

ES.259: ICT in Africa
Final Policy Paper

SABA GUL

I. Background

24% of Zambia's economy rests on its agricultural sector, and about 85% of its labor force is employed in the sector. Agriculture in Zambia is dominated by small-scale farmers or peasants, who operate their businesses without access to information, financial services or structured markets. When you bite into a bar of chocolate, there is a reasonable chance that it will not just be the cocoa farmer that was denied a fair price for his produce but that the dairy farmer, who produced the other main ingredient, also received a raw deal. Small farmers across the world are often forced to sell their produce for less than it cost to produce it.

In Zambia, the majority of selling for food crops takes place in local 'farmers' markets' where buyers and sellers get together weekly or daily, depending on the perishability of the crop. This market is primarily structure-less, with no fixed prices or buying rules. Farmers are usually forced to sell their crop immediately after harvest, fetching very low prices for it, hurting family income and leading to seasonal hunger. Lack of economic clout in the market, lack of information about buyers, and the absence of a price floor means that prices are open to negotiation and more often than not, exploitation, by buyers. There is a tangible lack of a forum that brings together buyers and sellers, stores their biographies for reference, documents buying power and availability of product, and lends a structure to pricing policies. Such a forum can transform the ad-hoc buying practices of the market, and boost selling prices for the farmers by reducing exploitation because of ignorance.

2. Suggested Technology and its Uses

My solution is a database called *FarmNet* that will be implemented in a computer (kiosk) at a single farmers' market this summer. Both farmers and sellers input their data into this software, whereby it acts as a searchable database. It can then be used by both farmers and buyers to find quick and accurate matches for their buying and selling needs.

From the sellers' (farmers) side, relevant data would be:

- Name, location and contact information of farmer
- Name of crop
- Quantity of crop available
- Selling period
- Selling price

Buyers would then input data such as:

- Crop they want to buy

- Quantity to buy
- Price they are willing to pay

FarmNet supports querying, and generates web forms with the relevant information. It maintains the data of farmers (sellers) and the buyers in two separate tables, that can be queried and sorted according to the farmer's name, their selling price of any of the other variables. Similarly, the buyers' data is stored such that queries can be run on it according to what price they are willing to pay for it. For example, a farmer looking for a minimum price of 20 Cedis for a ton of yam, could ask for all buyers in his village who are willing to buy yam for 20 Cedis or more. The script will generate a list of such buyers, which can then be used by the farmer to make a decision about who to sell his crop to. All buyers and sellers will also input their contact information so that deals can be made over the phone, or in person (if both parties are in the same village).

By using this software, farmers can reap multiple benefits. They can enjoy a wider target market that has access to their biographies, and can contact them to arrange a crop deal. In addition, they themselves can now make more informed selling choices. Instead of being forced to sell at low prices at the local market, they can now name a reasonable price and expect to meet it. Since prices are quoted in the database, there is no danger of price exploitation through negotiation. Both buyers and sellers can find complementary parties that match their needs.

3. Implementation Plan

The implementation phase of this project involves two distinct parts: the in-house development of *FarmNet* and the on-the-field deployment of this technology.

The deployment part has multiple phases:

- **Setting up of kiosk**

This can be a simple one-room unit, with a computer that will have *FarmNet* installed on it, a printer, two or three desks for the managers, and a space for pamphlets. The location should be central to the farmers' market since farmers will be visiting often to update their data, and request information about buyers.

- **Selection of team to run kiosk**

This is the team that will actually use *FarmNet*, and input data given to them by the farmers (sellers) and the buyers. It will consist of a handful of other computer-literate villagers who will initially serve as the managing team for the kiosk. They will undergo a training session to get familiar with *FarmNet*, learn how to gather data from farmers, and answer information queries for both buyers and sellers. Thereafter, they will run the kiosk and be responsible for any further training of new managers.

- **Introducing farmers to the technology**

On setting up the kiosk and selecting a managing team, the village farmers will be introduced to *FarmNet*. Even though they will not directly be using it since that will be the managers' task, familiarity with the technology will ensure that they trust what it is used for, feel comfortable giving their data to the managers, and are in a position to make queries about the buyers in order to make informed decisions about the sale of their crop.

It is here that the farmers will have a chance to ask any questions, voice concerns, and give suggestions.

- **Collecting data for *FarmNet***

The kiosk managers will update data on a pre-selected day of the week. On this day, farmers will visit the kiosk and relay the latest information about their crop by filling out a paper form, which will save time that might otherwise be spent waiting in queues for a manager. If a farmer's data becomes outdated before that day, they have the discretion to visit the kiosk and fill out the form. The kiosk managers enter data from the forms into the database on a daily basis.

Data will similarly be collected from buyers. Data queries can be made by buyers or sellers with specific needs whereby they visit the kiosk and simply pose the query to a kiosk manager. The manager will run the query, and generate a printable list for the buyer or seller.

- **Monitoring usage/Review of *FarmNet***

Once *FarmNet* is put to use, kiosk managers will also start collecting data for the following variables, which will help evaluate the success of *FarmNet*:

- 1) Number of visits by buyers and sellers over the course of a week
- 2) Number of queries made by buyers and sellers over a week
- 3) Number of deals made by matches through *FarmNet*

This data will be kept on file and evaluated at the project's completion.

After *FarmNet* has been in use for a while, feedback from the farmers, as well as the buyers, will be incorporated into the final implementation of the technology.

3.1 Potential Policy Issues

The adoption of a technology by the farmers will be highly dependent on a support system, such as extension and training services, credit availability, input supplies etc. Some of these are potential policy issues and are briefly outlined below:

- Technology diffusion i.e., the transfer of technology to make it widely accessible will be the responsibility of extension services. The full benefits of agricultural research are not likely to be realized until the research

results are appropriately communicated, especially to farmers with limited holdings. Some research results have been so successful that their widespread adoption occurred without concerted extension efforts. More frequently, however, there is a large gap between the productivity that modern research makes possible and the actual productivity realized by the vast majority of small farmers. The integration and widespread adoption of research results can be supported by extension services, by researchers with farm-level experiments, by communications people with mass media, by private suppliers, or, ideally, some combination of these.

- Zambia has a high level of VAT on imported computer equipment and technology, which could be a potential issue.
- Installation of lease lines for internet access is very low in Zambia. In the case that this technology needs online support or supplementation, this could be a hinderance.
- The local agricultural offices are where there are technical assistants in charge of villages in the area. Many of these technical assistants will not be well trained, and will have to rely on public transport to visit the farms. Availability of input supply, government silos, and marketing facilities provided by the government do not feature very positively in Zambia and could pose a bottleneck.
- Availability of banks or credit agencies in the area will need to be investigated. New technology can be expensive if one also takes into account the prices of fertilizers, high-yielding seeds, implements, and so on. Farmers need to raise loans to buy all these inputs. Development agencies in the district should find a way to grant loans to farmers.
- Storage will pose a considerable challenge for most. Traditional methods for storage limit the length of time that the crops can be stored. There is always the pressure to sell off whatever is stored before it goes bad. Under such circumstances, farmers accept low prices for their produce. State-owned enterprise, or government agencies need to be set up to buy and store the farmers' produce.

4. General Setbacks

We also anticipate some non-policy hurdles in implementing this technology in Zambia, the more salient ones, are outlined below:

1. *Customizing FarmNet to meet farmers' needs*

Technologies that are developed in isolation and without regard for the needs of the user are rarely successful in the deployment stage. The users of *FarmNet* will be villagers with minimal computer training. It is important to note that the main function of *FarmNet* will be to connect buyers and sellers, to give them easily accessible information about the other party, and to improve pricing policies. Special attention needs to be paid to pricing information and dissemination of the contact information of the two parties.

2. *Overcoming farmers' resistance to technology*

The implementation of this technology requires overcoming the resistance the farmers might show to using technology and to changing the selling practice that has been rooted in the farming community for a long time. The first change is the hardest, but it also opens up the avenue for further, even more valuable changes.

3. *Setting up kiosk*

There might be unprecedented hurdles in this stage, such as electricity cuts or issues with where to set up the kiosk.

4. *Updating the data for FarmNet*

The success of *FarmNet* rests partly on how reliable the data is. For this reason, it should be updated as often as possible. The responsibility for this will be the kiosk managers'. In the 'training program' outlined above, the managers must be made aware of the importance of regular updating. The farmers must be advised of the fact that they need to make regular visits to the kiosk to ask the managers to update their information. If this does not happen, buyers will easily get disillusioned and learn to distrust farmers whose data is often out-of-date, and will instead buy from farmers whose data is always up-to-date.

5. Conclusion

Implementing this technology in Zambia means infiltrating the existing fabric of the agricultural sector. The government's policies on importing technology, dissemination of technology, training of technical labor force, marketing the technology, transport and storage facilities to supplement the technology, and providing credit services for the users of the technology will all need to be looked into.

MIT OpenCourseWare
<http://ocw.mit.edu>

ES.259 Information and Communication Technology in Africa
Spring 2006

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.