Agricultural strategies and conservation interventions to reconcile food production and biodiversity conservation in India

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Ambitious conservation efforts combined with food system transformations mean that over two thirds of future biodiversity losses could be avoided.

Ère et al., 2020
Policies to limit future habitat loss driven by agricultural expansion
Spreading vs concentrating the impact of food production

Balmford, 2021
Ecological intensification may allow for win-win scenarios

Bommarco, Kleijn, and Potts, 2013
Ecological intensification may allow for win-win scenarios

Bommarco, Kleijn, and Potts, 2013
India has one of the greatest environmental pressures imposed by food production

Proportion of global cumulative environmental pressure (disturbance, excess nutrients, freshwater use, and GHG emissions) from all foods

Halpern et al. (2022)
Saving half of the world’s land surface for nature reduces food production

Saving 50% globally

Mehrabi, Ellis, and Ramankutty, 2018
Saving half of the world’s land surface for nature reduces food production. Saving 50% globally or saving 50% in every ecosystem.
Saving half of the world’s surface for nature reduces food production

Saving 50% globally

Saving 50% in every ecosystem

Saving 50% in every country

Mehrabi, Ellis, and Ramankutty, 2018
Cropland users - intensification potential

Endemism richness
Low-high
High-high
Intensification potential
Low-low
High-low

Not significant ($p > 0.05$)

Zabel et al., 2019
Zero-budget natural farming (ZBNF) – ecological intensification in SE India

Duddigan et al., 2022
ZBNF & Chemical farming sites

Covariate Balance

Sample
- Unadjusted
- Adjusted

Standardized Mean Differences

- prop.score
- temp
- rain
- elevation
- slope.degrees
- perc_quality_wfh
Forest, ZBNF & chemical farming
Forest: 122 species
ZBNF: 68 species
Chemical: 64 species

Species shared:
Forest & ZBNF: 48 species
Forest & chemical: 42 species
ZBNF & chemical: 48 species
In Conclusion

- Changing **what, where, and how food is produced** is critical if we want to halt biodiversity loss.

- **Stopping agricultural expansion** will be particularly important and requires increasing yields sustainably on existing farmland.

- In order to assess **farming-system wide** biodiversity implications we need data on crop yield and on species **abundances** in agricultural sites as well as in natural ecosystems.
Questions?