5k – 14k	3.3k – 18k

9 This issue of evolving settlement patterns is particularly challenging when it comes to sprawling settlement along the main roads out of major conurbations such as capital cities. In both Kenya and Tanzania we had to give large urban trading centre status to three locations that are clearly becoming extensions of Nairobi and Dar es Salaam but beyond the 10km radius we apply to cities. By contrast, in Uganda we looked at another location and decided to leave it as a smaller rural trading centre in the hinterland of Kampala but not yet part of it. These had to be handled as manual adjustments to the main data cuts behind Table 5 overleaf.

Table 6: Commercial banks and population coverage in East Africa

	KENYA	TANZANIA	UGANDA
Total commercial bank branches	919	430	384
Total commercial bank branches in capital district	325 (35%)	143 (33%)	164 (43%)
Total Postbank branches	90	28	33
Total Postbank agencies	234	141	63
Total population	36,276,663	41,356,521	22,292,113
Total population within 5 km of commercial bank branches	10,647,600 (29%)	9,083,334 (22%)	5,654,656 (25%)
Total population within 5km of Postbank branches	4,457,681 (12%)	4,950,035 (12%)	3,359,417 (15%)
Total population within 5 km of Postbank agencies	10,073,534 (28%)	7,693,281 (19%)	3,280,661 (15%)
Additional population beyond commercial bank branches reached by Postbank branches	728,382 (2%)	299,507 (<1%)	130,535 (<1%)
Additional population beyond commercial bank branches reached by Postbank agencies	2,741,853 (8%)	427,194 (1%)	284,844 (1%)

3.4. Financial service provision by settlement size

The bank branch locations are typically concentrated in the capital cities and the large towns. Access to financial services is widely variable geographically. This analysis only tracks the reach of fixed-location outlets but Postbank Uganda runs a series of mobile branches using a modified truck format. These cover multiple villages and must at least double the shown outreach beyond where other banks already reach.

The proportion of people who have access to a bank branch within 5km varies across countries, from 22% in Tanzania to 29% in Kenya. Those living within 1km of a bank branch (not shown) range from 7% to 11%.

About a third of all bank branches are in the district which contains the country's capital. This means virtually all of the capital's population is within 5 km of a bank branch. The extent of coverage in the capital can be emphasized even further by noting that 42% (Dar) and 66% (Nairobi) of all residents in the capital district are within 1 km of a bank branch. The impact of Postbank branches and agencies in expanding outreach is limited in the capital.

The distribution of Postbank branches does little to extend coverage beyond areas already served by banks.

Figure 8: Number of bank branches by admin area

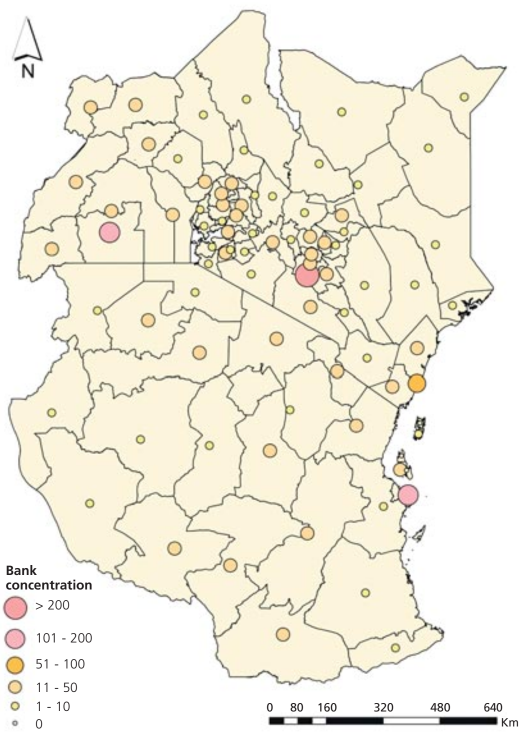


Figure 9: Number of bank branches per 100,000 people by admin area

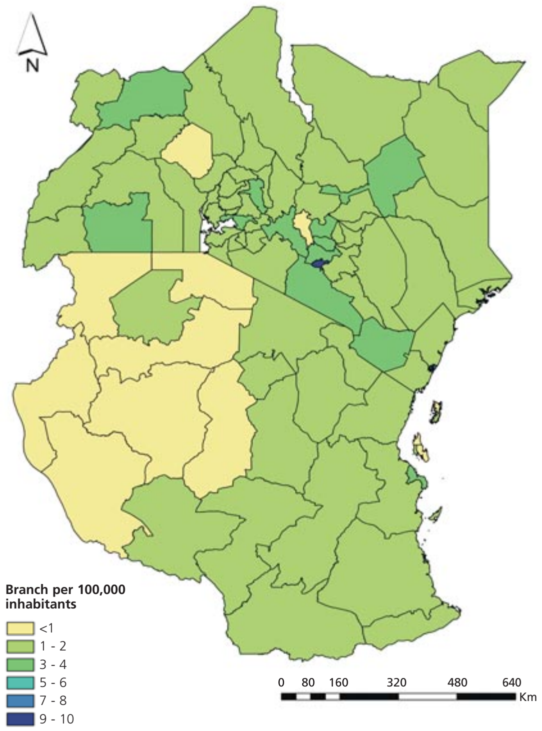


Figure 10: Locations of commercial bank and PostBank branches

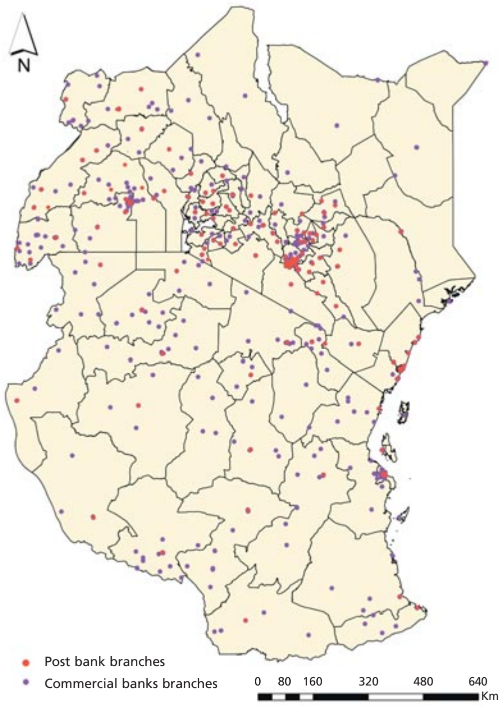


Table 7: Commercial banks and population coverage in East Africa's capitals

	NAIROBI, KENYA	DAR ES SALAAM, TANZANIA	KAMPALA, UGANDA
Total commercial bank branches in capital district	325	143	164
Total Postbank branches in capital district	19	9	12
Total Postbank agencies in capital district	35	29	16
Total population of capital district	3,239,490	3,481,950	1,648,558
Total population within 5km of commercial bank branches	3,168,197 (98%)	3,153,646 (91%)	1,644,050 (100%)
Total population within 5km of Postbank branches	3,016,134 (93%)	2,126,323 (61%)	1,462,630 (89%)
Total population within 5 km of Postbank agencies	3,123,945 (96%)	3,040,337 (87%)	1,643,126 (100%)
Additional population beyond commercial bank branches reached by Postbank branches	9,66 (0%)	0 (0%)	0 (0%)
Additional population beyond commercial bank branches reached by Postbank agencies	23,329 (1%)	19,189 (1%)	5,887 (0%)

Figure 11: Additional coverage provided by PostBanks

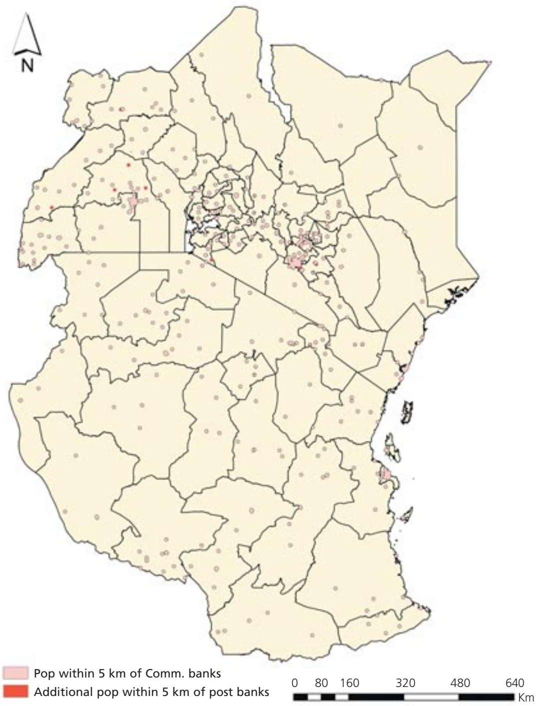
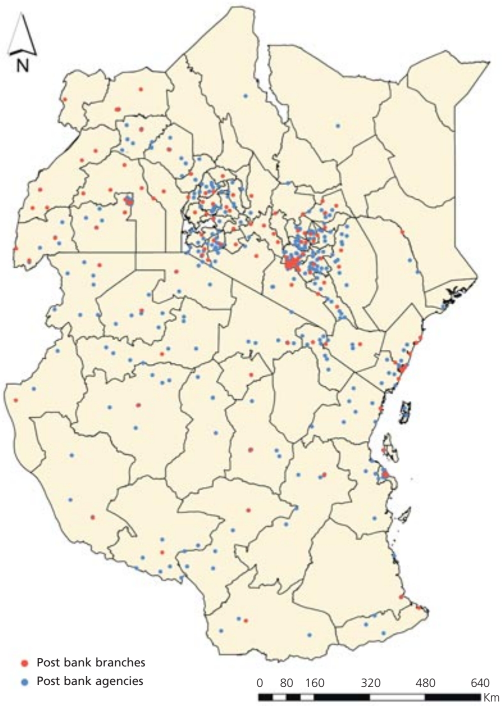


Figure 12: Distribution of PostBank branches and agents



The map in Figure 11 shows buffer zones of 5 km around commercial bank branches in pink. Additional coverage provided by Postbank branches is shown in red and is minimal.

All the Postbanks in East Africa have attempted to expand outreach through the use of agents. The agencies have expanded coverage to reach over 3 million more people in the region – see table below. Kenya is furthest along in having extended coverage to 8% of previously excluded populations through its agency network, to reach an additional 2.7m people.

3.5. Some proximity metrics

There are various potential variables that can be used to calculate proximity and monitor it over time. Below are listed some suggestions, which include items that have been calculated for the purpose of this paper.

- % of country's physical area that is within 5 km of a financial outlet
- % of population who live within 5 km of a financial outlet
- % of population who live within 1 km of a Postbank outlet
- Number of people who live within 1 km of a Postbank outlet

In terms of understanding the impact of a concentrated burst of expansion, similar to that being undertaken by the East African Postbanks, it might be useful to estimate the number of people who were unserved a year ago, and who now live within 1km of a Postbank outlet.

4. PROXIMITY – GENERALIZING THE APPROACH TO OTHER COUNTRIES

The first step to doing any kind of spatial analysis is to assemble the data you need. The key ones that you will need will be:

- **Demographics** – which are readily available from national statistics bureaus. The United Nations Statistical Office has developed a list of all country statistical bureaus that it interacts with: http://unstats.un.org/unsd/methods/inter-natlinks/sd_natstat.asp.

- **Poverty** – generally national household surveys include some poverty data, which will present it at fine levels of detail adequate for analysis. In additional, CIESEN runs a global poverty mapping project and provide links to many poverty country reports at: http://sedac.ciesin.columbia.edu/povmap/methods_nat_sae.jsp.

- **Settlements** – it is surprisingly difficult to get a list of settlements and to put them in classes depending on size. A settlement may be important by virtue of its population size, its population density, it's infrastructure or economic power – or a mixture of all of these. GRUMP is one effort to systematically define settlements across the world http://sedac.ciesin.columbia.edu/gpw/index.jsp. Typically, government sources will indicate what has been classified as urban and rural, and these will be the resources required to define what we have called cities, major towns and other towns. The number of settlements in a country far exceeds those listed in typical government sources or the GRUMP dataset. To supplement this, www.fallingrain.com is a useful source of information on additional settlements. The data will need some cleaning – to discover and exclude duplicate locations, with similar spellings or with (near) identical geo-locations.

- **Financial institutions** – some regulators have started to demand that financial institutions supply geo-locations for their outlets. If this is available in your country, count yourself fortunate Otherwise, the method to use to get approximate geo-locations is to visit the central bank site for your country, generate a list of regulated institutions, then visit the website for each institution and construct a list of all their outlet locations. Then use your previously constructed list of settlements, or a web resource like www.geonames.com to attach locations to them.

The next step is to generate basic maps to show where people are, and where financial institution outlets are. There are two types of geographic information you can collect to help you. Shape files are files that define geographic outlines, such as administrative areas. You can collect these to the lowest level available for your country. For Africa, it is possible to get raster level data on population from www.afripop.com (similar projects on Asia and Latin America are underway).

The third step is analytical. Classify your settlements and make educated guesses about their extents. If you do not have raster[10] data available, you will need to decide on which administrative areas can be classified with each settlement, and use the population for that admin area as the value for the settlement. If you do have raster data available, you can cast a buffer of a pre-defined radius around the center of the settlement and use that to estimate the catchment population. For each settlement, count the number of financial institution outlets present. You can do this using GIS software, again counting the number within the buffer area specified. You will then be able to generate a list of all settlements above a certain size that do not have financial institution outlets, and can therefore be part of your organization's expansion plan. As preparation for your strategy team, you can use Google Earth to print out a bird's eye view of the selected settlement.

10 This is data represented by a set of dots, with each dot representing graduated intensity. It is commonly used for elevation and graduations of intensity are often represented by different colors. The set of dots could also be seen as a matrix of data points, with each data point showing a single value for a particular position in a geographic grid. The population data provided by AfriPop has been generated for use in raster format.

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(iv) United Nations Statistical Office, country list of statistical bureaus: http://unstats.un.org/unsd/methods/inter-natlinks/sd_natstat.asp.

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