CONSERVATION AND MANAGEMENT OF AGRICULTURAL BIODIVERSITY: *increasing the role of ecosystem services*

BIODIVERSITY IS AN IMPORTANT CONTRIBUTOR TO AGRO-ECOSYSTEM FUNCTIONS. CROP, SOIL AND CROP-ASSOCIATED BIODIVERSITY BENEFITS ECOSYSTEMS BY IMPROVING SOIL ORGANIC MATTER, SOIL STRUCTURE, NUTRIENT AND WATER CYCLING, PEST AND DISEASE REGULATION, POLLINATION, REDUCTION OF RUNOFF AND SOIL EROSION AND OTHER WIDER ECOLOGICAL SERVICES. FARMERS CAN BUILD UPON, ENHANCE AND MANAGE THE ESSENTIAL ECOSYSTEM SERVICES PROVIDED BY BIODIVERSITY IN ORDER TO WORK TOWARDS SUSTAINABLE AGRICULTURAL PRODUCTION.

BRAZIL
nutrient uptake

In tropical areas of Brazil, poor soil nutrient availability is caused by phosphorous immobilization and aluminium toxicity. This results in poor soil health, and can lead to completely unproductive soils – leading to significant declines in crop production and yields.

Soil life and soil biological activity can be enhanced by not tilling the soil, and covering the soil with compost and integrating cover crops in the cropping system which help raise levels of organic matter in soils and improve cation exchange capacity. By using these practices, soil organic matter as well as organic acids mobilize nutrients like phosphorous. This then has a pH buffering effect which contributes to overcoming problems such as aluminium toxicity.

WEST AFRICA
weed management

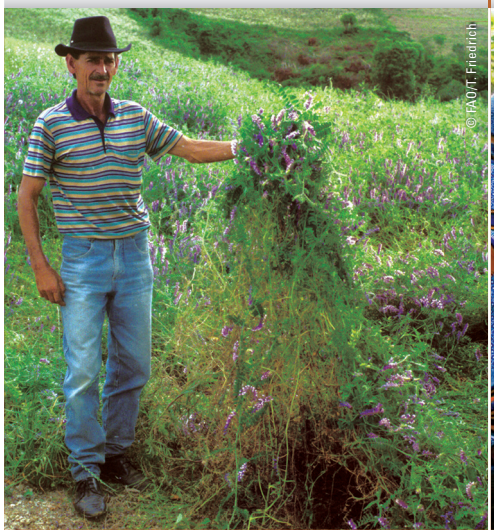
Striga hermonthica is a noxious weed affecting cereal production in West Africa and elsewhere. Thriving in degraded soils with low carbon/nitrogen ratios and low water holding capacity, *Striga* parasitizes cereal crops (maize, sorghum, millet, upland rice). Crop losses of up to 60-90% are common.

Crop diversity is important in managing *Striga hermonthica*. Non-cereal crops are used, in their capacity as false hosts, to control *Striga* attacks, through crop rotations (with non-hosts) and intercropping (e.g. maize with cowpea). Leguminous false host crops such as *Mucuna* are preferred, as they also promote soil fertility through their fixation of atmospheric nitrogen and protect soil from erosion while providing good quality livestock feed.

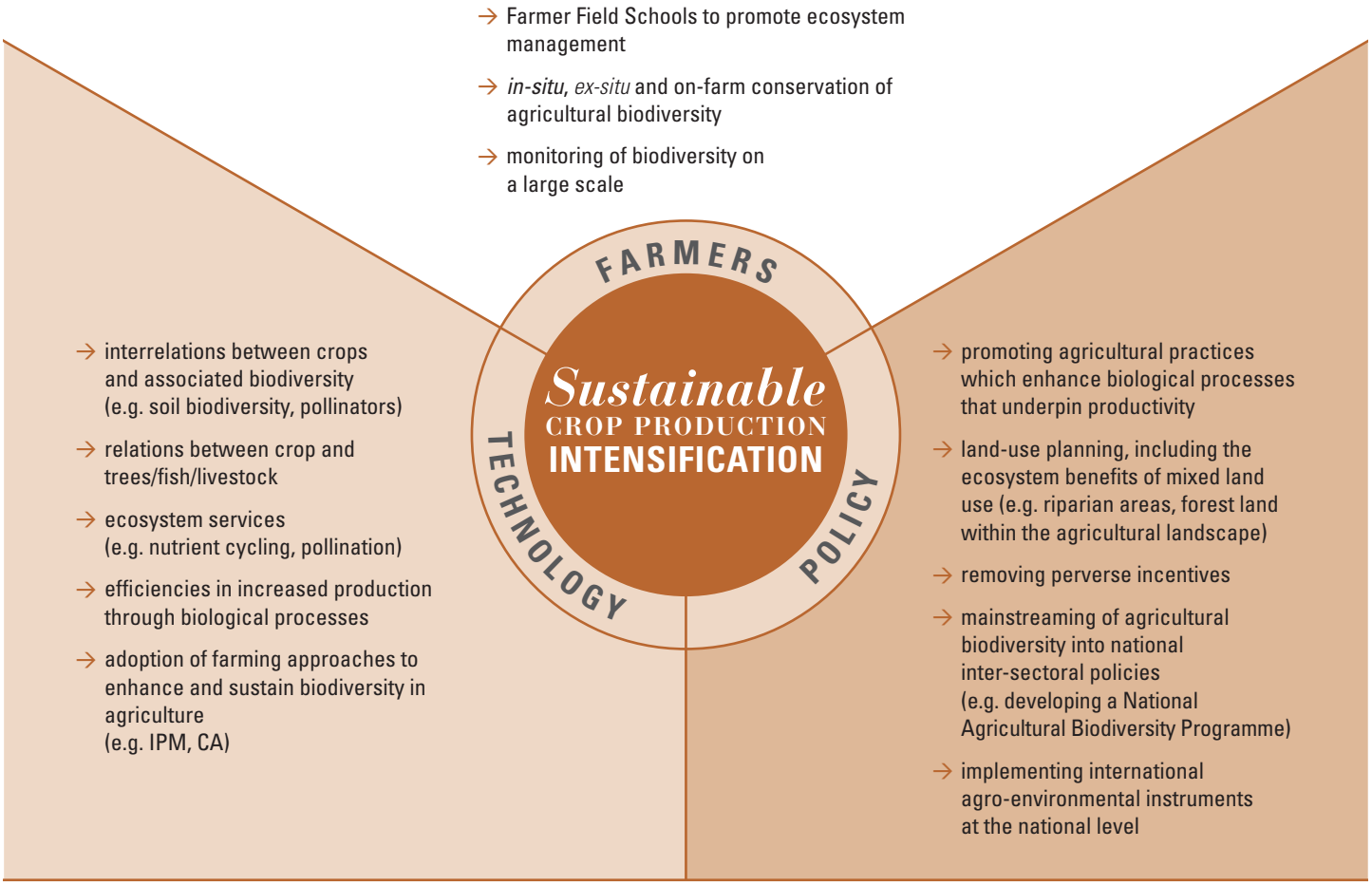
GHANA
pollination

Work on the conservation and management of pollinators requires an understanding of the ecological interactions between pollinators and plants. In the Ghana cocoa belt, applications of insecticides seriously impact the populations of the small midges that pollinate cocoa; without these pollinators yields may drop by 90%.

Where bananas or plantains were grown near cocoa, it was found that midge numbers recovered faster despite spraying, with the leaf litter of these trees providing a microhabitat for breeding. Farmers are now being encouraged to support the development of such habitats to sustain the pollination function provided by these insects.



CONSERVATION AND MANAGEMENT OF AGRICULTURAL BIODIVERSITY: *increasing the role of ecosystem services*



- Farmer Field Schools to promote ecosystem management
- *in-situ*, *ex-situ* and on-farm conservation of agricultural biodiversity
- monitoring of biodiversity on a large scale

- interrelations between crops and associated biodiversity (e.g. soil biodiversity, pollinators)
- relations between crop and trees/fish/livestock
- ecosystem services (e.g. nutrient cycling, pollination)
- efficiencies in increased production through biological processes
- adoption of farming approaches to enhance and sustain biodiversity in agriculture (e.g. IPM, CA)

- promoting agricultural practices which enhance biological processes that underpin productivity
- land-use planning, including the ecosystem benefits of mixed land use (e.g. riparian areas, forest land within the agricultural landscape)
- removing perverse incentives
- mainstreaming of agricultural biodiversity into national inter-sectoral policies (e.g. developing a National Agricultural Biodiversity Programme)
- implementing international agro-environmental instruments at the national level

BIODIVERSITY PLAYS AN IMPORTANT ROLE IN THE MAINTENANCE OF ECOSYSTEM FUNCTIONS. FARMERS, AS CUSTODIANS AND MANAGERS OF ECOSYSTEMS, ENHANCE AND BENEFIT FROM ECOSYSTEMS AND ECOSYSTEM SERVICES, THROUGH THE CONSERVATION OF BIODIVERSITY. THIS CAN INVOLVE ADOPTING SPECIFIC FIELD PRACTICES, E.G. CONSERVING SOIL BIODIVERSITY, MANAGING POLLINATORS, ENCOURAGING BIOLOGICAL OR NATURAL PEST CONTROL, OR SELECTING CROPS AND CROPPING SYSTEMS TO SUPPORT CROP GENETIC DIVERSITY.

TAKING INTO ACCOUNT THE ROLE OF CROP-ASSOCIATED BIODIVERSITY (E.G. POLLINATORS, SOIL-BASED ORGANISMS AND NATURAL PREDATORS OF PLANT PESTS) WHEN PLANNING A CROPPING SYSTEM CAN CONTRIBUTE TANGIBLY TO CROP PRODUCTIVITY, SUSTAINABILITY AND PROFITABILITY OF THE OVERALL PRODUCTION SYSTEM.

Sustainable CROP PRODUCTION INTENSIFICATION *around the world*

I1622E/1/06.10/500