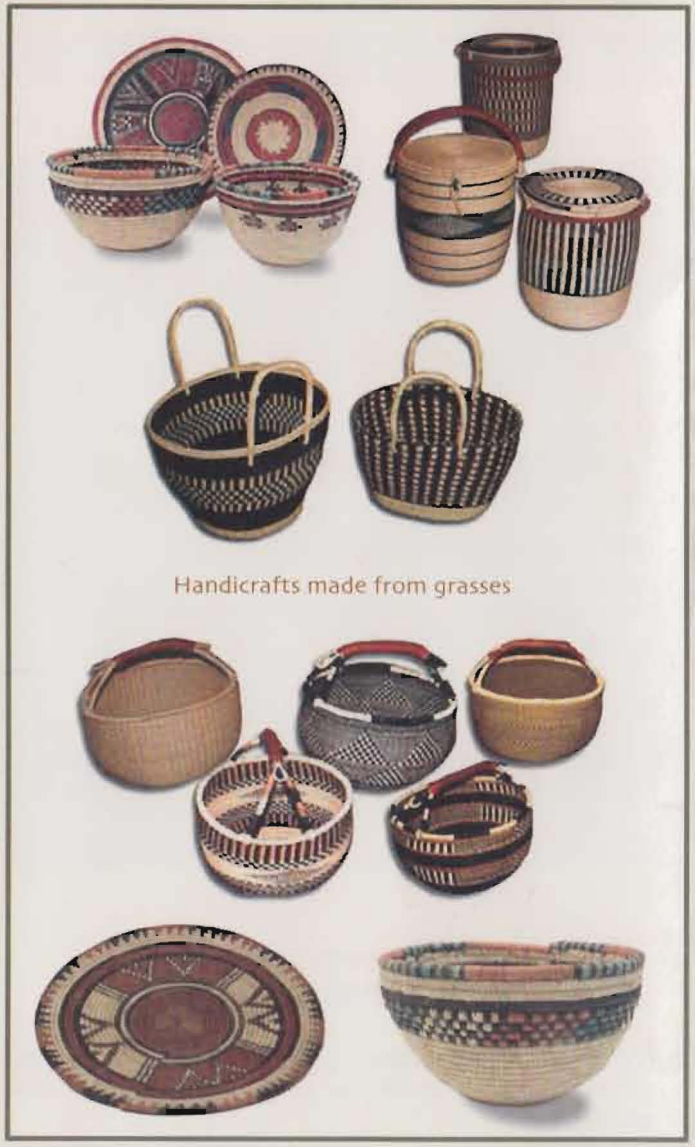
Plants and insects for self-regulating pest management and sustainable agriculture

Throughout the African landscape, from the highlands to the valleys, grasses are important food and energy providers to billions of people and livestock. Equally valuable are the arthropods which live in these grasses and which comprise approximately 70% of the world's biodiversity. Grasses and insects coexist in nature, as beneficial species (crops and enemies of pests) and as noxious species (weeds and crop pests). At present, both are under threat due to increasing human pressure to utilise new lands for cultivation. A regional project 'Conservation of Gramineae and Associated Arthropods for Sustainable Agricultural Development in Africa' is being implemented in Ethiopia, Kenya and Mali to avert this dilemma, improve the environment and increase farmers' incomes by utilising the positive value of grasses and insect diversity around their farms. This project is coordinated by the International Centre of Insect Physiology and Ecology (ICIPE) with co-financing from the Global Environment Facility (GEF) and implementation support from the United Nations Environment Programme (UNEP).

The project partners strongly believe that there is much beyond the grasses and their associated arthropods to unravel facts that may ultimately provide alternative ways to utilise grasses to drive off insect pests and attract farmers' friends—the beneficial species of parasitoids and predators—for self-sustainable agriculture much needed by the smallscale and resource-poor farmers in Africa. The primary objective of this project is to identify and implement conservation and management measures necessary to prevent loss of biodiversity of certain grasses and their associated insects; and to conserve these valuable resources in and around agroecosystems in Ethiopia, Kenya and Mali for self-regulatory pest management and sustainable agriculture.



Handicrafts made from grasses

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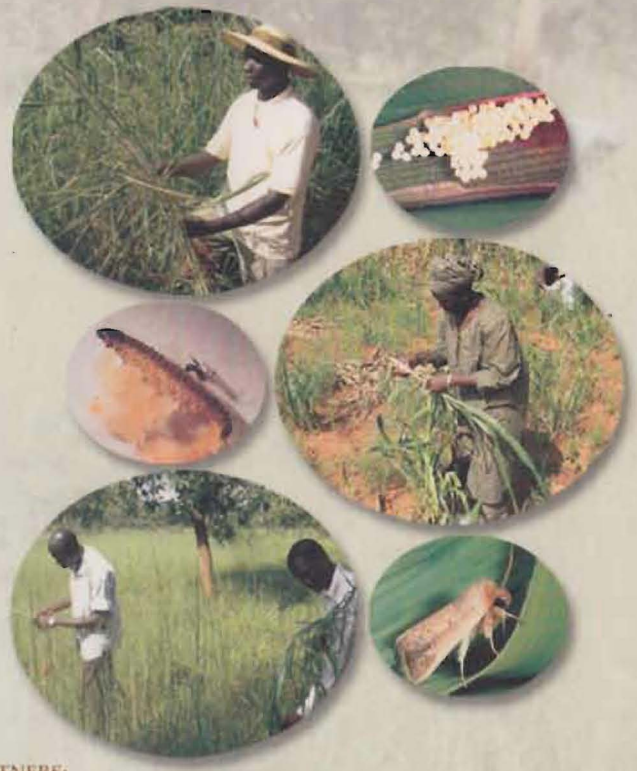
Beyond the Grasses...

Conservation of Gramineae and their associated arthropods for sustainable agricultural development in Africa



PARTNERS:
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Grasses can enrich farmers' livelihoods and diversity of farmers' friends

What is a grass?

A grass is a short to tall flowering plant with rounded stems and parallel veins that run lengthwise down the leaf. Grasses can be annual (dying after one year), biennial (lasting two years) or perennial (lasting several years) plants. Grasses belong to the Gramineae family, a group of plants that build the foundation of life, being at the base of the food chain feeding all animals and ourselves.

How can grasses increase farmers' livelihoods?

Grasses can enrich the livelihoods and diversity of beneficial species for farmers and the community, since they serve as:

- the main source of forage for domestic livestock and wild animals which provide a tourist attraction;
- nesting sites for beneficial species of insects and other predatory arthropods that help farmers combat crop pests;
- food and shelter for bird species that prey on larvae of pests attacking cereal crops, vegetables and orchard plants;
- nesting sites for crop pollinators (e.g. bees) and sources of pollen for the diet of myriads of insect parasitoids and predators (spiders, mites, etc.) known as "farmers' friends";
- sources of pollen for honey farming;
- soil-binders, through their fibrous root systems that hold soil particles and help prevent erosion;
- soil fertility improvers, high in organic matter.

In addition, some grasses attract ('pull') natural enemies while others repel ('push') insect pests when intercropped with cereals resulting in low pest damage and increase in crop yields.

Africa's rich grass diversity

- Africa has a unique, rich and diverse grass flora, with over 2400 species in 331 genera already known to occur.
- Specimens of grasses are deposited at herbaria in the National Museums of Kenya (NMK), the Smithsonian Institution (USA), Kew Gardens (UK), to name a few.
- Africa's grass diversity is diminishing and many species are lost due to soil erosion, fire, overgrazing, cultivation and overuse of land for human activities.
- Other factors that threaten grass diversity are invasive species of grasses displacing native ones, excessive use of grasses for other human needs (e.g. thatching, bedding), and harsh climate conditions.

How can we protect our common grasses?

- Create public awareness on the importance and value of grass diversity at all levels in schools and communities.
- Promote individual and community-based conservation on temporary, permanently cultivated and uncultivated land patches.
- Provide information on beneficial grass species and how they can be integrated into smallholder cropping systems.
- Demonstrate to farmers and the community small-scale industries such as handicrafts makers that utilising grasses can improve livelihoods.

How can grasses increase livelihoods at household level?

Grasses have multiple uses and can increase the family's and women's income in a number of ways, such as providing construction materials for building houses, raw material for cottage industries (e.g. furniture, baskets, mats, brooms, musical instruments, hats, belts, fishing rods), as lawns for homesteads and sports fields, as sources of human and livestock medicine, as grass grains for human food and poultry feed, as ornamental products, and for their role in cultural and spiritual functions.

What is this Project doing?

- documenting the diversity of grasses and associated insects in selected agroecosystems and socio-economic surroundings and their adjacent natural habitats in Ethiopia, Kenya and Mali;
- developing an understanding of the relationships between certain grasses and insects;
- developing and promoting the practical application of this knowledge in self-regulatory pest management and sustainable agriculture, by identifying and implementing conservation and management measures necessary to prevent loss of biodiversity of certain grasses and their associated insects;
- building the capacity of scientists, technicians and extension workers at national level in grass and insect collection, handling and rearing, and identification;
- collecting and preserving germplasm;
- compiling a directory of workers on grasses and their associated arthropods and publishing and disseminating information.