

TRANSFORMING AGRICULTURE IN AFRICA
AGROECOLOGY and ORGANIC TRADE



Reducing Synthetic Pesticides and Fertilizers

Agroecological Pest, Weed and Disease Management

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Regeneration International**

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Why we need Agroecological Food and Farming Systems

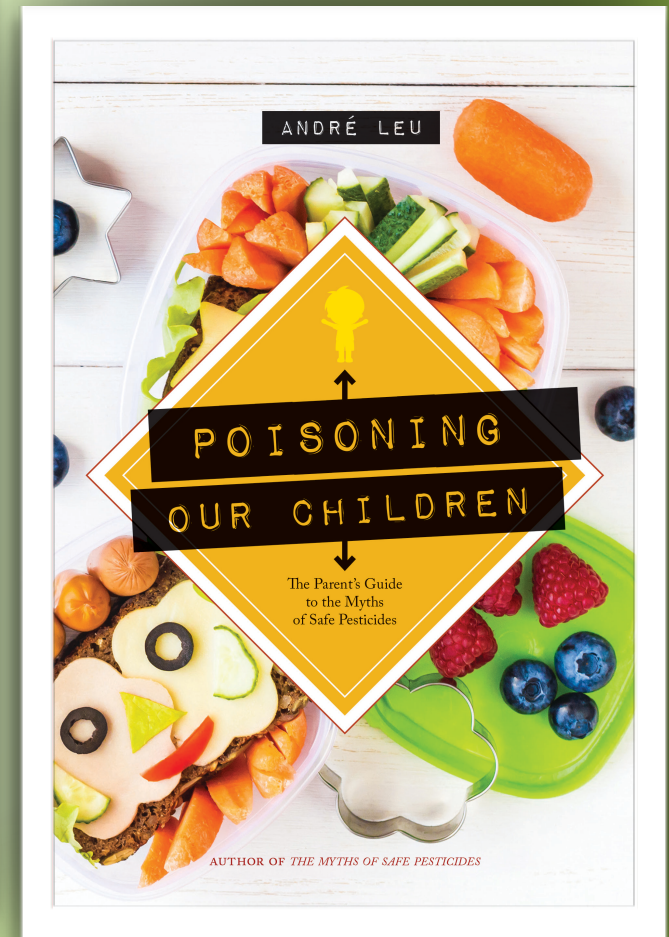


There is no peer reviewed scientific evidence that shows any level of pesticides that are safe for children

Hundreds of peer reviewed scientific studies show:

The smallest amounts of pesticides damage the unborn, developing children, in puberty and future generations

Most people get their pesticides from food and water



High Yield Agroecology/Organic Farming



The vast majority of the world's food insecure people live in the developing world (FAO)

A report by the United National Conference on Trade and Development (UNCTAD) and the United Nations Environment Programme (UNEP) on good practice Organic Agriculture

- 114 projects in 24 African countries covering 2 million hectares and 1.9 million farmers' ***...the average crop yield was ...116 per cent increase for all African projects and 128 per cent increase for the projects in East Africa.***
- **The report notes that there is 10% less food per person in Africa since the 1960's when pesticide based industrial agriculture started**

Organic Agriculture and Food Security in Africa 2008

Agroecological Controls

For Pests and Diseases



Soil Health

Soil health is the key principle to successful agroecological/organic farming

Most pest and diseases are opportunistic. They 'attack' plants that are stressed

Correctly balanced soil ensures minimal disease and insect damage

These soils are rich in organic matter, beneficial organisms, nutrients and have a good structure

Soil Health

Ethiopia



Wheat grown on
compost treated
field does not have
rust

Wheat grown
with
chemical
fertilizers
requires
spraying with
fungicide
for rust





Wheat infested with stripe rust and sprayed with fungicides – gave yield of 1.6 t/ha (1,600 lbs per acre)



Wheat grown on composted soil resists the rust – gave yields over 6.5 t/ha (6,500 lbs per acre)



Soil Health

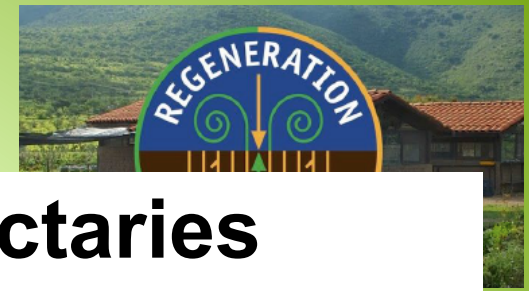


Insect damage controlled by improving soil nutrition and organic matter levels leading to plant health

Healthy plants have a greater ability to beat pests and diseases



Functional Biodiversity-Agroecology



Refuges of flowering plants are known as: **Insectaries**

Many beneficial insects have a range of host plants

Some useful species such as parasitic wasps, hoverflies and lacewings have carnivorous larvae that eat pests however the adult stages live mostly on nectar and pollen from flowers

Nectar and pollen are essential to the adult stage of many beneficial predators



Research has shown increasing the host plants in farms breed thousands of beneficial organisms that control pests

INSECTARIES



Flowers provide nectar, pollen, mating sites and refuges for beneficial insects - suppress weeds



Different Insectary Models

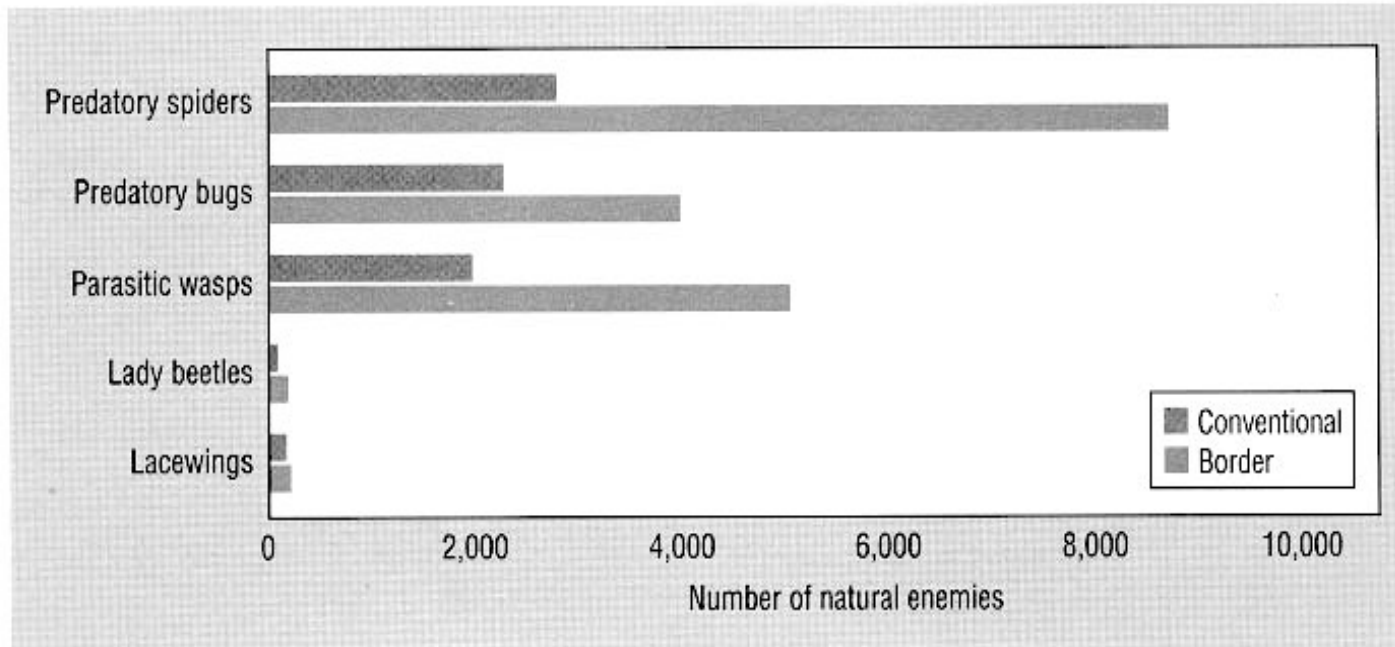
Perimeter plantings in the USA
Host beneficials, act as barrier
for pests and as windbreaks



Eco-Functional Intensification

Strip Mowing

Leaving rows of insectary plants increases the number of beneficial insect species



- FIGURE 6-2. Comparison of the relative abundance of naturally enemies in a border versus a conventional cut alfalfa field over a 4-month period from May through September. Data from Summers 1976.

Eco-Functional Intensification



Insectaries

Refuges
Created by
Strip
Mowing

There are no
weeds

These are
cover crops



Eco-intensification Agroecology



Insectaries

Borders of sunflowers in Myanmar create refuges for beneficial insects

Attracts and traps pests before they enter the field



Field Borders: Biodiverse vegetation as Insectaries



Provide habitat for birds, frogs lizards and beneficial insects

Act as a barrier for pests and diseases

Windbreak to shelter cash crop

Stock feed

Legumes provide nitrogen



Highly diverse field border hedges on organic farms in Kenya

Sustainably harvested biomass can be used for compost and bio gas generation

Field Borders -Biodiverse vegetation as Insectaries

Provide habitat for
birds, frogs lizards
and beneficial
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Act as a barrier for
pests and diseases

Windbreak to
shelter cash crop

Stock feed

Legumes provide
nitrogen

Botanical
Insecticides

Highly Biodiverse Roadside Vegetation In Shan State, Myanmar



**Sustainably harvested biomass can be used for
compost and bio gas generation**



- **Maximises solar capture**
- Does not compete for sunlight

- **Fixes nitrogen** and soil carbon – roots add nutrients instead of competing
- **Green Manure**
- **Stock Feed**

- Flowers attract beneficial Insects

- **Conserves water** and soil – living mulch

**Eco-function
Intensification
Pest and Weed Control**



Legume vines in fruit trees. Example of good practice and not a neglected orchard

Maximises solar capture

Does not compete for sunlight

Fixes nitrogen and soil carbon

Green Manure

Flowers attract beneficial
Insects

Conserves water and soil – living mulch

Eco-function intensification



This is an example of good practice in weed management and not a neglected orchard

Minimal solar capture

No Fix of nitrogen and soil carbon

No Green Manure

No Flowers to attract beneficial Insects

Does not conserve water

Soil subject to wind and water erosion

Industrial Agriculture

Not Eco-function intensification



This is an example of worst practice in pest, weed and soil management
Industrial systems need chemical fertilizers and pesticides

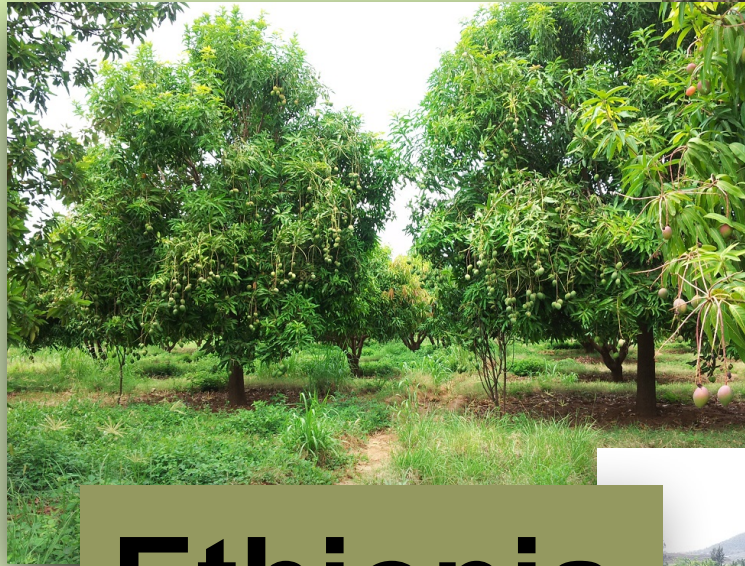
Agroecological Pest and Weed Control

Intercropping
to fix N for free

Desmodium repels pests
suppress weeds

Alfalfa and Desmodium
host beneficial insects

Napier grass traps pests



Ethiopia



Multiple Solar Powered Eco-system Services

Push Pull and Insectaries in a mango orchard and chili field gives total pest control, provide nutrients, feed for stock and biogas. The biogas slurry is composted and used as the only fertilizer. High yields of perfect fruit.

Thank You

