TAC meeting 1 (24 May 2021)

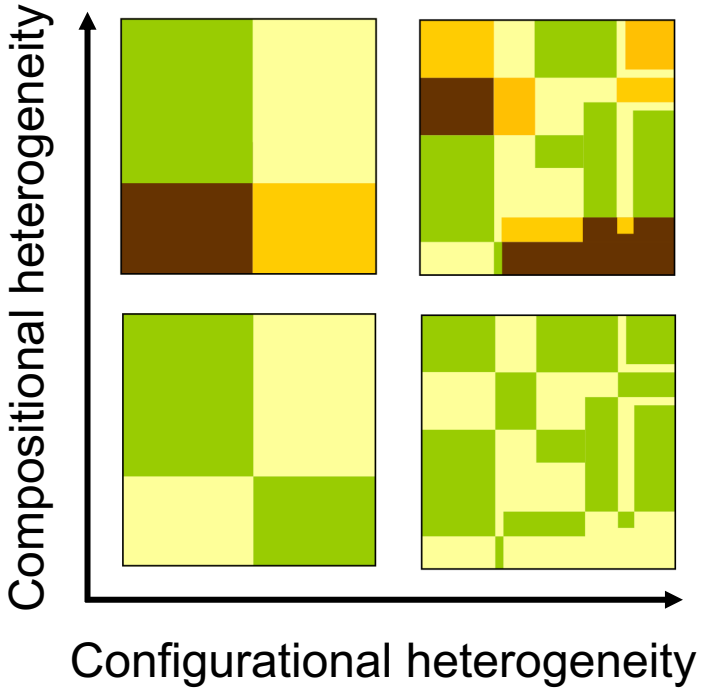
Project 1: The effects of invertebrate decline on ecosystem functioning: A global meta-analysis

Project 2: The effect of crop heterogeneity on farmland biodiversity: A global meta-analysis

Project 3: Agricultural pest butterfly *Pieris canidia* abundance can be suppressed by enhancing compositional crop heterogeneity

Project 4: Biodiversity in agricultural landscapes: Balancing crop production and biodiversity conservation by promoting crop heterogeneity

Project 2: A global meta-analysis reveals that beneficial biodiversity is positively associated with landscape heterogeneity in conventional agroecosystems



Fahrig *et al.,* 2011, *Ecology Letters;*
Sirami *et al.,* 2019, *PNAS*

Configurational heterogeneity

Shape and spatial arrangement of cover types

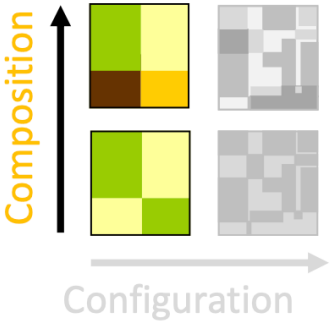
Mean field size ,
Field margin length or
Edge density

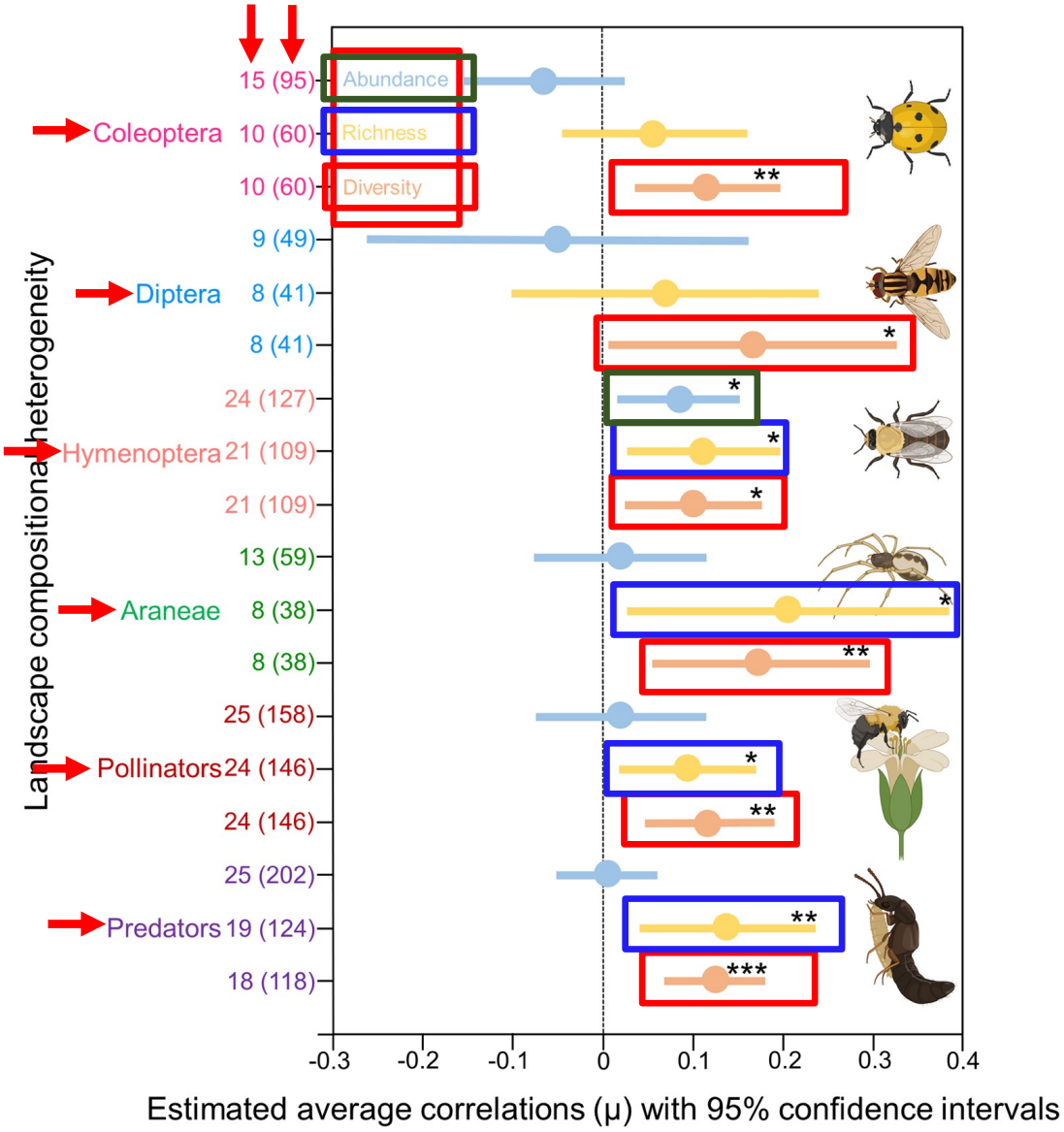
Compositional heterogeneity

The number and evenness of cover types

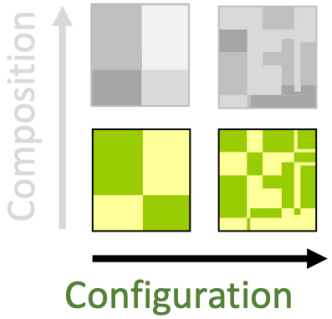
Shannon cover type diversity

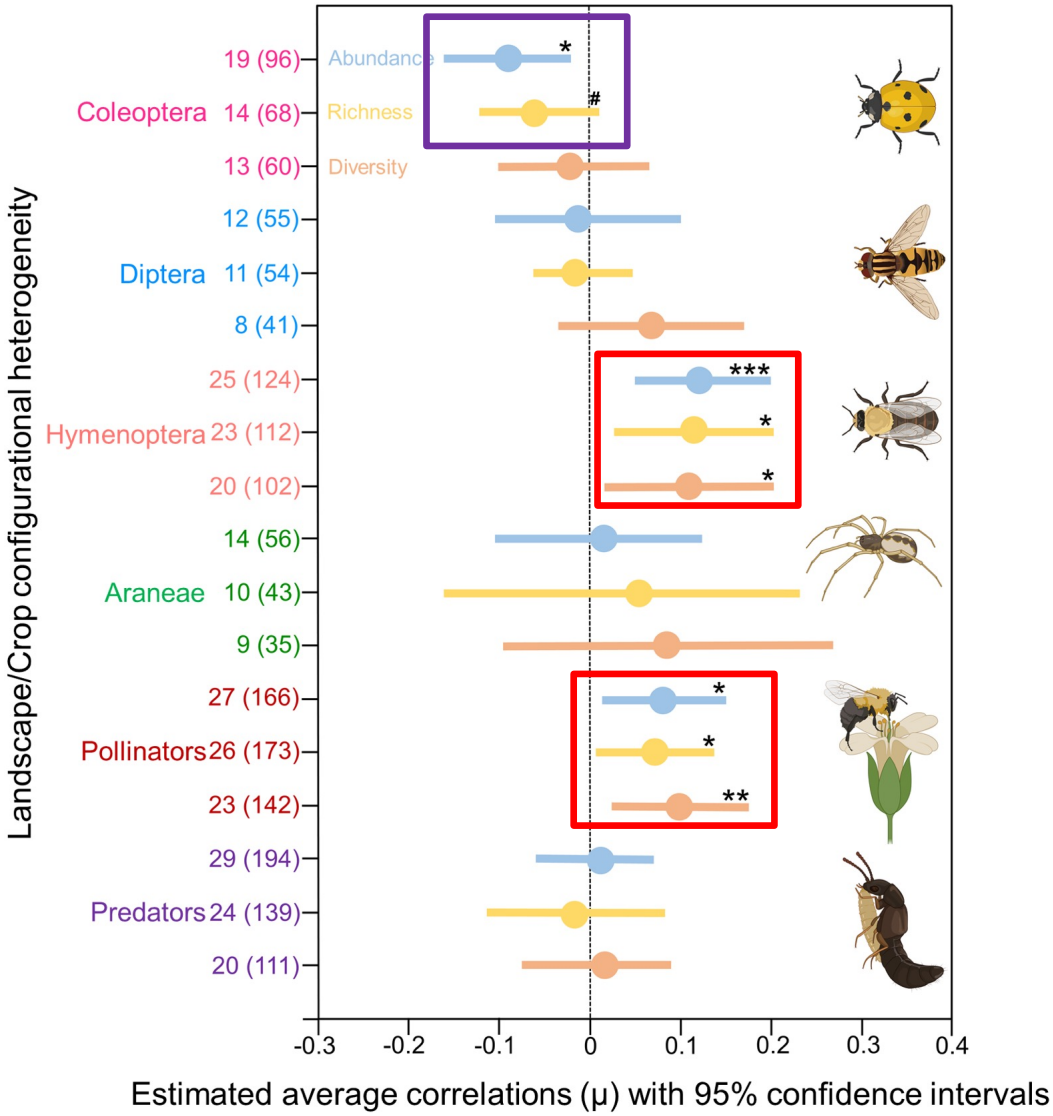
Effect of increasing landscape compositional heterogeneity





Effect of increasing landscape configurational heterogeneity





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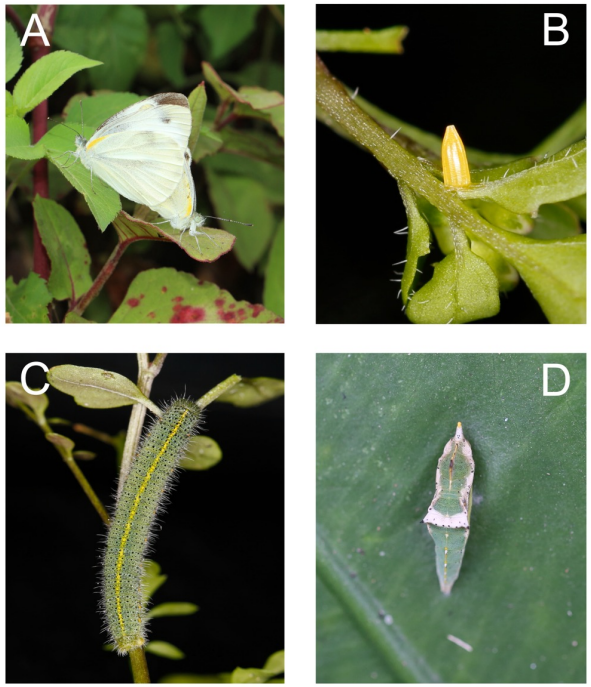
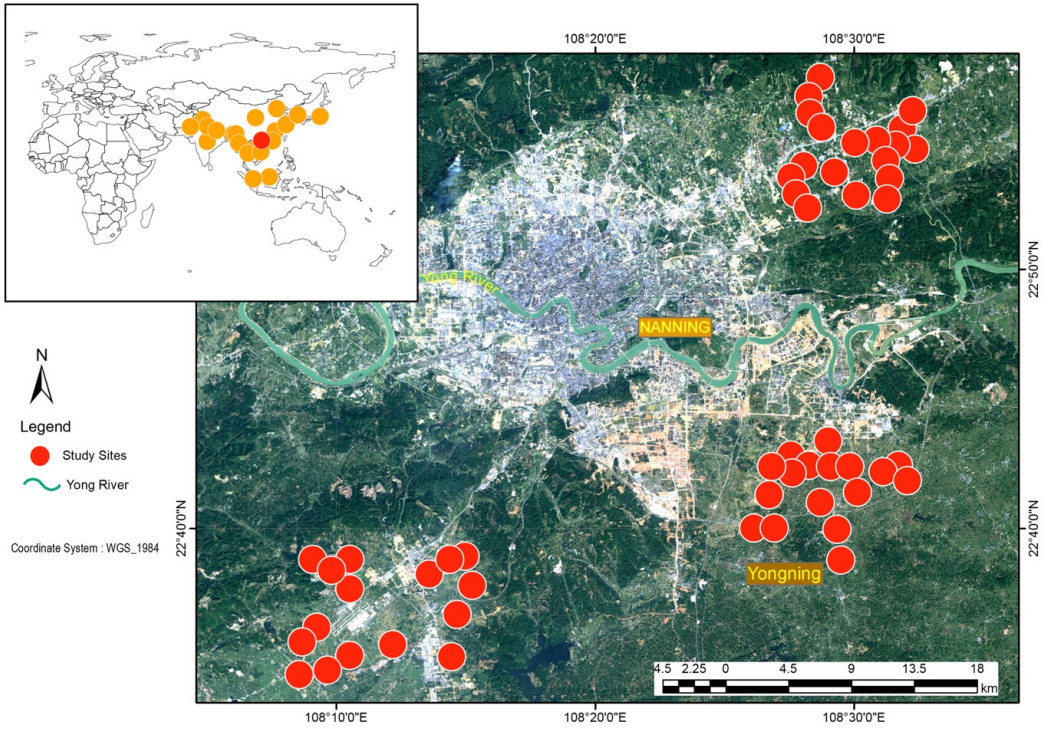
Project 4: Biodiversity in agricultural landscapes: Balancing crop production and biodiversity conservation by promoting crop heterogeneity

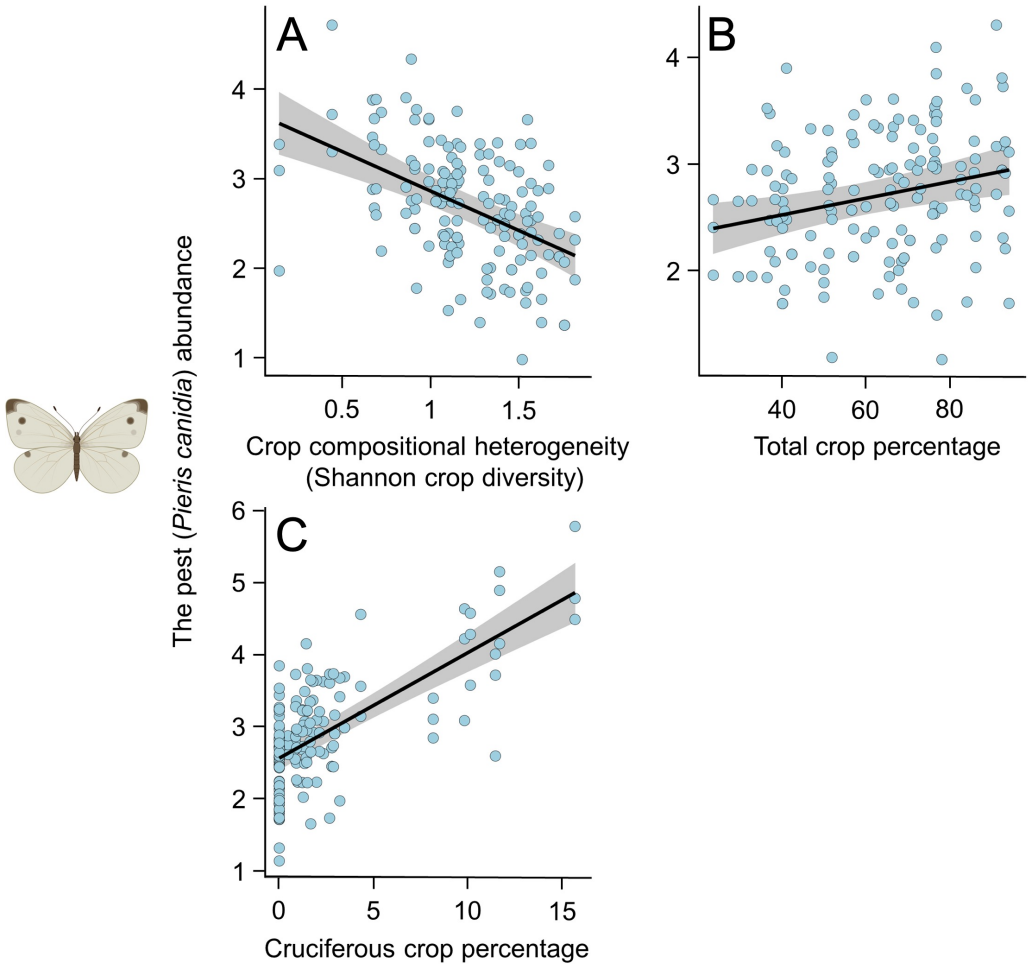
Project 3: Crop compositional heterogeneity suppresses the abundance of *Pieris canidia*, a major pest of cruciferous vegetables



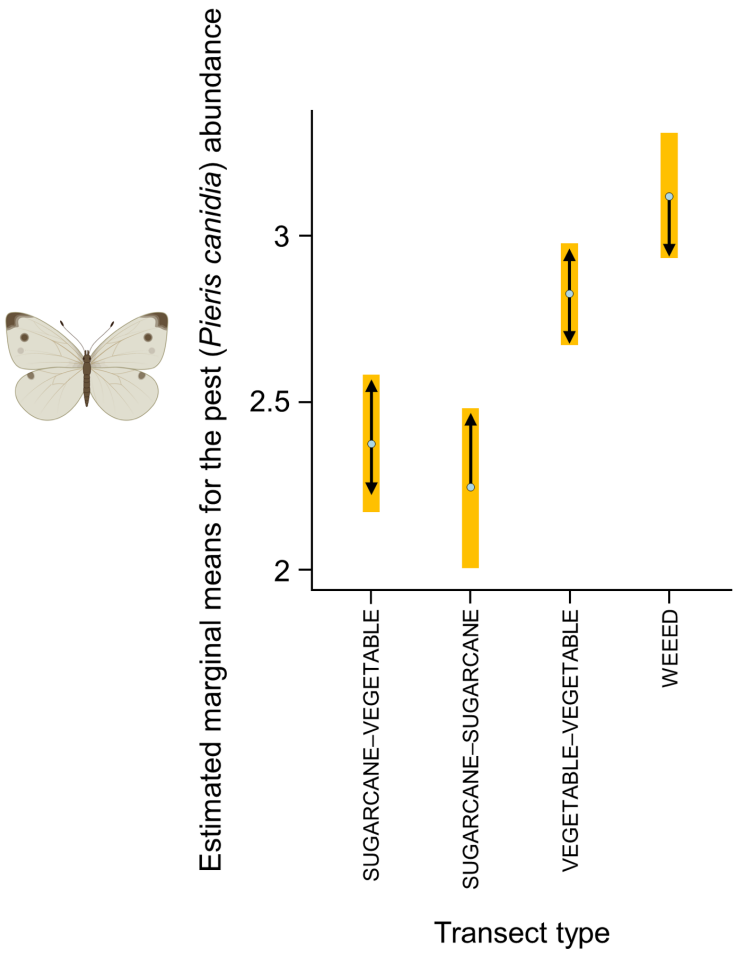


The distribution records of *P. canidia* were extracted from the CABI Invasive Species Compendium (CABI ISC, www.cabi.org/isc/)

Abstract was accepted in *Basic and Applied Ecology*



Regression lines represent model coefficients, and 95% confidence intervals are shaded. Data points are partial residuals from the full models



Effect of each category of transect type on the pest butterfly abundance. The yellow bars are the 95% confidence intervals for the Estimated Marginal Means (i.e. least-squares means)

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Project 1: Mechanistic links between invertebrate biodiversity and ecosystem functioning

("ecosystem function*", "ecosystem service*", "ecosystem proces*", "ecosystem multifunctionality"), ("decomposition", "dung removal*", "dung burial*", "breakdown", "decay*", "mass loss", "productivity", "mass remaining", "biomass production", "soil organic carbon", "carbon storage", "carbon stock", "C cycle*", "carbon cycle*", "N cycle*", "nitrogen cycle*", "nutrient cycle*", soil organic carbon, "organic matter cycle*"), ("biological control*", "biological pest control*", "pest control*", "pollination*", "yield", "fruit set", "seed set", "fruit weight", "fruit quality", "fruit size"), ("biodiversity" OR "species diversity" OR "species richness" OR "functional diversity", "inverte*" OR "arthropod*" OR "insect*" OR "soil fauna*" OR "detritivore*" OR "macroinvertebrate*")

Schematic illustration of researchers with different expertise exploring the underlying BEF relationships (Eisenhauer *et al.,* 2019, *Jena Experiment*)

Decomposition

Biological control

Pollination

Tilman et al., 2014, Annual Review of Ecology, Evolution, and Systematics;
Noriegaa *et al.,* 2018, *Basic and Applied Ecology;*
van der Plas, 2019, *Biological Reviews*;
Mori et al., 2020, Nature Communications;
McCary and Schmitz, 2021, *Journal of Animal Ecology;*
Hong et al., 2021, Ecology Letters

Invertebrate biodiversity ~ ecosystem functions

("species richness" OR "diversity" OR "biodiversity" OR "functional diversity") AND ("ecosystem function*" OR "stability" OR "ecosystem proces*" OR "ecosystem multifunctionality") AND ("inverte*" OR "arthropod*" OR "insect*" OR "soil fauna*" OR "detritivore*" OR "macroinvertebrate*") AND ("decomposition" OR "dung removal*" OR "dung burial*" OR "breakdown" OR "decay*" OR "mass loss" OR "mass remaining" OR "biomass production" OR "soil organic carbon" OR "carbon storage" OR "carbon stock" OR "carbon sequestration" OR "C cycle*" OR "carbon cycl*" OR "N cycl*" OR "nitrogen cycl*" OR "nutrient cycl*" OR "soil organic carbon" OR "organic matter cycl*" OR "biological control*" OR "pest control*" OR "pollination*" OR "yield" OR "fruit set" OR "seed set" OR "fruit weight" OR "fruit quality" OR "fruit size")

1312 studies by 6 December 2021

New idea: Mosquito larvae predation by odonates

Network meta-analysis

Malaria ⟷ Control ⟷ Dengue

224 studies were identified

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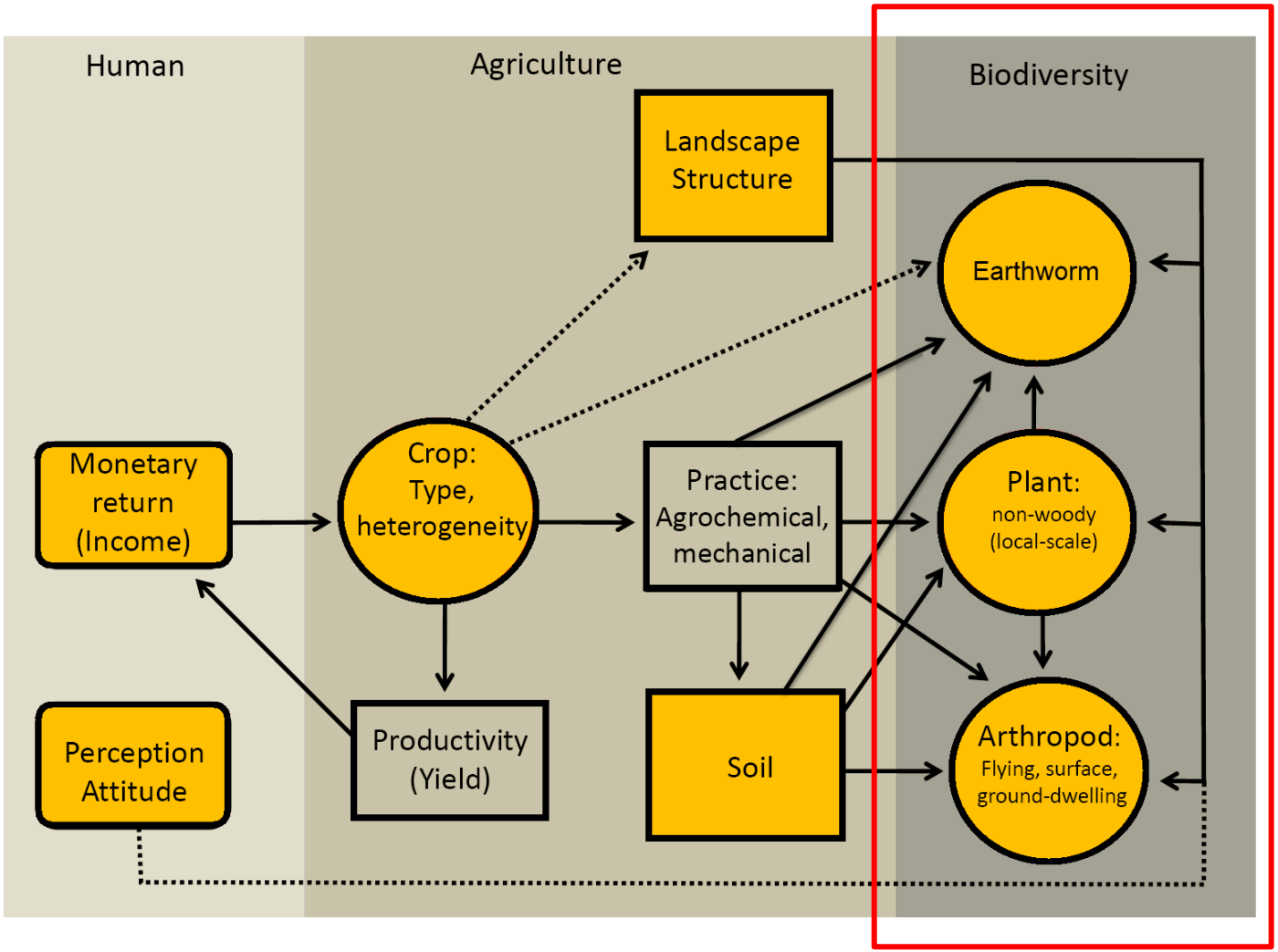
Project 4


Human
Agriculture
Biodiversity
Landscape Structure
Earthworm
Monetary return (Income)
Crop: Type, heterogeneity
Practice: Agrochemical, mechanical
Plant: non-woody (local-scale)
Perception Attitude
Productivity (Yield)
Soil
Arthropod: Flying, surface, ground-dwelling

Agricultural risks that impact the profitability of agricultural systems in Sri Lanka

Input supply risk (e.g., water shortage, a labor shortage)

Yield risk (e.g., pest infestation or drought will cause yields to be lower than average)

Price risk (e.g., the price that farmers receive for their yield will be higher or lower than average in a given year)

Output market risk (i.e., the farmers might not be able to find a buyer for their product)

Other types of risk (e.g., a family member getting sick)

How do farmers respond to these risks to minimize their losses?

Bowman & Zilberman, 2013, *Ecology and Society*

Mixed-crop agriculture

Monoculture

"Chena cultivation is oldest cultivation method in Sri Lanka" (Wikipedia)

Vegetables, cereals, grains and greens were cultivated in a Chena

Organic agriculture in Sri Lanka

Science

Current Issue First release papers

HOME > SCIENCE > VOL. 374, NO. 6572 > SRI LANKA'S HASTY AGROCHEMICAL BAN

LETTER

Sri Lanka's hasty agrochemical ban

THARAKA S. PRIYADARSHANA

SCIENCE • 2 Dec 2021 • Vol 374, Issue 6572 • p. 1209 • DOI: 10.1126/science.abm9186