Why we need to at least partly transition from pesticides to natural regulation of pests and diseases and what role agroforestry can play

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Sweet Sustainability: Cocoa Agroforestry
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What’s wrong with pesticides?

A lot!

1. Alarming rate of decrease in global insect population
What’s wrong with pesticides?

A lot!

2. Health hazard resulting from incorrect pesticide storage and use
Pesticide poisoning: confronting the hidden menace

More than 90% of pesticide fatalities are believed to occur in developing countries. Campaigners in Ghana are pushing for tighter controls.

▲ Pesticide poisoning accounts for 20,000 unintentional deaths a year, according to the WHO. Many farmers in Ghana are unaware of the dangers. Photograph: Alamy
What’s wrong with pesticides?

A lot!

3. High CO$_2$ footprint (production and products)
Can cocoa agroforestry replace pesticides?

*It depends!*

- **Fungal** diseases may be higher, equal or lower in agroforestry compared to monocultures

*Figure 4. Mean difference in the incidence of three fungal diseases in cocoa agroforestry systems and monocultures. The number of studies is shown in brackets; horizontal bars show the 95% confidence intervals; negative values indicate a higher mean value in monocultures; positive values indicate a higher mean value in cocoa agroforestry systems; levels of significance: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, n.s.: not significant.*
Can cocoa agroforestry replace pesticides?

It depends!

- Viral diseases such as CSSVD may be less severe
Can cocoa agroforestry replace pesticides?

*It depends!*

- **Pests** may be regulated by birds, bats and insects

**ECOLOGY LETTERS**

Letter

Bats and birds increase crop yield in tropical agroforestry landscapes

Bea Maas, Yann Clough, Teja Tscharntke
Can cocoa agroforestry replace pesticides?

- The potential regulating effect of agroforestry depends a lot on species selection and general management/maintenance of the system!

Cacao agroforestry systems do not increase pest and disease incidence compared with monocultures under good cultural management practices

Laura Armengot a,*, Leone Ferrari a, Joachim Milz b, Fortunato Velásquez b, Pierre Hohmann a, Monika Schneider a
Case-specific designs and management regimes are crucial to reap AF’s full potential of natural pest and disease regulation.
Thank you for your attention!