

## Internet.org's "Free Basics": Can Free Internet Initiatives Improve the Lives of Kenya's Rural Poor?

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### Abstract

The global Internet penetration rate is 62.0%, indicating that many people are offline. This divide raises questions regarding Internet accessibility and the repercussions of the absence of quality Internet provision. Internet.org's Free Basics aims to make the world more open and connected and aid the poorest of the poor by offering pared-down web services, such as Facebook and BBC News. Critics have characterized Internet.org as an anti-net neutrality service that is anti-innovation. They also condemn Free Basics for its limited website offerings and external links that require paid-for Internet, which they argue renders the app useless. Most research concerning the value of free Internet initiatives focuses on the urban poor, yet the digital divide is intensified in rural regions of developing countries. This study aims to measure the impact of Internet.org's Free Basics app on Kenya's poor rural population. The questions that guide this research are: Does Free Basics reach the poorest of the poor? If so, do they benefit from the product, or are free Internet initiatives exacerbating the digital divide? Using household data collected by Sauti za Wananchi, I find that Free Basics services are available to only 2% of the rural poor population. The question then becomes: what about Free Basics makes it helpful to that 2%? I conclude that Free Basics is marginally relevant due to the app's restricted websites and information. This research calls Internet.org's mission into question and suggests alternative ways Free Basics could address the global digital divide.

### Author's Note

My interest in Internet.org's Free Basics and free internet initiatives was inspired by the time I spent as an undergraduate participant at the United Nations General Assembly promoting sustainable development goals in 2015. The service was demoed as a part of an innovation forum. After the experience, I became interested in information and communication technologies for development initiatives. I can't underscore how instrumental the internet has been to me as an educational tool alone. Given the far encompassing usefulness of the internet, I hope that this research will lend itself to an ongoing discussion about democratizing

internet access for everyone including those most vulnerable to socioeconomic disparities.

### Keywords

Internet.org's Free Basics, Digital Divide, Information and Communication Technology for Development (ICT4D), Net Neutrality

### Introduction: Information Revolution and the Resulting Digital Divide

Tim Berners-Lee developed the hypertext system, or the World Wide Web, in the early 1990s to provide a common space where information could be shared without barriers (Jurich, 2000). As of June 30, 2020, the world Internet penetration rate is 62% (Internet World Stats, 2020).

Google, YouTube, Facebook, and Baidu are the top five most accessed sites meaning, globally, on average most Internet users are concerned with browsing and accessing information, communicating with others, and being entertained (Alexa Internet, 2015). Further analysis, however, of the world's 51.7% Internet penetration rate demonstrates that nearly half of the world's population remains without access to the Internet.

Policymakers and social scientists have been concerned with the distribution of Internet access since its emergence as a mass medium. Initially, observers believed that the World Wide Web would enhance equality of access to information by dramatically reducing information costs. As technological euphoria wore off, however, observers noted that certain people were more likely to use the Internet than others. For the most part, groups with higher levels of access to the Internet were the same groups - whites, men, residents of urban areas. These groups also had greater access to education, income, and other resources that help people get ahead (Harigittai, 2002).

A geographical disaggregation of Internet penetration rates shows that 90.3% of North Americans, 87.2% of Europeans, 67.7% of inhabitants of Oceania and Australia, 71.5% of Latin Americans/Caribbean, 70.8% of Middle Easterners, 58.8% of people living in Asia, and only 42.2% of Africans have access to the Internet in their respective regions (Internet World Stats, 2020). Oceania and Australia's population (.6%), as a percentage of the world, is disproportionately low compared to the other regions; therefore, their penetration rate is overstated. Africa remains the loser in the race to get the world connected. The data suggests, unsurprisingly, that regions considered less developed have low penetration rates. This digital divide raises important questions regarding Internet accessibility and the possible repercussions of the absence of quality Internet provision.

### Issues with Accessibility

Even with the narrowing of the digital divide between developed and

developing countries, it is estimated that nearly 3 billion people worldwide do not use the Internet. About 75% of the offline population is concentrated in 20 disproportionately rural, low income, elderly, illiterate, and female majority countries. The offline community faces barriers to Internet adoption spanning four categories: incentives, affordability, user capability, and infrastructure (Sprague, Grijpink, & Manyika, 2014). Despite the increasing utility of the Internet in providing access to information, opportunities, and resources to improve quality of life, large segments of the offline population are unmotivated to use it given the hurdles they face accessing the Internet.

Barriers include unawareness of the Internet or use cases that create value for the offline user, an absence of relevant local content and services, and a lack of cultural or social acceptance. In regions like Africa, the effective barrier is the low income of individuals in the offline population. This barrier is exacerbated by the high costs of providing access to the Internet for these disproportionately rural populations. The low incomes reflect the poor economic circumstances of segments of the offline community, and the need for economic development, employment, and income growth opportunities in their regions. User capability, another barrier to achieving 100% global penetration, describes the lack of digital literacy- that is, unfamiliarity with or discomfort in using digital technologies to access and use information. Lastly, a lack of infrastructures such as sustained electricity to power mobile devices or computers and mobile Internet coverage or network access makes Internet usage incredibly difficult for people living in rural areas (Sprague et al., 2014).

### Free Internet Initiatives as a Means of Alleviating Poverty

Though Africa's Internet penetration rate ranks lowest compared to other regions, with a growth rate of 12,441% from 2000 to 2020, Africa has the fastest-growing market segment of Internet users, making it an attractive landscape for both Internet Service Providers (ISPs) and Web Service Providers (WSP) (Internet World Stats, 2020). The question then becomes, how do ISPs and mobile operators attract individuals offline in a way that caters to their specific needs and resolves the hurdles they face accessing the Internet (NTIA, 1999)?

Many multinational companies and organizations such as Facebook, Google, and Internet.org have taken on this challenge. Launched on August 20, 2013, Internet.org (by Facebook in partnership with Samsung, Ericsson, MediaTek, Opera Software, Nokia, and Qualcomm) aims to bring affordable access to selected Internet services to less developed countries by facilitating the development of new business models around the provision of Internet access (Constine, 2013). Google X's Project Loon, a research and development project, uses high-altitude balloons placed in the stratosphere at an altitude of about 18 km (11 mi) to create

an aerial wireless network with up to 4G-LTE speeds to extend Internet access to rural and remote areas (Levy, 2013).

Evidence suggests that information and communication technologies (ICTs) are instrumental in creating a flexible economy (Krogt, 1999). By enabling the fast and low-cost collection, processing, and dissemination of information, new technologies have become essential to economic growth, suggesting that knowledge is a crucial element for sustainable development in the current global economy. This makes research and innovation in ICT, both relevant and important (Loader, 1998). ICTD (Information and communication technology for development involves consideration of human and societal relations with the technological world and specifically considers the potential for positive socioeconomic change through this engagement, especially for people living in poverty (Kano & Toyama, 2016). For example, many ICTD initiatives use mobile phones to provide financial services to those without access to traditional banks. Due to the increasing penetration of mobile phones even in poor communities, mobile-phone-enabled banking (m-banking) services are being increasingly targeted at the “unbanked” to bring formal financial services to the poor (A.A & Oyebola, 2016).

#### Internet.org’s Free Basics

In August 2013, Facebook announced an ambitious project titled ‘Internet.org,’ which, in partnership with six other telecommunication companies, is intended to help the poor gain access to information and the same opportunities that the rest of the world have, thereby also reducing digital inequality and eventually striving for social equality. However, this initiative was not entirely novel. One ICTD initiative, Free Basics by Facebook, the app that delivers the services Internet.org aims to provide, states its mission is to “make the world more open and connected (Brandom, 2016).” Mark Zuckerberg has proclaimed that “connectivity is a human right (Bhatia, 2016).” It closely followed the direction of the already launched Facebook Zero, but this time the initiative was of a much larger scale. With over 73% of the world’s phone market consisting of feature phone users (phones that incorporate features such as the ability to access the Internet and store and play music but lack the advanced functionality of a smartphone), Facebook Zero was an initiative that was aimed at the world’s non-Facebook users in emerging economies who used a feature phone with no specific data plan. The idea was to collaborate with mobile networks and offer a stripped-down version of Facebook (text only with no visuals) free of charge to these subscribers. If subscribers opt to download the visuals, they will incur the data charges as tariffed by the mobile operators (Venkatraman et al., 2016).

As shown in Figure 1, the Free Basics service comprises three components: (1) network service providers, which are cellular carriers that agree to carry data for any Free Basics service at no cost to the end-user,

(2) Free Basics proxy service provider which traffic routers that are currently run by Facebook, and (3) web service providers. To have their services accessed by Free Basics users, website operators must first re-design their services following a set of technical requirements and next apply to have their service approved by the proxy service provider. The Free Basics platform is open to include any web service that meets the stated technical requirements: the absence of JavaScript, high-resolution images, videos or iFrames, Flash, and Java applets (Sen et al., 2016).



FIGURE 1: Free Basics Architecture (from Sen et al., 2016 )

Internet.org's Free Basics is available in 60 countries through mobile operators and continues to expand (Internet.org, 2017). For example, in Kenya, Airtel customers can access the Free Basics service via the Internet.org app, which is downloadable using Google Play or Apple's App Store (Nanjira, 2015). In Kenya, Airtel customers enjoy 17 websites spanning seven categories: News and Weather, Sports, Health, Jobs and classified, Education and information, and Communication (Table 1).

Category	Site
News and weather	AccuWeather
News and weather	BBC News
News and weather	BBC Swahili
News and weather	Daily Nation
News and weather	Jammi Forums
Sports	SuperSport
Health	BabyCenter & MAMA
Health	Ebola Information
Health	Facts of Life
Health	Totohealth
Jobs and classifieds	BrighterMonday
Jobs and classifieds	OLX
Education and information	Girl Effect
Education and information	Scholars4DEV
Education and information	Wattpad
Communication	Facebook
Communication	Messenger

TABLE 1: List of Free Basics Websites Offered Through Airtel Kenya

### Free Basics: Reception and Issues

Internet.org's Free Basics has raised controversy since its inception in 2013 for its economic and social repercussions. Critics have characterized Internet.org as an anti-net neutrality service offering that would adversely affect innovation and start-up companies and would ultimately drive many Internet service providers (ISPs) out of business (Tripuraneni, 2016). Net neutrality is a phrase that was first coined by Columbia Law School Professor Tim Wu—and is used to signify the concept that the Internet is a carrier of online content that does not distinguish one website from another. The central idea inherent in this concept is that a "maximally useful public information network aspires to treat all content, sites, and platforms equally" (Cheng et al., 2011). While a formal definition of the operationalization of the principle does not exist, academics point out that net neutrality "usually means that broadband service providers charge consumers only once for Internet access, do not favor one content provider over another, and do not charge content providers for sending information over broadband lines to end-users" (Hanh et al., 2006). By offering only a subset of Internet services for free, Facebook potentially violates net neutrality by enabling unfair competition between the zero-rated Free Basics services and the paid web services that do not participate in Free

Basics. Critics asserted that the initiative involves differential pricing among subscribers/users for different data downloaded and therefore works against net neutrality. India's government banned Free Basics in 2016 because it violated net neutrality rules by creating a two-tiered Internet system- one for the rich and one for the poor.

Free Basics attempts to bridge the digital divide, but there are many other remaining challenges such as infrastructure, content availability and equality, education, and privacy. A critique of Facebook's strategy included how for several first-time users, Facebook became the first Internet experience and sometimes even became synonymous with the Internet. It also contended that Free Basics was a marketing ploy to get people hooked onto it and subscribe to a full-scale Internet data pack with the Internet service provider (Venkatraman, 2016). This critique demonstrates why many first-time Internet users believe that Facebook is the Internet (Miller, 2011). However, the more glaring challenge is that the population that Free Basics aims to capture is mostly poor and with low levels of education, which raises questions regarding literacy levels and how that may discourage the use of the offering. Free Basics is based on the belief that users will switch to paid-for Internet service within the first month of usage, which assumes that Free Basics users have the money to make the switch to paid-for-Internet service providers. This may be a dangerous assumption, given the poverty level of the offline population.

Additionally, users are offered a handful of stripped-down websites, which are not modified for popularity based on a country's province or region. All of the sites provide limited content, and users often come across "walled gardens," which are instances where the company controls the content developing-world populations can access (Wyche et al., 2017). Free Basics offers a limited set of services, and obtaining any Internet destination beyond that set is not blocked but will incur charges, with appropriate warnings to the user. In the case of Free Basics Pakistan, 60% of the services have external links, which will cause breaks in the user browsing experience. In some cases, such as [VirtualpediatricHospital.org](http://VirtualpediatricHospital.org), [SumirBD.mobi](http://SumirBD.mobi), 80-90% of the listed URLs are external links—rendering such services effectively useless (Sen et al., 2016). For example, although Free Basics includes access to the Bing search engine and will show snippets of listings free, reading any of the search results requires payment (Figure 2) (Solon, 2017). Data measuring the quality of Free Basics shows that while several web services are accessible on Free Basic, their functionality is somewhat restricted and the network performance for Free Basics traffic is weak compared to paid network access (Sen et al., 2016).

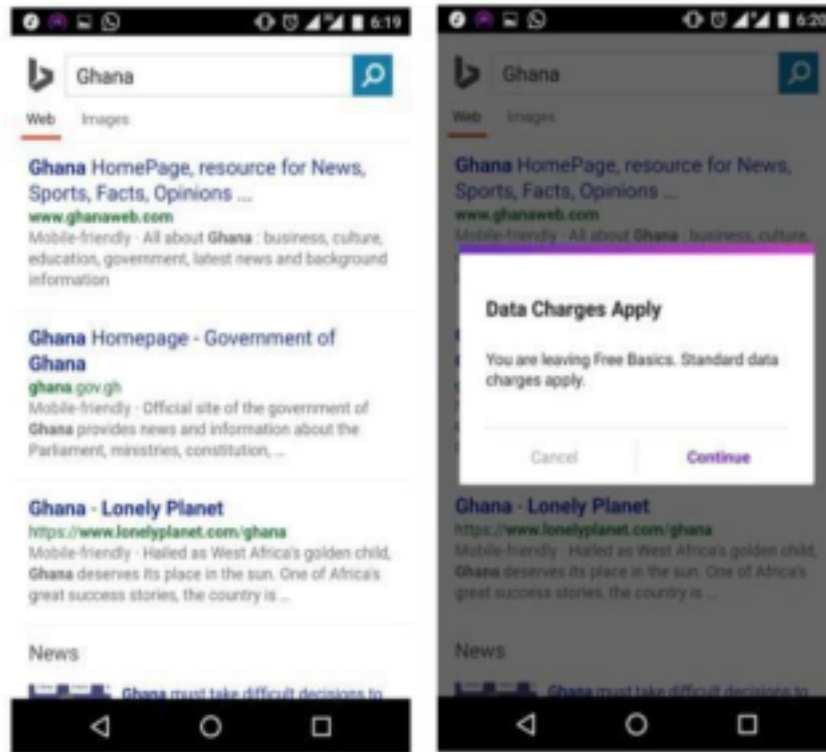


FIGURE 2: A Bing search in Ghana; after selecting a link, the user is told that standard data charges will apply (From Solon, 2017).

### Free Basics in Developing Countries

This digital divide exists not only between nations but also within individual countries. A study on the telecommunications and information technology gap in the United States shows that computer ownership and Internet access are strongly correlated with income and education (NTIA, 1999). The gap is intensified in rural regions of developing countries. Though they remain most vulnerable, with their lack of services, infrastructure, reliance on the land amid climate change, and fewer employment opportunities, the inclusion of rural populations in the conversation regarding Free Basics is understudied. Free Basics supporters ask pertinent questions: Is not some connectivity better than no connectivity (Venkatraman, 2016)? In contrast, this study seeks to answer: does this idea of some connectivity (partial information/slow connection) reassert digital inequality rather than reduce it? The ultimate goal of this research is to better understand the adoption rates of Free Basics by the rural poor, the Free Basics products they use, and how the app can be enhanced to increase adoption and maximize utility.



As with other countries in Africa, the majority of Kenya's population is rural, though they are rapidly urbanizing (The World Bank, 2017). The country's poor technical infrastructure, especially in rural regions, contributes to the technological disenfranchisement that has resulted in the nonuse of new technologies. 87% of adult individuals (aged 15+) in Kenya have a mobile phone or sim card, which is higher than the African average of 65% (Kuo, 2017). Relatively high mobile ownership among a disenfranchised population, an 89.4% Internet user penetration rate-the highest in Africa, and Free Basics availability in Kenya via Airtel make rural Kenya an excellent site to explore the extent to which products of the information revolution like Free Basics have succeeded in meeting their goal of helping the most vulnerable people (Internet World Stats, 2017). Also, conclusions drawn about the potential impact of Free Basics on the rural poor would be much more accurate than many other African countries. Free Basics is offered because Kenya has a comparatively abundant reservoir of data.

Given that most information and research concerning the value of free Internet initiatives focus on the urban poor and the digital divide is intensified in rural regions of developing countries, this study aims to measure Internet.org's Free Basics' potential impact app on poor rural populations in Kenya. I achieve this using household data collected by Sauti za Wananchi in 2015. While this study focuses explicitly on Free Basics, the approach can be applied to any similar zero-rated services that arise. To be eligible for Free Basics and benefit from the full range of the 17 products that Internet.org offers through the app, rural poor Kenyan households must be all of the following:

1. Mobile phone owners
2. Sim card owners
3. Mobile phone owners that access the internet on their phone
4. Airtel Users
5. English readers and writers

This study aims to estimate the potential penetration rate of Free Basics among Kenya's rural poor to gauge the viability of the app as a tool for connecting rural and poor populations. It is equally important to understand the avenues the rural poor rely on to get their information, what type of information they consume, and how their economic and geographic background inform the two. The results of these questions would provide insight into what services free internet initiatives should offer if they aim to connect and inform the most vulnerable populations and how they should go about delivering the service itself. The questions this thesis sets out to investigate are:

- What sources do the rural poor rely on to get their information? Why?
- Does Internet.org's Free Basics reach the poorest of the poor? If so, at what penetration rate?
- Does Free Basics bridge the digital divide?
- Based on how rural populations use the Internet and get information, are the 17 websites Free Basics offer helpful to them?
- What are the most significant determinants of accessing Free Basics?

The guiding conjecture of this study is that Free Basics will have low penetration in rural poor populations and that the most significant determinant to accessing Free Basics would be socioeconomic status. However, I expect that if rural communities had the opportunity to use Free Basics, they would use it to chat with friends on Facebook but not if it meant they had to change their behaviors, such as learning how to read and write in English or changing mobile phone service providers.

### Methodology

To analyze the potential impact of Free Basics, I performed a statistical analysis of Twaweza's Sauti za Wananchi national mobile phone survey launched in Kenya. The baseline sample was designed as a representative cross-section of all adult citizens in Kenya. The goal was to give every adult citizen an equal and known chance of selection for an interview by (a) strictly applying random selection at every stage of sampling and (b) applying sampling with probability proportionate to population size at the enumeration area (EA) sampling stage. EAs are survey areas in rural and urban settings defined by the Kenya National Bureau of Statistics. A representative sample of 2000 respondents from all 47 counties of Kenya was randomly selected to participate, with a further 399 citizens selected as reserve respondents if the primary respondents drop out. Therefore, in each two EAs, there are ten households in the primary sample with two reserve households. The margin of error for baseline data collection is +/- 2 at a 95% confidence interval. The sample universe for Sauti za Wananchi included all adult citizens in Kenya. Individual primary respondents that were not 18 years of age on the day of the survey were excluded.

During the household visits that make up the first phase, mobile phones, and solar chargers are distributed to those who agree to become Sauti za Wananchi respondents. Phones are allocated to ensure the representativeness of the sample, particularly when it comes to lower-income households, who are less likely to access phones. Chargers further ensure that the sample is representative by not excluding those who do not have access to electricity, again often the poorer households. Also, about 1/3 of the population has access to power at the household level. Thus, the

provision of mobile phones and solar chargers ensured that the sample remains representative. The sample's demographic characteristics can be compared to those used for the 2014 Demographic and Health Survey and the 2009 Census (Table 2).

<b>Gender</b>	<b>SzW</b>	<b>DHS</b>	<b>2009 Census</b>
Male	49% **	48%*	50%
Female	51%	52%	50%
<b>Setting</b>	<b>SzW</b>	<b>DHS</b>	<b>2009 Census</b>
Urban	40%	38%*	38%
Rural	60%	62%*	62%

TABLE 2: Comparison of Respondents to 2014 Demographic and Health Survey and 2009 Census: Gender and Geographical Location (from Twaweza.org, 2015) Source of data: Sauti za Wananchi Baseline Survey, 2015, Kenya DHS 2014, 2009 census data by KNBS. \*Unweighted data, \*\*Weighted data.

Given that Free Basics was only introduced nearly eight years ago, there are little to no public datasets available on Free Basics for analysis. However, Sauti za Wananchi collects a wealth of household information, which helps understand information accessibility and connectivity. Therefore, I can examine the usefulness of Free Basics in Kenya's environment. For this research, I focus on responses from each head of household (HOH) of 2,000 respondents regarding participants' geographic location, household assets, occupation, the highest level of education, information accessibility behaviors, Internet use, mobile phones, mobile phone service providers, and preferences. Below I have delineated each question analyzed how they are meant to address the research questions. The full questionnaire is appended.

### Modes of Analysis

To answer the question about the most significant determinants to accessing Free Basics, I conducted a logistic regression analysis. The indicator variables were setting (urban or rural) and socioeconomic status, assigned to every household based on principal components analysis (PCA). I use PCA to generate household asset-based proxy indices. Homes were grouped into quintiles, from wealthiest to the poorest. Some researchers have concluded that proxy measures compared to direct measures of determining wealth are reliable methods (Karigi, 2014). I

grouped the PCA results into three quintiles based on the strength of the PCA score. Based on what assets scored the highest in the given quintile, households were assigned to one of three quintiles. I judged that families with the highest PCA score, quintile 1, are relatively "wealthy" because they typically own electronics, furniture, land, and a home. Secondly, I judged that households with the highest PCA score, quintile 2, are comparatively "somewhat poor" because this group typically relies on farming but, in some cases, own land. Lastly, I judged that households with the highest PCA score being in quintile 3 are "poor" because all or most assets include small-scale farming materials. I then assigned each of the 2,000 households to a socioeconomic status (SES) based on the highest quintile score.

## Results

### *Rural and Poor: Access to Information in Kenya*

Of the 2399 households surveyed, I excluded the 399 reserved households surveyed if a family from the first 2000 dropped out. Of the 2000 households surveyed, 1312 HOH reported being rural. Of the rural households, only 1243 HOH said they lived in their rural locations for the full year. Therefore, 62% of the Kenyan households surveyed were rural. Of the rural households, 519 (42%) of them can be characterized as poor, the other 156 (12%) of them can be described as relatively somewhat poor, and the last 568 (46%) can be characterized as wealthy. These classifications are based on the households' strength given the PCA score contrived from the type and amount of household assets the HOH reported to own. Notably, the difference between those classified as somewhat poor and those considered poor is that the somewhat poor tend to be landowners. This distinction becomes negligible considering the somewhat poor may sell their land to buy other goods like mobile phones, which may cause them to be classified as poor. While having an asset is non-trivial, the PCA analysis conducted indicates that the line between the somewhat poor and poor is arbitrary.

On the other hand, the difference between those that are wealthy and those that are somewhat poor is that the wealthy own electronic and other durable goods such as refrigerators and TVs, and land, whereas the somewhat poor and poor do not. Therefore, for this research, the somewhat poor and poor will be combined to get a more robust understanding of the impact of Free Basics on the rural poor in Kenya. The group I focus my analysis on is the 675 rural and poor households.

Regarding the question, "what is the highest level of schooling completed by the head of the household?" 82% of poor rural Kenyans reported finishing coursework up to Form 1-4, which corresponds to Grades 9-12 or high school in the American system. 54 HOH reported going to college. 46 HOH reported not having gone to school at all. Only

6 HOH had a university-level education, and 1 HOH responded to having an adult education. The data also suggests that 63% of rural and poor households maintain their livelihoods through farming and agriculture. The next largest HOH group reported that they worked alone, but there is no indication of the exact line of work. The other 105 respondents indicated that they were either students, casual workers, worked for a private company, worked for the government, were unemployed and not looking for work, or were fishers.

When asked “what sources you received from within the last week”, 75% of the 675 rural and poor HOH reported that they received information from listening to the radio. 22% of the 675 rural and poor HOH said that they received information from reading a newspaper. 38% of rural poor HOH reported that they received information from watching TV. 11% of rural and poor HOH indicated that they received information from browsing the Internet. 95% of rural and poor HOH reported that they received information from texting or calling someone using their mobile phone. 7% of rural and poor HOH said that they received information from attending a political gathering, and 46% of the 675 rural and poor HOH indicated that they received information from attending a social gathering.

The data also indicates that if and when mobile phone users use their phones to access the Internet, which was the case for a total of 103 HOH in poor rural Kenya, most respondents stated they used it to chat with friends. The next most significant response was from those who said they read the news and current affairs on the Internet. Others read emails, read online newspapers, and books. Some indicated they use the Internet for academic purposes/school, but there is no indication of what websites they used explicitly. When asked to provide all the social networking sites they usually visit, 79 HOH indicated they used Facebook, which made up the majority of feedback. The next highest number of participants who answered this question selected WhatsApp as the networking site they often visit. Based on the responses to the question, “In which language do you get most of your information from the media?”, 45.19% of HOH’s reported absorbing information in Kiswahili. The second highest response was Kikuyu/ The third highest percentage at 12% in English. Duolo at 7% and Kalenjin and Kisii both received 4%, indicating only a small fraction of the rural poor consume media that is not in Kiswahili or Kikuyu.

#### *Rural and Poor: Mobile Phone and Free Basics Eligibility*

The Sauti za Wananchi survey also includes a question that asks, “What do you use your mobile phone for?” Of HOH that are rural poor mobile phone owners with sim cards (n=150), all of them reported making phone calls while 147 reported receiving phone calls (Figure 14). Notably, 101 of 150 HOH said using their mobile phones for paying bills and other banking services. Only 66 individuals reported using Internet Services on

their phones.

The data indicates that the majority of rural poor mobile phone owners (n=575) use Safaricom as a mobile phone service provider. The second-largest response was Airtel at 86. 26 respondents reported Orange/Telkom, Equitel at 9, and Yu at 7. The answers do not add up to a perfect 575 but rather 690 because, in many cases, HOH may own multiple sim cards from different mobile phone service providers. The survey also asked HOH, “Which mobile service provider would you switch to if your most often used mobile service provider were not available?” The Sankey diagram demonstrates that the number of people who stated they would choose Airtel rose exponentially to 361 from 86 people who are subscribed to it. The diagram also indicates that the number of people who said they would prefer not to have a mobile phone provider than to switch to another phone service was the second-highest at 73 (Figure 3).

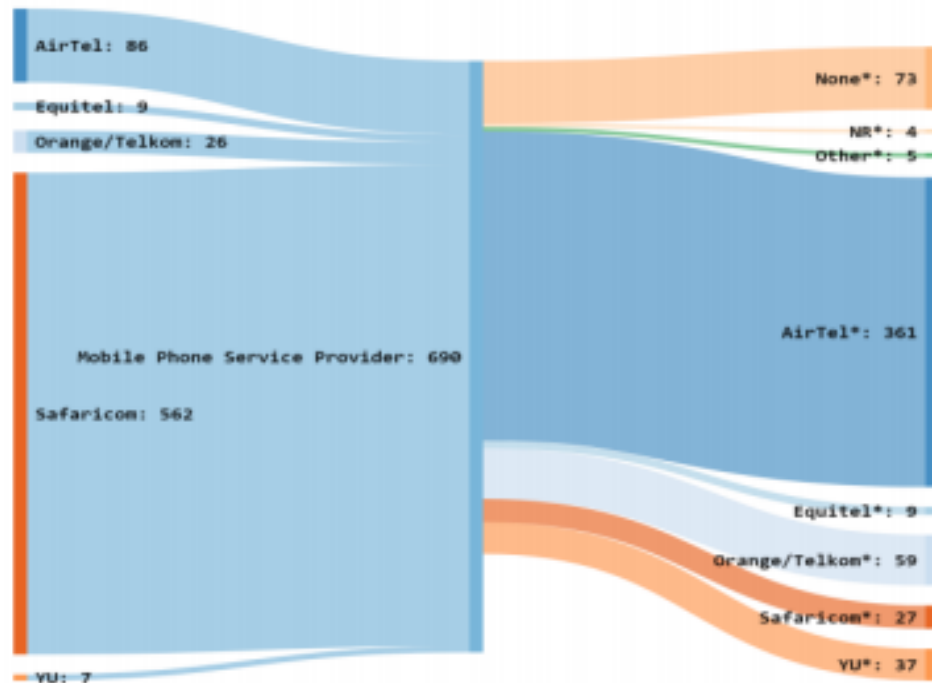


FIGURE 3: Response to “What mobile phone service provider are you currently using?” and “\*Which mobile service provider would you switch to if your most often used mobile service provider were not available?” Rural Poor Mobile Phone Owners (n=575). Source of data: Sauti za Wananchi Baseline Survey.

549 rural poor mobile phone-owning HOH believe that Safaricom has the most reliable network. Only 24 other HOH of the 575 rural poor mobile phone-owning households believes that Airtel has the most reliable

network coverage. In comparison, the other 2 HOH thought that the most reliable network service provider is Orange/Telkom. To access the full range of Free Basics products, individuals must be mobile phone owners, sim card owners, mobile phones to access the Internet, be Airtel subscribers, and be English readers and writers. Results of subsetting the responses from the questionnaire indicate that of the 675 rural and poor households, only 575 were mobile phone owners, and 150 households reported having a sim card (Table 3). Of 150 mobile phone and sim card owners, 66 HOH use their mobile phone to access the Internet of those 16 HOH only 15 can read and write English. Therefore, Internet.org can only potentially capture 2% of the rural poor. Additional analysis indicates that of all the qualifications to accessing Free Basics, owning a mobile phone was the only statistically significant indicator. Figure 19 suggests that the single statistically significant determinant of holding a mobile phone is economic status. There is a positive correlation between being wealthy and owning a mobile phone, which indicates that the more affluent a person is, the more likely they are to own a mobile phone (Figure 4).

Qualifications	<i>n= 675 Rural and Poor Households</i>
Mobile Phone Owners	575
Mobile Phone User + Sim Card Owners	150
Mobile Phone User + Sim Card Owners+ Use Mobile Phone to Access The Internet*	66
Mobile Phone User + Sim Card Owners+ Use Mobile Phone to Access The Internet*+ Airtel Subscribers	16
Mobile Phone User + Sim Card Owners + Use Mobile Phone to Access The Internet* + Airtel Subscribers + English Reader/Writer	<b>15</b>

TABLE 3: The number of households Free Basics can capture considering the qualifications for using the app.

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Call:
glm(formula = gq46 ~ d11 + ses, family = "binomial", data = statsdata)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-1.7706  -1.5210   0.7180   0.7711   0.8691

Coefficients:
            Estimate Std. Error z value Pr(>|z|)
(Intercept)  1.06072    0.08867  11.962  <2e-16 ***
d112        -0.10955    0.11140   -0.983   0.3254
SESsomewhat poor -0.17211    0.13759   -1.251   0.2110
SESwealthy    0.27289    0.11843   2.304   0.0212 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 2258.1  on 1999  degrees of freedom
Residual deviance: 2244.1  on 1996  degrees of freedom
AIC: 2252.1

Number of Fisher scoring iterations: 4

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FIGURE 4: Logit Model Indicating Determinants to Owning a Mobile Phone All Kenyan Households (n=2000).

## Discussion

The data indicates that by virtue of being rural and poor, individuals rely primarily on phone calls and texts, the radio, and social gatherings to get their information. Only 11% of rural poor HOH reported getting information from the Internet within the last week. The only other lower information source was political gatherings, which is understandable considering political gatherings may only occur when there is an upcoming election. This information should be especially alarming to zero-rated Internet service providers because it suggests that the population they are trying to capture is unconcerned with or have the Internet on their radar to get their information. However, it is clear from the data that 81% of poor rural households have cellphones, yet only 2% of Kenya's rural poor meet the requirements for accessing Free Basics. This may be partly due to the relatively higher cost of feature phones that do more than just allow people to receive and make calls. Feature phones give owners the ability to access Internet services. Only 10% of poor rural households in Kenya access Internet services using their mobile phones and therefore have feature phones. The data also demonstrates that 88% of media that is already consumed by the rural poor are in a non-English language. What this may mean for Free Basics is that the rural poor who are not very comfortable reading and writing in English would be less likely to use Free Basics.

As established by the analysis of the rural poor with mobile phones with sim cards, using their phone to access the Internet is their fourth consideration after making and receiving calls and paying bills or other banking services. 67% of HOH use their mobile phone to pay bills and get other banking services, which provides a rationale for why the adoption of Free Basics is so low in Kenya. Paying for things such as taxi rides has



been made easier due to Kenya's leading mobile money system, M-PESA. Launched in 2007 by government-backed Safaricom, the country's largest mobile network operator, it is now used by over 17 million Kenyans, equivalent to more than two-thirds of the adult population. M-PESA lets people transfer cash using their phones (T.S. 2015). It was initially designed to allow microfinance-loan repayments to be made by telephone, reducing the costs associated with handling money and making lower interest rates possible. However, after pilot testing, it was broadened to become a general money-transfer scheme. Once you have signed up, you pay money into the system by handing cash to one of Safaricom's 40,000 agents (typically in a corner shop selling airtime), who credits the money to your M-PESA account. You withdraw money by visiting another agent, who checks that you have sufficient funds before debiting your account and handing it over. You can also transfer money to others using a menu on your phone. Cash can thus be sent from one place to another more quickly, safely, and efficiently than taking bundles of money in person or asking others to carry it. This is particularly useful in a country where many workers in cities send money to their families in rural villages.

Oteri reports that among Kenyan operators at the end of June 2014, Safaricom had the highest subscribers with 21,928,450. Airtel is in the second position, with a total subscriber base of 5,068,765 in Kenya. This distribution of users corresponds with the results of this study, which indicates that rural poor mobile phone owners use Safaricom most and perceive it to have the strongest network. They also view Airtel only as an alternative to Safaricom if Safaricom is unavailable. Researchers have claimed that money transfer services in rural areas help to resolve a market failure that farmers face- access to financial services (Oteri, 2015). Oteri also found that the largest proportion of money received via mobile phone-based money transfer (MMT) was used for agriculture. The use of MMT services significantly increases household annual input use by 3,300 (\$42) Kenyan Shillings (KSh), household agricultural commercialization by 37%, and household farm incomes by 17,700 (\$224) KSh. (Oteri, 2015). These findings imply that the use of MMT services, especially in rural areas, resolves limited access to financial services. MMT services' success can be attributed to a host of factors: the service is simple to operate, and the registration process takes just a few minutes. Ideally, all one needs to use MMT is an active mobile phone number. While Airtel does boast such a scheme, called Air-Tel money, the service is not as widely used as M-PESA because MMT services in Kenya have become almost synonymous with M-PESA as it was the first of its kind in Kenya (Kirui, 2013). The rural poor also believe that Safaricom has the most reliable network connection of any other mobile phone service provider. This calls into question Internet.org's service delivery mechanism. It is not clear why Internet.org chose to collaborate with Airtel to provide Free Basics, but if their mission was to "connect the unconnected," they

exclude a large addressable market. Providing Free Basics to Safaricom users would be the quickest way to increase the amount of Free Basics users. However, this is only one-half of the problem. While most rural poor households have mobile phones, it is clear that they are not using them to access the Internet. Of the 9% of rural and poor Kenyan households that are mobile phone and sim card owners and use their mobile phones to access the Internet, only 2.4% of those individuals are Airtel users. That number shrinks to 2% when you consider that Free Basics users also have to read and write in English to access the app.

One of the questions that such a mission as Free Basics gives rise is: how do you define help? The data suggest that Kenyan rural poor households earn their livelihood through farming and livestock. Many researchers have predicted that climate change will create and has already created significant stresses on agricultural sectors (Sjögersten et al., 2013). This would be detrimental to previously rural poor individuals that earn their living through agricultural production. Therefore, one could argue that the best thing that Free Basics could do to help these people and incentivize them to use the app would be to offer websites that provide helpful information regarding agricultural responses to climate change. Sites that could predict weather patterns, educate individuals on farming policies and inform them on how certain goods are doing in the market would be most relevant to the rural poor. Of the 17 websites that Free Basics offers to Kenyans, however, only one of them, Accuweather, provides information about weather patterns in Kenya and is directly relevant to the rural poor's line of work, which is not always modified by region and restricts content. Free Basics does offer other websites such as BBC Swahili, BBC News, Facebook, and Messenger, all with their own set of content limitations. I contend that these websites could disseminate pertinent information to rural and poor populations.

This research reinforces establishes that rural individuals have far lower household incomes, lower levels of education, and are vulnerable to climate change due to a reliance on farming and livestock as their primary source of income. It suggests that this group should be granted equal access to educational and economic opportunities, which the Internet can provide as long as its content is accessible and unrestricted. Internet.org offers what seems to be a solution to the digital divide. However, Free Basics fails to incorporate rural poor individuals that live in areas that do not have mobile coverage, do not have feature phones, do not read and write English, and do not subscribe to Airtel. Also, the free content Free Basics offers has to address the rural poor's immediate and basic needs in the way certain technologies such as M-PESA does for the rural poor. The first thing Internet.org must do, moving forward, is to review its mission, product offering, and service delivery model. If its mission were to get the rural poor to use Free Basics, my recommendation would be to offer the app to Safaricom users. This move would make Free Basics available to a

larger group of people. Focus groups would help Internet.org understand why the rural poor do not look to the Internet to get information and how they could help them get online using their mobile phones. They will need to determine if Free Basics delivers the web pages that individuals in rural poor populations desire, what they use the websites on Free Basics for especially Facebook, and if it impacts their lives as it pertains to meeting their basic needs. Internet.org also needs to address how individuals may use Free Basics, the features that render the app ineffective or useful, and what about the app they like and dislike. Given that Free Basics customers may choose to use the app because they cannot afford paid-for-Internet services, the idea that the very poor who use Free Basics would switch to paid-for-service after using Free Basics is farfetched. Therefore, it is incumbent upon free Internet initiatives, which take on the feat of bringing online the offline population, to operate in a way that considers the habits, demographics, economic background, and basic needs of the rural poor.

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## Appendix: Questions and their Reasons for Inclusions

*What setting do you live in? Urban or Rural? Do you live in this location for the full year?*

The purpose of analyzing this question is to capture individuals who live in rural regions for the majority of the year and not just present during the survey, given that there may be a high level of back-and-forth movement.

*Does your household own the following assets? Yes or No?*

Given that the questionnaire does not explicitly ask respondents to provide household income, a measure of economic status can be drawn from the amount and type of asset a household has. I look for trends in the amount of durable and technological assets a home has to exclude those who may be relatively wealthier from my analysis.

*What was the main occupation of HOH for the past 12 months?*

The purpose of analyzing this question is to get a better understanding of the demographic Free Basics seeks to capture. This information could then inform the type of apps Internet.org should push on the app based on the interests of the rural and poor and what could potentially push them forward in their respective lines of work.

*Highest Level of schooling completed by HOH?*

The purpose of analyzing this question is to get a better understanding of the demographic Free Basics seeks to capture and see if digital literacy or lack thereof plays a role in the disuse of specific technologies.

*Apart from today, when was the last time you listened to the radio/ read a newspaper? Watched TV? Used the Internet? Used a mobile phone? Attended a religious gathering? Participated in a political gathering? Attended a social gathering?*

The purpose of analyzing this question is to see what sources the rural and the poor rely on to get their information.

*For those that used the Internet in question five, what did you use the Internet for in the past month 12 months? Multiple responses allowed.*

The purpose of analyzing this question is to see whether the web apps Free Basics offer match the rural poor's needs.

*Please tell me all the social networking sites you usually visit?*

One of the sources of contention regarding Free Basics, as mentioned, is that it tracks your data on all websites, especially on its premier web app—Facebook. In addition, another critique holds that Free Basics strategy targets several first-time users in which Facebook became the first experience of the Internet, sometimes even became synonymous with the Internet, and was in all actuality a marketing ploy. The purpose of this question then is to forecast the impact of offering Facebook on Free Basics to poor rural Kenyans.

*In which language do you get most of your information from the media?*

The purpose of analyzing this question is to provide insight on the preferences of poor rural Kenyans. It would answer the question: Does Free Basics offer web apps in a language that poor rural Kenyans already consume, or would many people be excluded or pushed to change their behavior to incorporate the app into their lives?

*Do you currently own a mobile phone?*

One of the requirements for accessing Free Basics is owning a mobile phone. This information is key to arriving at a Free Basics rural reduced penetration rate in Kenya.

*Do you have a SIM card that you insert in a mobile phone handset when you need to use mobile phone services?*

Another requirement for accessing Free Basics is owning a sim card. This information is key to arriving at a Free Basics rural reduced penetration rate in Kenya.

*What do you use your mobile phone for?*

Responses to this question would be used to understand what mobile phone owners use their devices to do. It should answer the question: How many rural poor households access Internet services using their mobile phone?

*Which mobile phone service provider are you currently using?*

One of the requirements for accessing Free Basics is that all customers must be Airtel users. This information is key to arriving at a Free Basics rural reduced penetration rate in Kenya.

*Which mobile service provider would you switch to if your most often used mobile service provider was not available?*

This question provides insights into customer preferences and perceived alternatives in Kenya.

*Record the mobile phone service provider with the most reliable network according to the community questionnaire.*

This question also provides further insights into customer preferences and perceived alternatives in Kenya.

*Which languages do you write in?*

Although the app instructions are available in English and Kiswahili, the app's default language is English. Kiswahili is an alternative language of instruction (the app is available in a Kiswahili interface). Still, most sites are not translated in Kiswahili for users that opt to read content in that language. There are few services in Kiswahili. Most are in English. Therefore, for users to benefit from the full range of web apps on Free Basics, participants must write and read English. This information is key to arriving at a Free Basics rural reduced penetration rate in Kenya.