



Strategies for Reducing Pesticides in Agriculture

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Strategies for Reducing Pesticides in Agriculture

Most Organizations and Rural Industries Support Reducing Pesticides

- Why do we need to reduce pesticides if they are safe when used as directed? This is a fair question.
- The first step is to look at this issue critically.

Pesticide Reduction Strategies

- Introduce IPM systems where aim is reduction and use of least toxic alternatives.
- Eco-Function Intensification, where functional biodiversity is integrated into farming systems to replace pesticides – applied agroecological science.

The Myths of Safe Pesticides

MYTH 1: Rigorously Tested

“All agricultural poisons are scientifically tested to ensure safe use”

- Most pesticide formulations sold on the market are deemed safe on the basis of just testing one of the ingredients without testing the whole formulation.
- It cannot be assumed that there is no difference in toxicity between the active ingredient and the whole formulation.
- The limited scientific testing of formulated pesticide products shows that they can be hundreds of times more toxic to humans than the pure single active ingredient.



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The Myths of Safe Pesticides

MYTH 1: Rigorously Tested

- Multiple pesticides (insecticides, herbicides, fungicides) are approved for each crop
- Many foods have multiple residues
- Most people have multiple residues in their bodies
- No testing of chemical mixtures
- Many mixtures are synergistic $1+1=3$ or much more
- Up to 232 chemicals found in placental cord blood
- It is data-free assumption to assume that there are no additive or synergistic toxic effects from mixtures
- The published peer reviewed science shows that mixtures are additive and synergistic



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The Myths of Safe Pesticides

MYTH 1: Rigorously Tested

- The special requirements of the foetus, the newborn, and the growing child in relation to developmental neurotoxicity are not sufficiently taken into consideration.
- Currently the pesticide testing used in the regulatory approval processes do not specifically test for the risks particular to these age groups.
- Peer reviewed testing shows that these groups are particularly vulnerable to the smallest amounts of pesticides.



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The Myths of Safe Pesticides

MYTH 2: Very Small Amount

“The residues are too low to cause any problems”

- The smallest amounts of chemical residues can be harmful.
- Given that there are hundreds of studies showing that many chemicals can be endocrine disruptors and therefore more toxic at significantly lower doses, setting the Average Daily Intake (ADI) on the basis of extrapolating it from testing done at higher doses is a data-free assumption.



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The Myths of Safe Pesticides

MYTH 3: Breakdown “Modern pesticides rapidly biodegrade”

- All synthetic pesticides leave residues in food, that is why Maximum Residue Levels (MRL) and Average Daily Intakes (ADI) are set.
- Testing shows that the majority of foods and people have pesticide residues.
- There is a lack of testing for the metabolites formed by pesticides as they degrade.
- Limited testing shows that many of them are more toxic and residual than the pesticide itself.



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The Myths of Safe Pesticides

MYTH 4: Reliable Regulatory Authorities “Trust us — we have it all under control”

- Regulatory authorities are ignoring a large body of peer reviewed science showing the harm caused by pesticides and are largely basing their decisions on unpublished industry studies.
- The scientific credibility of pesticide regulatory authorities has to be seriously questioned when they are approving the use of pesticides on the basis of data-free assumptions and not on the published peer reviewed science.



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Pesticide Reduction – Integrated Pest Management

IPM

One of the most effective methods to reduce pesticides without losing yields.

Pest Thresholds

The key is monitoring to establish thresholds where pest damage will cause economic levels of damage before spraying.

Hot Spot Spraying

Only spray the areas with the highest concentration of pests. This lets most beneficial species survive to control the remainder of the pests.

Research

Research is critical to determine pest thresholds and the efficacy of pesticides.

Training

Farmers need to be trained to recognize pests, beneficials and the insects 'that are just there', determine thresholds and the most effective pesticides – **how to use safely.**



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Safer alternatives can be substituted

Biologicals

BT, Metarhizium, Trichoderma, Clitocladium virens. Bacillus subtilus, Verticillium lecanii, Beauveria basiana. These tend to be pest specific.

Non Toxic Sprays

Emulsified vegetable oils, light oils
Natural Soap Sprays
Clays, Flour and water

Botanical Sprays

Natural Pyrethrums, Neem etc. Although some are harmful also to non-target species, they rapidly biodegrade leaving no residues.



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Alternatives to Pesticides Eco-function Intensification

- 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

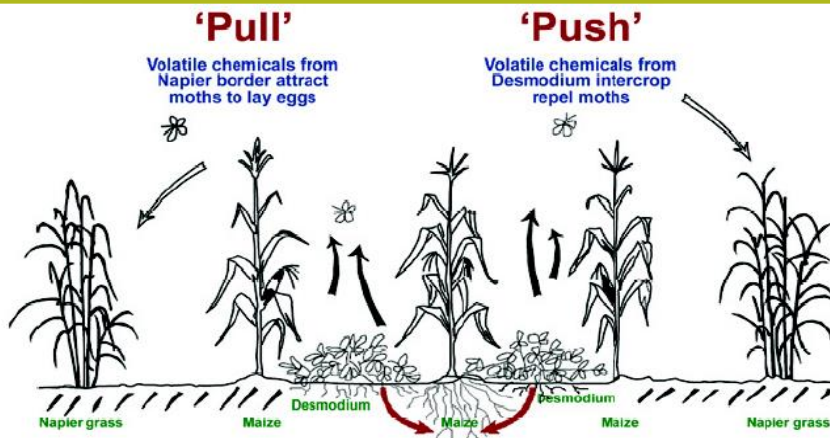


Research has shown that they breed thousands of beneficial organisms.



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“Push–Pull” for Stemborer and Striga Control



Chemicals (isoflavones) secreted by desmodium roots inhibit attachment of striga to maize roots and cause suicidal germination of striga seed in soil



Source: International Centre of Insect Physiology and Ecology (ICIPE) | 12

Eco Function Intensification - A whole of System's Approach

Using natural
systems to
regulate pest
outbreaks

push-pull
greater farm
productivity
with higher
corn yields
(2 to 10X)



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Push-Pull Adapted to New Crops

Intercropping
to fix N for free

Desmodium repels
pests, suppresses
weeds (selective
allelopathy), provides
fodder

Alfalfa hosts
beneficial insects

Napier grass traps
pests



Push Pull and
insectaries in a
mango orchard
gives total pest
control



Chilies grown with desmodium and alfalfa

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Conclusion

- The first step in pesticide reduction is based on the large body of peer reviewed science showing that the current permitted MRLs are based on outdated science and data-free assumptions.
- There are hundreds of peer reviewed studies showing that the current MRLs are not safe.
- The current body of science is showing massive data gaps that need to be researched before adequate safety can be established.
- Until this is done, pesticide reduction is the best strategy.
- IPM is a proven way of doing this.
- Low and non toxic options can be included in IPM.
- Eco-function Intensification can provide alternatives to pesticides.

Thank You

