

NTDs and Food Security

There are three major food security challenges associated with epidemics and diseases such as Ebola and NTDs. The first challenge is that they interrupt regular health services and health infrastructure, making it more challenging, or in some cases impossible, for people to seek the regular treatment of other illnesses such as HIV or Neglected Tropical Diseases (IFPRI, 2016). There is also a fear among patients and healthcare workers of contracting other diseases while seeking or providing treatment (Ndawinz et al, 2015).

The second challenge is that epidemics and diseases create immobility. Many Neglected Tropical Diseases create mobility challenges, and government restrictions on people's movement in order to limit the spread of epidemic outbreaks interrupt market economies and leads to increased food prices (IFPRI, 2016). The third challenge is the reduced income and productivity associated with diseases and epidemics. Farmers are unable or less able to work, money and time is spent on treatments, and large-scale food insecurity results when large proportions of an economy are affected by disease (IFPRI, 2016). ICTs present potential avenues to address these main food security challenges stemming from epidemics and disease.



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Case Study Box 7: SMS for Life ***Reducing unnecessary incapacities in rural communities by improving drug access***

There are a range of ICT applications that are currently being piloted and employed in efforts to combat global health issues. One of these ICT applications includes mobile health (or mHealth) which is the practice of medicine and public health supported by mobile devices. mHealth includes collecting community and clinical health data and the delivery of healthcare.

It achieves this by offering information regarding the availability of health services, testing and treatment methods, and disease management. The use of mHealth has emerged as an important innovation with tremendous potential to strengthen health systems in developing nations. Mobile phones provide an opportunity for people living in remote areas to access public health information. In many sub-Saharan African nations, inadequate stock levels of essential medicines remain a major problem at the health facility level.

SMS for Life is one such mHealth program which aimed to eliminate malarial medicine stock-outs in health facilities across the Lindi Rural, Uganda and Kigoma Rural districts of Tanzania during its pilot in 2009. SMS for Life was designed to allow healthcare workers to send SMS messages via mobile phone to a central database to ensure adequate stock levels of malaria treatments were maintained. During the 21-week pilot, malaria medicine availability improved significantly in all three districts. At the end of pilot, stock-out rates were reduced from 57% to 0% in Lindi Rural, from 87% to 30% in Ulanga, and from 93% to 47% in Kigoma Rural (Roll Back Malaria, 2010).

The SMS for Life pilot was highly successful in reducing stock-outs and subsequently reducing the number of deaths from malaria. It also demonstrated that health information can be made available using simple devices like mobile phones that can be harnessed by people living in remote areas.

Maternal Health, Mental Health, and Issues of Inequality

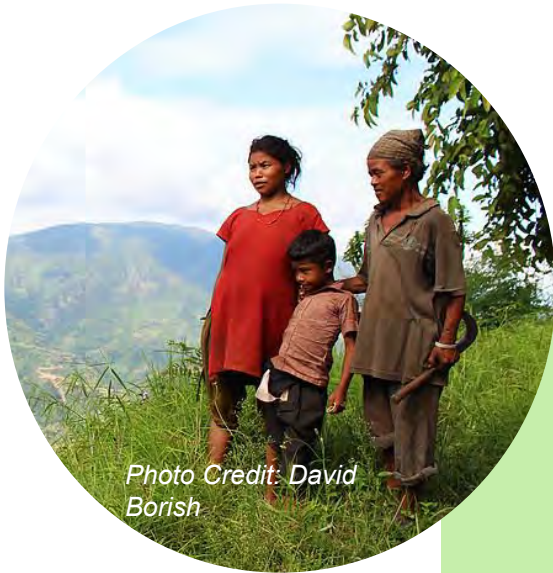
Gender inequalities within healthcare are closely linked to health issues of mothers in rural communities. Many communities experience poor maternal health care, which results in life threatening labour complications and high maternal mortality rates (Hussein et al., 2012). Over 98% of maternal deaths occur in developing nations, despite 88-98% of them being preventable (Hussein et al., 2012). Many of these deaths come as a result of unsafe delivery, due to a lack of available services in rural communities or lack of basic skills from healthcare providers (Hussein et al., 2012). This often results in complications during labour, infection, extreme bleeding leading to death or long term complications (Hussein et al., 2012). The illness or death of a mother can lead to a loss of household earnings and potential debt for the family (Hussein et al., 2012). However, maternal health issues can be prevented if affordability, availability, quality, awareness and accessibility are tackled (Hussein et al., 2012).

Mental health and suicide are other significant yet often neglected areas within rural development. As of 2008, the WHO estimates that over 75% of people suffering from mental health disorders in the Global South receive no treatment or care (WHO, 2008). It is estimated that one person dies of a result of self inflicted harm every 40 seconds (WHO, 2008). Low income countries and communities face poverty, poor education and limited health services, resulting in limited resources to deal with mental health issues and prevention (Milner, 2010). Mental health care in the Global South, specifically in rural communities, is not only difficult to access, but is costly, resulting in the majority of individuals going without help. Both maternal and mental health issues in rural areas can benefit from SMS messaging, as it aims to reduce the stigma as well as providing information about symptoms and available resources. See Case Study Boxes 8 and 9 for examples.

Case Study Box 8: TulaSalud ***Using mobile phones to address maternal health***

TulaSalud is an initiative in Alta Verapaz, Guatemala, which addresses maternal health and high mortality rates, through mobile phones. Guatemalan NGO TulaSalud and the Canadian Tula Foundation fund the initiative, working in partnership with the Guatemalan Ministry of Health (Lemaire, 2011). TulaSalud provides mobile phones to community health workers (CHW), individuals in rural areas, that have a basic knowledge of health and carry out maternal health care during pregnancy and postpartum (Lemaire, 2011). CHWs use the phones to call a nurse or doctor in an urban hospital, who answer questions that arise for CHWs while providing care. The phones also contain an app, Kawok, specifically designed for TulaSalud. Kawok is used to record patient's information, as well as check previous health records. Kawok also enables doctors to monitor pregnancies and take action, if they notice a potential problem (Pan American Health Organization, 2013). Finally, Kawok contains informational videos on maternal health to educate CHWs and the women they treat.

TulaSalud has increased the knowledge of CHWs and provided them with support from individuals with more healthcare knowledge. It has had a statistically significant effect on decreasing maternal mortality in Alta Verapaz (Fernandez, Lobos-Medina, Diaz-Molina, Chen-Cruz & Prieto-Egido, 2011). In 2015, the Canadian Department of Foreign Affairs, Trade and Development gave the organization a \$7.6 million grant, which will enable it to increase in scale (Tula Foundation, 2015).



Case Study Box 9: Mass SMS Messaging in Bangladesh *Using mobile phones to address mental health*

In Bangladesh, a government mHealth initiative capitalizes on the high rate of mobile phone adoption in the country. The government sends out mass SMS messages, containing health information to all phones with a Bangladeshi number. This has included topics pertaining to mental health. Messages include signs of mental health and how and where to get support. This innovation helps to raise awareness of mental health and shows the potential of harnessing mass SMS messaging for health knowledge more broadly (Brian & Ben-Zeev, 2014).

Finally, healthcare in rural developing communities is expected to experience an increase in health service demands as the ageing population increases. The expanding aging population places demands on healthcare services that already tend to be ill prepared to provide health care needs (Firdhous & Karunarathe, 2011). This not only places a burden on the healthcare system, but on the families of the individuals to provide informal care (Firdhous and Karunarathe, 2011). The use of ICTs and mobile phones not only provides an opportunity to take stress off these care providers, but to also provides more affordable options to these individuals.

If challenges to inclusion are met, ICT has great potential to benefit those over the age of 60 in the Global South. Unique health and wellness issues faced by this age group can be mitigated in various ways through ICT use, for self-care, assisted or supervised care, and continuous monitoring, which may serve to lessen the burden on stressed economies and healthcare systems (Chiarini et al., 2013). MHealth, e-Health, and telemedicine in particular have given way to promising applications of ICT for the elderly (Acharya et al., 2015) See Case Study Box 9 for an example. Examples include using mobile phones for alerting and instructing caregivers on what to do in abnormal or emergency situations, monitoring details such as the timing of medications, blood pressure, and nutrient intake by way of web applications, automated calls, or SMS, and built-in fall-detection systems and GPS to get immediate help even for those who have fallen, even in remote areas (Chiarini et al., 2013).

Dangers of Pesticide Use on Rural Farms, Livestock Disease, and Prevention

Pesticides are the most common method of ensuring crop protection and eradicating disease vectors. In turn they are designed to improve agricultural production and protect stored agricultural products (Igbedioh, 1991). Despite these benefits, there is a growing world-wide concern about their negative effects on human health and the environment. This concern is especially centralized around pesticide use in the Global South, where information and safety protection are extremely lacking. The excessive overuse and misuse of chemicals has the potential to harm not only those directly involved and living close to agricultural practices, but may also inhibit crop growth and deter crop yield (Ecobichon, 2001). The foremost negative externality of pesticide use is occupational exposure, which rural farmers are at risk to. This is an extremely prevalent risk and is caused by a number of contributing factors. Many of these can be attributed to the careless handling of pesticides during preparation and application. Carelessness combined with a lack of personal protective equipment, deficiencies in safety training, and the careless disposals of empty pesticide containers all increase farmers risk of exposure to toxic chemicals (Ecobichon, 2001).

These careless practices have made pesticide use a very dangerous process. The majority of farmers are participating in the application process with little to no protective equipment and households and surrounding environments are becoming more frequently contaminated with chemical residue. A lack of proper information surrounding the hazards of unprotected use means that farmers remain unaware of how dangerous the health hazards are. These negative effects on health range from acute and temporary symptoms such as facial and skin irritation, to chronic and delayed illnesses such as respiratory diseases, various cancers, and developmental and reproductive disorders (Issa et al., 2010). A long term solution to this problem ultimately comes down to education and the spread of information. Effective information transfer is key to reducing many of the pesticide related problems that are entrenched in the Global South (Ecobichon, 2001).



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Livestock disease and prevention are just as important in the context of farmer health. Not only is livestock health important for the sustainable livelihood of rural farmers, but also for the maintenance of healthy, strong and productive farmers (Swanepoel, 2010). While the impacts of epidemic and zoonotic diseases are fairly controlled in the developed world, they are still quite unpredictable in much of the Global South. When a farmer has infected livestock, they run the risk of losing a major part of their livelihood, and contracting the virus themselves. This affects their health and food security; a situation which could be avoided with proper education and access to health services (Swanepoel, 2010). Furthermore, farmers inability to control these diseases ultimately prevents them from entering into international trade. In order to gain the necessary certification, farmers must have two qualifications: healthy livestock, and the ability to show this health through a system which has tracked their life history. Currently, many countries in the Global South lack the capacity to provide either of these qualifications (Deloitte, 2010). The implications of these findings illustrate two things; there is a dire need for a technological innovation to educate farmers on livestock diseases and help them diagnose and eradicate the disease quickly, moreover, there needs to be an electronic database which acts as a system of traceability, proving livestock health and allowing rural farmers to enter international trade. It is imperative that farmers have access to information regarding livestock disease and how to prevent or cure it. In order for this to be possible, an ICT which allows inputs from farmers reciprocated by input from an information source is necessary.





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Gender, Class, Age, and Inclusivity



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Gender

ICTs are socially and economically empowering, and if utilized appropriately can catalyze positive changes for women (Sibanda & Mwamakamba, 2012). They have the potential connect women across different regions, allowing for the sharing of information as well as the development of networks of support (Macueve et al., 2009). Moreover, ICTs may help women feel safer in their communities; for an example see the SafetiPin Case Study Box 10 on page 35.

The rural poor at large are a marginalized group, but inside this group, women may find themselves particularly disadvantaged due to their gendered positionality within the wider community. This is problematic, not only from a human rights perspective, but practically speaking, considering their significant contribution to agriculture. Rural women contribute to the production of 60- 80% of food crops in the Global South (Mehra and Rojas, 2008). The roles that women take on in agriculture are multifaceted, ranging from unpaid to paid work, as both employees and employers (Mehra and Rojas, 2008). In spite of this, challenges associated with accessing mobile devices, newer farming technologies, education, land, and income prevent women from independently, efficiently and sustainably contributing to agricultural production. The power of sociocultural norms in shaping the expectations and roles of women should not be overlooked; in many rural communities, women are often not understood to be farmers although they perform tasks which are crucial to the agricultural process (Twyman et al., 2015).

Their ability to access land, credit, and inputs to increase productivity, or to earn an independent income is highly constrained (Agarwal, 2000). This presents a major opportunity to increase data collection focusing on rural women's unique needs, to find innovative avenues for easing the flow of information to women, as well as to advocate for policies that will benefit them. Their ability to access land, credit, and inputs to increase productivity, or to earn an independent income is highly constrained (Agarwal, 2000). This presents a major opportunity to increase data collection focusing on rural women's unique needs, to find innovative avenues for easing the flow of information to women, as well as to advocate for policies that will benefit them (see Case Study Box 10 on page 35 as a prime example).

In both the Global North and Global South, there exists a tendency to associate women with care work and assign them domestic responsibilities, which plays out differently in particular cultural, political, and socioeconomic contexts (MacRae, 1995). This can help to explain why many day-to-day choices of rural women in the Global South are made with the wellbeing of children and family in mind (Djebbari, 2005). For example, for children to obtain various social benefits, it is largely the responsibility of mothers to register them at birth (Kleine et al., 2014). However, women in rural areas have difficulties accessing the necessary formal channels to do so, given their limited physical and social mobility, as well as the fact that most government offices are located in urban centres (Kleine et al., 2014). Mobile IT and SMS birth registration can help overcome these mobility challenges, allowing mothers to officially register their children as citizens and also to receive post-natal advice via mobile phone (Kleine et al., 2014). In addition to working disproportionately within the home, women are expected to assist with agricultural work on a regular basis (Doss, 2011). Consequently, women can spend up to 16 hours a day performing unpaid work (Doss, 2011). With this in mind, ICT initiatives must seek to understand the cultural contexts of women in agriculture to overcome barriers to their inclusion and help foster their improved agency.



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Class

For many ICT initiatives, the target demographic is the rural poor. Of the Global South's 1.4 billion people who experience extreme poverty, nearly 70% of them reside in rural areas (IFAD, 2011). While ICT projects aimed at the "poorest of the poor" are essential, it is important that class-related issues are taken into account. "Social class and SES are based on the interaction between people's social, cultural and economic backgrounds and status" (Rubin et al., 2014). Social class can be attributed to power differences that lead to discrimination and prejudice (2014). Social class can also be considered at local, national, and global scales.

There has been a notable increase in rural to urban migration in the Global South (Goldsmith, Gunjal, & Ndarishikanye, 2004). This influx can be attributed to several interrelated factors, one being stigma surrounding agriculture as a means of livelihood (Goldsmith et al., 2004). Although a strong agricultural sector is often cited as imperative in development discourse, many people in the Global South are less inclined to take on agricultural work (Ngongi, 2010). Young men and women who are born into rural families are increasingly migrating to urban centres, where wages are perceived to be higher and job opportunities more abundant (World Bank, 2008). As a result, there is often a prejudice against rural life, due to its affiliation with those in lower social classes and inadequate income provision (Schoenhals, 2007). Projects should aim to make ICTs attractive to potential users in rural areas, but they must also seek to overcome prejudices against agriculture and challenge notions that moving up in social class means moving away from agriculture.

When considering inclusivity and social class, it is also important to address issues of access. This goes beyond access to technology itself and includes access to the resources necessary to effectively adopt the technology, such as education and appropriate infrastructure. The issue of cost can certainly be a barrier to ICT use. While it is important to recognize that the terms "lower-class" and "low income" are not synonymous with one another, many lower-class individuals do have less financial capital, and therefore cost is a concern in this context (Rubin et al., 2014).

Another important consideration in terms of access is availability of education towards improved e-literacy (Robinson et al., 2015). The distribution of information is highly contingent upon power relations. Individuals in lower social classes may have lower levels of education, including education on ICTs and their benefits (World Bank, 2008). Making e-literacy education accessible to individuals from various social classes contributes to increasing equitable access to knowledge and learning opportunities surrounding ICT.

ICT and its potential within the field of agriculture cannot be adequately examined without bringing inclusivity into the discussion using a lense of intersectionality. Intersectionality is defined as “the interconnected nature of social categorizations such as race, class, and gender as they apply to a given individual or group, regarded as creating overlapping and interdependent systems of discrimination or disadvantage” (Oxford Dictionary, 2016). This means that an individual can have overlapping minority status, which positions them to experience an elevated level of marginalization. It is important to recognize that there are marginalized groups within society and that these marginalized identities are often intersecting with one another (Bakardjieva, 2003).

Through ignoring the intersectionality of various identities, we fail to recognize the context and interconnectivity of identity. As a result, individuals who identify with multiplicitous marginalized identities face a different level of discrimination, even in liberation spaces (i.e. communities and institutions that are striving towards decreasing the oppression that people face) (Collins and Chepp, 2013; Miriam-Webster, 2016). Gender, age, and class are three main categories in which we can see both opportunities and constraints of mobile ICTs in agriculture. However, it is important to remember that they are not exclusive entities and that their intersectionality should be of primary focus. For example, young women have different experiences than young men who have different experiences than elderly women. This example demonstrates the importance of considering context in all situations where agricultural ICT is involved.

Case Study Box 10: SafetiPin Using Mobile IT to collect data on women’s unique needs

SafetiPin is an application for mobile phones developed in India in 2013. By using a crowdsourcing feature in which people input data themselves, the app is designed to improve women’s safety and security in cities.

The goal of the app is to raise awareness and inspire action to address women’s safety and feelings of insecurity. This app could be relevant to women and girls in rural areas as well. First, the roles of women in agriculture often include walking long distances to fetch water, wood or other resources.

This app, if used without the need for cellular data (for example through SMS), could help women feel safer in this context. Second, using the crowdsourcing feature, this app could be a means for women to share recipes or agricultural information with one another. For more information, visit <http://www.safetipin.com> (Viswanath and Basu, 2015).



Photo Credit: Emma Stewart-Small

Age

Issues which pertain to age are multidimensional, in the sense that they often do not solely affect a single demographic (e.g. children, youth, adulthood and the elderly). Increased incorporation and use of mobile IT and ICTs can have a wide range of positive effects on the various challenges that different age categories encounter on a global level. The extension of ICTs hold the power to help to tackle a single age-specific problem, but further, have the potential to aid in bridging intergenerational gaps.



Photo Credit: David Borish

Youth: A Window for Opportunity

According to the International Telecommunications Union, 45% of Internet users around the world are below the age of 25 (Ben-Attar & Campbell, 2013). Youth have the potential to create social change through media and through the use of ICTs. Technological platforms offer youth an opportunity to engage in politics, and considering their growing presence, it is imperative that they are not denied access to decision-making processes (Ben-Attar & Campbell, 2013). The diffusion of mobile devices has enabled youth to become increasingly politically aware and active, as many use social media outlets to voice their concerns and to acquire information (Ben-Attar & Campbell, 2013). On a national level, mobile platforms encourage citizen-government relationships, where national leaders correspond directly with youth (Ben-Attar & Campbell, 2013). Heads of state in Rwanda, Tanzania, Kenya, and South Africa, for example, are engaging with their citizens through websites, blogs, twitter profiles, and through SMS messaging (Ben-Attar & Campbell, 2013). According to Ben-Attar & Campbell (2013), the frustration that youth experience through their inability to have their voices heard at a local level has inspired this two-way engagement. In rural areas, ICTs can be used by youth to conveniently and directly lobby for the unique needs of their communities, including those pertaining to land rights, food security, and agriculture.

Youth and ICT Use

Youth, those aged 24 and younger, comprise 45% of global internet users (UN, 2016)



The international telecommunication union maintains that, youth are the most active users of ICTs. In the Global South, young people are three times more likely to use the internet than older generations (ITU, 2013). Since youth make up the majority of ICT users, issues affecting youth must be considered when creating ICT related policies in the Global South (UNPY, 2010). The United Nations Programme on Youth (UNPY) 2010 claim that ICTs can help youth gain employment, and foster a connection with other youth from around the world.

Education

As the agriculture sector becomes more sophisticated, in regards to technologies and information use, there is a greater emphasis being placed on education and ICT skills (ICU, 2014). Unfortunately, youth often prioritize finding a job over their education in an effort to provide an income for themselves and for their families (Classen, 2008). Expectations are placed on youth, especially girls, to sometimes forgo their education altogether in order to find work (FAO, 2012). In remote areas, having access to the internet allows students to have access to online learning methods. Schools play an important role in the way youth are connected to ICTs as, in many rural areas, schools are the only way young people have access to the internet (UN, 2016). Going forward, there is a need to incorporate necessary agriculture skills into general education in Global South (FAO, 2012).

An example of how education in the Global South leads to non-transferable, impractical skills are the thé-chômeurs in Mali. These thé-chômeurs, which translates to “tea-drinking unemployed”, spend most of their time drinking sweet tea to pass time (White, 2012). Many of these men have had some sort of formal education but are unable to find adequate jobs that their schooling has prepared them for (White, 2012). They tend to congregate in urban areas because if they return to their homes in rural areas, there would be the expectation of them to participate in manual agricultural labour (Soares, 2010). The chômeurs believe the stigma that agriculture is a labour sector for the uneducated and unskilled. The removal of this stigma would increase the chance that youth may remain in the agriculture sector. Agricultural education should be fluid and always changing to make sure that students meet the needs of a challenging labour market (FAO, 2012). If youth are taught basic agricultural skills early on in their education, with an emphasis on practical ICT oriented skills, there is a chance that youth will not only prioritize education over jobs, but potentially remain engaged in the agriculture sector as older youth and adults.



Photo Credit: David Borish

Youth and Unemployment

According to the International Labour Organization (ILO), 13.1% of youth worldwide are unemployed, or a total of 71 million young people (ILO, 2016). Urban youth are often disadvantaged in labour markets due to a lack of formal job experience and professional contacts (ILO, 2016). The International Communications Union (ICU) states that the underemployment rate is triple that of the unemployment rate (ITU, 2014). This means that although youth are employed, three out of four workers are engaged in the informal sector (ITU, 2014). If urban youth are unemployed, the jobs they hold are typically short-term, informal work with little job security (USAID, 2012). Countries in the Global South have a lower unemployment rate than their counterparts in the Global North (9.4% compared to 14.3% respectively); this represents that youth in developing nations are typically engaged in poor-quality and low-paying jobs to provide themselves and their families with basic necessities (ILO, 2016).

ICTs and access to information can provide opportunities and benefits for youth worldwide. Improved access to the capital, markets, and training means that youth have access to the necessary resources to start their career (ITU, 2013). The high rate of youth in working poverty encompasses the fact that, youth consider themselves too good to work in the agriculture sector, and would rather be unemployed or informally employed than engage in what they consider a less worthwhile job sector (FAO, 2012). There is an increasing amount of dialogue concerning ICTs and youth access to education, employment, and poverty eradication (UNPY, 2010). In terms of employment, knowledge of basic ICT skills are necessary for those entering the labour market (ICU, 2014).

As the agriculture sector becomes more knowledge intensive, knowledge of ICT skills are becoming more important (ICU, 2014). With the use of ICTs, youth have the ability to excel in the field of agriculture, as 76% of young people in the Global South access the internet from their mobile phones (ITU, 2013). Current and instant access to information about harvests, future weather patterns, and crop prices would be crucial to a young farmer's success. Youth familiarity with technology, creates an opportunity for implementing these technological innovations in the field of agriculture.

Case Study Box 11: Mkulima Young *Inspiring youth in agriculture through ICTs*

Mkulima Young online platform in Kenya uses; mobile phones, the internet, Facebook and a smartphone application in tandem as extension services to encourage youth to engage in agriculture (Irungu et al., 2015). The platform connects young farmers and youth aspiring to become farmers, in a virtual space. Ninety-five percent of the farmers using the Mkulima Young platform are under the age of 32 (Irungu et al., 2015). As long as there is internet access, members access the virtual community can use their phones, tablets or computers to post questions related to farming and agriculture. Questions are met with a prompt answer from other members, facilitating knowledge sharing and transmission. Farmers can also advertise their produce or livestock online in a buy-and-sell format. Using this digital hub and social media, youth can connect to a wider community of like-minded individuals, share knowledge and information instantaneously, and simultaneously ask questions pertaining to farming and agriculture (Irungu et al., 2015). Mkulima Young online platform, utilizing various forms of social media, Internet sites and apps, has the potential to revolutionize youth's access to efficient and innovative, agriculturally relevant information.



Photo source: van Loon, J. (photograph). (2014). Kenya. Deutsche Welle.

Elderly

The number of persons aged 60 and up, and their percentage of the population relative to other age groups, is growing rapidly (World Ageing Report 2015, 2015). It is projected that by 2030, the number of older adults will comprise one in six people internationally (World Ageing Report 2015, 2015). Although population ageing is occurring in virtually every region of the world, the phenomenon is now spreading throughout countries in the Global South at a more accelerated pace (World Ageing Report 2015, 2015). This requires that these countries prepare for and acclimate faster to a growing ageing demographic, typically at considerably lower national incomes than those in Western nations (World Ageing Report 2015, 2015). This pressing situation necessitates finding ways to increase the efficiency and capacity of already strained healthcare systems to meet the unique needs of the elderly in high numbers, and to equip individuals and their families to maintain their health from home (Firdhous & Karunaratne, 2010). Research has shown that applying ICTs for use by and for older adults has the potential to help address many of the issues associated with population ageing, specifically in the area of healthcare (Chiarini et al., 2013)

However, within the body of literature on ICTs' extension in the Global South, it is evident that elderly people as a category have been largely overlooked. This neglect is partially reflective of widely-held, preconceived notions that elderly people are less willing to learn about ICTs and are technologically less competent due to their age (Berridge, 2014). However, the elderly are not a homogenous group; there is wide variation between and across older adults in regards to physical, cognitive, and dextrous ability, as well the ability to see and hear (Lorenz & Opperman, 2009). Although chronic health issues and mental and physical impairment are disproportionately faced by those age 60 and up, this occurs on an individual basis to varying degrees (Lorenz & Opperman, 2009). Many older adults do not experience serious barriers to using ICTs, and for those who do, these challenges are by no means impossible to circumvent in the development of ICTs for older end-users. In several studies on smartphone design for older adults in the Global South, elderly individuals were interested in using mobile technology and were willing to learn how, and in which ways, they could use it to enrich their daily lives (Acharya et al., 2015).



Photo Credit: David Borish

In order to make ICTs accessible and worthwhile for this age group, it is imperative to design with the explicit goal of creating hardware, software, applications and forms of education which are tailored to the needs and desires of older people (Renaud & van Biljon, 2010). Where this has happened successfully, participatory research and development as well as reciprocal person-to-person knowledge sharing have been at the core (Acharya et al., 2015). A study by Minnamari Naumanen and Markku Tukiainen (2009) found that motivation from younger people encourages older generations to engage with and learn about ICTs, and that social modes of education such as peer tutoring aids in the promotion of elderly e-literacy. In addition, intergenerational communication can be mutually beneficial in that it directly informs younger adults, who tend to be on the designing end of ICT, of the user needs of an older demographic (Acharya et al., 2015).

In rural areas of the Global South, where agriculture is the primary means of sustaining livelihoods, mobile health innovations can help engage older persons in the processes of agricultural decision-making. In many rural communities, elders are culturally revered and their wisdom and traditional knowledge is respected and used if shared (Bezner Kerr et al., 2008; Firdhous and Karunaratne, 2010). This knowledge can play a key role in agriculture, which includes decisions surrounding what will be planted, best practices, and how foods should be prepared and consumed after harvest (Bezner Kerr et al., 2008). Emotionally, physically, and mentally healthy elders, with the help of ICT, can be more empowered and equipped to add value to agriculture in the Global South.



Photo Credit: David Borish

Intersectionality

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Conclusion

Adequate funding is a crucial component for the success of ICTs. Whether or not there is sufficient funding to enable ICT projects to continue in the long run, as well as scale up, must be considered when implementing these projects (Lemaire, 2011). Partnering with companies that have an incentive to fund an ICT is a potential source for significant funds. It can also be beneficial to work with local actors in the area where the ICT will be implemented. Partnership with government bodies can help create legislation that supports the ICT (Lemaire, 2011).

Moreover, successful initiatives tend to use a participatory approach that ensure those who would be using the ICT are involved in the project throughout its development and programming (Lemaire, 2011). Finally, successful ICTs have a strong understanding of the demographics of the people they were being built for. They considered key factors such as; the overall knowledge on health and agricultural practices, the extent of technological infrastructure, financial constraints, language, and literacy. These elements of successful ICTs tend to occur in countries committed to investing in education, technological development, and public service (Chetley, 2006).

It remains a challenge to implement ICTs in many countries throughout the Global South, which remain plagued by weak social and economic institutions. Due to mobile IT's ability to bridge information gaps and networking capacity, mobile IT can help overcome the various environmental and socio-economic problems that currently impede the growth and development of smallholder farmers. By providing time-specific information, issues of climate change and land degradation can be mitigated through modern advances in agricultural practices. The universality of mobile technology also enables those with limited mobility to access information, decreasing health risks and thereby increasing food security. Mobile IT also has the potential to reach those who are marginalized within the agricultural sector. Women, despite the large role they play in agriculture, often do not have access to information. However it is clear that ICT's present women with the opportunity to enhance their agricultural skills and ensure their overall safety and wellbeing.

Furthermore, younger generations have benefited greatly and stand to benefit even more from mobile usage, since a majority of Internet users are youth. Mobile IT projects can provide them with a wide range of information and encourages them to consider alternative agricultural methods in an age where interest is waning. The Mkulima project in Kenya is an example of how this can occur (Irungu et al., 2015). For older generations, mobile technology provides a unique opportunity for information sharing between age groups that combines traditional knowledge with modern day techniques and practices.

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