

## **Off the Grid but in the Know: Advancement through Interactive Radio**

### **Executive Summary**

**Concept:** Many rural communities in Africa still do not have reliable cellular or electrical service, thus members of these communities cannot meaningfully use Information and Communication Technologies (ICTs) to aid advancement. In addition, women in rural communities face gendered barriers to the access and use of ICT-based development initiatives. The AIR (Advancement through Interactive Radio) project seeks to advance women in rural agricultural communities by adding interactivity to community radio. AIR gives community radio listeners, especially women, a voice with which to respond to development programming (such as agricultural extension programs), as well as a mechanism to participate in the creation of programming content. The AIR project is based upon the premise, grounded in development communications theory, that enabling women to publically articulate what they know, and what they wish to know, will advance community development strategies and increase the stature of women in the community. This objective is widely acknowledged as a key component to sustainable development.

**Rationale:** While Sub-Saharan Africa is the fastest-growing mobile market in the world, more than 50 percent of Sub-Saharan Africa does not have cellular phone coverage. Community Radio is still the most accessible and popular ICT in the region. For example, Zambian agricultural communities benefit from community radio networks that air the Radio Farm Forum (RFF), a program (started in the 1960's) that is produced by the National Agricultural Information Services; and the successful "Development Through Radio" programs, where women's listening groups meet to discuss agricultural extension, health information, educational material and poverty reduction strategies that have aired previously. While community radio's popularity and reach have caused it to be named "the Internet of the Poor" and "Africa's Internet," Community radio's inherent unidirectionality limits its potential usefulness to connect essential development information to those who would most benefit from it – the women who are responsible for agricultural production, management and marketing. Radio also needs to make itself relevant to the growing numbers of technologists who focus on ICT for development; else it will be overlooked as a "serious" ICT by those who do not appreciate fully its potential and audience base. Adding incremental interactivity to radio provides a platform for idea exchange, rather than the more common information "push," for the communities that employ it.

#### **The AIR prototype:**

**The Community** – Radio Mang'elele reaches approximately 500,000 people in a 75km radius around the station tower in southeast Kenya. Broadcasting eight hours a day in the local tribal language, Ki-Kamba, Radio Mang'elele is the definitive source of news and information for the Kamba, a rural society currently undergoing major agricultural shifts due to climate change, the associated loss of both of the typical rainy seasons, and unexpected flash floods. Almost all agricultural work in the region is conducted under the purview of a number of *mwethya*, or women's work collectives, who divide agricultural and community improvement by locality and interest. *Mwethya* members take their radios everywhere – it is impossible not to hear Radio Mang'elele when the station is operating. Interviews with *mwethya* members have shown that these women have a strong and nearly universal desire to communicate with the station. They are full of ideas and feedback about the programs that arrive at the station each month on CD; they have criticism regarding agricultural content that seems irrelevant or goes against the common wisdom; they have questions about myriad development initiatives that are aired without the option of face-to-face follow up to clarify the data or position in a local context. However, given their work load and social factors, women

in general are not able to visit the radio station, nor do they have other means to communicate their feedback. AIR is designed to provide women a mechanism to communicate with the station from their work and home locations, and influence programming to make it more relevant to their livelihoods.

Cell phones have been suggested as an alternative to the custom AIR device. We rejected this approach, at least in the near term, for several reasons. Many of communities served by Radio Mang'etele simply do not have cellular service. Further, several women in areas with partial cellular service were adamant that anything resembling a cell phone would likely be taken by their husband and sold. In contrast to the successes of cell-phone-based initiatives such as the GrameenPhone, this observation highlights the non-universal nature of developing communities.

***The Technology*** -- The design requirements for the AIR device prototype were developed based upon information collected from community radio listeners, station managers, station operating personnel, and community radio NGO leadership. We met with mwethya representatives to iterate on design decisions and discuss deployment and evaluation strategies. The prototype consists of 3 parts – the handset, a solar-powered charging station, and the equipment required at the radio station. The handset is designed to enable users to simply push a button and talk into the device, in order to support non- or semi-literate populations. Inside the ruggedized enclosure, the device architecture consists of a low-power ARM processor, and 802.11 and Flash RAM USB devices for networking and storage, respectively. When a woman presses the push-to-talk button and speaks into the device, her voice is filtered (in hardware) and compressed for storage using codec software, and then stored in the Flash RAM. AIR devices in a given area form an ad-hoc mesh network; thus, voices are asynchronously routed through a Delay Tolerant Network (DTN) architecture to the terminus device at the station, where incoming voice messages are made available on the existing station PC for post-production and broadcast use. Once the radio station has received and stored a particular voice message, an acknowledgement packet is routed back to the original transmitting AIR device, so that users have confirmation that the transmission was successful – a requirement added by mwethya members on our last field visit.

***Next Steps*** -- We are preparing to deploy an AIR device to each of the thirty-four mwethya served by Radio Mang'etele. Following deployment, we will study the impact that AIR has on broadcast content and audience response, especially as listeners become more active participants in the broadcast/response cycle. Does better content lead to better practices? Does a two-way communications model increase women's perceived empowerment? While still in the early stages, we have already begun to compile a desired features list from users for the next iteration of the AIR device. A feature receiving significant interest from both mwethya representatives and radio station personnel is the integration of an FM radio receiver with the AIR device. The architecture of the AIR device can easily handle this addition, with a significant negative impact upon power consumption. We have also received requests for the ability to handle multiple destinations, so that voice messages could be routed to additional destinations (police, NGO offices and each other); the ability to support erase/re-record/listening functionalities like tape recorders; and a back-haul solution for longer-distance transmission. We are conducting exploratory conversations with health and microfinance NGOs who are investigating the use of AIR in scenarios where it is as necessary to receive information from the community as it is to deliver information to the community, especially in areas where the infrastructure or culture challenges more sophisticated technologies. We are also monitoring the growing use and convergence of community radio and Internet Radio. While expanding into different development areas is not a primary goal of AIR, we intend to make the source code and hardware design freely available for ICTD purposes.