CONNECT ALL VILLAGES WITH ICTs AND ESTABLISH COMMUNITY ACCESS POINTS

Target 1: Connect all villages with ICTs and establish community access points[1]

Executive summary

Despite the seeming ubiquity of ICTs, their benefits are not uniformly experienced by the 7.1 billion people in the world. According to recent estimates, over 4 billion people are not yet connected to the Internet (ITU, 2013a). The majority of those unconnected people are the main target group for the Millennium Development Goals (MDGs), and are also people for whom ICTs potentially have a great development impact. Communities living in rural and remote areas stand to benefit particularly from greater connectivity to telephones and the Internet, to be able to receive information and services that can improve their economic and social condition. In a broader context, the achievement of Target 1 would help developing countries make progress towards the MDGs.

Target 1 distinguishes rural and urban populations and is tracked using four indicators identified by the Partnership on Measuring ICT for Development. The indicators cover mobile cellular network coverage (Indicator 1.1), household access to telephones and the Internet (indicators 1.2 and 1.3), and use of the Internet by individuals (Indicator 1.4). Progress made towards Target 1 has been mixed. On the one hand, the last decade has shown much faster than anticipated growth in mobile-cellular telephony, with consequent changes in the provision of access to basic communication services. In particular, significant progress has been made in increasing mobile cellular coverage for rural populations. Currently available data suggest that in 2013, almost 90 per cent of the world's rural inhabitants were covered by a 2G mobile cellular signal. By 2015, all rural communities around the world are likely to be covered if the current rate is sustained. On the other hand, rural population coverage of a 3G mobile cellular signal was comparatively low in 2013. Household access to any type of phone service (fixed or mobile) has grown rapidly, largely fuelled by increased access to mobile phones due to falling prices and growing popularity of prepaid SIM cards.

In terms of Internet access and use, Target 1 is unlikely to be achieved by 2015 and currently available data suggest a pronounced rural-urban divide. Access to the Internet in any form (narrowband or broadband, fixed or wireless) is extremely low for rural households in developing countries, while in developed countries, rural households appear to enjoy comparable access to their urban counterparts, albeit with slight variations in type of access and (usually) a small lag in levels of penetration.

Nevertheless, currently available data on Internet access offer some cause for optimism. Access to the Internet using mobile networks appears to be a growing trend. In fact, there are indications that rural residents are now adopting mobile Internet, because fixed-line connection tends to be unavailable in rural areas. Broadband wireless networks are also growing in developing countries. These adoption patterns should offer telecommunication operators some assurance that rural households are a viable market, especially for wireless broadband. Another incentive for using wireless broadband to connect rural communities is that the installation of wireless broadband equipment generally requires less investment than wired infrastructure. To further facilitate the development of wireless broadband, policy-makers should provide incentives for rural deployment.

Based on the findings of this report, and given the limited achievements made on Target 1, the following recommendations are made should there be a post-WSIS target dealing with rural connectivity:

- Future tracking should focus on fewer indicators, in particular, changing subindicators of Indicator 1.2 (proportion of households with telephone, by type of network) and supplementing Indicator 1.3 with data from operators on the number of subscriptions according to types of access.
- Attention should shift towards measuring quality of access, which is partly covered by Indicator 1.3 (proportion of households with Internet access, by type of access). Data analyses for Target 1 suggest that while coverage was a primary goal for 2015, quality of access is likely to become the key distinction between rural and urban households. Quality of access entails a broader definition of ICT connectivity and further work on such indicators is recommended.
- The issue of rurally-relevant applications and content needs to be addressed alongside the issue of connectivity. For rural households to bridge the knowledge divide and access public services, they need to have access to relevant information and applications. This issue is further discussed in Chapter 9, which discusses WSIS Target 9 on content and language. Several cases presented in this chapter suggest that demand for content and communication could drive ICT adoption.
- Finally, in terms of connecting rural communities, more public-private partnerships should be formed. Governments play a critical role in setting the right regulatory framework to foster development of ICTs in rural areas. Lessons from countries that have made greater progress towards Target 1 can be adapted for countries that are lagging. Two specific strategies are offered: (1) market liberalization to introduce more competition in the mobile sector, and (2) introduce conditional licensing by setting targets in licence agreements for the percentage of the rural population covered by a mobile cellular network.

Introduction

At the end of 2013, there were an estimated 2.7 billion people using the Internet worldwide and approximately 6.8 billion mobile phones. Despite the apparent ubiquity of ICTs, their benefits are not uniformly experienced by the 7.1 billion people in the world. According to latest estimates, over 4 billion people are not yet online (ITU, 2013) and the majority of those are the main target groups of the Millennium Development Goals (MDGs) and any post-2015 development goals. ICTs potentially have a great development impact for this group – communities living in remote areas, in particular, stand to benefit greatly from connectivity because ICTs can deliver health, education and other services that may be otherwise unavailable.

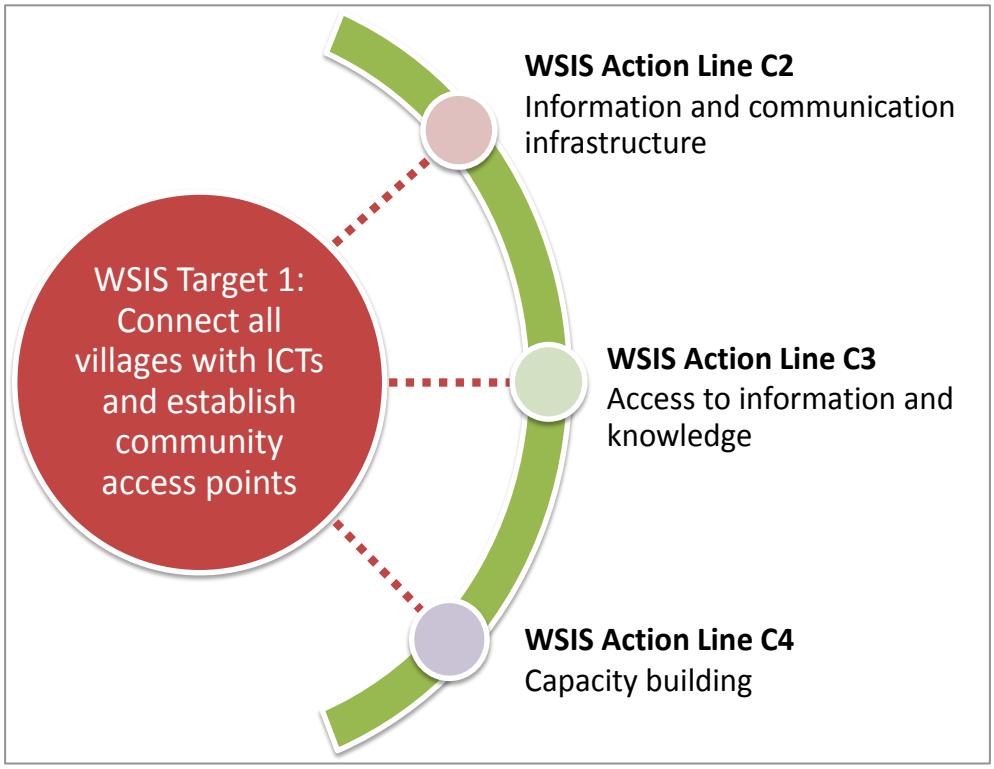
The guiding principles for rural access were embodied in the 2003 WSIS *Declaration of Principles* that declared a "… common desire and commitment to build a people-centred, inclusive and development-oriented Information Society, where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life, premised on the purposes and principles of the *Charter of the United Nations* and respecting fully and upholding the *Universal Declaration of Human Rights*."[2] (ITU, 2005)

Target 1 focuses on connecting all villages with ICTs and establishing community access points. For rural residents, especially in developing countries, the costs of digital exclusion are profound. When urban residents in developing countries get Internet access, they also enjoy greater opportunities to improve their economic and social condition. With the Internet, they can access more information, economic opportunities, and essential health and public services. When rural residents are left unconnected, they remain trapped in a self-perpetuating cycle of existing conditions and are caught on the wrong side of the Matthew Effect[3] (those who have get more; and those who do not have get less). Target 1 is important in its recognition that connecting rural residents to ICTs will grant them access to opportunities that can better their lives and, at the broader level, help developing countries make progress towards the MDGs.

The challenge of connecting rural residents with ICT is non-trivial; even developed countries like the United Kingdom (Warman, 2013) and United States (NTIA, 2013) struggle to provide all their rural residents with Internet access that is comparable to that of their urban counterparts. The situation is understandably more dire in developing countries. Assessing the extent of access in rural communities is itself challenging because measuring the penetration and use of ICT is optimally conducted in a context of connectivity and basic infrastructure such as electricity – amenities that rural communities in developing countries often lack. Such communities are thus doubly disadvantaged because without robust assessment of connectivity, appropriate measures cannot be taken to address lack of access

Target 1 is related to all the WSIS action lines (ITU, 2010). In particular, there are direct linkages to action lines C2, C3 and C4 (see Figure 1.1).

Figure 1.1: Relevance of Target 1 to WSIS action lines



Action Line C2 (Information and communication infrastructure: an essential foundation for the information society) highlights that "Infrastructure is central in achieving the goal of digital inclusion, enabling universal, sustainable, ubiquitous and affordable access to ICTs by all … to provide sustainable connectivity and access to remote and marginalized areas at national and regional levels." (ITU, 2005). This action line also calls on governments to provide ICT connectivity for schools, libraries, post offices, community centres and other institutions accessible to the public. The action line further calls for strengthening national broadband network infrastructure, which is critical for rolling out high-speed Internet access to rural areas. It also advocates national e-strategies to cater for disadvantaged and vulnerable groups, who are often found in rural areas, and refers to unused wireless capacity, including satellite, for providing access in those areas.

Action Line C3 (Access to information and knowledge) is directly linked to Target 1 as it states that "Governments, and other stakeholders, should establish sustainable multipurpose community public access points, providing affordable or free-of-charge access for their citizens to the various communication resources, notably the Internet. These access points should, to the extent possible, have sufficient capacity to provide assistance to users, in libraries, educational institutions, public administrations, post offices or other public places, with special emphasis on rural and underserved areas ..." (ITU, 2005).

Action Line C4 (Capacity building) is directly linked to Target 1, in that basic ICT literacy skills are essential for making use of the connectivity supplied to villages and via community access. Indeed, C4 explicitly refers to this potential: "Promote e-literacy skills for all ... taking advantage of existing facilities such as libraries, multipurpose community centres, public access points …" It also calls for the empowerment of "local communities, especially those in rural and underserved areas, in ICT use and promote the production of useful and socially meaningful content for the benefit of all." (ITU, 2005).

Another important issue is to ensure that once villages are connected with ICTs, relevant applications and content are delivered to their inhabitants. The availability of relevant applications and content is addressed in action lines C7 (ICT applications), C8 (Cultural diversity and identity, linguistic diversity and local content) and C9 (Media) (ITU, 2005).

Data availability and scope

Target 1 comprises two objectives: 1) connecting all villages with ICTs and 2) establishing community access points.

Villages have been interpreted as referring to rural areas and reflect the focus on addressing the information gap between rural and urban areas (ITU, 2010). However, there is no internationally agreed geographic classification that defines rural areas and distinguishes them from urban areas. Nor is there a standard for defining villages (*Partnership*, 2011). This chapter uses the urban and rural splits provided by countries. The United Nations Statistics Division (UNSD, 2013) recognizes that definitions will vary between countries but states the importance of providing the urban and rural split:

> "Because of **national differences** in the characteristics that distinguish urban from rural areas, the distinction between the urban and the rural population is not yet amenable to a single definition that would be applicable to all countries or, for the most part, even to the countries within a region. Where there are no regional recommendations on the matter, countries must establish their own definitions in accordance with their own needs … traditional urban-rural dichotomy is still needed, classification by size of locality can usefully supplement the dichotomy or even replace it where the major concern is with characteristics related only to density along the continuum from the most sparsely settled areas to the most densely built-up localities."

Connectivity is focused on the Internet (narrowband and broadband) and both fixed and mobile phones. Connectivity by radio and television is covered in Target 8.

In ITU's first attempt to track the WSIS targets (*World Telecommunication/ICT Development Report 2010*, ITU, 2010), **Community access points** were interpreted as equivalent to Internet use locations community Internet access facilities and commercial Internet access facilities.[4] Tracking community access points was initially proposed as a WSIS target indictor, 'percentage of localities with public Internet access centres (PIACs)', broken down by size of locality, or by urban/rural. This indicator was removed from the list of WSIS target indicators for feasibility reasons and for lack of data (*Partnership*, 2011). Community access points are now tracked through the *Partnership* core indicator 'location of individual use of the Internet in the last 12 months' (*Partnership*, 2010).[5] The breakdown by location includes the two subcategories: 'Community Internet access facility' and 'Commercial Internet access facility'. Community access points play a vitally-important role in connecting people who lack access to ICTs. Box 1.1 presents a case study of rural public access centres in Bangladesh from the Global Impact Study of Public Access to ICTs (Sey *et al.*, 2013). Findings from the study, which lasted from 2007 to 2012, provide cause for optimism about the impact that rural public access centres are making. One particularly interesting finding was that when computer experiences were taken into consideration, there was little difference between rural and urban users in their rate of use and perceived positive impact. This suggests that geography is not

necessarily limiting for rural residents – with the right training and access to ICTs, they are also able to make use of the opportunities afforded by ICTs to improve their economic and social condition. This is also demonstrated by the *Infolady* programme in rural Bangladesh (Box 1.2).

Box 1.1: Users of rural public access centres – a case from Bangladesh

The Global Impact Study of Public Access to ICTs (Sey *et al*., 2013) was a five-year project (2007–2012) aimed at generating evidence about the character and impacts of public access to ICTs in eight countries: Bangladesh, Botswana, Brazil, Chile, Ghana, Lithuania, the Philippines and South Africa. Across all countries, the study found that overall, rural users had lower usage rates than urban users. However, controlling for level of computer experience, usage frequency and venue type, rural users mostly experienced positive impacts in similar proportions to urban users.

In the case of Bangladesh, the study estimated that about 46 per cent of users of public access facilities (telecentres, libraries, and cybercafés) live in rural areas. The study found several noteworthy differences between rural and urban users. Rural users most commonly accessed the Internet for communication and leisure, education, employment, and culture and language, although their use trails their urban counterparts in these areas. Another difference is type of access venue. Rural users largely visited telecentres, while urban users frequented cybercafés, presumably due to the respective availability of these facilities in their locality. In general, telecentre users tended to report lower usage, as well as lower levels of positive impacts, than cybercafé users.

One key finding from the study is that when computer experiences were taken into consideration, there was little difference between rural and urban users in their rate of use and perceived impact. Hence, it seems likely that the level of computer experience contributes to the observed rural/urban differences. Rural users, who are more likely to be inexperienced telecentre users, offer fewer reports of positive impacts compared with more experienced urban cybercafé users. This finding is consistent with the notion that access to ICTs is a necessary but not sufficient condition for inclusion in the information society. Other conditions, such as digital literacy, also need to be in place so that those who are least connected do not continue to be excluded.

Another finding from the Global Impact Study was that rural users consistently reported lower positive impacts in communication when compared to urban users, regardless of their computer experiences. These impacts relate to communication with family and friends, pursuing interests and hobbies, meeting new people and pursuing other leisure activities. These urban-rural differences can be attributed to different preferences for modes of communication and leisure activities. Urban residents appear to use ICTs for leisure and to maintain and expand their social networks.

In this regard, rural residents may be missing the opportunities afforded by ICTs to increase their social capital.[6] Rural residents with fewer social ties may thus be deprived of novel information and be confined to the provincial news of their close friends (Granovetter, 1983). Their smaller social networks can also limit their awareness of available employment and other economic opportunities.

Source: Global Impact Study, Technology & Social Change Group.

The *World Telecommunication/ICT Development Report 2010: Monitoring the WSIS Targets, A mid-term review* (WTDR) (ITU, 2010) concluded that community access points constitute one of the most practical methods of providing ICTs in rural areas in many developing countries. Reasons given were that incomes tend to be lower in rural locations compared to urban areas, and many rural households simply cannot afford ICTs; shared access is therefore a cost-effective means of providing rural connectivity. Box 1.1 suggests that community access points are still relevant for rural communities. However, in recent years, the price of handsets and mobile services has fallen to levels where basic services are more affordable in rural areas in the form of pre- or post-paid SIM cards. Given the trend in declining telecommunications costs, it is an opportune time to consider modes of providing access to rural communities in addition to community access points. Libraries and post offices (discussed in Target 4), schools (discussed in Target 2) and retail environments, such as coffee

shops, can also serve as community access points. The challenge for policy-makers and other stakeholders is finding modalities that work best in rural areas.

As ITU's first exercise demonstrated (ITU, 2010), assessing the impact of community access points is a challenging task, particularly from the supply side. One way of capturing the uptake and importance of community access from the demand side is through the *Partnership*'s core indicator HH8 'Location of individual use of the Internet in the last 12 months'[5] (*Partnership*, 2010). The indicator is collected through household surveys and includes information on locations of Internet use, including community and commercial Internet access facilities.

Box 1.2: Infolady – a women-centred programme to deliver information services in rural Bangladesh

The *Infolady* programme[7] offers information, communication and ancillary services to rural disadvantaged dwellers, mostly women. In line with WSIS target 1, the programme provides rural communities with access points to the Internet and other communication services. In particular, it provides ICT access and locally relevant content to those members of the population who tend to be most digitally excluded, namely rural women of poor communities.

The services are provided by specifically trained women – the infoladies – who travel between villages on bicycles and are equipped with laptops, webcams, mobile phones, printers and Internet connectivity. Beneficiaries are met both in groups and at their homes, and are offered affordable services that would otherwise not be readily available. The services offered by infoladies include:

- communication services such as writing messages or VoiP telephone interactions between villagers and their spouses, or other relatives, who often have to migrate to find employment,
- basic health services, such as blood pressure measurement, blood testing for diabetes,
- reproductive health information and services such as pregnancy tests,
- advice on farming issues, using ICT to access and share relevant information,
- legal advice and assistance in interactions with administrations, for example, obtaining relevant information online or claiming benefits,
- buying and selling from villagers to enhance their access to markets and provide them with new opportunities.

An infolady typically listens to a villager's livelihood problems and assists them with Internet services or preloaded offline audio-visual livelihood content in the local Bangla language. The programme provides the infoladies with specific training, and a loan to purchase a bicycle and ICT equipment. They are able to generate a significant and steady income for themselves through the services they sell and the products they trade. The programme associates each infolady with an *Infolady HUB*, a local organization that provides security, training, logistical and technical support, and credibility. In return, infoladies buy products from the HUB and sell them to their beneficiaries. They can also buy products from their clients and sell them to the HUB, which the HUB then sells to retailers.

The model was launched in April 2010 by D.Net and is being scaled up nationwide in Bangladesh. D.Net is seeking to expand and increase the number of infoladies to 12 000 by the year 2017. Bangladesh Bank (the central bank of Bangladesh) recently allotted a facility of approximately USD 1.2 million to facilitate the availability of low-interest loans to infoladies. The fund is disbursed by the National Bank Limited (NBL), a private bank. This model has already created more than 50 women entrepreneurs in Bangladesh who earn approximately USD 150 per month. These entrepreneurs have reached over 300 000 rural citizens to date.

The model has had positive impact on the rural population's wellbeing by addressing issues such as family planning, hygiene, healthcare during pregnancy, agriculture, education and entertainment.

Over the years, the Infolady programme has received multiple awards for being a unique model of disseminating information. By providing relevant, useful and localised content to rural women, the programme contributes to the objectives of WSIS Target 1 in a least developed country context. It is a practical, low-cost and viable model for connecting rural people and facilitating the creation of knowledge networks in rural Bangladesh. At the same time, it offers new technology-based self-employment opportunities for educated rural women.

Source: UNESCAP, Infolady.

Re-thinking the 'build-it-and-they-will-come' assumption

Action lines C2 and C3 focus on the provision of services by governments and stakeholders, with the underlying assumption that once infrastructure and access is provided, rural residents will move into the digital society. This assumption is reminiscent of the telecentres era in the 1990s and early 2000s. Large investments were made to establish telecentres in rural villages in developing countries, with the hopes of bridging the digital divide for rural populations. The assumption then was that access to infrastructure and information would accelerate development in impoverished areas. Since then, most telecentres have been found to have limited effects in reducing poverty and tend to be financially unsustainable (Best and Kumar, 2008; Gurstein, 2011). As the WSIS targets and action lines are being reviewed, this is an appropriate time to consider the validity of the assumption of 'access equals development'. Would rural populations subscribe to Internet plans and use public access points if these were available? What other conditions need to be in place for the needs of rural populations to be addressed?

Another point of consideration arising from the relevant action lines is the implicit order in the delivery of connectivity and content. As the action lines are currently framed, connectivity precedes content. The pipelines must be present before content can be delivered. This logical linear order enables rollout of infrastructure installation in distinct phases, from a project management perspective. However, as the village of Talea (Box 1.3) demonstrates, there are alternatives to this modality. In the case of Talea in rural Mexico, the community created a mobile phone network of their own, and redefined traditional notions of community access. In this case, there was first the need for information exchange between the villagers and other people in their networks, and then came the construction of home-grown infrastructure that addressed those communication needs.

Box 1.3: The Mexican village that got itself talking

In the tiny coffee-producing village of Talea de Castro in Mexico, residents are unserved by any of the main telecommunications operators. For years, the locals have asked the main networks in Mexico to install a mobile phone antenna in the village. They kept getting the same answer: it was not worth sending an engineer into the remote mountains of Oaxaca for fewer than 10 000 customers. Villagers said that the phone companies wanted other infrastructure built before they would provide coverage. According to the community leaders, the phone companies wanted electricity lines and a new road built to the site where the antenna would be erected, involving significant cost and red tape for the local people.

Faced with intransigence from big business, the 2 500 villagers of Talea decided to do something for themselves. They launched a mobile phone network of their own. Using technology from a US-based company and expertise from a non-profit organisation, Rhizomatica, the villagers installed an antenna on the roof of a strategically-placed private residence to provide maximum coverage to Talea. Experts from Rhizomatica worked with the community using local structures and local capacity in order to provide equipment and services at costs that the community could afford.

Calls and texts within the village are free and calls to areas outside are significantly cheaper than they would be using the big telecom companies. Residents report that a five-minute call to the United States only cost 30 cents, which is about ten times cheaper than using a landline. Other residents have boosted their income by carrying a phone. Taxi drivers could get work through their mobile phones rather than driving around the streets looking for work. The impact is not just economic in nature. When newcomers arrive in the village, they automatically receive a message telling them to go to the local radio station to register their phone. Their phones can then be used to get help in a medical emergency or when flooding occurs.

Since its initial launch, calls had been restricted to five minutes to avoid saturating the system's capacity. Residents have now installed a more permanent antenna on top of a specially built phone mast to provide more lines and wider coverage.

Source: BBC Latin American news, 14 October 2013.[8]

The rest of this chapter reviews the indicators for Target 1, data availability to track the indicators and reports the progress towards the achievement of this target since the 2010 review. It further discusses the importance of staying committed to the target, while taking a more integrated approach to connecting rural populations to ICTs.

Indicators to track WSIS Target 1

The following four indicators were identified to track Target 1:

> Indicator 1.1: Proportion of rural population covered by a mobile cellular telephone network, by type of mobile cellular telephone technology
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> Indicator 1.2: Proportion of households with telephone, by type of network, by urban/rural
>
> Indicator 1.3: Proportion of households with Internet access, by type of access, by urban/rural
>
> Indicator 1.4: Proportion of individuals using the Internet, by location, by urban/rural.

Indicator 1.1 refers to the percentage of a country's inhabitants that live within rural areas and are served by a mobile telephone signal, irrespective of whether they use the service – either as a subscriber or a user who is not a subscriber. The indicator measures the theoretical ability to use mobile cellular services, not the actual use or level of subscription.

Indicator 1.2 refers to phone access at home by in-scope urban and rural households. The indicator is further split into four parts based on the type of phone access. This indicator measures phone access at home and reflects the shared nature of the phone use at home regardless of who the subscriber is.

Indicator 1.3 refers to Internet access at home by in-scope urban and rural households and by type of Internet access services they have. As with Indicator 1.2, this indicator assumes that once a household has an Internet subscription, family members will be able to use online services regardless of who the subscriber is. The indicator does not measure actual use.

Indicator 1.4 refers to the use of the Internet by in-scope[9] urban and rural individuals and the location of their Internet use. This indicator focuses on Internet use rather than access, which is covered by Indicator 1.3. Locations of use include community and commercial Internet access facilities.

Table 1.1 presents the data sources used in this report for measuring Target 1. For Indicator 1.1, the original data sources are telecommunications operators. In almost all countries, data are aggregated at the national level by telecommunication/ICT regulators and ministries, which provide information annually to ITU. The indicator is a further disaggregation of the *Partnership* core ICT indicator, A7. The split of the indicator into urban and rural is not collected by most countries and was estimated from urban and rural classifications in population censuses. For indicators 1.2 to 1.4, the data are collected by ICT household surveys, usually conducted by national statistical offices (NSOs).

Table 1.1: Data sources for indicators for measuring Target 1

Indicators		*Partnership* core indicator	Data availability (2012 or 2011)
1.1	Proportion of rural population covered by a mobile cellular telephone network, by type of mobile cellular telephone technology	A7	High – based on country data for mobile-population coverage and rural population data; estimated from ITU data covering 177 countries.
1.2	Proportion of households with telephone, by type of network, by urban/rural	HH3	Low – Fewer than 19 countries had data by urban/rural and type of network.
1.3	Proportion of households with Internet access, by type of access, by urban/rural	HH6, HH11	Low – 21 countries had data by urban/rural; data availability is lower when disaggregated by type of access.
1.4	Proportion of individuals using the Internet, by location, by urban/rural	HH7, HH8	Low – 19 countries had data by urban/rural split and 16 countries had data by locations of use.

Source: ITU.

The indicators used for the current review are from *Partnership* (2010). Changes to the household indicators were finalized in 2013, with some changes to HH3, HH11 and HH8. Changes to the indicators on ICT infrastructure and access were also finalized in 2013, with A7 becoming A6 and being limited to 3G mobile networks. See ITU (2014) for more information.

Achievements against Target 1

Rural population covered by a mobile phone network

This is measured by Indicator 1.1 and is *Partnership* core indicator A7. It refers to the proportions of rural populations covered by a mobile cellular telephone network. Indicator 1.1 is disaggregated by mobile phone technology, as follow:

- 2G mobile communication network (providing download speeds of below 256 kbit/s)
- mobile broadband signal (providing download speeds of at least 256 kbit/s).[10]

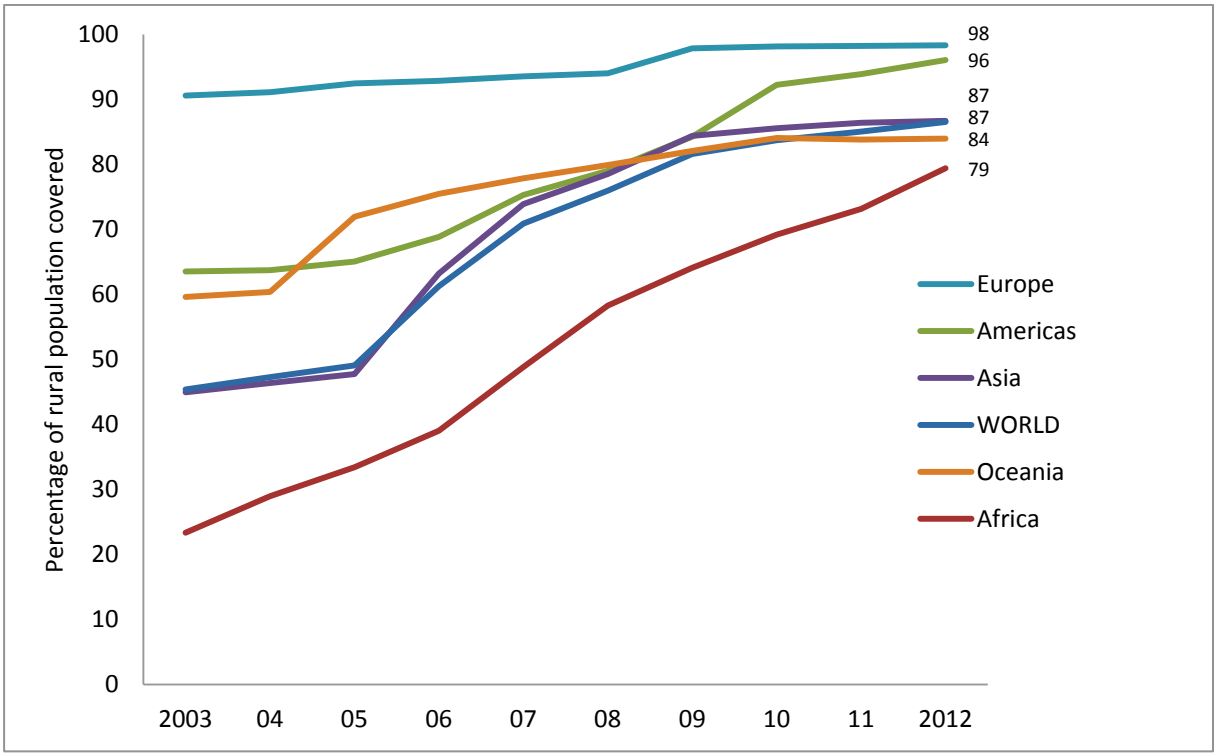
Considerable progress has been made in Indicator 1.1 in terms of mobile-cellular coverage for rural populations since 2003. Based on the latest statistics, only about one in eight rural residents is out of range of a mobile signal (see Table 1.2); this compares to one in four in 2008 and about one in two in 2003. By the end of 2012, 87 per cent of the world's rural population, or 2.9 billion people, were covered by a mobile cellular signal. In 2008, it was 76 per cent (2.5 billion people) and in 2003, 45 per cent (1.5 billion people). The number of rural residents not covered decreased from 800 million in 2008 to 451 million by the end of 2012. Progress made by regions from 2003 to 2012 is shown in Chart 1.1.

Table 1.2: Rural population covered by a mobile cellular signal,[11] 2012

Region	Overall mobile cellular coverage	Rural population covered	Rural population covered	Rural population not covered
	%	%	millions	millions
Africa	88	79	498	129
Americas	99	96	171	9
Asia	92	87	2 017	309
Europe	100	98	196	3
Oceania	98	84	3	0.6
World	93	87	2 886	451

Source: ITU estimate.

Chart 1.1: Rural population covered by a mobile cellular signal, by region, 2003–2012



Source: ITU estimate.

In 2003, only 23 per cent of rural populations in Africa were covered by a mobile cellular signal; this coverage had improved to 79 per cent by the end of 2012. Mobile cellular coverage in Asia nearly doubled from 45 per cent in 2003 to 87 per cent by the end of 2012. Even in Oceania where some of the most remote countries in the world are located, 84 per cent of rural populations were covered by a mobile cellular signal by the end of 2012, up from 60 per cent in 2003.[12] While this is still below the 87 per cent global coverage, the increase in connectivity has helped many rural citizens in small island states of Oceania to connect to information and services previously lacking in their locality (Box 1.4 describes the information-communication revolution in the Pacific). European countries connected a further 7 per cent of their rural populations between 2003 and 2012, with many countries in Europe now reporting 100 per cent mobile cellular coverage for their rural populations. At the end of 2012, the Americas had rural connectivity comparable to Europe (96 per cent of rural population).

Box 1.4: An Information-communication revolution in the Pacific

Oceania is a region comprised of some 9 000 islands spread across a vast ocean, making them among the most remote in the world (with the exception of Australia and New Zealand). This is also a region where ICT outreach is rapidly developing. More than two million people in Papua New Guinea and the Pacific Islands gained access to mobile phones over the last six years. Access to mobile networks and devices has reduced isolation, made it easier and cheaper to do business, and increased government options for service delivery.

In Papua New Guinea and the Pacific Islands, villagers who for years had made three-hour long boat trips to make a simple phone call to the capital, are now calling and texting family in other provinces and even other countries. Government and business transaction costs are also decreasing as connectivity improves. The benefits have been felt right across Papua New Guinea, Samoa, Solomon Islands, Tonga and Vanuatu, and are now stretching into the North Pacific. The telecommunications revolution is also creating jobs where they are needed most: directly creating livelihoods for at least 30 000 people in Papua New Guinea alone.

Mobile phones are just the beginning. High-speed broadband is the next step to help overcome the challenges related to remoteness. Currently, most Pacific Island countries still depend on costly satellite links with limited bandwidth, and Internet connectivity costs are among the highest in the world. A 256 kbit/s broadband Internet connection costs around USD 650 per month in Palau. In Kiribati, one of the poorest countries in the region, it would cost USD 430. Such high rates are common across the Pacific. As a result, less than 1 per cent of the region's population typically has access to a reliable Internet connection. Where the Internet exists, access speeds are often slow and connectivity sporadic. Outside the main towns, people are still more likely to communicate with letters transported by ship than by e-mail.

The situation is expected to improve in 2014 with the arrival of broadband. Through a project funded by the World Bank and Asian Development Bank, an 830 km fibre-optic cable will be installed underwater to connect Tonga, a country made up of 176 islands spread across 700 000 square kilometres of ocean, to the Southern Cross Landing Station in Fiji, and onwards to global broadband networks.

Source: adapted from World Bank (2013).

This optimistic evaluation and outlook for rural mobile cellular availability has two caveats. First, indicator 1.1 focuses on the proportion of inhabitants that are within range of a mobile cellular signal, irrespective of whether or not they are subscribers. The numbers presented above are not equivalent to mobile subscription density or mobile usage. Second, data were not available for many developing countries that presumably have lower cellular signal availability. In Oceania, nine out of the nineteen countries in the region had no data about mobile coverage.

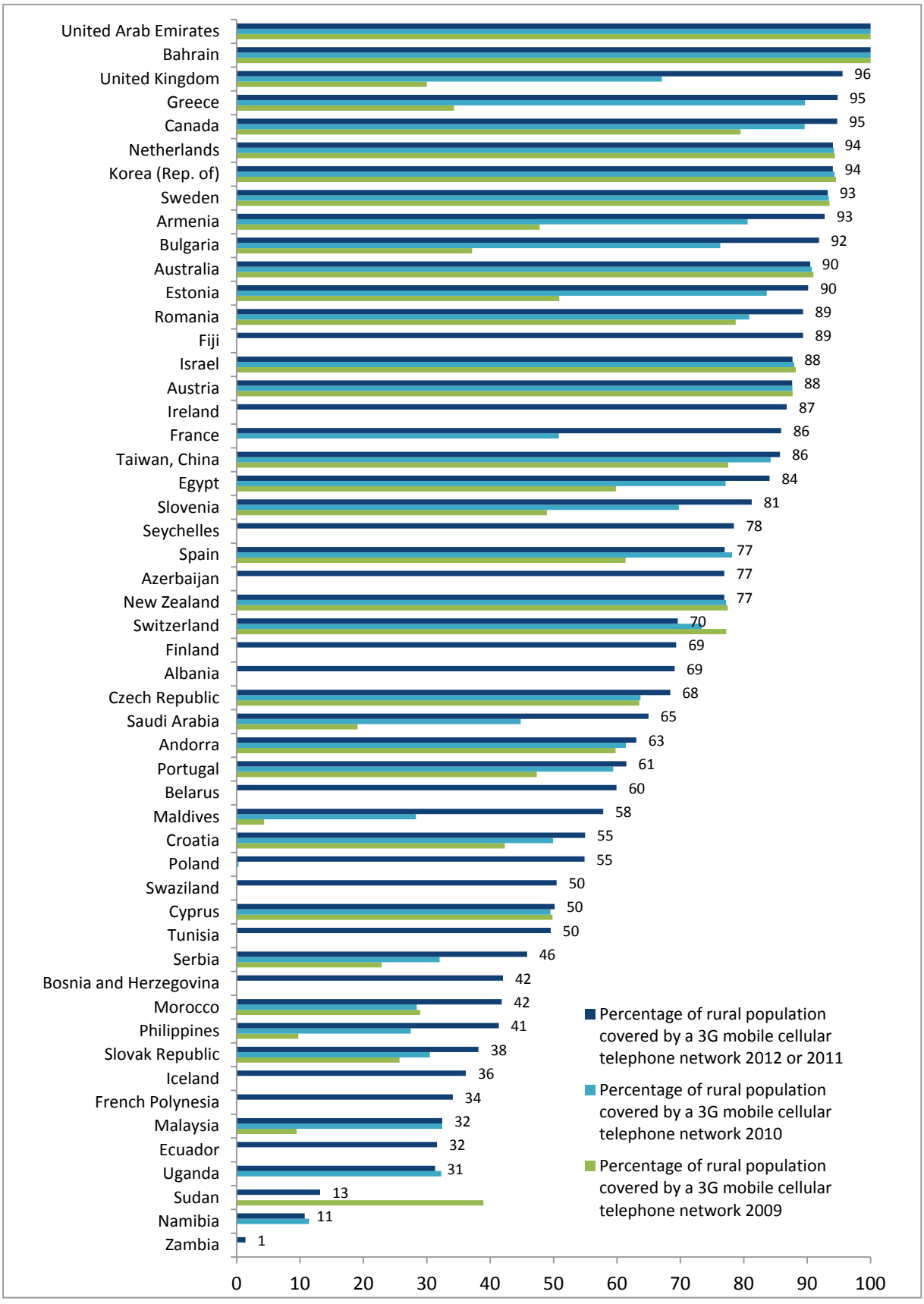
Turning to the indicator on rural populations covered by a 3G mobile cellular network, data availability was considerably lower. Chart 1.2 shows the proportion of rural populations covered by a 3G mobile cellular signal for countries that reported non-zero data for 2012.[13] A 3G mobile cellular signal is least available in African countries, with many sub-Saharan countries reporting no 3G mobile cellular coverage for their rural populations. While Chart 1.1 demonstrates tremendous progress in closing the digital divide in terms of mobile cellular signal availability to rural populations, Chart 1.2 demonstrates that there is still a considerable gap between developed and developing countries in terms of 3G cellular coverage. However, this gap is expected to close rapidly in the next few years – especially if current growth in mobile ownership is sustained. To provide better signal coverage to their subscribers, operators are likely to upgrade existing infrastructure to 3G or better, or install new infrastructure that would be faster than 2G.

3G mobile cellular coverage of rural populations ranged from highs of over 90 per cent in several developed countries to 100 per cent in the United Arab Emirates and Bahrain. Among developing countries, Fiji has done noticeably well in making 3G mobile cellular coverage available to rural residents. This progress was recognized in ITU's *Measuring the Information Society 2012* (ITU, 2012).

Fiji tied for the third largest improvement of any country, moving up five places to 88th from 2010 to 2011. In the 2012 report, ITU attributed Fiji's high ranking to strong growth in mobile-broadband penetration, extension of 3G coverage, and the development of Fiji's, and the Pacific's, first national broadband plan. The country is ranked 82nd in the 2013 report (ITU, 2013).

The rural populations of a number of African countries do not have 3G mobile cellular coverage. This lack of access means that mobile services are mainly limited to basic telephony like phone calls and text messages. Public services that require a 3G connection are still unable to reach the populations who are likely to benefit most from using such services.

Chart 1.2: Rural population covered by a 3G mobile cellular signal,[14] 2009–2012



Source: ITU estimate.

Note: The country of Sudan split in 2011.

Indicator 1.1 provides contrasting results on progress made towards connecting rural populations to ICT and these have implications for how the digital divide is defined post-2015. As shown above, progress in 2G mobile cellular coverage has been impressive, while progress in 3G mobile cellular coverage has been modest – at least for most developing countries. However, 3G is a fairly new technology and many countries are just starting to deploy 3G or LTE Advanced technology.[15] Global coverage patterns could therefore change rapidly in the coming years, with 3G perhaps taking a shorter time than 2G to achieve near global coverage. As countries move to deploy 3G or LTE Advanced infrastructure, the issue of spectrum allocation could also become more salient. To meet the increase in demand for radio spectrum, it is important to have agreement on uniform and coordinated strategies both within countries and between neighbouring countries.[16] If the current growth trends continue, the mobile digital divide may soon be less about a dichotomy of haves and have-nots for a basic mobile signal, and more about the quality of connectivity. The scarcity of 3G mobile cellular coverage for rural populations, especially in developing countries, suggests that quality of access will be a key dimension of the digital divide post-2015. The amount of information and services that can be accessed on a smartphone with a 3G or 4G connection is significantly greater than that available on a basic mobile phone on a 2G network.

The issue of the quality of access is relevant, even in developed countries. A recent study released by the Pew Research Center's Internet Project[17] found that 63 per cent of American adult mobile phone owners in the United States now use their phones to go online, a figure that has doubled since the Pew Research Center first started tracking Internet usage on mobile phones in 2009. For many, such as younger adults or lower-income Americans, mobile phones are often a primary device for accessing online content; 21 per cent of all adult mobile phone owners now do most of their online browsing using their mobile phone rather than a computer. However, screens are considerably smaller on mobile devices and the data connection is usually of a lower speed and often more expensive than a fixed-line connection. In addition, fixed-broadband packages often provide unlimited data allowances, while mobile-broadband packages are capped. Finally, the quality of mobile broadband networks depends on the number of people using the network at the same time. While mobile devices appear to be the future of Internet access, these factors relating to quality of access need to be considered.

If trends for growing 3G mobile Internet occur in developing countries, the availability of basic 2G mobile networks would not be able to meet the communication needs of their populations – and even more so for rural residents. One way of meeting this challenge is to look for cost-effective ways of ensuring coverage that will give telecom operators an incentive to serve rural populations. Box 1.5 highlights emerging technologies that provide mobile coverage for remote parts of Congo without the installation of costly cell towers.

Box 1.5: Emerging technologies provide mobile coverage in rural Congo

Emerging technologies in the form of picocells may soon provide mobile coverage to the remote parts of Congo. In 2012, the Pan-African telecom provider RascomStar-QAF, Viasat and UK-based ip.access announced plans to use small access nodes called picocells to provide coverage even in Congo's rainforests. Picocells have a range of hundreds of metres compared to the tens of metres range of femtocells that are typically used to deliver a private signal to homes outside of the coverage area.

The RASCOM-QAF satellite is the first satellite entirely dedicated to the African continent. When it was launched in 2010, one of the goals was to provide the African continent with mobile network coverage. However, in many remote and rural parts, people are still unable to use mobile phones simply because of the lack of necessary infrastructure, particularly telecommunications towers.

To address the lack of cell towers, the partnership will install 50 picocells mini base stations around Congo to provide mobile coverage to remote rural communities. UK-based company ip.access will supply picocells around Congo, with one gateway in the capital, Brazzaville. Each cell will then create a private wireless network in a particular area. A picocell is easy to use and the company says that it could be put up by someone with basic technical knowledge. Therefore, the picocell solution would be much simpler and cheaper than building new towers and expensive base stations. The partnership believes that this solution will provide affordable universal telephony access to previously unconnected parts of the world at an affordable price.

Source: ITU research based on BBC News (5 June 2012).

Proportion of households with telephone

This is measured by Indicator 1.2 and is *Partnership* core indicator HH3. It refers to phone access at home by in-scope urban and rural households.[18] The indicator is split into four parts, as follows:

Proportion of households with any telephone access

Proportion of households with fixed telephone only

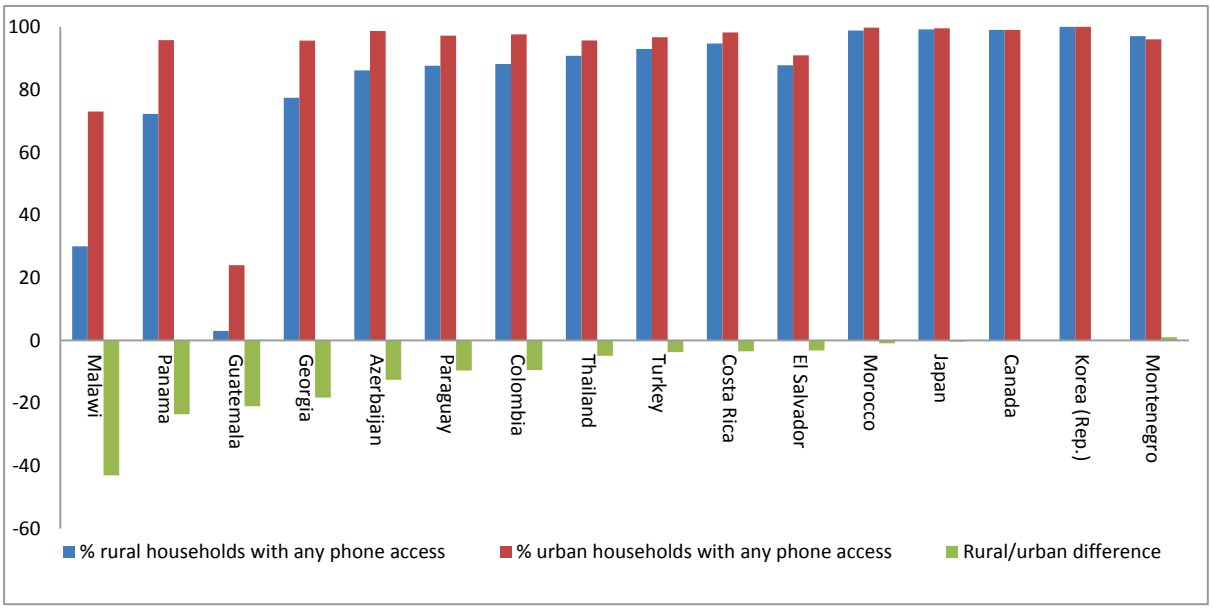
Proportion of households with mobile cellular telephone only

Proportion of households with both fixed and mobile cellular telephone.

The data for Indicator 1.2 are collected by ICT household surveys, usually conducted by NSOs. Data for the indicator split by rural/urban breakdown were very limited and only a handful of countries (17–20) reported data for the years 2011 or 2012. One reason for the scarcity is that many developed countries have stopped tracking fixed-line phone subscriptions at the household level; data were also very limited for the least developed countries.

Chart 1.3 uses available data to show the proportions of households with any phone access, disaggregated by urban and rural populations, and showing the differences between levels of urban and rural access. Overall, access to phone services was high for rural households in countries for which data were available, except for Malawi (30 per cent) and Guatemala (3 per cent). For the other countries, penetration of phone access for rural households was high, ranging from 72 to 100 per cent for 2012. Not surprisingly, for most countries, urban households had greater access to phone than rural households. Rural/urban differences were largest in Malawi (43 percentage points), Panama (24 percentage points), and Guatemala (21 percentage points).

Chart 1.3: Households with any telephone access, by rural/urban difference, 2012/2011



Source: ITU.

Table 1.3 presents multi-year data for rural/urban differences for households with any phone access, for selected countries. Only nine countries had multi-year data for the time period 2009 to 2012. In Japan and the Republic of Korea, rural and urban access was consistently high (99–100 per cent). The other countries have been making steady progress at narrowing the gap between rural and urban populations. Georgia for instance, had a rural/urban gap of 55 percentage points in 2010 and this narrowed to 18 percentage points in 2012; rural penetration improved from 18 to 77 per cent in the same period.

Table 1.3: Households with any phone access, by rural/urban difference, 2009–2012, percentage

Country	2009			2010			2011			2012		
	Rural	Urban	Diff.	Rural	Urban	Diff.	Rural	Urban	Diff.	Rural	Urban	Diff.
Georgia	..	..	..	18	73	-55	..	..	..	77	96	-18
Azerbaijan	47	85	-38	82	91	-9	..	..	..	86	99	-13
Paraguay	79	92	-13	76	93	-17	84	95	-12	88	97	-10
Thailand	87	95	-8	..	..	..	91	96	-5	91	96	-5
Turkey	94	96	-2	94	97	-3	93	97	-4	93	97	-4
Costa Rica	79	92	-13	81	93	-12	91	97	-6	95	98	-3
El Salvador	77	90	-13	84	92	-9	86	93	-7	88	91	-3
Japan	100	100	0	99	99	0	100	100	0	99	100	0
Korea, Rep.	100	100	0	..	..	..	100	100	0	100	100	0

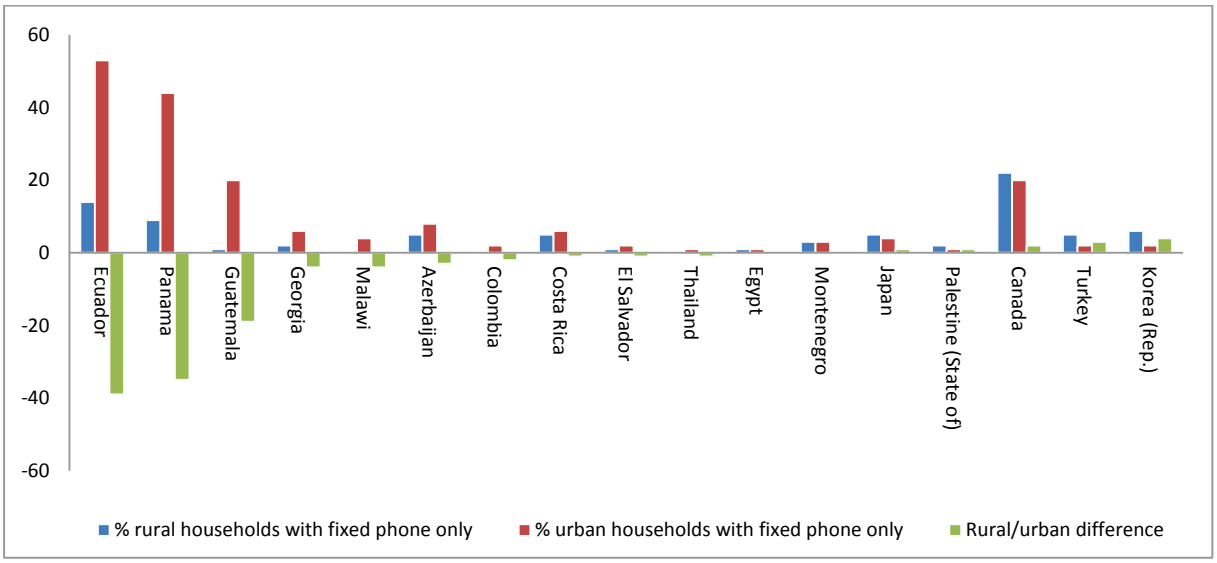
Source: ITU.

Note: .. not available.

Turning to proportions of households with fixed phone only, the statistics suggest the decreased importance of the fixed phone line (Chart 1.4). In almost all 17 countries with data available, with the exceptions of Canada and Ecuador, the proportion of rural households with fixed phone only was less than 10 per cent in 2012. These figures are consistent with dipping global trends in fixed phone subscription rates (ITU, 2013a). Fixed-telephone networks are often limited to urban areas,

particularly in developing countries. In rural areas, many people are getting connected with mobile phones instead of fixed phone because mobile cellular prices have been dropping rapidly to the extent that low-income groups can afford connectivity.

Chart 1.4: Households with fixed phone only, by rural/urban difference, 2012/2011



Source: ITU.

In terms of the rural/urban differences, rural households lag urban households in most countries for which data are available. The largest differences were in Ecuador (39 percentage points) and Panama (35 percentage points). Several countries reported higher access figures for rural households, though the differences were small in all cases. In those cases, the difference is likely due to rural households retaining their fixed-line subscriptions and not adopting mobile phones. This observation is consistent with demographically older rural populations who tend to be later adopters of mobile technology (Bond *et al*., 2007).

Table 1.4 shows multi-year data for the proportion of households with fixed phone only, by rural/urban differences, from 2009 to 2012. Only nine countries had multi-year data for this time period. In most of these countries, the proportion of both rural and urban households with fixed phone only decreased over the time period.

Table 1.4: Households with fixed phone only, by rural/urban difference, 2009–2012, percentage

Country	2009			2010			2011			2012		
	Rural	Urban	Diff.	Rural	Urban	Diff.	Rural	Urban	Diff.	Rural	Urban	Diff.
Georgia	..	..	..	18	73	-55	..	..	..	2	6	-3
Azerbaijan	6	9	-2	6	9	-3	..	..	..	5	8	-3
El Salvador	2	7	-4	2	3	-2	1	3	-2	1	2	-2
Thailand	1	3	-1	1	2	-1	1	2	-1	0	1	-1
Costa Rica	20	16	4	19	13	6	10	8	2	5	6	0
Egypt	6	9	-3	..	..	..	2	3	-1	1	1	0
Japan	3	4	0	7	5	2	6	4	1	5	4	1
Turkey	11	6	5	4	2	2	6	3	3	5	2	4
Korea, Rep.	9	3	6	..	..	..	6	2	4	6	2	4

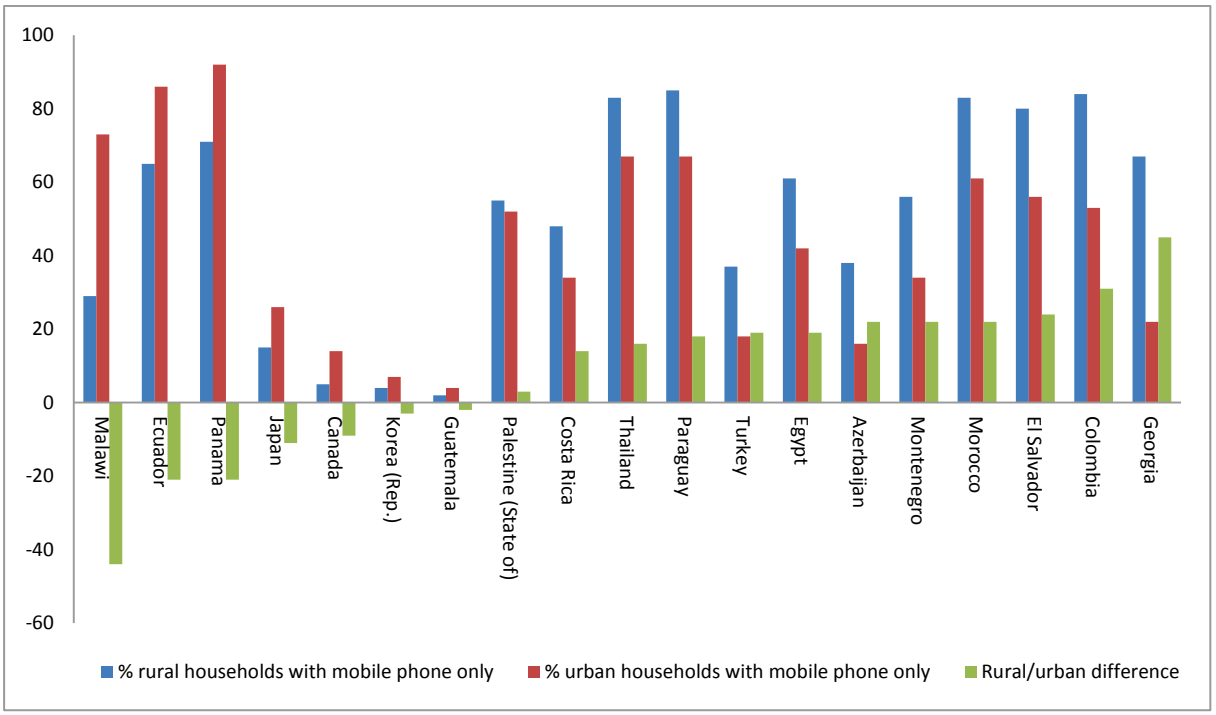
Source: ITU.

Note: .. not available.

The third component of Indicator 1.2 is proportions of households with mobile phone only. Overall, mobile phones appear to be playing an increasingly significant role in connecting rural households. Proportions of rural households with mobile phone only ranged from 2 per cent in Guatemala to 85 per cent in Paraguay. In 11 of the 19 countries with available data, this proportion was over 50 per cent. This is significantly higher than the corresponding figures for fixed phone only.

For access by mobile phone only, there was a higher proportion of rural households than urban households in 12 countries out of 19 countries with available data. This is likely to be a function of rural households having limited access to fixed phone services.

Chart 1.5: Households with mobile telephone only, by rural/urban difference, 2012/2011



Source: ITU.

Table 1.5 shows multi-year data for the proportion of households with mobile phone only, by rural/urban differences, from 2009 to 2012. In seven of the nine countries with data available, the proportion of rural households with mobile phone only increased significantly. For instance, in Azerbaijan, the proportion of rural households with mobile phone only more than doubled from 14 per cent in 2009 to 38 per cent by 2012. In Costa Rica, the proportion nearly doubled, from 25 per cent in 2009 to 48 per cent by 2012.

Table 1.5: Households with mobile phone only, by rural/urban difference, 2009–2012, percentage

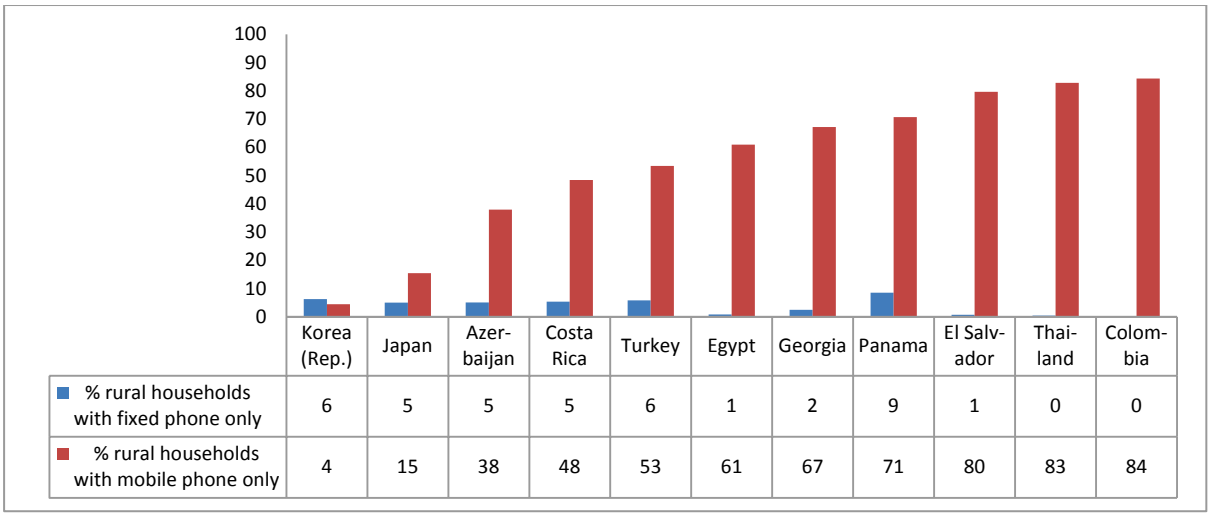
Country	2009			2010			2011			2012		
	Rural	Urban	Diff.	Rural	Urban	Diff.	Rural	Urban	Diff.	Rural	Urban	Diff.
Japan	9	7	2	10	19	-8	13	20	-8	15	26	-11
Korea, Rep.	14	21	-6	..	..	..	5	6	-1	4	7	-2
Costa Rica	25	18	7	28	23	5	41	29	12	48	34	15
Thailand	75	54	21	78	56	22	82	60	21	83	67	16
Paraguay	76	61	15	76	63	13	81	62	19	85	67	19
Turkey	35	33	2	45	38	7	51	42	9	37	18	19
Egypt	49	34	15	..	..	..	58	40	18	61	42	19
Azerbaijan	14	18	-4	40	18	22	..	..	..	38	16	22
El Salvador	65	45	21	74	54	20	78	59	19	80	56	24

Source: ITU.

Note: .. not available.

Chart 1.6 shows a comparison of rural households by the two modes of access. In Colombia, Egypt, El Salvador and Thailand, less than 1 per cent of rural households have fixed phone only, while values for mobile phones only range from 61 per cent (Egypt) to 84 per cent for Colombia. The chart underscores the earlier point made about the phenomenal role that mobile phones have played in recent years to connect rural residents in developing countries.

Chart 1.6: Rural households by fixed phone only and mobile phone only, 2012/2011



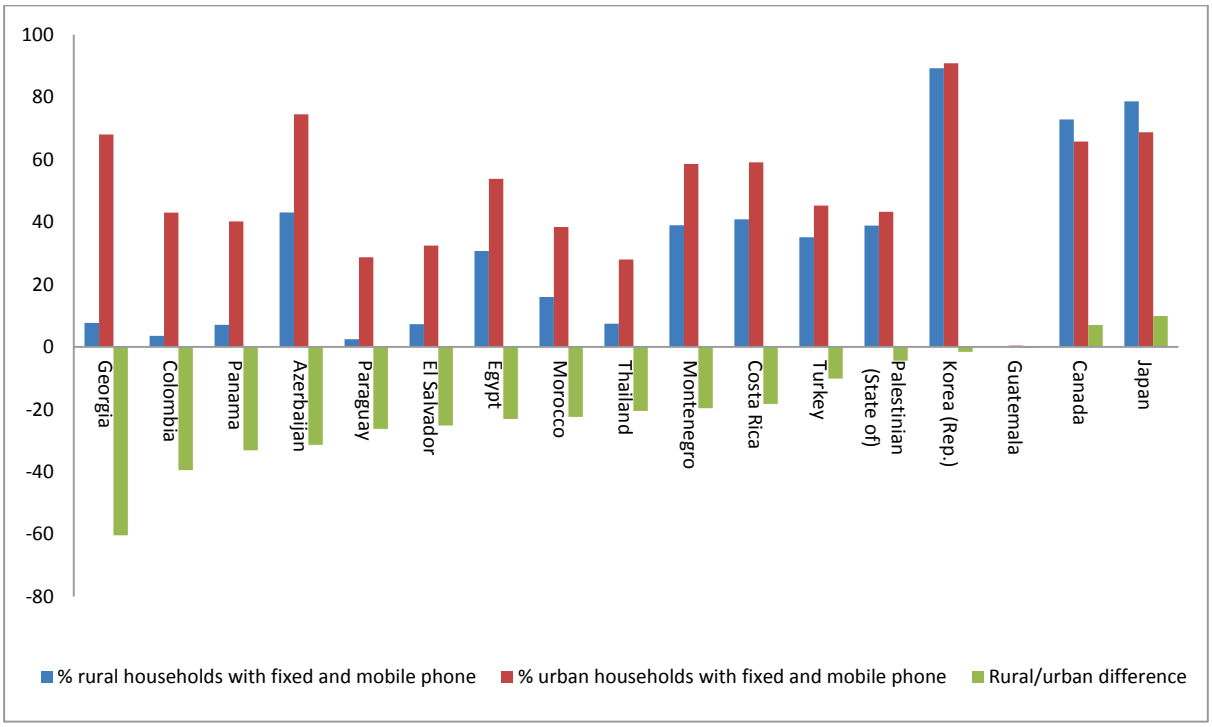
	Korea (Rep.)	Japan	Azer-baijan	Costa Rica	Turkey	Egypt	Georgia	Panama	El Salv-ador	Thai-land	Colom-bia
% rural households with fixed phone only	6	5	5	5	6	1	2	9	1	0	0
% rural households with mobile phone only	4	15	38	48	53	61	67	71	80	83	84

Source: ITU.

With regard to proportions of households with both fixed and mobile phone, the data are consistent with the trends discussed earlier (Chart 1.7). In seven of the 17 countries for which data are available, the proportion of rural households with both fixed and mobile phone was below ten per cent. Given that fixed phones are less likely to be available to rural households, there would naturally be a lower proportion of rural households that have access to both fixed and mobile phone. The Republic of Korea, Canada and Japan have some of the smallest rural/urban differences in terms of connectivity to both fixed and mobile phone. Rural and urban residents in these three countries were as likely to have high access to both types of telephony. In Guatemala, less than 1 per cent of both urban and rural households had fixed and mobile phone. In the State of Palestine, about two in five

households (both urban and rural) had fixed and mobile phone. The largest rural/urban differences were in Georgia, Columbia and Panama (60, 39 and 33 percentage points respectively).

Chart 1.7: Households with both fixed and mobile telephone by rural/urban difference, 2012/2011



Source: ITU.

Overall, Target 1 has not been achieved in respect of telephone connectivity, although significant progress has been made. For most of the countries for which data are available, over 70 per cent of rural households have phone access of some type. The proportion is likely to be lower for least developed countries, most of which do not collect data on ICT access.

Although data availability was generally low for Indicator 1.2, three trends are evident:

- Mobile telephony is providing connectivity to rural populations who had been largely excluded from the diffusion of fixed-line telephony.
- Rural populations are tending to connect via mobile telephony only – whether from lack of choice and/or because mobile phones offer other advantages.
- Although telephone signal coverage is widespread, there are still rural populations who are unconnected. When they are connected, the next digital divide is likely to be one of quality of access, as evident from the low availability of 3G signals for rural populations in Indicator 1.1.

Proportion of households with Internet access

This is measured by Indicator 1.3 and uses the *Partnership* core indicators HH6 and HH11. It refers to the proportion of households with Internet access, by type of access, by urban/rural. Indicator 1.3 is split into two parts, as follows:

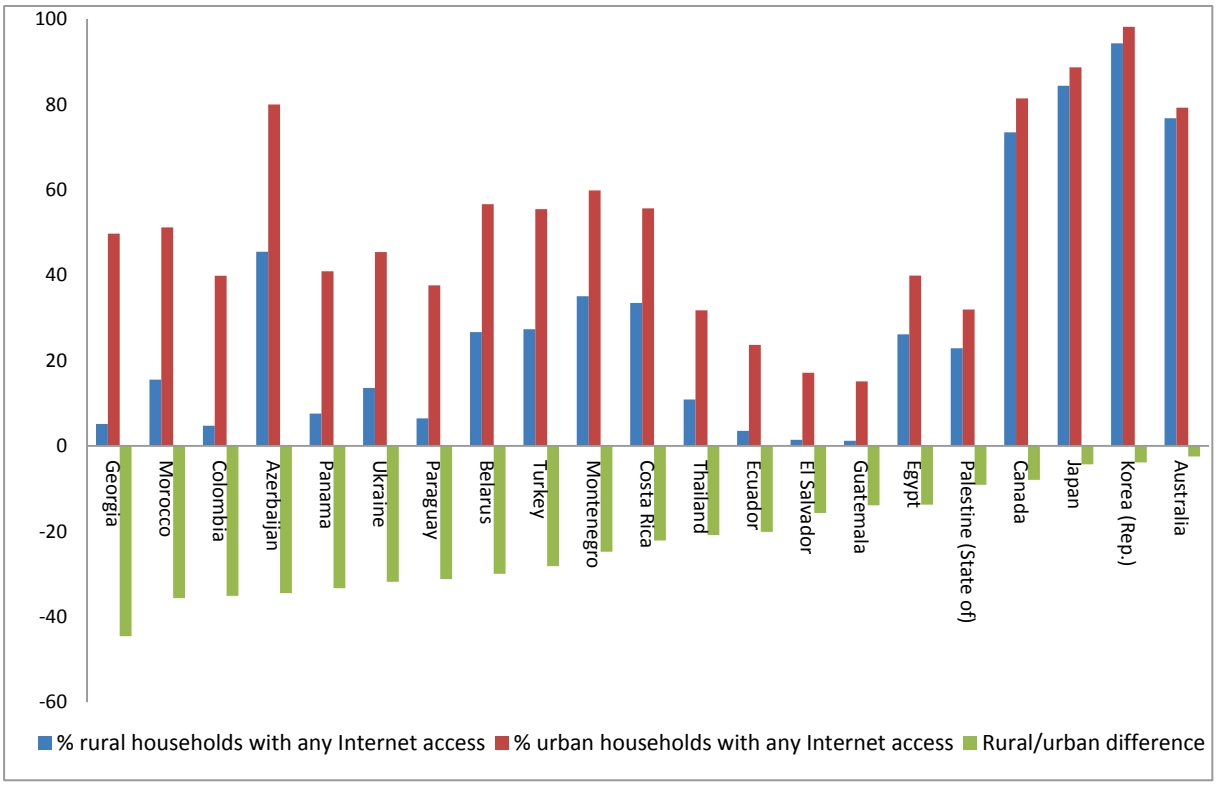
- Proportion of households with any Internet access, by urban/rural
- Proportion of households with Internet access, by type of access, by urban/rural.

Indicator 1.3 deals with Internet access for rural households. Measuring rural household access to the Internet, and especially broadband Internet, is important for understanding how well connected

rural households are. ICTs in the home represent a fundamental measure of accessibility, as residents can access the Internet within the privacy of their home and have more control on the duration and purpose of use. Household access also monitors shared access to ICTs. Residents in rural communities in many developing countries cannot afford personal ICTs – unlike their counterparts in developed countries. Therefore, shared access in the home may be their only means of being connected. The measurement of household access enables policy-makers to make evidence-based policy decisions, especially where access is low. From a measurement perspective, household access is an unambiguous measurement, as a household is a well-defined statistical concept and the maximum penetration level is 100 per cent (ITU, 2010). The limitation to measurement of household Internet access is that access outside the home is not captured. Indicator 1.4 provides information on use of the Internet at locations other than home.

Chart 1.8 shows the proportion of households with any Internet access by rural/urban differences, in 2012 and 2011. Only 21 countries had data on household Internet access dissected by rural/urban. As with other household indicators, very little data are available from least developed countries. Rural household penetration ranged from 1 per cent in Guatemala and El Salvador to 94 per cent in the Republic of Korea. Of the 21 countries, seven had rural household penetration of less than 10 per cent and ten had penetration between 10 per cent and 50 per cent. Only four countries had rural household penetration rates of above 50 per cent.

Chart 1.8: Households with any Internet access by rural/urban difference, 2012/2011



Source: ITU World Telecommunication/ICT Indicators Database.

Rural/urban differences, especially in developing countries, show clearly that rural households are being left behind. In Guatemala, urban households are 12 times more likely to be connected to the Internet than rural households. In Georgia, the ratio is ten times. Even for several countries with relatively high GNI per capita, rural/urban differences are noticeably large. In Morocco, the difference in rural and urban household connectivity was 36 percentage points, in Ukraine 32 percentage points and in Turkey 28 percentage points.

Table 1.6 shows the proportion of households with Internet access, by rural/urban differences, from 2009 to 2012. In respect of the 12 countries that had data for this indicator, rural household penetration of the Internet is growing, but generally at a slow rate. Nevertheless, several countries have done very well in ensuring that rural households are connected to the Internet. In Azerbaijan, rural household penetration more than doubled from 21 per cent in 2009 to 45 per cent in 2012. In Costa Rica, penetration quadrupled, from 8 per cent in 2009 to 33 per cent in 2012.

Table 1.6: Households with any Internet access, by rural/urban difference, 2009–2012, percentage

Country	2009			2010			2011			2012		
	Rural	Urban	Diff.	Rural	Urban	Diff.	Rural	Urban	Diff.	Rural	Urban	Diff.
Colombia	1	19	-18	2	24	-23	2	29	-27	5	40	-35
Azerbaijan	21	42	-21	29	58	-29	..	..	..	45	80	-34
Ukraine	..	..	..	6	30	-24	10	38	-28	14	45	-32
Paraguay	3	17	-14	2	21	-19	6	32	-26	6	38	-31
Belarus	10	31	-21	13	38	-25	21	47	-26	27	57	-30
Turkey	16	36	-20	24	49	-25	23	51	-28	27	55	-28
Costa Rica	8	26	-19	11	32	-21	18	43	-25	33	56	-22
Thailand	4	21	-17	5	24	-18	6	26	-19	11	32	-21
El Salvador	0	9	-9	1	12	-11	2	17	-15	1	17	-16
Egypt	19	33	-15	..	..	..	..	..	..	26	40	-14
Japan	81	84	-3	79	85	-6	84	89	-6	84	89	-4
Korea, Rep.	91	97	-6	..	..	..	94	98	-4	94	98	-4

Source: ITU World Telecommunication/ICT Indicators Database.
Note: .. not available.

Despite the progress made in some countries, the overall trend of a widening gap between rural and urban households is clear. In Colombia, the rural/urban difference doubled from 18 to 35 percentage points between 2009 and 2012. In Azerbaijan, the difference increased from 21 to 34 percentage points. Given that Internet infrastructure is typically rolled out first in urban areas, the trend observed is unsurprising. Nevertheless, the growing gaps deserve attention so that rural households do not fall too far behind. For areas where access is limited, efforts should be made to improve connectivity so that rural households can start to experience the benefits of the Internet as many of their urban counterparts are already doing.

Box 1.6 highlights ways in which the Internet and mobile phones are improving the reach and effectiveness of health, economic and agricultural programmes in Africa.

Box 1.6: Internet-based applications for rural populations in Africa

A recent report by the McKinsey Global Institute identified several opportunities for Internet-driven growth and productivity in several sectors including health, financial services and agriculture. Three opportunities in these sectors that are specific to rural populations are highlighted below:

Health

Remote diagnostics and telemedicine could address 80 per cent of the health issues of patients in rural clinics, thereby revolutionising health care for large portions of the population, while reducing costs and travel time. Internet access could enable widespread automation and centralisation of patient admissions, health records and supply chains in public health systems and private hospitals. It also paves the way for advances in practitioner education and training.

Telemedicine can also be used to promote health education and ensure that patients follow through on treatment regimes. Uganda's *Text to Change* project aims to increase public knowledge of HIV/AIDS prevention through text messaging, using a multiple-choice quiz for Celtel mobile subscribers in the rural region of Mbarara. At the end of the quiz, a final text message is sent to encourage participants to go for voluntary testing and counselling at the local health centre. This project led to an increase of nearly 40 per cent in the number of people coming in for free HIV/AIDS screening. In a scheme in Mozambique, tuberculosis patients receive daily SMS reminders to remind them to take their medication; this has raised compliance rates considerably.

Financial Services

The Ethiopia Commodity Exchange (ECX) provides a virtual marketplace and is accessible online, by phone and SMS. It improves transparency on supply, demand and prices, and increases farmers' share of revenue. The ECX receives more than one million requests per month for market information, with 80 per cent coming from rural areas. As the Internet brings greater transparency, producers are able to see price differences between different grades and commodities. They are therefore able to make more informed decisions on what to plant and can see the quality premium and discount associated with post-harvest production. Likewise, the Agricultural Commodity Exchange in Malawi allows farmers to submit bids and offers online. The East Africa Exchange goes one step further, providing a virtual trading platform, building a regional market and improving price transparency for farmers across six countries. It also provides support services such as warehousing, logistics and market intelligence on stockpiles and expected yields of key crops.

Agriculture

Internet-based agriculture platforms also have the potential to drive up demand for web access, and thus support infrastructure rollout in rural areas. This is exactly the effect that the Senegal-based Manobi had on mobile networks. The initiative, which provides weather and pricing information to fishermen via SMS and WAP, has directly assisted with extending network coverage to remote areas. Technology-driven agricultural services have already shown their ability to improve crop yield, expand access to markets and boost revenue for farmers – thus improving livelihoods and boosting the broader economy. Such services could also create a valuable market in and of themselves, growing to some USD 3 billion a year across Africa by 2025.

Source: adapted from McKinsey Global Institute (2013).

More than just showcasing Internet-based applications for rural populations, Box 1.6 advances the notion that emphasis on Internet connectivity for rural populations can enhance the ways in which development programmes reach the populations that can benefit the most. Furthermore, uptake of the applications could lend strength to infrastructure rollout in rural areas by driving up demand for web services, as in the case of the Senegalese Internet-based agricultural platforms.

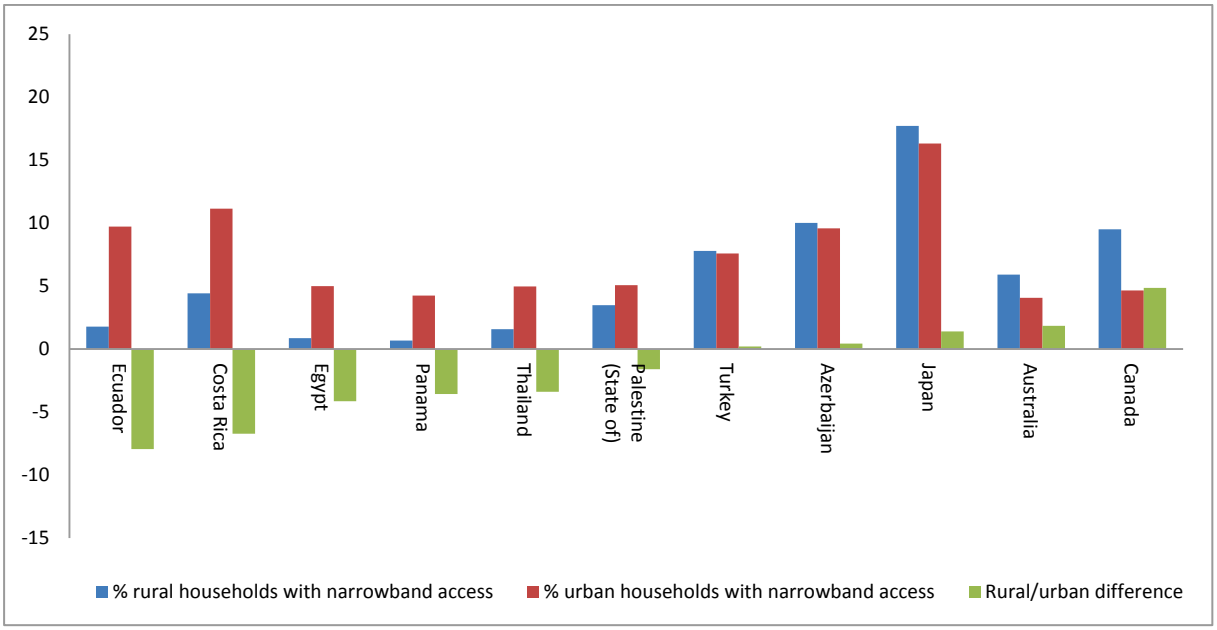
Charts 1.9 to 1.11 present the proportion of households with Internet, by type of access and by rural/urban differences. The different types of access shown are narrowband, fixed (wired) broadband and wireless broadband.

Chart 1.9 shows the proportion of households with narrowband access by rural/urban differences in 2012 or 2011. Narrowband includes analogue modem (dial-up via standard phone line), ISDN

(Integrated Services Digital Network), DSL at advertised download speeds below 256 kbit/s, and mobile phone and other forms of access with an advertised download speed of less than 256 kbit/s. Narrowband mobile phone access services include CDMA 1x (Release 0), GPRS, WAP and i-mode (*Partnership*, 2011).

Only 12 countries had data on narrowband access split by rural/urban. For most countries shown, the proportion of rural households with narrowband access is low (below 10 per cent), with the exception of Japan, where the proportion was 18 per cent in 2012. Even for urban households, the proportions are low, with Japan showing the highest penetration at 16 per cent. Because household penetration rates were generally low, the differences between rural and urban household penetration were also small (less than 10 percentage points in all cases).

Chart 1.9: Households with narrowband access by rural/urban difference, 2012/2011

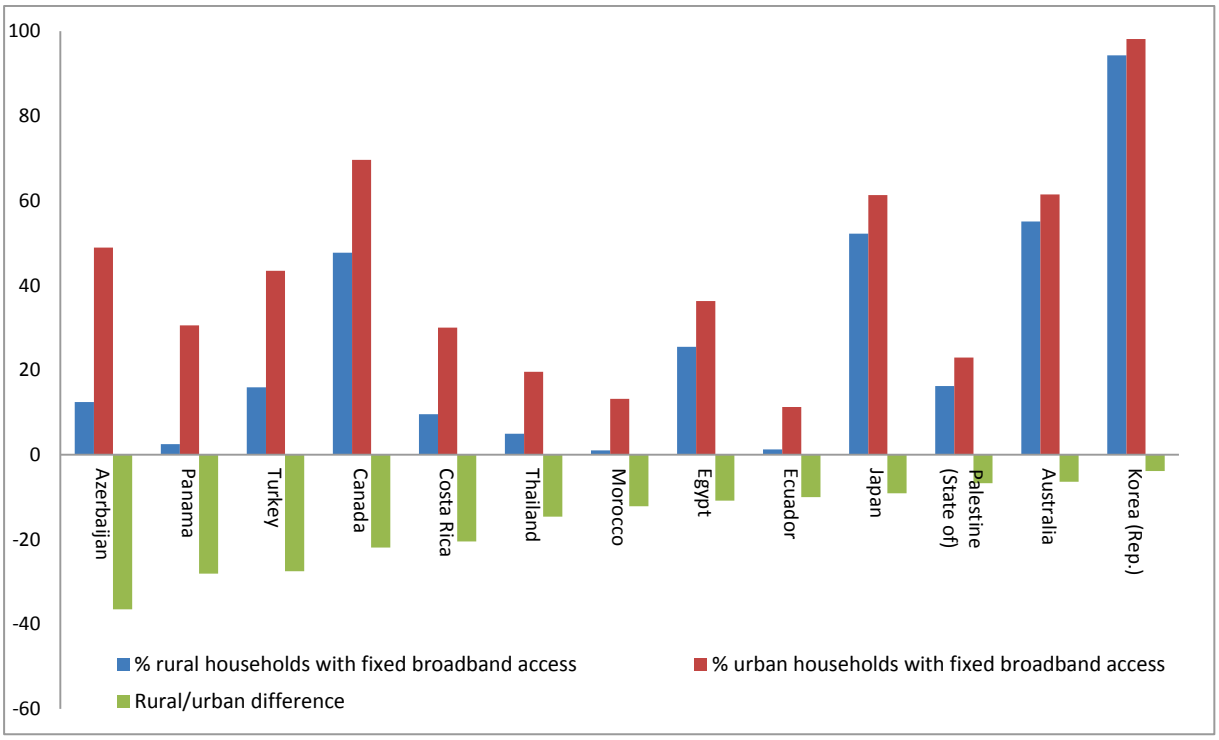


Source: ITU.

Chart 1.10 shows the proportion of households with fixed broadband access by rural/urban differences in 2012 or 2011. Fixed broadband refers to fixed (wired) high-speed access to the public Internet (a TCP/IP connection) at downstream speeds of at least 256 kbit/s. This can include cable modem, DSL and fibre-to-the-home/building (*Partnership*, 2011).

Thirteen countries had data available for this part of Indicator 1.3. Rural household penetration varied considerably across countries and ranged from a low of 1 per cent in Morocco and Ecuador to a high of 94 per cent in the Republic of Korea. Rural household penetration of fixed broadband was generally higher than narrowband but five developing countries had penetration rates of less than or equal to 10 per cent of households. For developed countries with data available, rural household penetration was about 50 per cent or more. The rural/urban gap was highest in Azerbaijan where urban households were four times more likely to have fixed broadband access than rural households. The gap was smallest in the Republic of Korea where rural households enjoy a level of connectivity similar to their urban counterparts (94 and 98 per cent respectively in 2012).

Chart 1.10: Households with fixed broadband access by rural/urban difference, 2012/2011



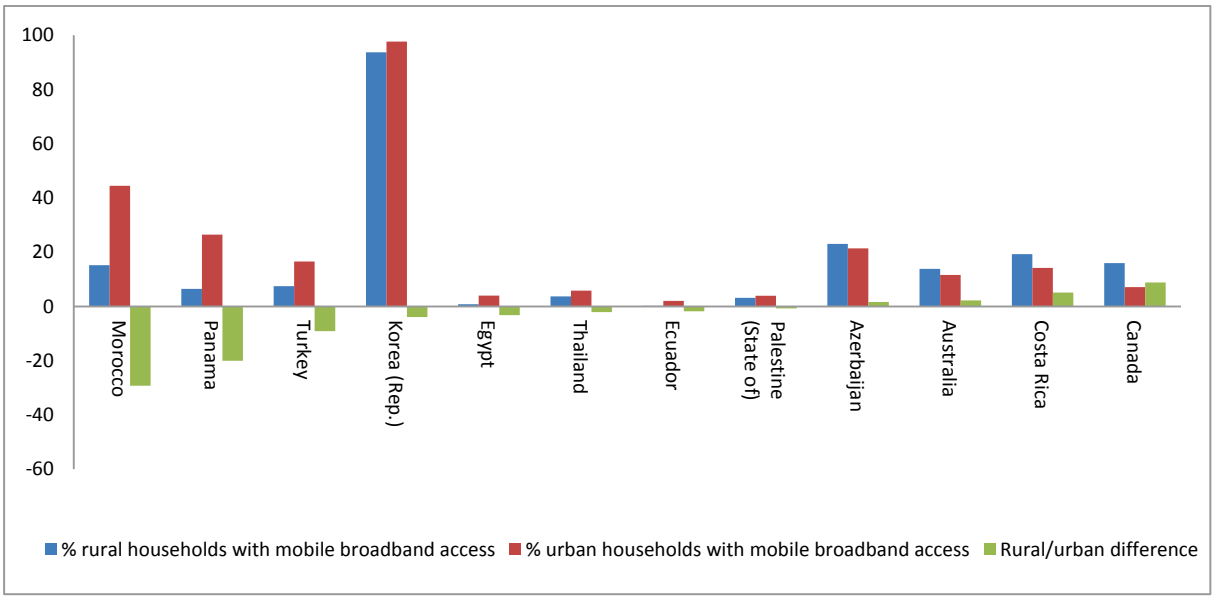
Source: ITU.

The third part of Indicator 1.3 focuses on the proportion of rural households with wireless broadband access. Wireless broadband refers to wireless high-speed access to the public Internet (a TCP/IP connection) at downstream speeds of at least 256 kbit/s. This can include satellite Internet, terrestrial fixed wireless and fixed WiMax. It also includes broadband terrestrial mobile wireless access, which includes the following two types of subscriptions:

- standard mobile subscriptions with active use only, which include mobile subscriptions with advertised data speeds of at least 256 kbit/s and which have been used to make an Internet data connection via IP in the previous three months;
- subscriptions to dedicated data services over a mobile network that are purchased separately from voice services either as a stand-alone service (modem/dongle) or as an add-on data package to voice services, which requires an additional subscription.

Chart 1.11 shows the proportion of households with mobile broadband[19] access by rural/urban differences in 2012 or 2011. Twelve countries had data available for this part of Indicator 1.3. Rural household penetration of mobile broadband access ranged from less than 1 per cent in Ecuador and Egypt to 94 per cent in the Republic of Korea.

Chart 1.11: Households with mobile broadband access by rural/urban difference, 2012/2011



Source: ITU.

The figures from Azerbaijan and Costa Rica reflect the opportunity of mobile broadband for connecting rural households. For both countries, the proportion of rural households with mobile access was higher than fixed broadband access. It is possible that rural households in these countries could be skipping the wait for rural broadband connections and adopting mobile broadband. For this adoption trend to gain traction, cost is a key barrier to be overcome. Even in developed countries, the cost of mobile broadband can still be prohibitively high for the average household. In rural areas of least developed countries, the cost is likely to be out of reach for most residents.

In 2012, rural households connected to the Internet were most likely to have broadband access. At least for countries with available data, narrowband Internet does not seem to be playing a large role in connecting rural households. Mobile broadband has the potential to connect rural households, as mobile infrastructure requires a lower investment by operators. Mobile broadband is a fairly new technology and as it develops in the next few years, subscription costs could be lowered to a level where low income households can afford it. However, to formulate the appropriate policies to connect rural households, policy-makers need to know the extent of connectedness and, as the preceding sections show, this information is scarce for the countries and regions that are the least connected.

In terms of progress made towards Target 1, Indicator 1.3 is still far from being achieved. In 2010, the WTDR reported that Internet access in rural households was very limited in developing countries and broadband access did not exceed 10 per cent of rural households in any developing country for which data were available. Current data indicate that little progress has been made with regard to connecting rural households to the Internet. Even if substantial efforts are made in the time remaining, it is highly unlikely that all rural populations could be connected to the Internet by 2015. For full access to the possible economic and social benefits afforded by ICTs, the Internet needs to be made available to rural residents who are already struggling with difficult geographic and demographic conditions.

The failure to adequately connect rural households calls to attention the need to rejuvenate efforts to this endeavour in the time remaining and also post-2015. This is not to say that Internet access

should take precedence over other development goals like poverty reduction and improvement of health. However, there is a growing awareness that ICTs can greatly accelerate the speed at which innovations are diffused and applied.

Proportion of individuals using the Internet

This is measured by Indicator 1.4 and uses *Partnership* core indicators HH7 and HH8. It refers to the proportion of individuals using the Internet, by location and by rural/urban. This indicator is split into two parts, as follows:

- Proportion of all individuals using the Internet at any location in the previous 12 months
- Proportion of Internet users using the Internet at each location (namely home, work, place of education, another person's home, community Internet access facility, commercial Internet access facility, any place via a mobile cellular telephone, and any place via other mobile access devices) (*Partnership*, 2011).

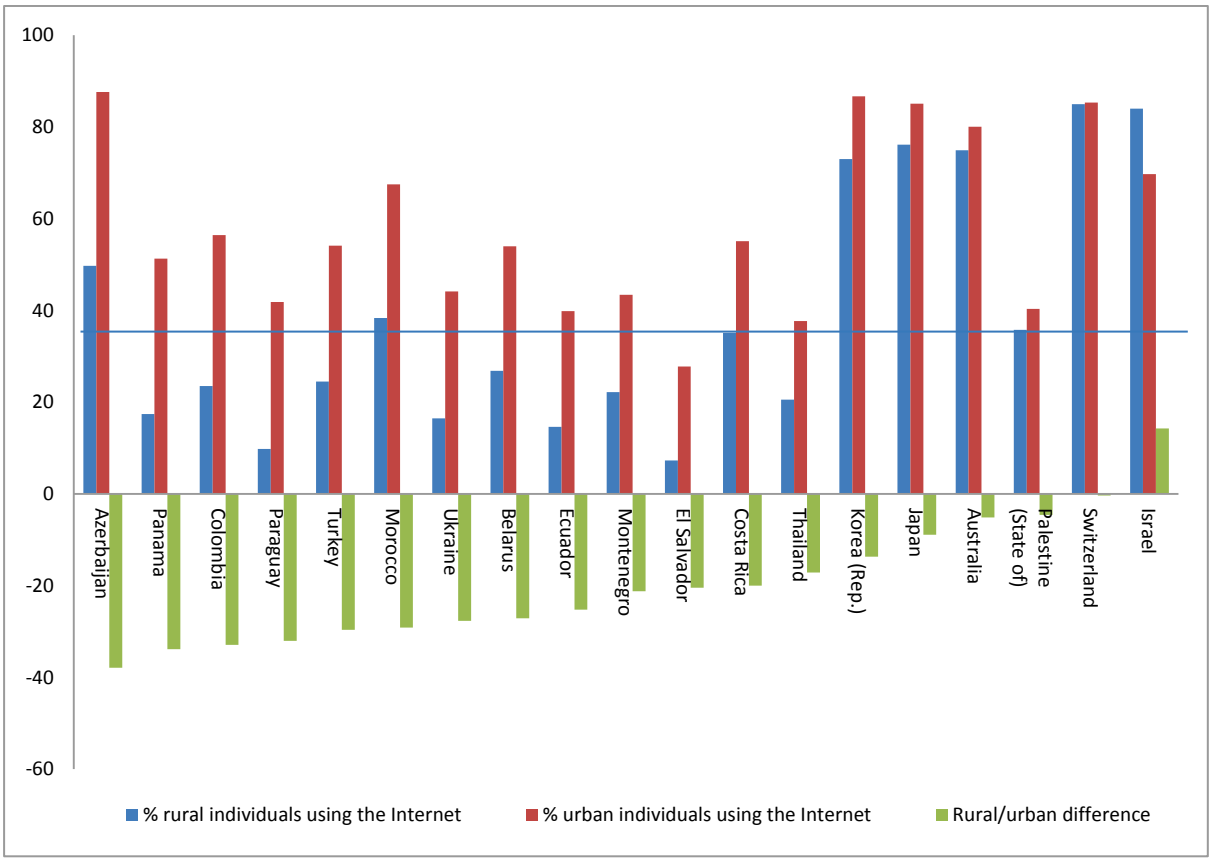
This indicator focuses on use rather than access, which is covered by Indicator 1.3.

Globally, about two in every five persons (39 per cent of the world's population) were estimated to have used the Internet in 2013. The global estimate of Internet users has increased at the rate of about 3 percentage points per annum since 2006. The percentages of Internet users in Africa and Asia have been below global averages since 2006. Only one in five persons living in Africa (21 per cent) and one in three in Asia (32 per cent) accessed the Internet in 2013. These global estimates do not differentiate between rural and urban areas; in cases where data by rural/urban splits are available, the rural residents in Africa, and to a large extent Asia, are far below global averages in terms of Internet use.

Chart 1.12 shows the proportion of Internet users by rural/urban differences in 2012 or 2011. Nineteen countries had data available and country data for rural individuals ranged from 7 per cent in El Salvador to 85 per cent in Israel and Switzerland.

Given that the estimated global average proportion of individuals using the Internet was 36 per cent in 2012, Chart 1.12 depicts a scenario of relatively low connectedness for rural populations in developing countries. While the percentages of urban Internet users in developing countries generally exceed the global average, the percentages of rural Internet users in most developing countries are well below 36 per cent. In countries like El Salvador and Paraguay, fewer than 10 per cent of rural residents used the Internet.

Chart 1.12: Individuals using the Internet by rural/urban difference, 2012/2011



Source: ITU World Telecommunication/ICT Indicators Database.

For all but one of the countries (Israel) shown in Chart 1.12, rural residents trailed urban residents in terms of Internet use. Developed countries generally had much smaller rural/urban differences than developing countries. Israel was the only country where the proportion of rural users outnumbered urban users (by 14 percentage points).[20] Switzerland had the smallest gap of (less than 1 percentage point). At the other end of the spectrum, Azerbaijan had the largest gap, with 38 percentage points. In 2012, 88 per cent of urban residents in Azerbaijan accessed the Internet compared to only 50 per cent of rural residents. Among developing countries, the State of Palestine has a relatively small rural/urban gap but the country also has low overall proportions of residents using the Internet.

Table 1.7 shows the proportion of individuals using the Internet, by rural/urban differences, from 2009 to 2012, for the 15 countries with multi-year data. Similar to the proportions of households with Internet access shown in Table 1.6, the rural/urban gap appears to be widening in developing countries, while most developed countries have a small or reducing gap.

Table 1.7: Individuals using the Internet, by rural/urban difference, 2009–2012, percentage

Country	2009			2010			2011			2012		
	Rural	Urban	Diff.	Rural	Urban	Diff.	Rural	Urban	Diff.	Rural	Urban	Diff.
Colombia	10	36	-26	..	..	..	17	48	-31	23	56	-33
Azerbaijan	14	39	-25	32	58	-26	..	..	..	50	88	-38
Turkey	19	44	-24	22	47	-25	24	51	-27	24	54	-30
Ecuador	9	32	-23	12	38	-26	15	40	-25	..	..	..
Paraguay	5	28	-22	5	30	-25	7	36	-29	10	42	-32
Belarus	12	33	-21	15	38	-23	23	46	-23	27	54	-27
Thailand	15	33	-18	17	35	-19	17	36	-19	21	38	-17
Ukraine	5	21	-15	8	29	-21	..	..	..	16	44	-28
Korea, Rep.	69	84	-15	..	..	..	72	86	-14	73	87	-14
El Salvador	3	17	-14	3	19	-15	5	24	-19	7	28	-20
Australia	69	77	-8	..	..	..	75	80	-5	..	..	..
Palestine	28	34	-6	..	..	..	36	40	-5	..	..	..
Japan	76	81	-5	76	83	-7	75	87	-12	76	85	-9
Switzerland	79	82	-3	82	84	-2	..	..	..	85	85	0
Israel	76	62	14	83	66	16	..	..	..	84	70	14

Source: ITU World Telecommunication/ICT Indicators Database.

Note: .. not available.

Comparing the proportion of Internet users (Table 1.7) with the proportion of households with Internet access (Table 1.6) demonstrates the value of collecting both types of data. In some countries, actual use exceeds household access. For instance, in El Salvador, in 2012, only 1 per cent of rural households had Internet access but 7 per cent of rural individuals are using the Internet, indicating that the Internet is being accessed outside the home. This suggests that in countries where access lags use, efforts should be made towards improving infrastructure and increasing the availability of the Internet in the home. Policy-makers and other stakeholders would need to tailor a mix of actions that suit the contexts in which they operate.

Indicator 1.4 also tracks the proportion of Internet users by locations of use (Table 1.8).

Table 1.8: Internet use by rural/urban and location of use, 2012/2011, percentage of Internet users

Country	Home		Work		Place of education		Another person's home		Community Internet facility		Commercial Internet facility		Any place via mobile phone		Any place via other mobile devices	
	Rur.	Urb.	Rur.	Urb.	Rur.	Urb.	Rur.	Urb.	Rur.	Urb.	Rur.	Urb.	Rur.	Urb.	Rur.	Urb.
Australia	**93**	**95**	**40**	**50**	16	21	31	37	13	13	14	18	..	..	..	..
Belarus	**89**	**90**	**4**	**5**	0	0	1	1	..	..	0	0	4	3	2	1
Colombia	16	**57**	4	21	**51**	21	6	7	1	2	**41**	**29**	..	..	..	..
Costa Rica	**40**	**53**	9	**17**	**11**	8	3	2	0	0	8	7	..	..	27	11
Ecuador	14	**43**	7	10	**42**	18	1	1	..	..	**35**	**27**	..	..	..	..
El Salvador	12	**46**	3	7	9	5	4	3	0	0	**50**	**23**	3	2	**19**	14
Israel	**98**	**98**	**65**	**62**	..	..	..	..	..	..	..	..			29	36
Japan	**84**	**86**	34	39	8	8	..	..	6	6	3	4	**68**	**71**	..	..
Korea, Rep.	**96**	**98**	36	43	21	22	4	4	3	3	10	11	**50**	**55**	3	4
Morocco	**72**	**75**	11	19	5	5	**37**	20	9	6	**62**	21	14	13	11	11
Panama	**25**	**59**	15	**32**	**39**	21	8	7	8	7	12	4	7	9	0	0
Paraguay	**39**	**61**	5	11		2	..	3	..	..	9	7	**37**	**16**	..	..
Switzerland	**96**	**96**	**42**	45	8	8	16	21	6	7	..	..	..	..	40	**48**
Thailand	**38**	**64**	24	**37**	**57**	37	14	14	4	3	31	21	3	4	10	17
Turkey	**50**	**69**	24	**34**	6	7	16	17	0	0	**28**	18	18	23	0	1
Ukraine	**66**	**91**	12	**11**	17	5	**25**	8	2	0	6	1	9	3	0	0

Source: ITU World Telecommunication/ICT Indicators Database.

Notes:

1. Rur.=Rural; Urb.=Urban.
2. .. not available.
3. As many individuals use the Internet at more than one location, at country level, the split by location of use will add up to more than 100 per cent.
4. The two most common locations of access (for urban and rural Internet users) are shown in bold.
5. Country age scope varies, therefore data comparability between countries may be affected to the extent that different subpopulations are included in the data.

In 2012, urban Internet users in all countries most commonly accessed the Internet at home. Rural Internet users also most commonly accessed the Internet at home except in Colombia, Ecuador and El Salvador, where the most common locations of access were instead places of education and commercial Internet facilities. In fact, outside of the home, workplace and place of education, commercial Internet facilities appear to be an important location of access for rural Internet users for six of the 16 countries with available data. In contrast, community Internet facilities were not commonly accessed by either rural or urban Internet users. In this context, it should be noted that of course the popularity of community access centres – where access is typically free – depends on their availability. If there are no public or private initiatives to provide such community access, people will be not able to use them. This, and the limited data availability, do not allow for generalization to other countries but highlights the importance of places of education and commercial Internet facilities in providing access for rural Internet users. This is an important consideration as Internet use at these locations can be a stepping stone for the adoption of Internet at home (Coward *et al.*, 2013; Larose *et al.*, 2012). In the case of commercial Internet facilities, the fact that rural Internet users are willing to pay for their services is an indication of the value that they attach to these resources (Coward *et al.*, 2013). Policy-makers could partner with the private sector in this regard to

look for viable modalities that can improve rural connectivity for areas that are unserved or underserved.

Conclusions and recommendations

Progress made towards Target 1 has been considerable according to some indicators but modest for others. The last decade has shown much faster than anticipated growth in mobile-cellular telephony. Significant progress has been made in terms of increasing mobile cellular coverage and access to phones for rural populations. Current data suggest that by 2013, almost 90 per cent of the world's rural inhabitants were covered by a 2G mobile cellular signal. By 2015, all rural communities around the world are likely to be covered. In this regard, Target 1 has been achieved. However, coverage of the 3G mobile cellular signal was comparatively low in rural communities in 2012 – although this could change rapidly as 3G is a fairly recent technology.

With respect to telephone access for rural households, Target 1 has not been achieved, although significant progress has been made in those countries for which data are available. For most of those countries, over 75 per cent of rural households have phone access of some type. The proportion is likely to be lower for the least developed countries, most of which do not collect data on ICT access.

In terms of Internet access and use, Target 1 is unlikely to be achieved by 2015 and there is pronounced rural-urban divide in terms of Internet access. Available data indicate that access to the Internet in any form (narrowband or broadband, fixed or wireless) was extremely low for rural households in developing countries in 2012. On the other hand, in developed countries, rural households are more likely to have comparable access to their urban counterparts, with slight variations in modes of access and (usually) a small lag in levels of penetration. Available data also indicate that use of the Internet by individuals in developing countries was low, especially in rural areas.

Three conclusions can be drawn from examination of currently available data:

1. Despite the progress that has been made in expanding mobile network coverage to rural areas, Target 1 will not be achieved by the end of 2015 in terms of Internet access and use for rural areas.
2. The widest rural/urban digital divide is in broadband access; mobile broadband offers one modality for connecting rural communities.
3. Measurement and tracking rural access to, and use of, ICTs is vitally important but data availability is low, reflecting the high cost of collecting data using household surveys.

Rural households in developing countries seem to be twice disadvantaged – first, by their remote geography and secondly, by the developmental status of their nations. *Measuring the Information Society 2013* (ITU, 2013) estimated that for the world's least developed countries (LDCs), fewer than one in ten people would be using the Internet by the end of 2013. On the basis of the target set by the Broadband Commission for Digital Development, at least 60 per cent of the world's population should be online by 2015, including 50 per cent in developing countries and 15 per cent in LDCs. This target is also unlikely to be achieved at the current growth rates. Given that Internet access will offer greater functionality and more public services for rural communities compared to basic telephony, policy-makers and other stakeholders need to continue to strive to make Internet services available and affordable to rural residents.

Currently available data do offer some cause for reasoned optimism. Access to the Internet using mobile phones appears to be a growing trend. In fact, there are indications that rural residents are adopting mobile broadband Internet rather than fixed-line connections (because the fixed line tends to be unavailable in rural areas). Other types of broadband wireless networks are also growing in developing countries. These adoption patterns should offer telecommunication operators some assurance that rural households can be a viable market, especially for mobile broadband.

The availability of household survey data for rural households was very low, as is evident from the data presented. Data availability for the least developed countries was particularly limited. Although the original intent of the full set of Target 1 indicators was to provide an in-depth assessment of ICT access and use, few countries have been able to provide relevant data, especially time-series data and data split by urban and rural areas. Should there be a post-WSIS target on rural connectivity, it is recommended that future tracking be focused on fewer indicators that would provide concise insights into the information lives of rural households.

Household-level data relating to Indicator 1.2 may become more difficult to interpret as fixed lines decrease in importance globally. A useful modification post-2015 would be to measure the proportion of households with any mobile phone (regardless of whether they also have a fixed phone) and possibly the proportion of households with any fixed phone (regardless of whether they also have a mobile phone). Those two indicators, together with the existing indicator on the proportion of households with any telephone access, should provide a more meaningful picture of rural connectivity. All these indicators are included in the ITU household questionnaire and are collected by a few countries.

Indicator 1.3 could be supplemented with data from operators on the number of subscriptions according to types of access. This is contingent on the ability of operators to break down residential subscriptions by rural/urban.

Data collection on locations of use for Indicator 1.4 has yielded very limited information but when available, the data can provide useful insights.

In terms of definitions, a challenge remains on how to identify rural populations (and distinguish them from urban populations) in a manner that is both meaningful and comparable across countries.

It is suggested that attention should shift towards quality of access data post-2015. Analyses for Target 1 suggest that while coverage was the primary goal for 2015, quality of access is becoming the key digital divide between rural and urban households. The current indicators address quality of access through the type of mobile telephone coverage and the type of Internet access. However, quality of access can be more broadly defined. Other measurables include speed and reliability of networks (data that are available from telecommunications companies) and the accompanying skills to use ICTs (perhaps as a component of WSIS Action Line C4). Quality of access to ICT and ICT capabilities cannot be decoupled because the benefits that rural households can garner from good quality access may be limited by poor ICT skills. Governments working on improving the quality of ICT access should monitor some of the quality of service (QoS) indicators that ITU collects and introduce policies to improve ICT skills in order for rural households to realize the full potential of ICTs.

Measures of actual usage and QoS entail a broader definition of ICT connectivity that goes beyond the 'haves and have-nots' type of analysis. Such measures could better capture the digital divide in the post-2015 information society (ITU, 2012). The ITU Expert Group on Telecommunication/ICT

Indicators (EGTI[21]) discussed the topic of QoS indicators from 2009 to 2012, and concluded that it was not possible to collect a comprehensive set of QoS indicators for mobile- and fixed-broadband services at the international level. However, given the importance of these data, further work should be carried out on such indicators. The main issues identified by the EGTI were lack of country-level data and differing methodological approaches that did not enable international comparison.

It is suggested that any future indicators on rural connectivity address the issue of rurally relevant applications and content. Demand for, and use of, ICTs, such as applications on commodity prices or transport schedules delivered via text messaging, can help to drive demand for better phone and Internet connectivity. It may seem logical to deliver connectivity first and then content but development outcomes are realized only when the content is put to use. For rural households to bridge the knowledge divide and access public services, they need to be connected to the relevant information services and applications (action lines C7 and C8). In fact, several cases presented in this chapter suggest that demand for content and communication can drive ICT adoption. Just as the introduction of this chapter suggested rethinking the 'build-it-and-they-will-come' paradigm, the conclusion suggests the parallel approach of identifying the information needs of rural households so that efforts at increasing the availability of ICT can meet those needs.

The underachievement of Target 1, especially in Internet access, highlights the magnitude of the challenges to be overcome in order to connect people living in rural areas with ICTs. The challenges include remote geography, perceived low demand and high costs of service delivery. Affordability and availability of telecommunications services generally work against people living outside major urban centres. Vast distances between rural villages can make the rollout of ICT infrastructure prohibitively costly for private investors as multiple cell towers have to be set up to reach relatively small numbers of clients. Understandably, telecommunication companies have pursued the 'low-hanging fruit' of urban populations, where incomes are higher and potential clients are concentrated in a relatively small geographic area. There is also a perception that rural residents spend less on their telecommunication needs because, on average, they generally have lower discretionary income.

It is recommended that more public-private partnerships be created in order to accelerate progress towards the achievement of Target 1. The past decade has shown that it is overly-optimistic to leave the task of connecting rural residents to the private sector. Private investors are not in the business of bridging the digital divide – they are ultimately accountable to their shareholders and have to remain financially viable. In this context, governments play a critical role in setting the right regulatory framework to foster development of ICTs in rural areas. The task of connecting rural residents should therefore be undertaken by a specialized team of stakeholders, from both the private and public sectors, possibly also including international agencies, national coordinating agencies and experts. This team should formulate and implement national ICT plans to ensure that rural residents will not continue to be excluded from the information society.

There are two specific strategies that governments can implement with respect to the telecommunications sector. These were recommended in the WTDR 2010 and are still relevant:

- **Market liberalization.** Introduce as much competition in the mobile sector as possible. The more operators the better, since they will compete to gain incremental customers and hence extend coverage into rural areas. In order to make services more affordable and increase the spread of the Internet and broadband, governments need to encourage greater liberalization in the

Internet market. For example, while many countries have encouraged the entry of Internet cafés or ISPs, true competition is constrained due to high prices for essential backbone infrastructure such as international gateways and leased lines. There are many rural households that miss out on Internet connectivity because of a lack of options and high prices.

- **Conditional licensing.** Set targets in licences for the percentage of the rural population to be covered by mobile cellular networks. Some countries have not exploited the regulatory tool of imposing licence conditions on operators in order to expand coverage. This can be rectified when licences come up for renewal or when additional or new spectrum is awarded. Some countries have also been lax in enforcing coverage requirements, even though enforcement costs are far less than what it would cost to extend access through universal service funding schemes.

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Endnotes

[1] The original WSIS indicator was worded slightly differently “Connect villages with ICTs and establish community access points”. In this report, villages are also referred to as "rural areas".

[2] These Principles have also been institutionalized in several countries either as part of a National ICT/Broadband Plan or some form of a universal access policy. These plans are discussed in greater detail in Chapter 10.

[3] Also commonly known as “the rich get richer and the poor get poorer” phenomenon.

[4] As defined by the *Partnership* (2010).

[5] Note the change in the reference period in ITU (2014) to three months.

[6] Social capital is a set of associations between people, consisting of social networks and associated norms that have an effect on community productivity and well-being. Social capital facilitates coordination and cooperation (World Bank, 2011).

[7] See: https://www.youtube.com/watch?v=zhAUeIfGwA8&list=PL95853B5AE338A359, official website: http://infolady.com.bd.

[8] See http://www.bbc.co.uk/news/world-latin-america-24450542.

[9] Country age scope varies, therefore data comparability between countries may be affected to the extent that different subpopulations are included.

[10] Mobile broadband coverage is defined as at least 3G for the purposes of this report.

[11] Mobile phone coverage is defined as at least 2G for the purposes of this report.

[12] Though note that in Oceania, nine out of the 19 countries in the region had no data about mobile coverage.

[13] A small number of developing countries in Africa and the Americas reported zero coverage for 2012.

[14] Defined as at least 3G for the purposes of this report.

[15] LTE refers to Long Term Evolution, a high-speed cellular data transmission network that provides download speeds of at least 100 Mbit/s and upload speeds of at least 50 Mbit/s. LTE Advanced is one on the technology families recognized as IMT-Advanced, as defined in ITU Standards. For more information, see, for example: http://www.3gpp.org/technologies/keywords-acronyms.

[16] The ITU Radiocommunication Report for Mobile, Radiodetermination, Amateur and Related Satellite Services 2078 (ITU-R M. 2078) establishes recommendations for the allocation of sufficient radio spectrum to allow for the proper development of advanced networks. See http://www.itu.int/pub/R-REP-M.2078/en.

[17] See http://pewinternet.org/Reports/2013/Cell-Internet.aspx.

[18] Countries apply different concepts in measuring ICT household access. Some countries consider a household to have access to ICTs if any (individual) member has access to ICTs. Other countries apply the traditional concept established in household surveys about household goods availability and would only consider a household as having access to ICTs if they are generally available for use by all members of the household at any time. The latter is the concept recommended by the ITU Manual for Measuring ICT Access and Use by Households and Individuals (ITU, 2014). Because two different approaches are applied in measuring ICT household access, data are not always comparable between countries.

[19] Mobile broadband is a sub-category of wireless broadband, which is the sum of: mobile-broadband plus satellite plus fixed wireless (Wimax).

[20] Israel has a relatively small rural population, with only around 8 per cent of the population living in rural areas.

[21] See work of the ITU Expert Group on Telecommunication/ICT Indicators, http://www.itu.int/en/ITU-D/Statistics/Pages/definitions/default.aspx.