

# Pollinator Declines Threaten the Nutritional Health and Livelihood of Rural People

## Evidence from Nepal

**Sujan Sapkota**

Research, Development and Innovation

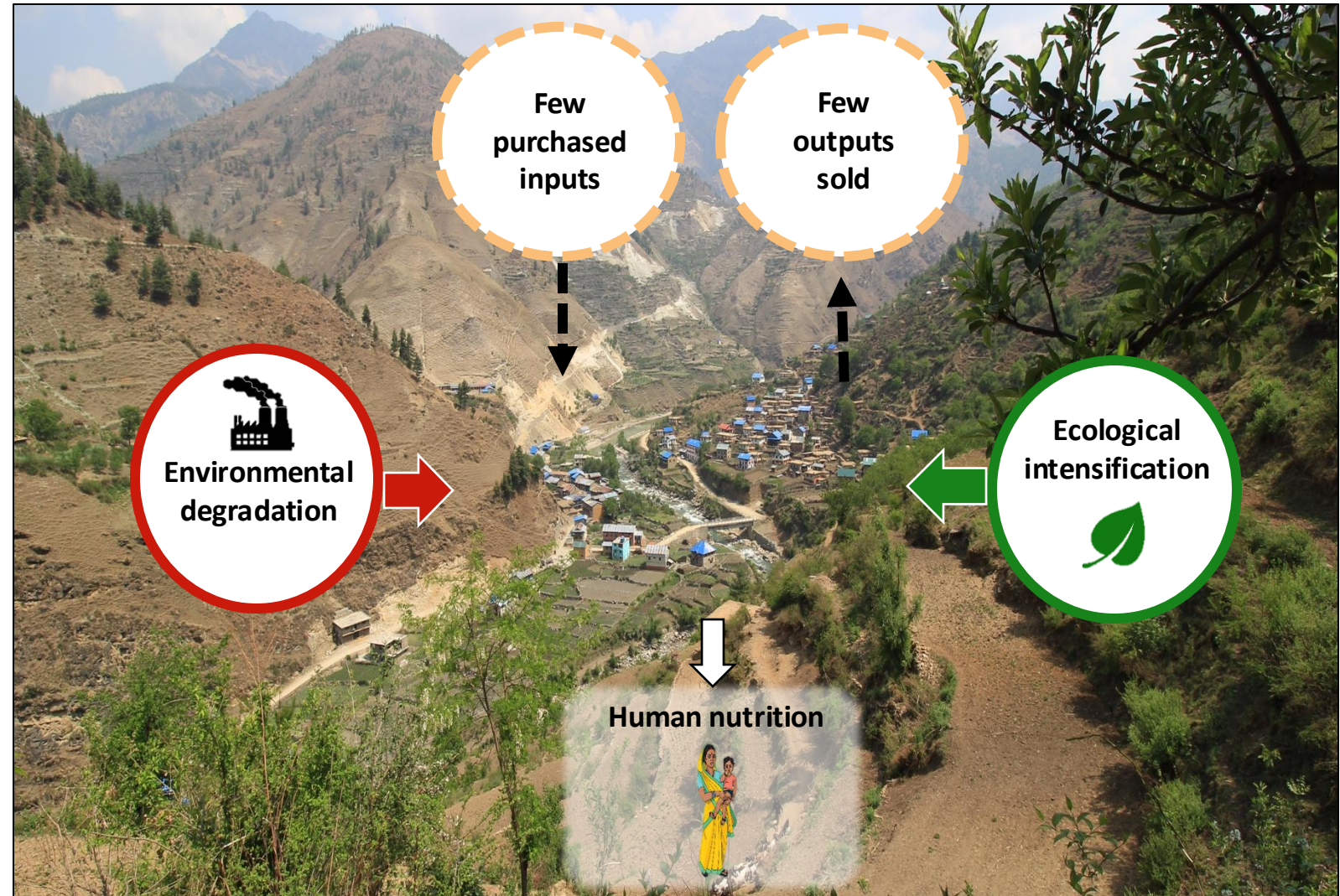
HERD International

# Rationale/ Objective

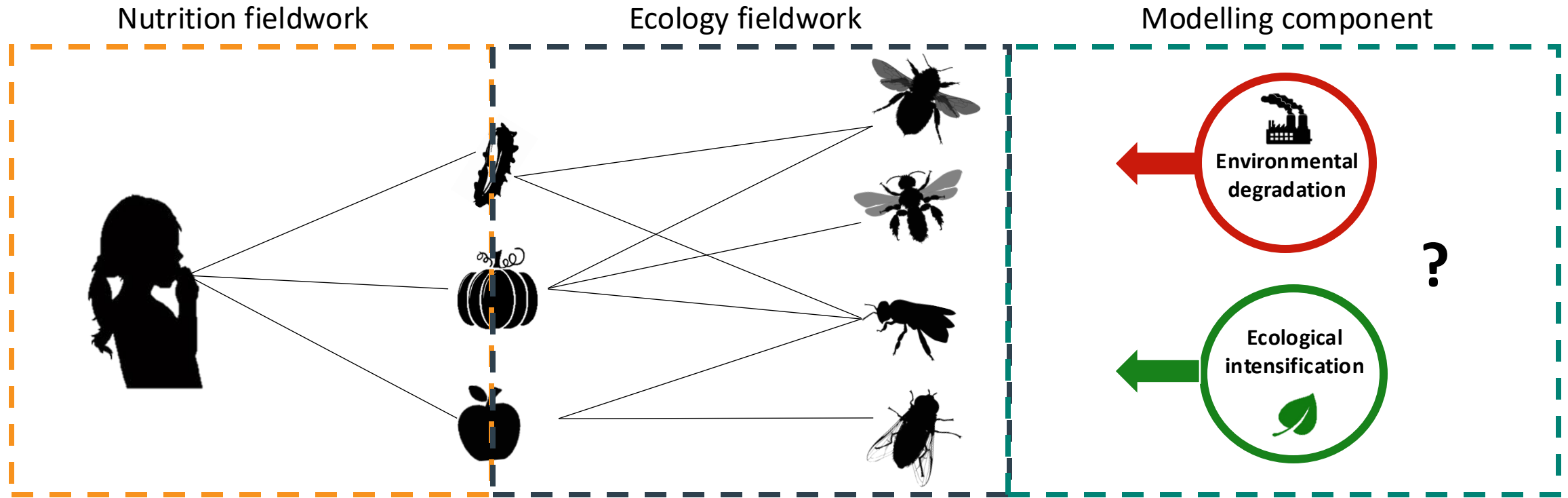


# Background

- 84% of all farms are smallholdings
- Highly reliant on local agroecosystem services
- 3/4 of crop species depend on pollinators
- Pollinator decline is one of the major threat
- Food insecurity and malnutrition are high
- Extremely vulnerable to climate change and environmental degradation



# Key Questions



What are families eating & which crops provide their key nutrients?

Which insects pollinate these crops?

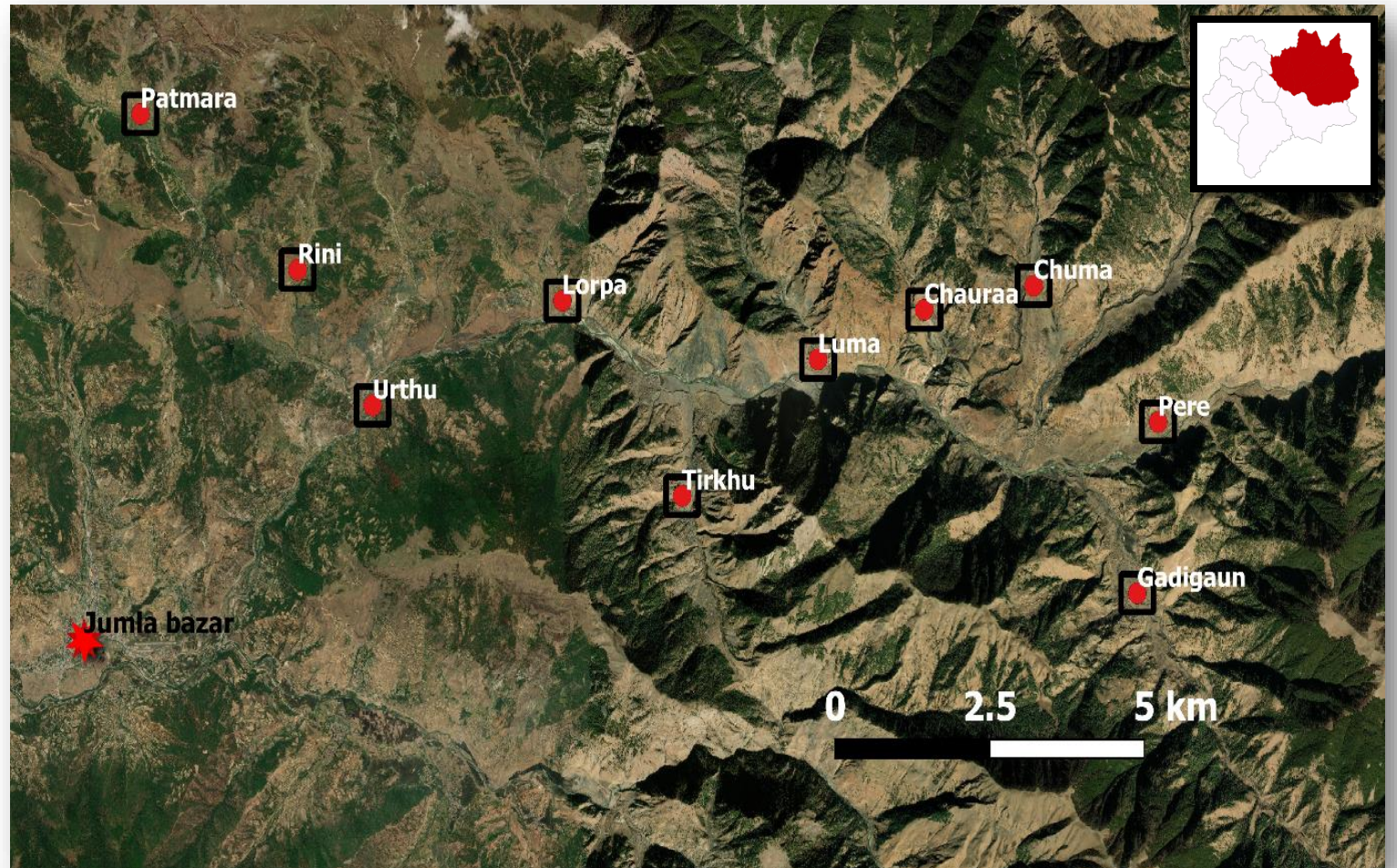
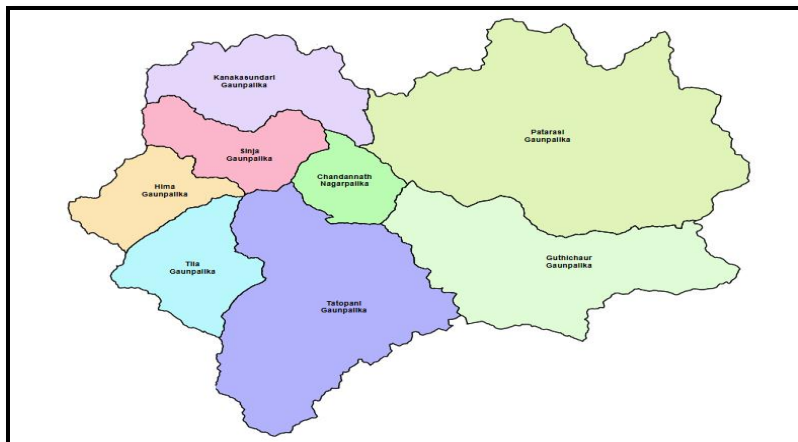
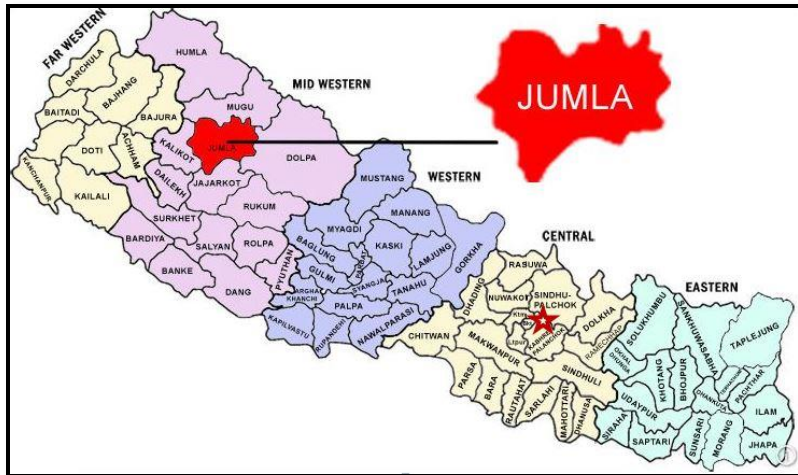
How will climate change & other stressors impact the system?

How can we safeguard and enhance human nutrition & livelihoods through pollination management?



# Study Location

10 Study Sites in Patarasi RM





# Methods/ Analysis

# Nutrition Survey



10 study villages



200 households (20/village)



800 participants (4/HH)

Fortnightly dietary recall surveys for 12 months = 15,687 dietary recall surveys

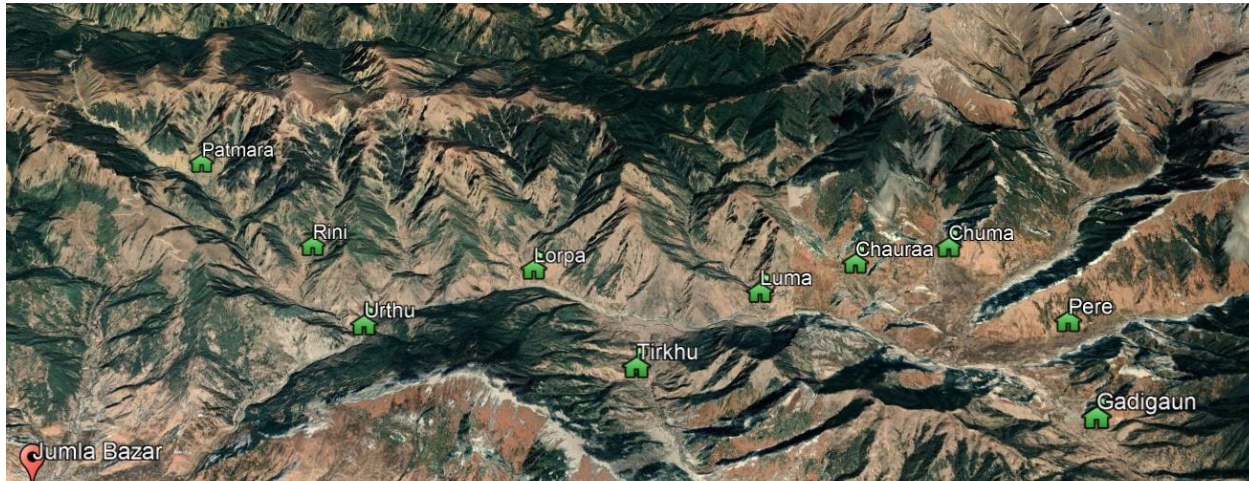
*What are people eating throughout the year? What is the nutrition status?*





# Ecological Survey

- ❑ Plant-pollinator visitation surveys
  - 11,000 plant-pollinator interactions recorded
- ❑ Pollinator exclusion experiment
  - Four major crops (apple, slipper guard, jumli bean, and pumpkin)



Custom-built survey app

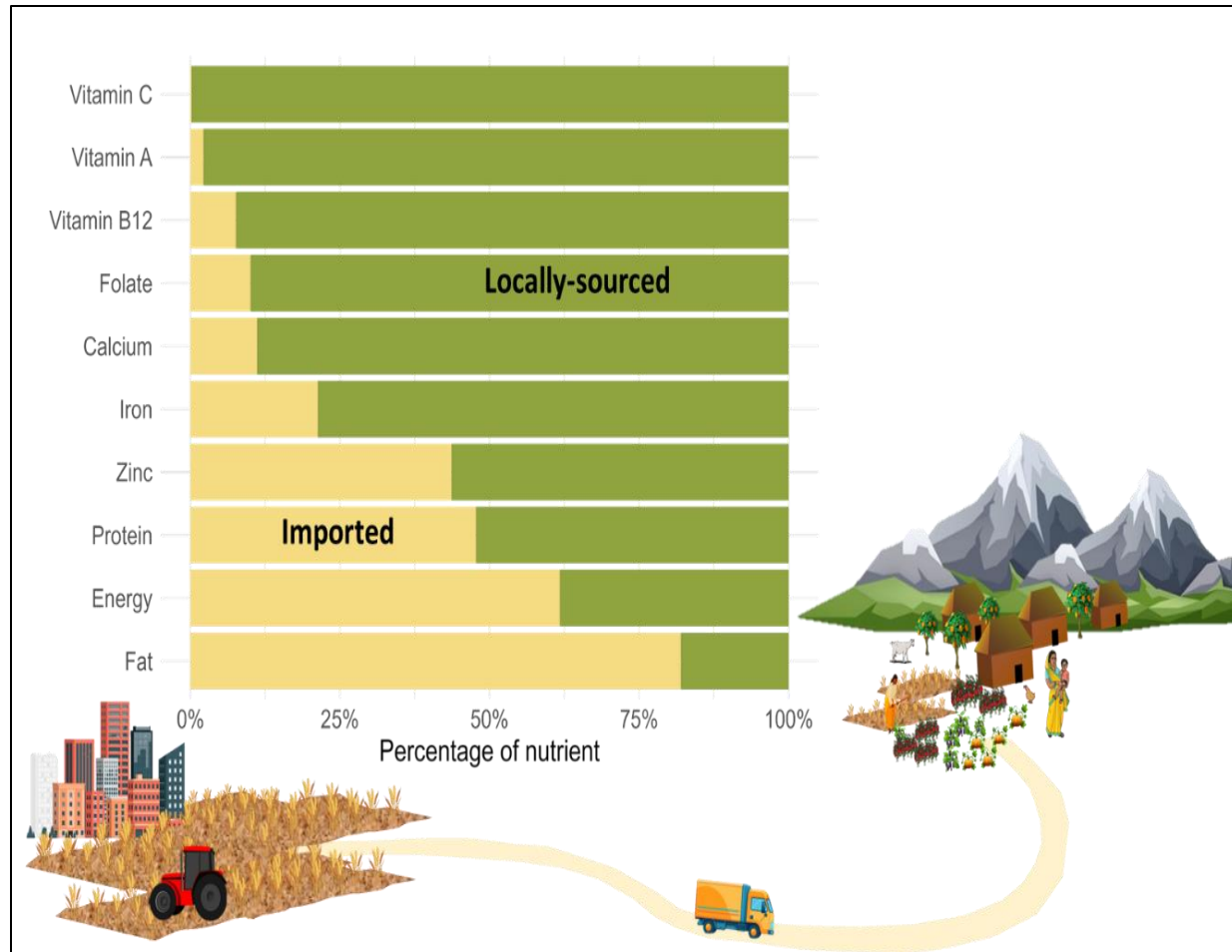


Local plant atlas with QR codes

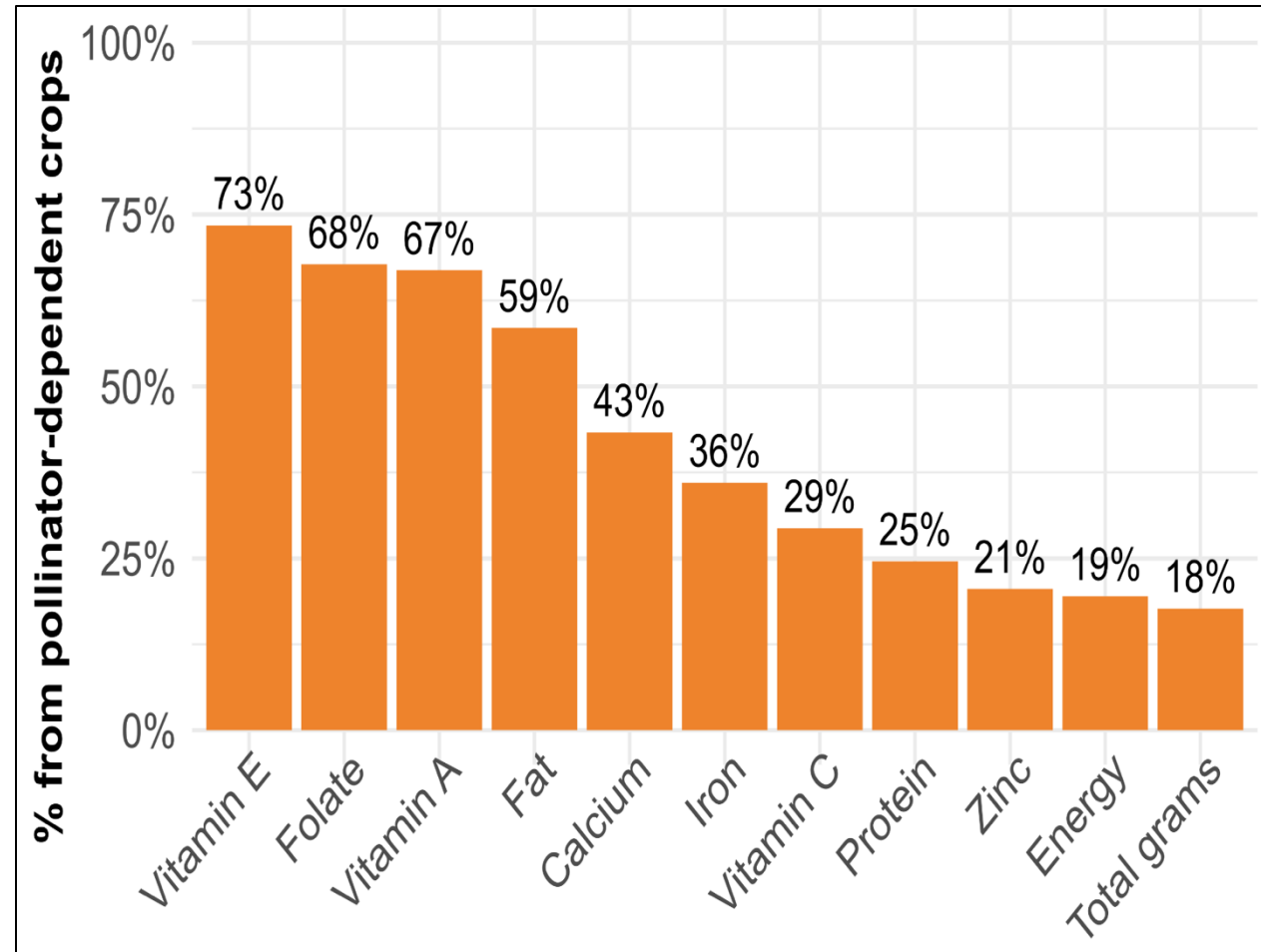


# Results/ Findings

# Nutrient Intake %: Local vs Imported Source



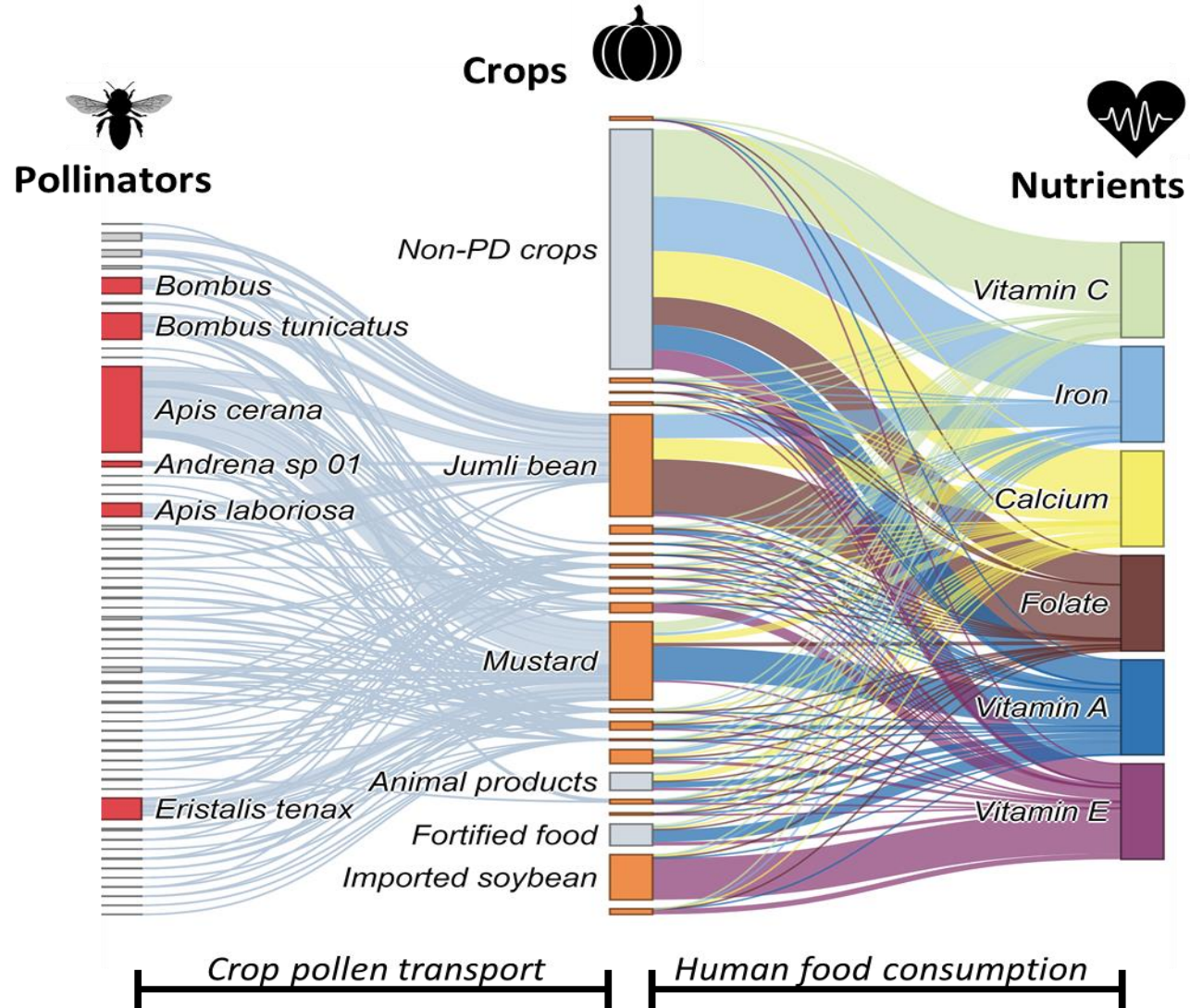
# Nutrient Intake %: PD Crops



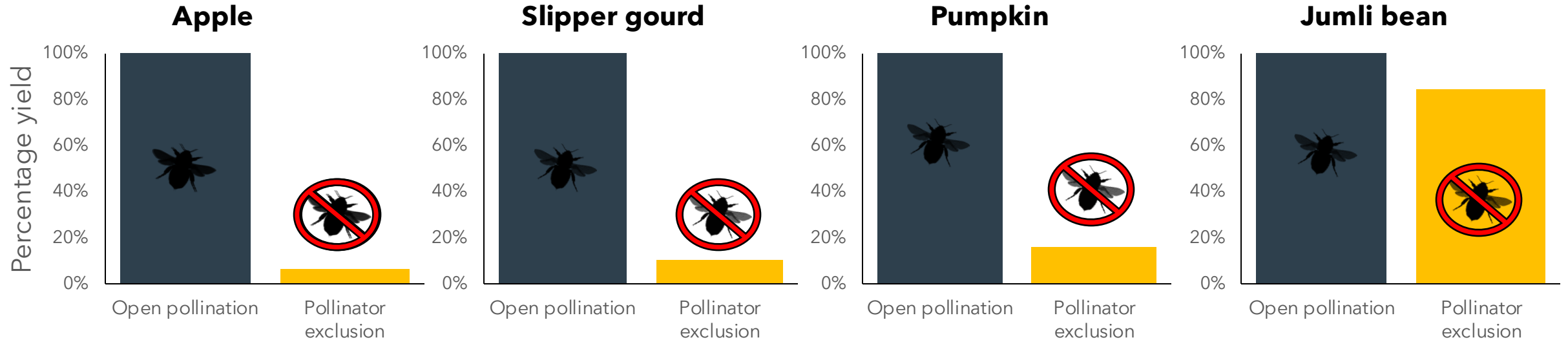
**93% of farming income comes from pollinator-dependent crops**



# Key Pollinator Insects for Human Nutrition



# Consequences of Losing Pollinators



Yield ↓94%



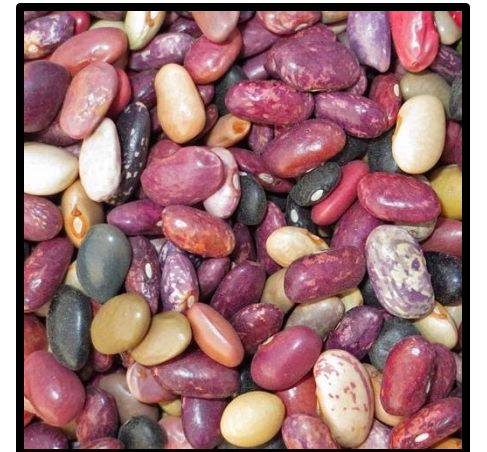
Yield ↓90%



Yield ↓84%



Yield ↓16%





# Pollinator Change Impacts

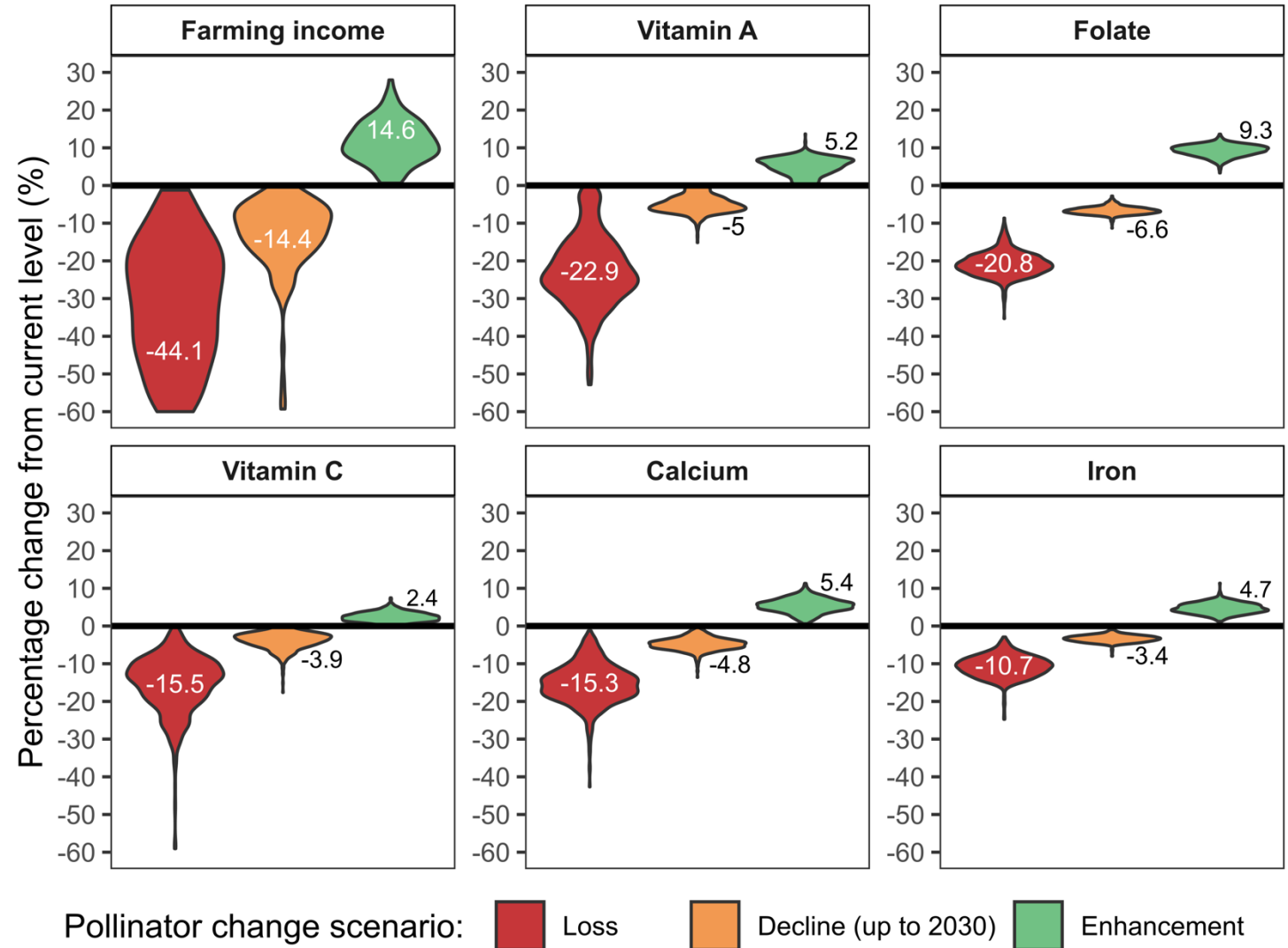
## Pollinator loss results in:

- 44% decline in household income
- 23% decline in vitamin A intake
- 21% decline in folate intake

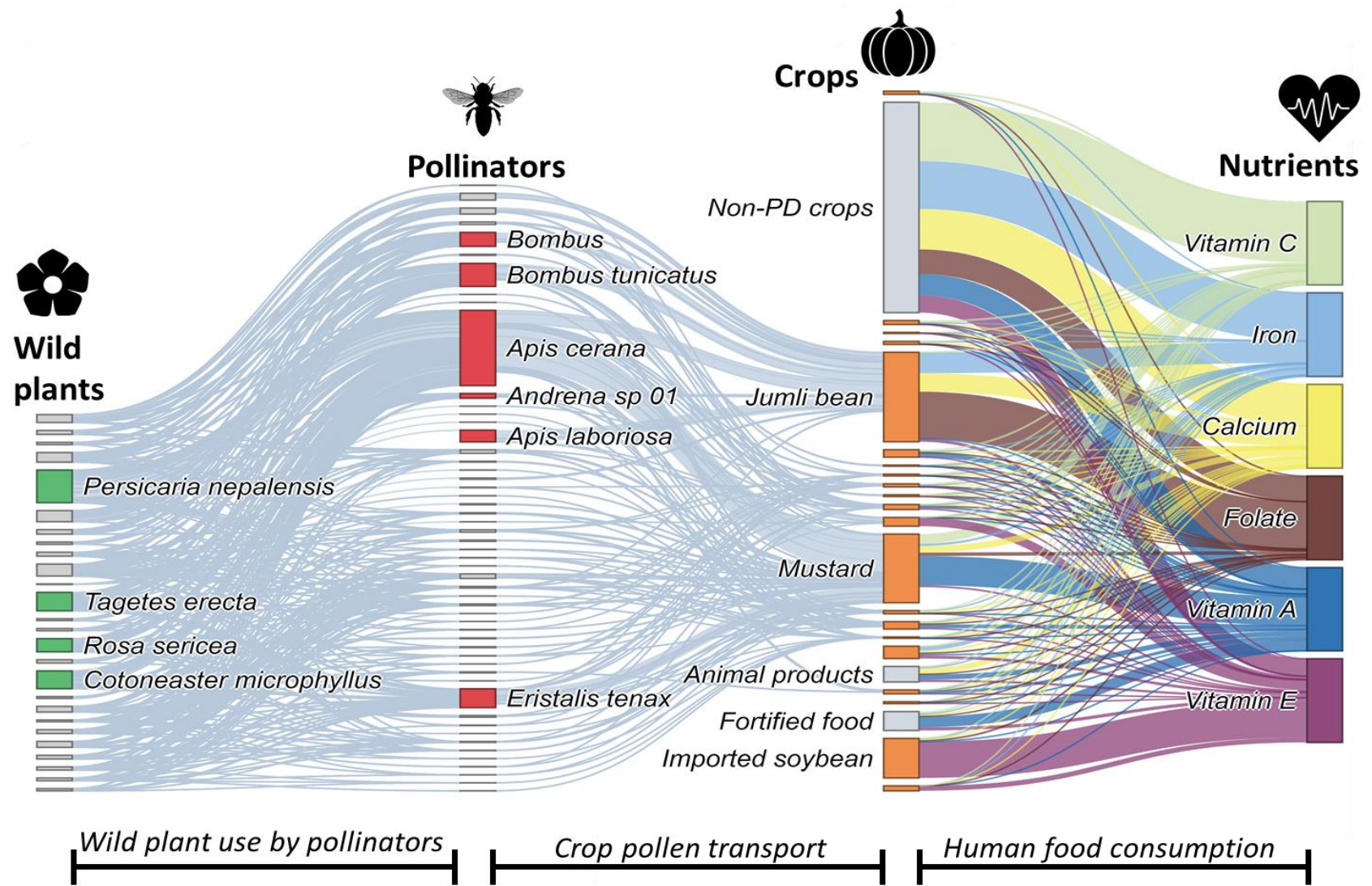
## Enhancing pollination services results in:

- 15% increase in household income
- 9% increase in folate intake

How can we safeguard & enhance the pollination service?



# Enhancing Pollination Services





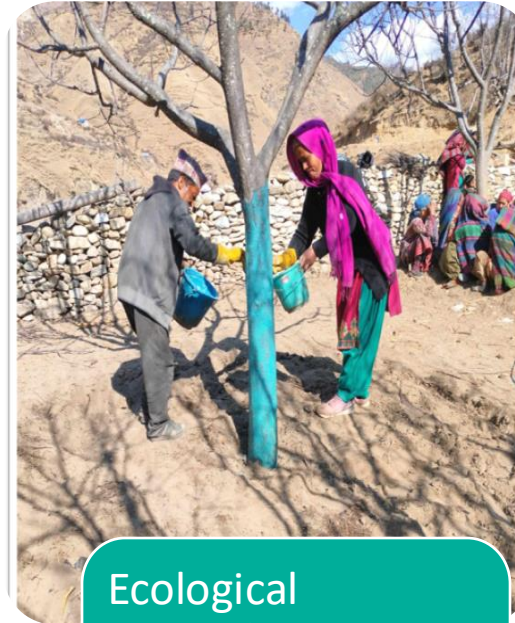
# Implications

# Pathway to Enhanced Health and Biodiversity



## Pollinator Management Approach

- Increases forage availability
- Enhances nesting habitats
- Beekeeping promotion



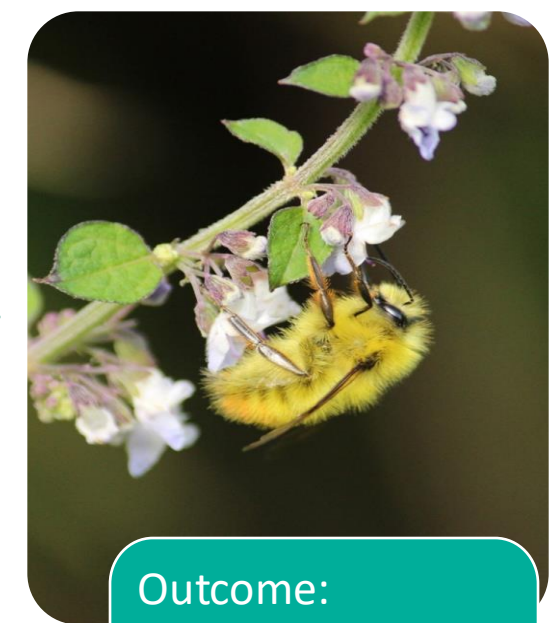
## Ecological Intensification

- Pollination services
- Biological pest management
- Nutrient cycling
- Water regulation
- Soil health improvement



## Social & Behavioral Dietary Changes

- Healthier diets through awareness and education



## Outcome: Enhanced Human Health & Biodiversity

- Improved nutrition
- Greater biodiversity



3-year interdisciplinary project studying the links between pollinators, human nutrition and climate change in rural Nepal

Ecology Team

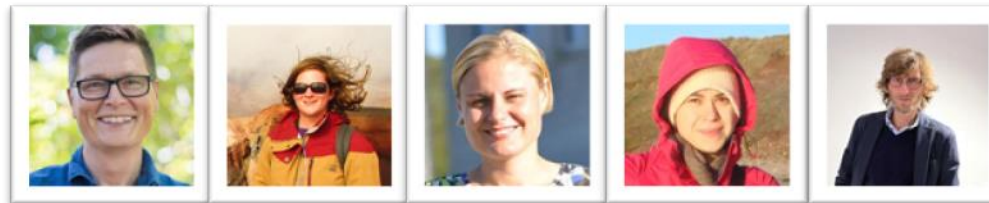
Nutrition Team



Jane Memmott & Tom Timberlake  
University of Bristol

Daya Bhusal & Kedar Devkota  
Tribhuvan University & AFU

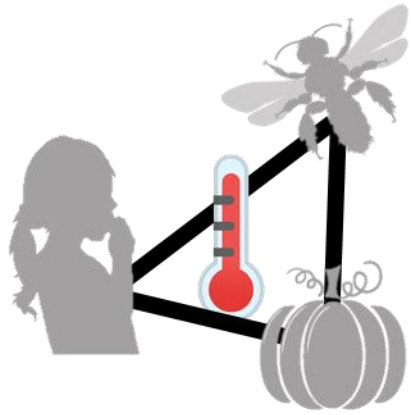
Sushil Baral, Deepak Joshi, Shradha Manandhar, Sujan Sapkota  
HERD International, Kathmandu



Tomas Roslin, Alyssa Cirtwill, Susanne Kortsch, Edith Villa Galaviz, Giovanni Strona  
University of Helsinki

Sam Myers & Matt Smith  
Harvard University

Naomi Saville & Helen Harris-Fry  
UCL & LSHTM



Micro-Poll Project



Ecological data collectors



Nutritional data collectors

