

Partnership in research and development of diatomaceous earths technology for small-scale on-farm grain protection

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Introduction to the purpose of partnership

There is an increasing awareness that development impact and lesson learning is best realised through partnership. This takes the form of mainlining farmers in all research processes and the earliest involvement of other stakeholders from the state, civil society and private sector.

Rural householders in sub-Saharan Africa have prioritised the need for new options to combat storage pest damage, which would improve their household food-security and income-generating opportunities and ultimately reduce the vulnerability of their livelihoods.



Farmers evaluating DE-treated grain

Insect damaged maize

Research has identified diatomaceous earths (DEs) as one such option. DEs are soft whitish powders formed from the fossils of phytoplanktons (diatoms). When insects come into contact with DEs, the waxy layer is absorbed from their exoskeleton resulting in water loss, dehydration and death. DEs are applied by admixing directly with grain and have extremely low mammalian toxicity. DEs could provide a safe and environmentally friendly alternative to the currently widely used organophosphorous-based grain protectants.

From 1998-2000 on-farm trials were set up in three agro-ecological regions of Zimbabwe (Buhera, Binga districts and Harare) and more recently in 2002 in Tanzania (Dodoma, Shinyanga and Manyara regions) to study the comparative efficacy of two DEs (Protect-It and Dryacide) versus synthetic and traditional grain protectants, in protecting a number of commodities (maize, sorghum, cowpeas and beans) under tropical small-scale farming conditions.

Partners and their roles



Farmers plastering the mini granaries

To optimise the research process and subsequent impact, the work is progressively engaging a diversity of partners:

- Rural farming communities (groups and individual farmers from two villages in Zimbabwe and five in Tanzania) - are engaged throughout the research process, from the needs assessment phase to hosting and evaluating the grain storage activities.



Inspecting stored maize grain

- Ministry of Agriculture staff (Plant Health Services, Tanzania; Institute of Agricultural Engineering, Zimbabwe) - key in facilitating farmers' needs assessments, linking with DE researchers, developing and implementing the proposal, networking with agencies, providing opportunities for policy impact.
- Village and district level extension staff - arranging the farmer linkages, helping implement the project trials, overseeing the ongoing involvement of local partners (e.g. stockists, government officers across sectors, NGO and church agencies).
- Researchers (UZ, NRI) - identified funding sources, developing and implementing the proposal, providing technical support.

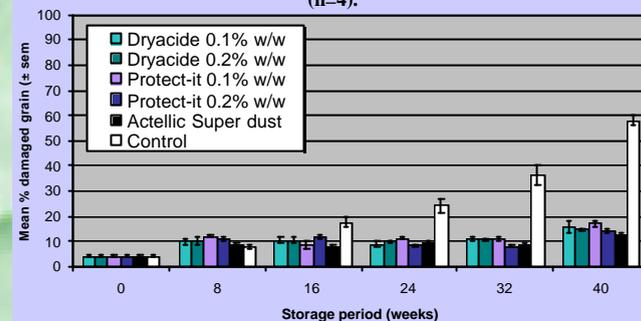
- NGOs and church agencies - development of proposal, advising in the project's implementation, facilitating wider access to and promotion and adaptation of research findings.
- Agrochemical stockists - advising in the project's implementation, facilitating wider access to and promotion and adaptation of research findings.
- Agrochemical companies (EcoMark Ltd, in Zimbabwe; Twiga Chemical Industries Ltd in Tanzania and Balton Tanzania Ltd) - potential contributors to the registration application process, marketing and distribution of DE products.

- Registration authorities (Plant Protection Research Institute, Tropical Pesticides Research Institute) - advising on the registration procedure.
- Funding agency (Crop Post Harvest Programme) - funding of proposal development and of proposal, project progress monitoring.

Project findings

The partners found that DEs effectively protected maize, sorghum, beans and cowpeas against insect storage pest damage for more than 8 months under diverse small-scale farming conditions (see Fig. 1). Moreover DEs scored as highly as synthetic protectants and much higher than traditional protectants (e.g. ash, plant materials etc.) using sets of criteria identified by groups of farmers. The findings with regard to local DE deposits are still at an early stage, with samples from several countries in the region being evaluated and interest expressed by a range of partners and other stakeholders.

Figure 1. Insect damage to maize grain treated with DEs or Actellic Super dust during the 1998/99 storage season in Buhera district, Zimbabwe (n=4).



Partnership experiences and lessons learnt

An appreciation of the political economy and institutional context within which partner organisations operate is a pre-requisite to the project establishing successful partnerships.

A pluralistic and inclusive approach enhances project design, planning and implementation, and early involvement of diverse stakeholders further optimises this.

Partner participation:

- broadened project ownership and improved project design and implementation
- increased the capacity of individuals and individual agencies
- extended mutual understanding of the differences and competencies of partners
- has led to a more critical appreciation of individual and household diversity within the rural communities
- is open to multiple interpretations, and agreeing on a specific definition is essential
- revealed that stakeholders have different interests and agendas which are not always compatible



Tanzanian stakeholders discussing linkages

Developing and maintaining project partnership:

- incur significant front-end transactional costs and resources associated with capacity building
- require timely and appropriate communications (including addressing cultural, technical and geographical skews between partners)
- require individual partner agencies to have sufficient on-going commitment and capacity to fulfil their respective role
- require consensus-building to optimise the development and maintenance of project processes
- benefit from shared objectives and participatory monitoring & evaluation.

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