



ACP SCIENCE & TECHNOLOGY PROGRAMME

Optimisation of pesticidal-plants: technology innovation, outreach & networks (OPTIONS)

The use of pesticidal plants for food security through pest control technologies which meet local needs and resources will be promoted, facilitated and optimised. The project partners and community-based organisations in Kenya such as the Communities Initiatives for Rural Development (CIFORD) will be enabled to support the technology innovations through propagation, training and revising policies to facilitate outreach. The project will optimise use and propagation of pesticidal plants, raise awareness about pesticidal plant use, create an environment for cross-training and skill transfer, and develop policies that enable commercialisation, marketing and promotion of safe and effective pesticidal plants.

Grant
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Co-ordinator
Natural Resources Institute (NRI) - University of Greenwich, UK

Partners
Royal Botanic Gardens, UK
University of Zimbabwe, Zimbabwe
Mzuzu University, Malawi
Sokoine University of Agriculture, Tanzania
World Agroforestry Centre (ICRAF), Kenya
Sustainable Global Gardens, UK
National Museums of Kenya, Kenya

Project duration
36 months
1/1/2014 – 31/12/2016

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Challenge

Most African farmers depend upon their agricultural produce for their livelihoods, so food security along with factors that limit production of sufficient food for their families are their most important considerations. However, adequate yields can be secured through improved crop management and food storage and, where surpluses can be produced, these can generate additional income and a potential route to improve livelihoods. Food production and storage are limited by numerous constraints, but insect pests are arguably the most important since they are a constraint over which even the poorest farmers can have some direct control with low-cost interventions. If left unmanaged, insects will invariably cause severe damage.

Commercial insecticides are usually effective, but they have limited distribution in rural areas, are often adulterated (diluted to ineffective concentrations by unscrupulous traders) or applied at inappropriate application rates due to illiteracy, poor labelling or use of old, expired products. Moreover, they are increasingly ineffective owing to the wide occurrence and rapid evolution of pesticide resistance. Health and safety is also a serious issue since insecticides are typically applied without the use of protective clothing. There is no mechanism to ensure food safety for consumers, and little concern for the chronic effects of exposure. The environmental impact for wildlife, crop pollinators and natural enemies is also severe while the cost of correctly applied synthetics can be prohibitive.

Pesticidal plants or botanical insecticides have been promoted as an effective alternative to synthetic chemicals for the control of arthropod pests and are used widely across Africa. Their promotion, particularly with

optimised application that makes them safer and more reliable, improves access to plant materials through propagation and cultivation, and improves delivery services, would have considerable impact on pest management and ultimately food security.

Focus

The promotion and facilitation of the uptake of innovative pest control technologies based on pesticidal plants can be effectively deployed within the context of local needs and resources. Formulating and revising agricultural input technology policies that enable commercialisation of the innovations the project will develop will enable an effective outreach of different approaches to the use of plant materials in pest management.

Rationale

The OPTIONS project is developing an incentive-driven nursery propagation strategy for promoting indigenous pesticidal tree species to farmers, developing new pest control technology innovations for safer, effective and sustainable use of pesticidal plants in food production, and fully exploiting plants for use in the control of stored product pests, field pests and livestock ectoparasites (parasites, such as a flea or fly, that live in or on the skin

of another organism). The propagation of Pyrethrum will be developed in the highlands of Malawi and Zimbabwe based



Propagation of pesticidal plants by nursery growers is the most effective way to increase availability of plant material for pest control without putting pressure on wild habitats (Mzuzu, Malawi, July 2013).



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Farmer trials of pesticidal plants provide an opportunity to train farmers in their preparation and demonstrate their efficacy (Jenda, Malawi, March 2012).



The root bark of *Securidaca longepedunculata* (violet tree) is highly effective for stored product insect control but its use is not sustainable as it requires uprooting. Propagation of the tree will reduce harvesting pressure on natural woodlands (Nchenachena, Malawi, 2012).

ACP regions and countries involved

Eastern Africa – Kenya
Southern Africa – Malawi, Tanzania, Zimbabwe

Programme theme(s)

Agriculture and food security

Sector

Agricultural development
Food crop production
Agricultural education / training
Plant and post-harvest protection and pest control

Keywords

pesticidal plants
Pyrethrum
nursery propagation

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on a successful model in Tanzania in partnership with McLaughlin Gormley King (MGK), a major commercial importer of Pyrethrum products to the USA. Pesticidal plants will also provide marketable products for nursery producers who can widely distribute the most effective and useful species after appropriate training. The commercial and financial incentives will ensure the sustainability of small businesses and farmer co-operatives will provide both an additional income stream to poor farming communities and a major uptake pathway for business-driven promotion of this proven and effective pest management technology. The strategy will guide sustainable agricultural development through environmentally benign and safe pest control. It will use reliable and locally available plant species that can be promoted and distributed via trained commercial nursery growers directly to farmers and reduce poverty without the reliance on synthetic pesticides.

Policies will be developed related to the regulation of indigenous knowledge, bio-diversity conservation, health and safety directives and commercialisation of pesticidal plants and natural products. Basic research and technology carried out across Africa will be strengthened in the field of pesticidal plants by ensuring that promotion of pesticidal plant technologies is properly focussed on current constraints and strongly linked to the needs of end users, civil society and enterprises. Institutional and policy levels across countries will be strengthened by encouraging debate and consensus over best practice guidelines, and the need for formal regulatory frameworks regarding the protection and utilisation of indigenous knowledge, bio-diversity conservation, health and safety and the commercialisation of pesticidal plants and overall environmental protection.

Method

- Consolidation of the existing regional partnership of farmers, technologists, scientists, business partners and policy makers through meetings and workshops addressing specific issues such as regulation of pesticides, marketing support, distribution and propagation to exploit plant-based pest control technologies that have market potential and broad relevance for food security.
- Networking activities, outreach, training and use of public media for raising awareness about pesticidal plant use, particularly the livelihood benefits to poor farmers and potential for commercial exploitation.
- Enabling and facilitating cross-training and skill-transfer through practical demonstration workshops on propagation and optimised application of plant-based pesticides and building capacity among target farmers, NGOs in Kenya including CIFORD, and also extension officers of the national agricultural programmes in Kenya, Tanzania and Malawi and collaborating scientists at partners universities including Sokoine, Zimbabwe and Mzuzu universities.
- Development of policy guidelines that simplify commercialisation of plant-based pesticides based on effective policies that are currently in operation in China and India, and trial of the innovative technologies to ensure validity before marketing and promoting plant-based pesticides.

Results

- Science and technology policies developed at national level in Kenya and Malawi for commercialisation and national-scale promotion of pesticidal plants, enabling the exploitation of pesticidal plants through commercialised propagation using farmer incentives.
- New methods for application of plant-based pest control technologies evaluated by farmers to ensure their subsequent promotion and validated with effective and robust evidence of efficacy.
- Pyrethrum cultivation introduced to new areas with guaranteed markets for successful farmers and innovative application protocols for livestock and food grain storage.
- Network of stakeholders from government representatives, policy makers, technical and research persons and farmers consolidated with training provided in propagation and application of pesticidal plants.
- Training information sheets for farmers, extension services and organic grower NGOs.



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