Demonstrating the Value of Herbicides for Smallholder African Farmers
Summary of Year One Project Activities

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Summary

In October 2008, 25 herbicide demonstration plots were established both in Kenya and Malawi through a network of agrodealers supported by CNFA. CNFA's affiliates in Malawi (RUMARK) and Kenya (AGMARK) arranged for meetings with input suppliers, identified agrodealers for participating in the demo plots and organized field days. This work was considered part of CNFA's overall demand creation activity in which agrodealers were linked to supply companies, who in turn provided the technical support in addition to the improved agricultural inputs required by the farming communities.

Funds for the project were collected by the CropLife Foundation from four multinational herbicide manufacturing Companies: Dow Agrosciences, Bayer Agroscience, Monsanto, and FMC. These funds were used to hire a Principal Investigator who oversaw the plot work and conducted field days for farmer visits. Herbicide products for the demo plots were selected by the herbicide companies. Herbicides and application equipment were donated by the herbicide companies. Fertilizers and seeds were donated by several Companies including Pioneer and Monsanto and by ICRISAT. Guidance on safety precautions, applicator training and product stewardship was provided by CropLife Malawi and CropLife Kenya. USAID funds administered by CNFA in its Farmer to Farmer program were used to support a visit to the plots by a Rutgers University weed scientist who assessed the performance of the First Year’s activities.

Although some data on herbicide effectiveness were generated, the purpose of the demonstration plots was not to generate data for a scientific publication. After all, numerous scientific articles have been published over the years which clearly document the potential advantages of smallholder use of herbicides: better weed control, less expense, less handweeding, and higher yields. Rather the purpose of the demonstration plots was to create awareness and demand for herbicides among smallholder farmers. The demonstration sites were visited by thousands of farmers who saw herbicide-treated plots free of weed infestations without the need of hundreds of hours of handweeding. Farmers formed their own opinions particularly that the labor saved from weeding could be productively used for other farming and family activities. As a result of the first year demonstration, there is anecdotal evidence that hundreds of farmers are interested in herbicide purchases for the coming year.

Another purpose of the project was to link together the suppliers of herbicides with an effective method of distribution of their products to smallholder farmers. The project linked several multinational herbicide manufacturers and their African distribution companies to a network of agrodealers who sell inputs to millions of smallholder farmers. No single Company’s products were the focus of the project. All participating Company’s were given access to setting up demonstration plots. Ultimately, these Companies will compete for shares of the African herbicide market. Currently, due to the miniscule size of the smallholder herbicide market, most Companies have limited sales and technical representatives in Africa. As a result of this cooperative project, all participating Companies have benefitted through access to a large number of farmers and the agrodealers that serve them. The Project generated articles in the local press and videos produced by local companies. The Ministries of Agriculture in Malawi and Kenya were also informed about the project’s activities.
Malawi

Thirteen agrodealers were engaged in the herbicide demonstrations located within a 100 km radius from Lilongwe. (Figure 1) Each of 12 agrodealers engaged two farmers within his/her territory for the demonstration sites. The 13th agrodealer engaged one farmer giving a total of 25 demonstration sites in Malawi. Two crops were selected for the demonstrations: maize and groundnuts.

A total of twelve demo plots were set up per site to compare a number of factors, namely: (a) herbicide vs no herbicide; (b) farmer saved seed vs improved (hybrid) seed; and (c) sole-cropping vs intercropping. (Figure 2) The plots were prepared by the farmers with assistance of the agrodealers. Herbicides were applied by applicators and in some cases by agrodealers who were trained as applicators. Farmers applied fertilizer under the supervision of the agrodealers.

Monsanto and Farmers Organization (FO) supplied herbicides for the demos, Agricultural Trading Company (ATC) supplied spraying equipment while Seed-Co and Monsanto supplied maize seeds. ICRISAT supplied groundnut seeds. CropLife Malawi supplied protective clothing. Fertilizer was supplied by Omnia Fertilizers.

Chemical and Marketing LTD (C&M) conducted two application training sessions for agrodealers and other applicators. The herbicides supplied included Harness (Acetochlor) used in the groundnut plots, Bullet (Alachlor + Atrazine) used in the maize plots, and Roundup (glyphosate) used as a burndown treatment before planting. Most of the sprayers supplied were high volume knapsack sprayers and a few Ultra-low-volume sprayers. On one site, maize was attacked by leaf blight disease and on another site, maize was attacked by maize stalk borer. C & M recommended the use of Dithane for disease control and cypermethrin for the stalk borer. However, no fungicides or insecticides were applied.

Figures 3-6 are photos of the groundnut and maize plots in Malawi.

A total of 38 field days were organized which attracted over 3000 farmers (in a male:female ratio of 2:1). Before a field day was conducted, messages were sent to the key stakeholders such as the Ministry of Agriculture, Traditional Leaders and Input Supply Companies informing them about the particular day a field day would be conducted, the place, time and the objectives of the field day. The Ministry of Agriculture through its extension workers and the Traditional Leaders in the areas helped to inform farmers about the event. Once confirmations were made, supply companies and other key stakeholders involved were invited to the field day. A typical field day had an average of 150 people in attendance.

During the field days which were normally chaired by the extension workers, a member of staff from CNFA or the PI or the project Coordinator would explain the purpose and objectives of the project and then led by the farmer (owner of the field) would tour the field, farmers would observe the field and then ask questions. The questions would be addressed by both the supply companies as well as CNFA staff. Farmers were also given the chance to share their experiences and hence make comparisons with the new technology.

Figures 7-9 are photos of the field days in Malawi.
In June 2009, Albert Ayeni from Rutgers University assessed the herbicide demo plots in Malawi as part of USAID’s Farmer to Farmer program. He met with the principal investigator, the project coordinator, agrodealers, input suppliers, Extension officers, and farmers and visited three of the demonstration sites (Figures 10-11). Dr Ayeni reported that enthusiasm for herbicide use was strong among the farmers who participated in the project and who showed interest in applying the herbicides themselves to their fields. One agrodealer (Malimba Farmers Cooperative Society in the Salima District) reported that members of the 380-member society had started registering their names for purchase of herbicides for the coming year (Figure 12). More than 100 farmers in the Dowa and Mchinji districts were reported to be interested in herbicide use as a result of viewing the demo plots. Dr Ayeni reported that farmer interest was strong due to large amount of time saved for other farming and socio-economic needs with the use of herbicides instead of handweeding. Dr Ayeni reported that the herbicides had proven their effectiveness in keeping fields free of weeds. The herbicide treated plots and the hand-weeded plots were completely weed free (Figure 13).

The following is a list of Project personnel and Company representatives (Malawi):

Monsanto- Sam Munthali/Jacqueline Juma/Paul Chimimba
C & M- Mr Newa
FO- Amos Dzinza/Bob Renshaw
ICRISAT-Mr Madzonga/Moses Siambi
ATC-Adams Tong’o
Seed-Co-Dellings Phiri
CropLife Malawi- George Magai
Omnia Fertilizers---Mr. Mackenzie

The principal investigator---Justice Chimgonda (AGMARK)
Coordinator of demo plots---Phyness Thembulembu (CNFA)

Kenya

The herbicide demonstration plots in Kenya were in the Embu region (Figure 14) where seven agrodealers were engaged in setting up a total of 19 demos. Each demo had nine plots (Figure 15). Two training programs were organized for agrodealers and herbicide applicators (Figure 16). Maize and beans were the crops selected for the demos(Figures 17-18). The supply companies involved were Lachlan (Dow Agrosciences), Farmchem (Pioneer), Monsanto and Bayer. Seeds were contributed by Farmchem in the Farmchem demo plots while Monsanto contributed seeds for the Bayer, Lachlan and Monsanto demo sites. Protective clothing was contributed by Bayer. Fertilizer and sprayers were contributed by CNFA.

The herbicides used in the demo plots were Mamba (glyphosate), Roundup(glyphosate), Guardian Max (acetochlor), Basta (glufosinate), Farmuron (linuron), Dicopur (2,4-D), and Limazine (alachlor + atrazine).

In Kenya the season was dogged by long periods of dry weather from December 2008 to February 2009 and out of the nineteen plots, maize was harvested from only seven demonstration plots the rest having succumbed to dry weather. Mean production data from
the harvested maize plots indicate that plots with herbicides and hybrid seeds produced double the yields in comparison with farmer practice plots (farmer saved seeds and handweeding). The plots with farmer saved seeds and herbicides yielded 26% more maize than the handweeded farmer saved seed plots. The costs of herbicide use (including application costs) were 50% lower than the cost of two handweedings in the maize plots. The handweeded plots required 160 hours of labor per acre while the herbicide application required only 8 hours per acre (Figures 19-20).

671 farmers participated in three field days (Figures 21-24).

The following is a list of Project personnel and Company representatives (Kenya):
Monsanto: Kinyua Mbijjewe, Peter Kiburi, Abraham Mbugi
Bayer: Mr Iracha, Gift Baya, Simon Ngugi
Lachlan: Mr Macharia, Joseph Kinyua
Farmchem/Pioneer: Mr Muli, Peter Ngugi

Ministry of Agriculture: Mr Kaburu

Principal Investigator: Justice Chimgonda (AGMARK)
Coordinators of Demonstration plots: Esborne Baraza and Rose Wanyiri (AGMARK)

Lessons Learned

Following the assessment by Albert Ayeni and comments from Project participants, the following recommendations are being made for Year 2 demos based on the experiences of Year 1.

1. One Principal Investigator for multiple countries is stretched too thin. The recommendation is to have one in-country weed scientist for each country.
2. The assessment by a US weed scientist could have additional benefit throughout the project and not just at the end of the year. The recommendation is to have one US scientist per country assessing the project throughout the year.
3. Twelve plots per demonstration were an excessive number. The recommendation is to focus on paired comparisons of herbicides and no-herbicide plots.
4. One training session for herbicide applicators was not sufficient. The recommendation is for the development of a standard applicator training course.
5. In order to understand the performance of the herbicides, it is important to have information on the weed species infesting the plots. The recommendation is the collection of information documenting the weed species prevalent in the demo plots.
6. Farmers were very concerned that the demos be continued so that they could continue learning about herbicides. The recommendation is that the CLF/CNFA team seeks funding for a multi-year expansion and continuation of the project.
Figure 1: Location of Demo Plots: Malawi

Figure 2: Demonstration Plot layout in Malawi (Lilongwe area)
Figure 3: This Groundnut plot in Mvera is herbicide applied.

Figure 4: This is a herbicide applied plot in Nathenje containing groundnuts.
Figure 5: Hybrid Maize seed Plot. This plot is to be hand weeded.

Figure 6: Hybrid maize with herbicides in Mitundu. No weeds are visible in this field.
Figure 7: With women farmers seated on the ground, standing is Mr. Munthali from Monsanto and the two ladies sitting on chairs are the agro-dealers that service this area in Salima, Maganga area.

Figure 8: Farmers inspect a herbicide applied plot in Mvera. This field day was very well attended. It had an attendance of 183 farmers who all expressed willingness to start farming using herbicides.
Figure 9: A group of farmers inspecting a site at Mvera.

Figure 10: Ayeni at Demonstration Plot with farmers in Boma
Figure 11: Dr. Ayeni at Agrodealer at Malobvu, Dowa District.

Figure 12: Malimba Farmers Cooperative Society, Salima
Figure 13: The above site (Nathenje) shows a herbicide applied plot (left) and another plot hand weeded (right). The dead weed has dried up as seen.

Figure 14: Location of demo plots: Kenya
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**Figure 15:** Demonstration Plot Layout in Kenya

![Demonstration Plot](image)

**Figure 16:** A sales Representative of Farmchem Ltd demonstrates to a group of farmers how to use a pressurized knapsack sprayer in Embu District.
Figure 17: Herbicide treated bean plot

Figure 18: Africa Project Investigator, Mr. Justice Chimgonda, checks maize grown with herbicide protection
Figure 19: A plot ready for handweeding

Figure 20: Post-emergence herbicide spray application
Figure 21: Bayer EA Agent takes farmers through the benefits of using herbicides to combat weeds

Figure 22: Farmers listen intently at an herbicide field day
Figure 23: A Kenya Broadcasting Corporation news crew interviews Farmchem rep on their maize variety use.

Figure 24: Herbicide demonstration field day presentation for farmers.