MEASURING VILLAGE ICT IN SUB-SAHARAN AFRICA

The very first target enunciated in the World Summit on the Information Society (WSIS) Plan of Action aims at rural areas:

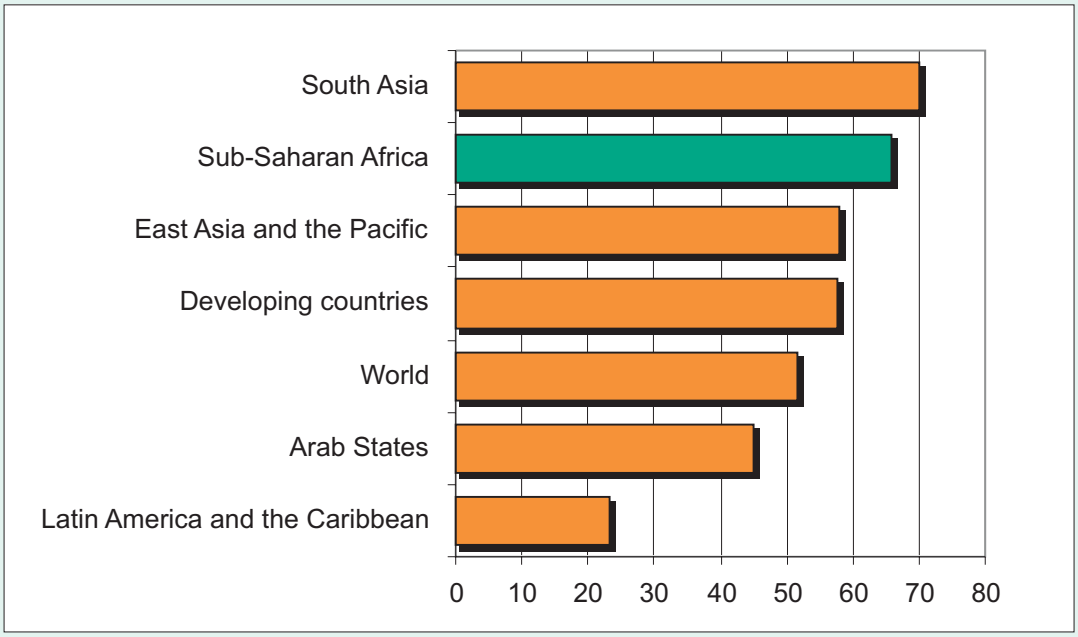
> "…to connect villages with ICTs and establish community access points…".[1]

This is a particularly relevant goal for Sub-Saharan Africa, which after South Asia, is the least urbanized region in the world (Figure 1). Some two-thirds of people in Sub-Saharan Africa reside in rural areas.

In order to measure the WSIS target for Sub-Saharan Africa, the number of villages must be determined. This is a challenge since the lowest level of administrative division in most African countries tends to be one layer before villages. Few countries in Africa compile official data on the number of villages because government administration does not reach that deep. Schools, health clinics, post offices and other public facilities are usually available only at a level higher than villages such as a district capital. Indeed, the lack of basic infrastructure rather than the number of inhabitants often defines whether a locality is a village in Africa. For example, according to the Zambian national statistical office, an urban area is defined as:

> "An urban place in the Zambian context is a locality with at least 5'000 people half of whom are not engaged in agriculture. Such a locality should have urban attributes such as electricity, piped water, schools and hospitals. Localities with less than the population threshold but have these facilities qualify as urban centres."[2]

Figure 1: Rural population (% of total) 2004



Source: Adapted from UNDP (2006).

[1] World Summit on the Information Society (WSIS). December 2003. *Plan of Action.*

[2] Central Statistical Office (Zambia). November 2003. *Migration and Urbanization 2000 Census Report.*

In addition, factors such as urbanization, nomadic populations, civil war, resettlement, etc. also impact the ability to precisely determine how many villages there are in a country.

Ironically, information and communication technologies (ICTs) and particularly the quest to map the world, provides help to determine the number of localities in a country. Computers can easily generate maps once the geographic information has been digitized. *Geo-coded* data containing the coordinates for locations around the world has grown tremendously with the availability of inexpensive Global Positioning System (GPS) devices. As a result, many of the places where people live on the African continent has been geo-coded.

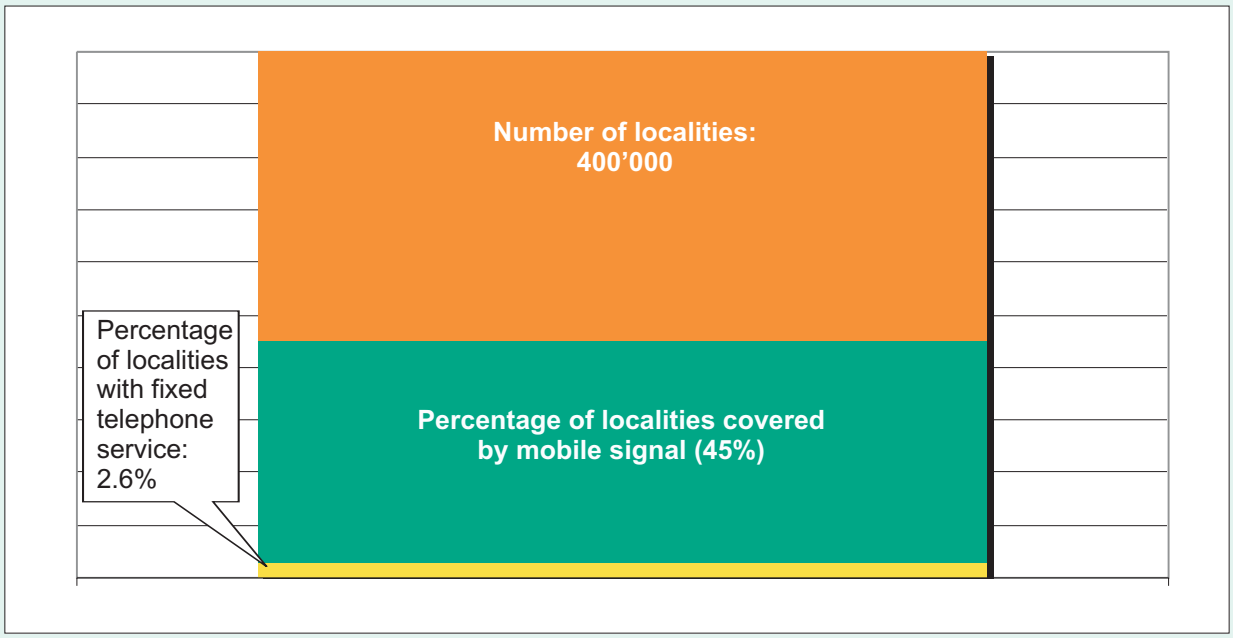
According to official data, geo-coded information and approximations based on national definitions of rural areas, it is estimated there are around 400'000 localities in Sub-Saharan Africa, of which 99 percent are villages. Less than three percent have a fixed line telephone connection. The high cost of connecting rural areas with fixed telecommunications, coupled with lack of electricity and low incomes, has severely restricted the availability of fixed lines. Although many African countries have some type of universal service program for connecting rural areas, they have for the most part, not been very successful. They have also tended to focus on more populated localities, which though in rural areas, do not really qualify as villages.

On the other hand, mobile communications has made huge inroads in providing connectivity to villages. About 45 percent of Sub-Saharan African villages were covered by a mobile signal in 2006.[3] Much of the increase in mobile population coverage in rural areas has come in the absence of any specific universal access policy or plan. Instead growing competition among mobile providers has provided the impetus to increase coverage. Being covered by a mobile signal does not necessarily mean that inhabitants in a rural area are actually mobile subscribers. It is estimated that around seven percent of rural households in Africa currently have a mobile service subscription. Low incomes may inhibit the ability to pay for the service and there may be an absence of retail channels to support the service (e.g., sale of handsets and prepaid cards) as well as electricity to recharge mobile phones. However, it is interesting to note that rural mobile household subscription is higher than electricity availability in rural households. This suggests that rural households have some other method besides the electricity grid to recharge mobile handsets (e.g., car batteries) or recharge the handsets when they travel to larger localities where electricity is available. Indeed, it is not uncommon in Africa to see mobile handset recharging offered as a paid service.

Some countries have been successful with developing retail distribution models so that users do not need their own handsets or mobile subscription and simply use a mobile phone when they need to at a public facility. The first was in South Africa where the provision of community service telephones was written into the license conditions of the three mobile operators. By the end of 2006 there were close to 100'000 community service telephones installed in South Africa by mobile operators. In many other African countries, entrepreneurs resell mobile airtime either through branding arrangements with mobile operators or operating on their own. A recent development has been projects specifically geared to rural areas based on the GrameenPhone experience in Bangladesh. In this scheme, rural dwellers are offered loans from microfinance entities in order to buy a handset and airtime to provide mobile service to the village. The model has been successfully applied in Uganda where the MTN Village Phone project had

[3] The distance that wireless signals radiate from a base station vary by the frequency used and terrain. Localities with mobile service have been estimated assuming an even distribution of rural population coverage.

Figure 2: Percentage of localities in Sub-Saharan Africa with telephone service



36'000 service providers in 2006, seven times more than initially projected.[4]

Primarily as a result of mobile competition and despite numerous barriers (e.g., lack of electricity, difficult terrain, lack of transport), some African countries are approaching full universal access or near coverage of all inhabited rural areas with a mobile signal. The list of countries with mobile rural population coverage over 90 percent includes Comoros, Kenya, Malawi, Mauritius, Seychelles, South Africa and Uganda which will meet the WSIS target of village connectivity ahead of schedule. Other countries on the way to meeting the WSIS target before the end of the decade include Botswana, Burkina Faso, Burundi, Cape Verde, Guinea, Namibia, Rwanda, Senegal, Swaziland and Togo, all of whom have rural mobile population coverage rates of over 50 percent.

The second part of the WSIS target on village connectivity deals with community access centers to provide access to the Internet. While the availability of fixed telephone lines in villages is low, Internet access is even lower. It is estimated that less than 0.5 percent of African villages have a public Internet facility.

There have been numerous projects driven by development partners to install community access centers in rural areas. However for the most part, they have not proven sustainable and eventually end up being closed when funding ends. The development of e-government in the region is providing a new impetus to rural Internet access. After all, what is the use of e-government services if the majority of the population has no access to it? In Kenya, the government is developing a Digital Village scheme in order to provide rural inhabitants with electronic

[4] International Finance Corporation. "Replicating Village Phone from Uganda and Bangladesh." *Monitor*. May 2006.

access to government services. The plan is to install Internet connectivity in some 200 locations. From there, entrepreneurs will be assisted to extend access to more remote rural areas through kiosks that will have wireless connectivity back to the main centers. The wireless connectivity will include both WiMAX and 3G technologies such as EDGE and EV-DO.

The major bottleneck for rural connectivity in Sub Saharan Africa is electricity. Without a constant source of electricity, mobile handsets and computers cannot be used. Only fifteen percent of Sub Saharan Africa rural households have electricity. This figure is distorted by Nigeria, the most populous country in the region which has a relatively high level of rural electrification. Removing Nigeria from the equation brings rural household electrification down to only five percent. Mobile operators have gotten around electrical limitations through the use of diesel-powered generators but this adds to costs, making service more expensive.[5] Solar solutions have thus far not proven optimal.

Nevertheless, there is optimism that the WSIS village connectivity target can be achieved in many Sub Saharan African countries before 2015. Rural mobile population coverage is spreading rapidly which will minimally support low speed data access and text messaging. Upgrading rural networks to provide higher speed 2.5 and 3G mobile services would be a big plus for village connectivity. The development of wireless WiMAX technologies is also promising and a number of African operators already provide this service. Growing experience with successful community access models such as the MTN Village Phone in Uganda should also help to spread village connectivity. Finally, the development of e-government and the need to provide all citizens with government services reinforces the social justification for enhancing village connectivity.

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[5] "Mainly in Africa, with the exception of Mauritius, the electricity supply is insufficient due to the growth experienced in most of the countries where we operate. We therefore have to rely on diesel-powered generators that we source, install, maintain and refuel. In Chad and Sierra Leone, at March 31, 2007, close to 100% of our radio sites were powered by diesel-powered generators, and in the Democratic Republic of Congo it was the case for about 75% of our sites. This increases our costs and impacts the profitability of our African operations." See: Millicom