

MILLENNIUM VILLAGES ANNUAL GENERAL MEETING

JULY 25, 2009

ADDIS ABABA, ETHIOPIA

**PRESENTATION GIVEN AT THE AGRICULTURE AND
ENVIRONMENT PRE-RETREAT**



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Biogeochemical Ecosystem Services

Shahid Naeem

Ecology, Evolution, and Environmental Biology

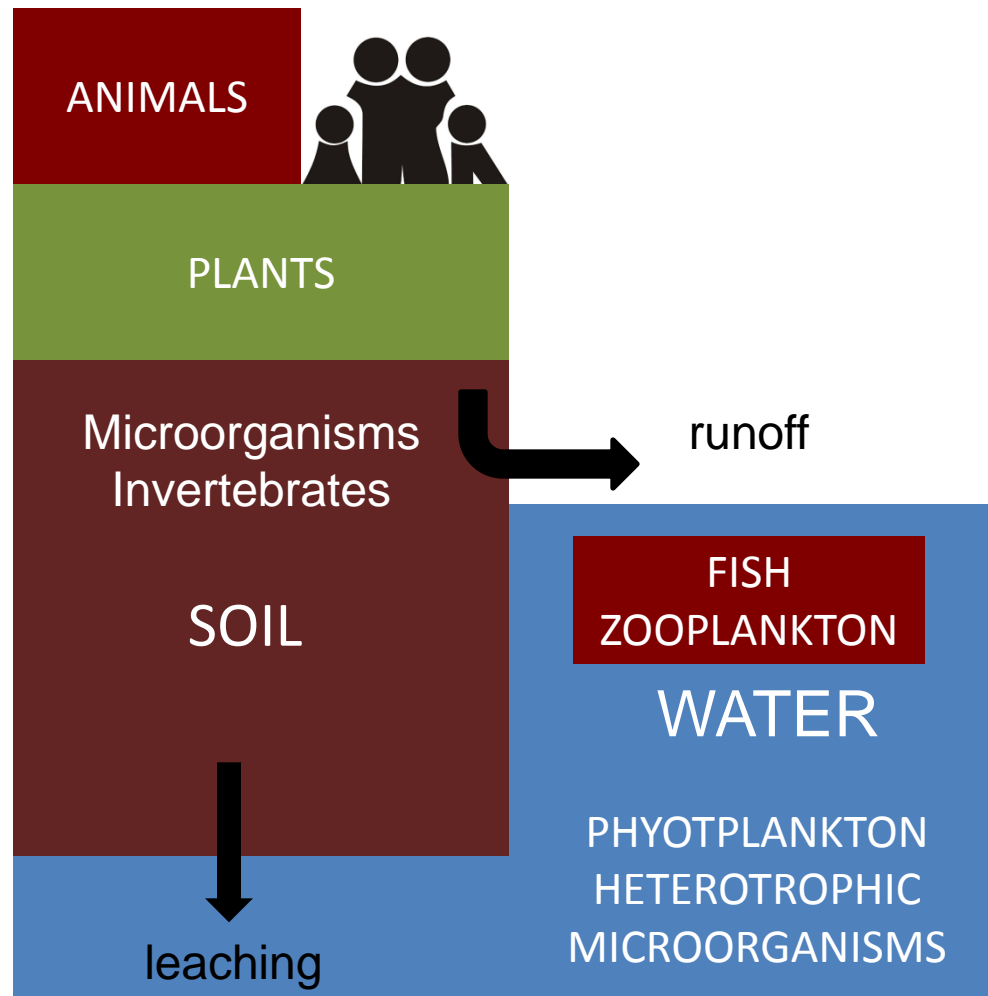
Columbia University

USA

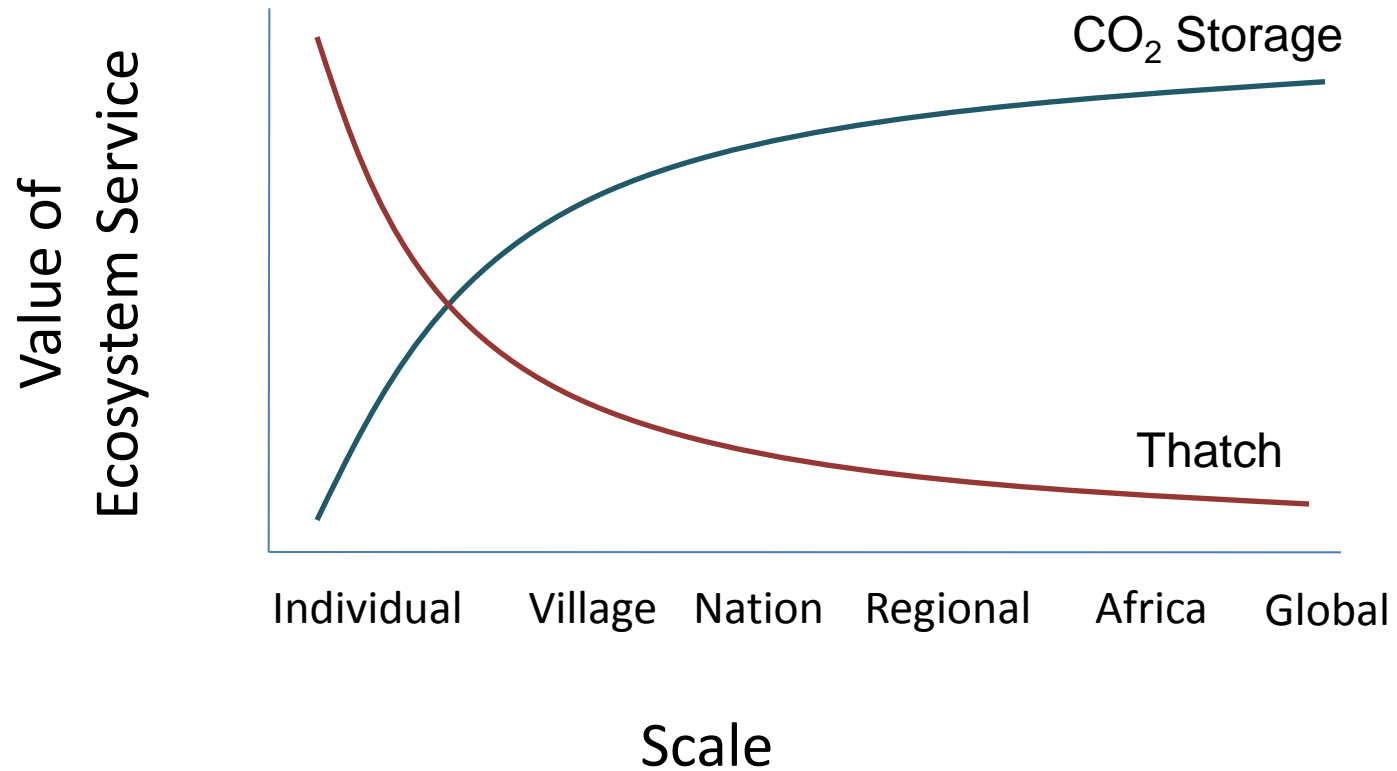
Four Key Issues to Implementing Ecosystem Service Based Development (in 5 minutes)

- Scale inversion
 - (e.g, bake, burn, or bank carbon)
- Interacting time lines
 - (e.g, bundles or packages)
- Correlations
 - (e.g, tradeoff and synergies)

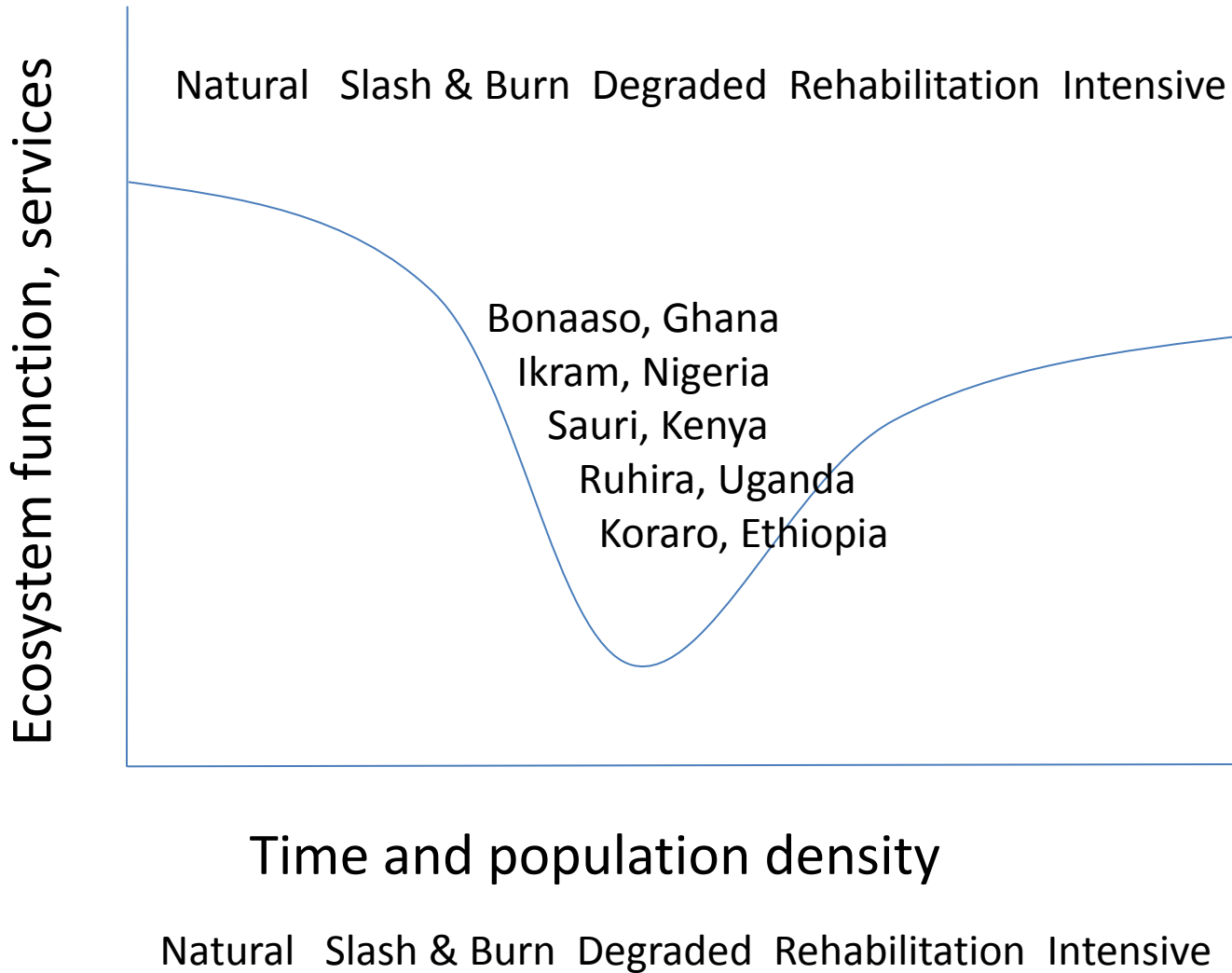
SERVICE ECOSYSTEM



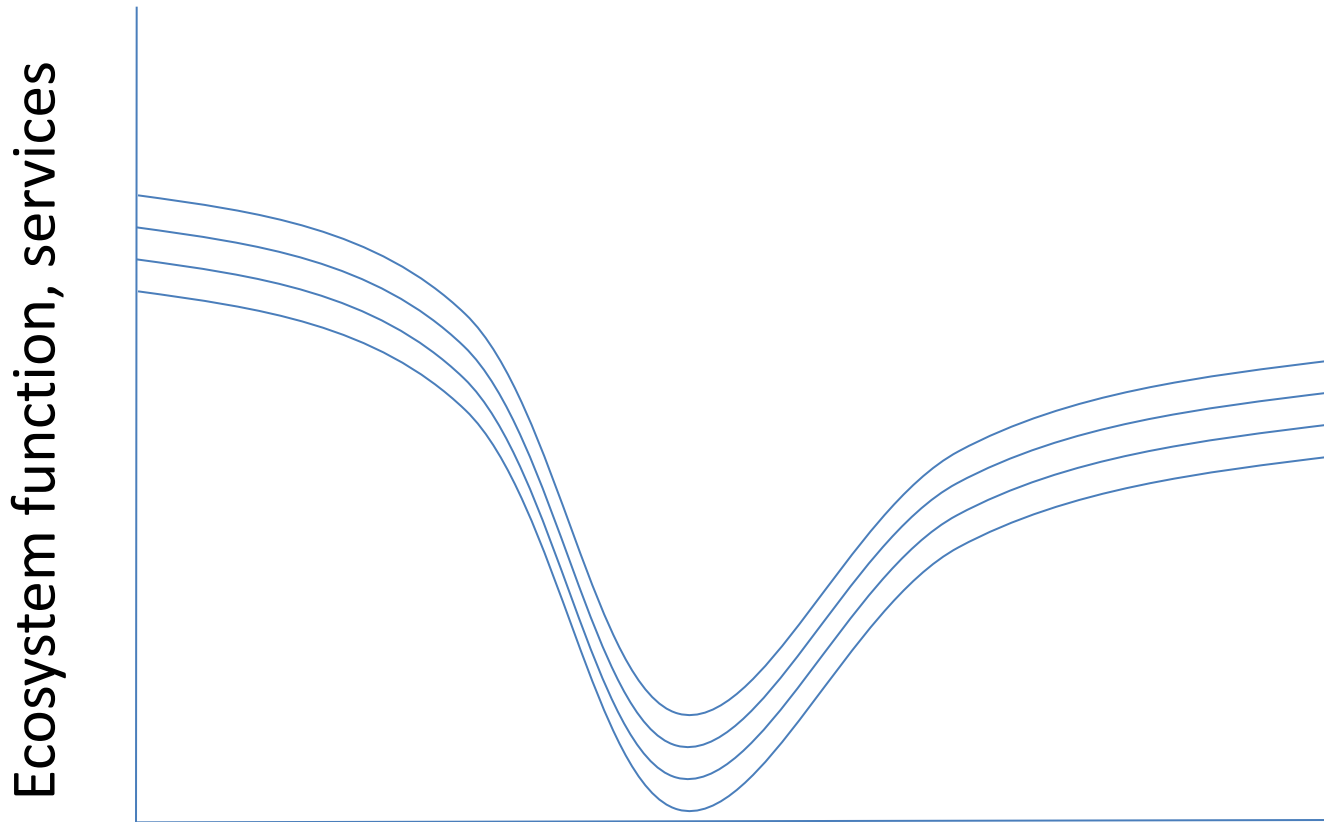
Ecosystem Services: Scale inversions



Ecosystem Services: Time line



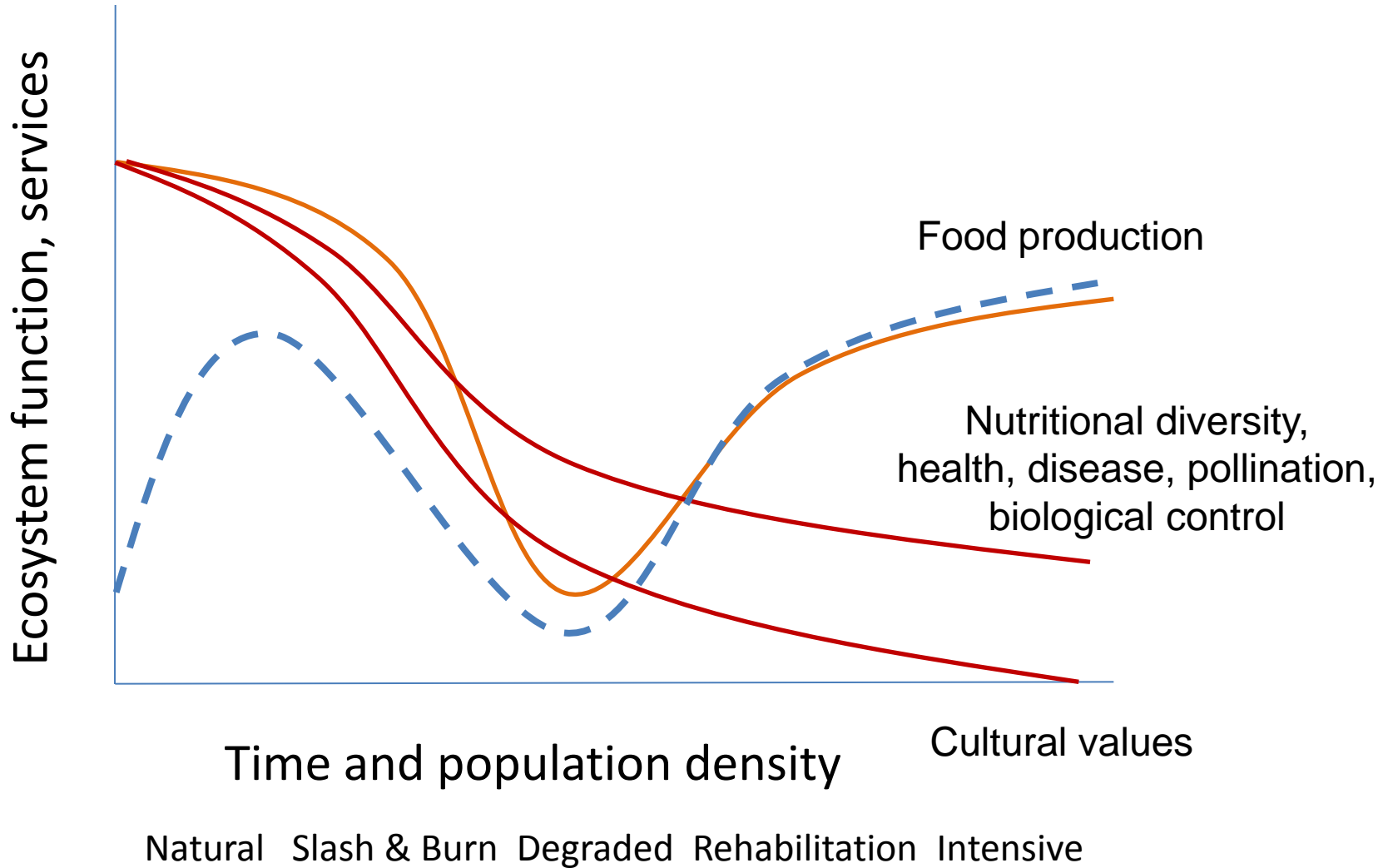
Assumption: All ecosystem services follow this trajectory?



Time and population density

Natural Slash & Burn Degraded Rehabilitation Intensive

Or does the bundle or basket of ecosystem services follow this trajectory?



Food, Fodder, Fuel Production and Forest

Soil Condition

- Erosion
- Nutrient cycling (N retention)

Greenhouse Gas Regulation

- C sequestration
- N₂O, CH₄, NO_x emissions
- Full accounting for fertilizer

H₂O Availability

- Infiltration
- Water storage
- Leeching
- Evapotranspiration

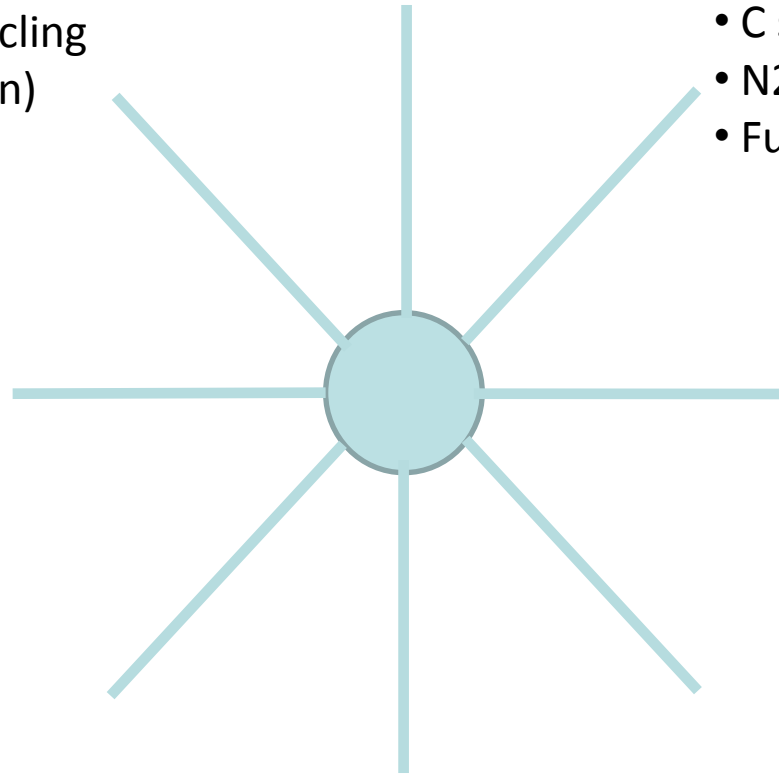
H₂O Quality

- NO₃⁻
- Sediment
- Pathogens

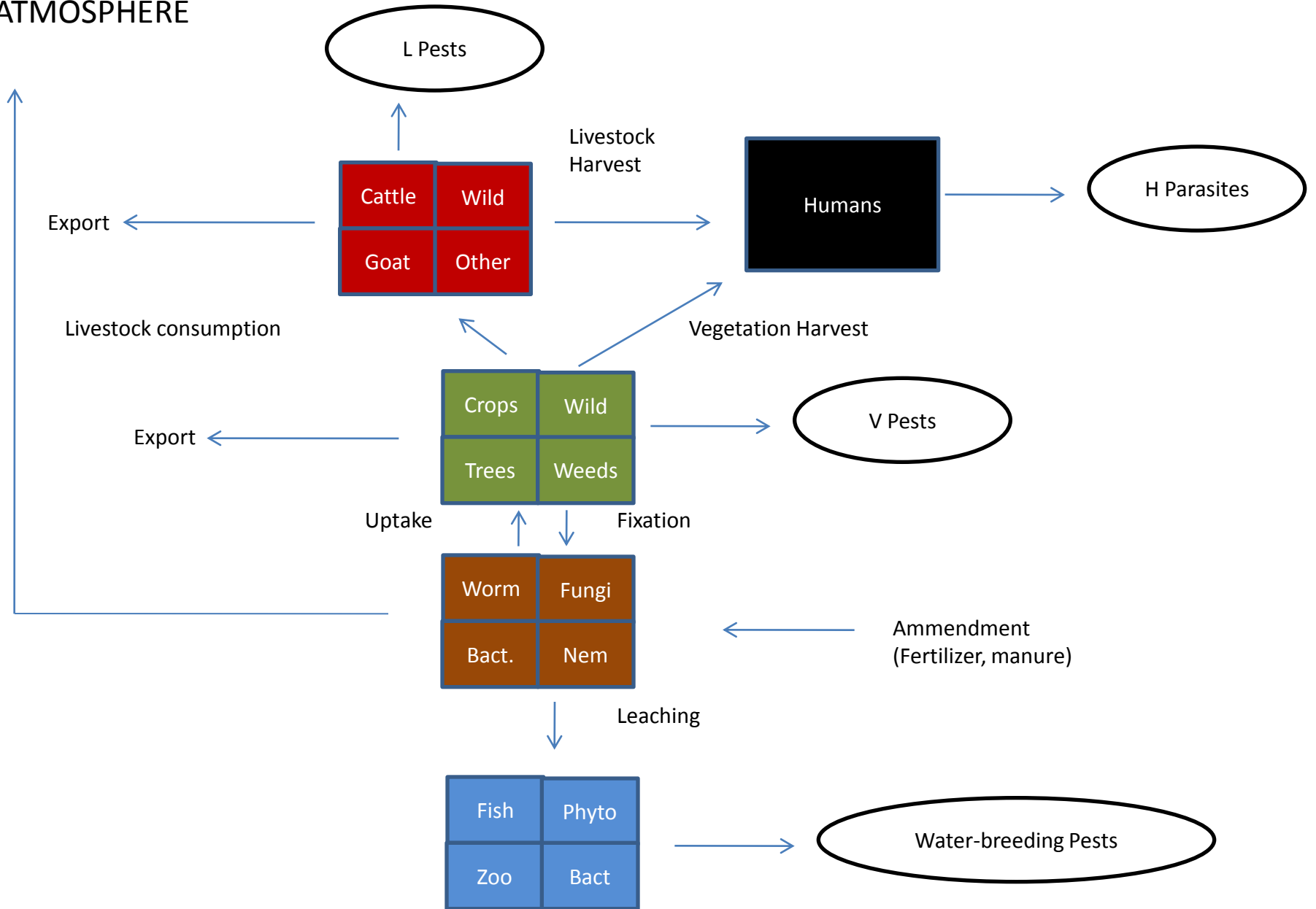
Disease Regulation

(Plants, animals, people)

- Major crop diseases associated with N management (Striga, streak viruses)
- Vector-borne diseases; Zoonotic (malaria, schisto) and chronic (malnutrition) diseases

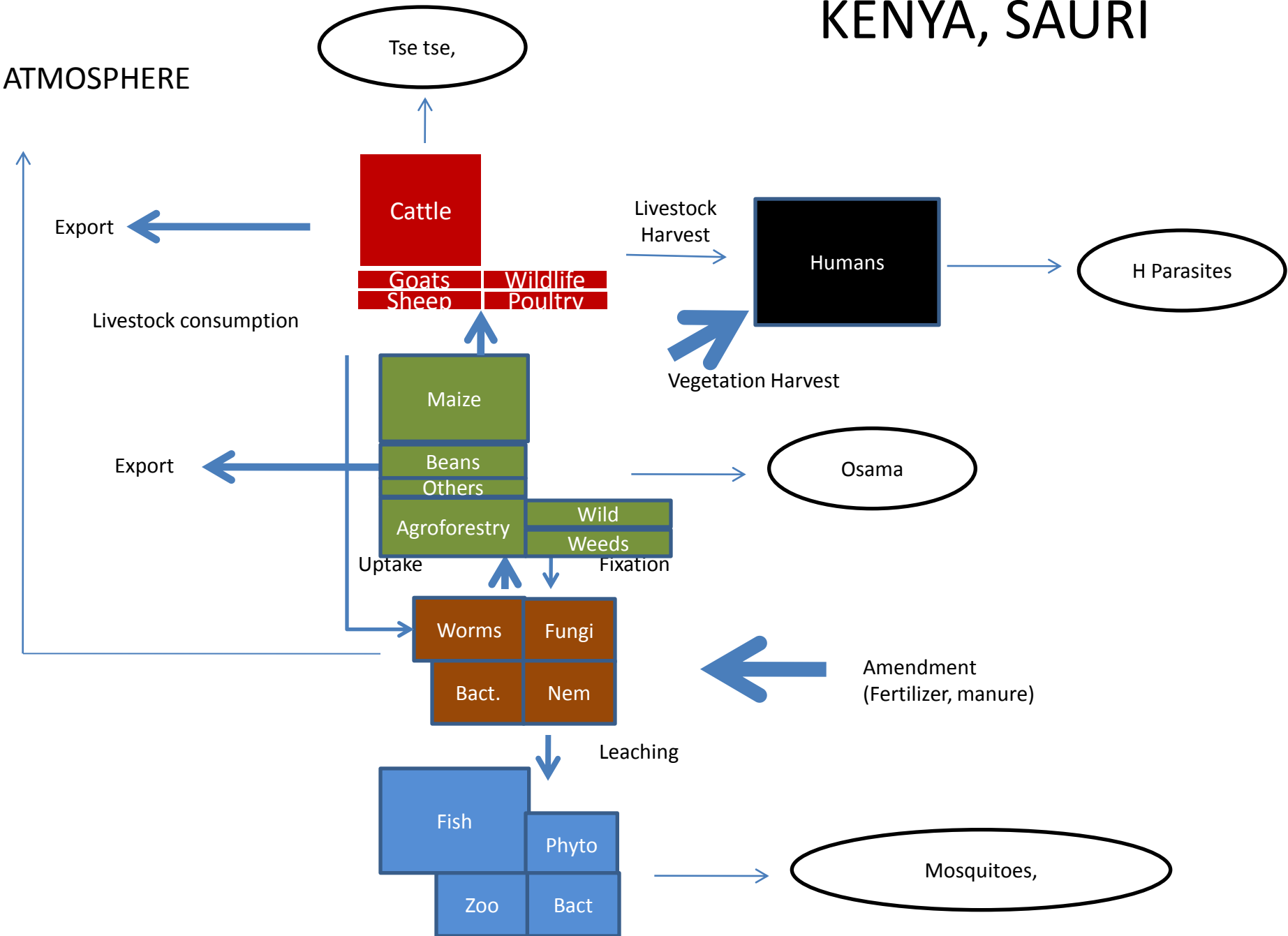


ATMOSPHERE



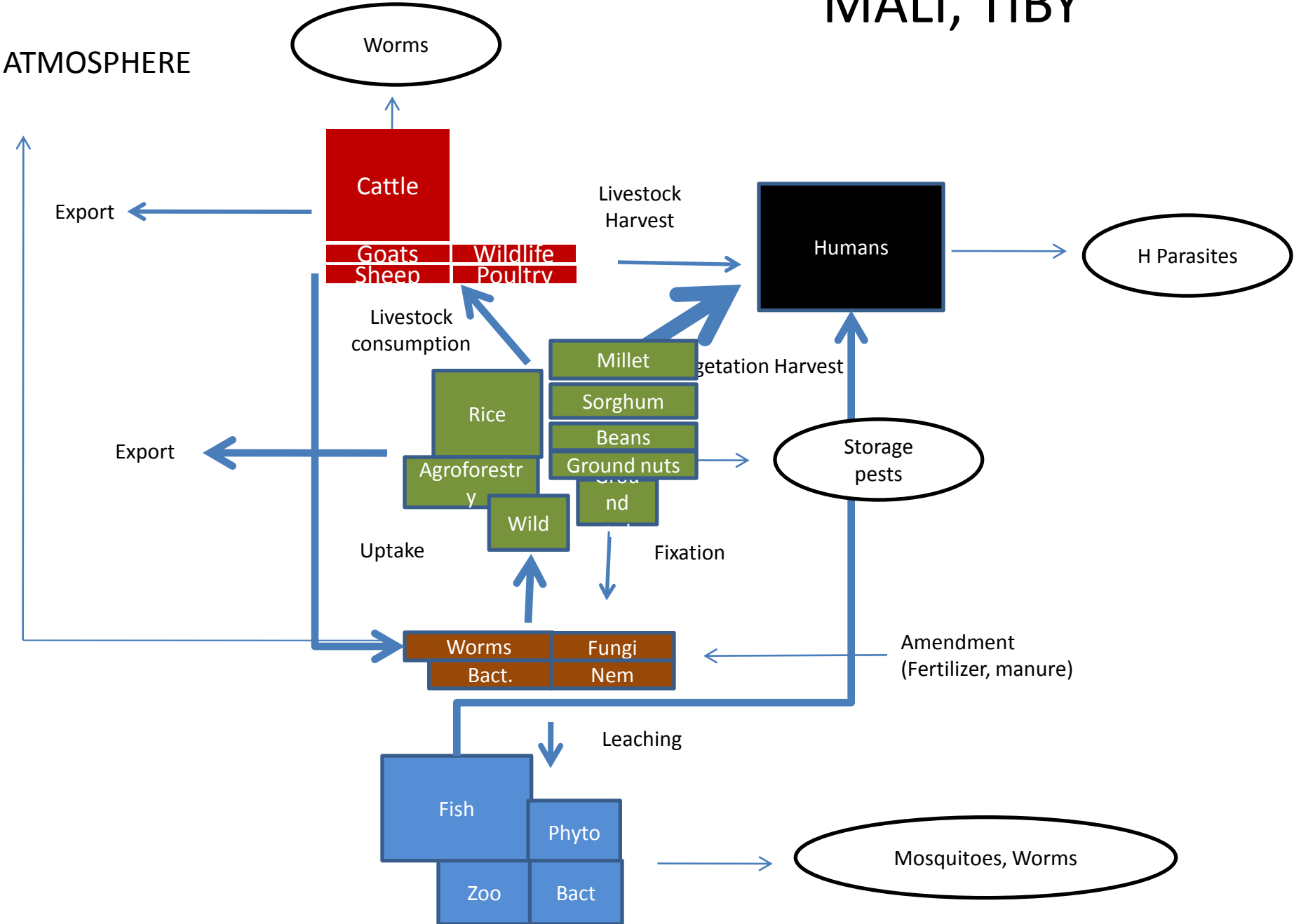
KENYA, SAURI

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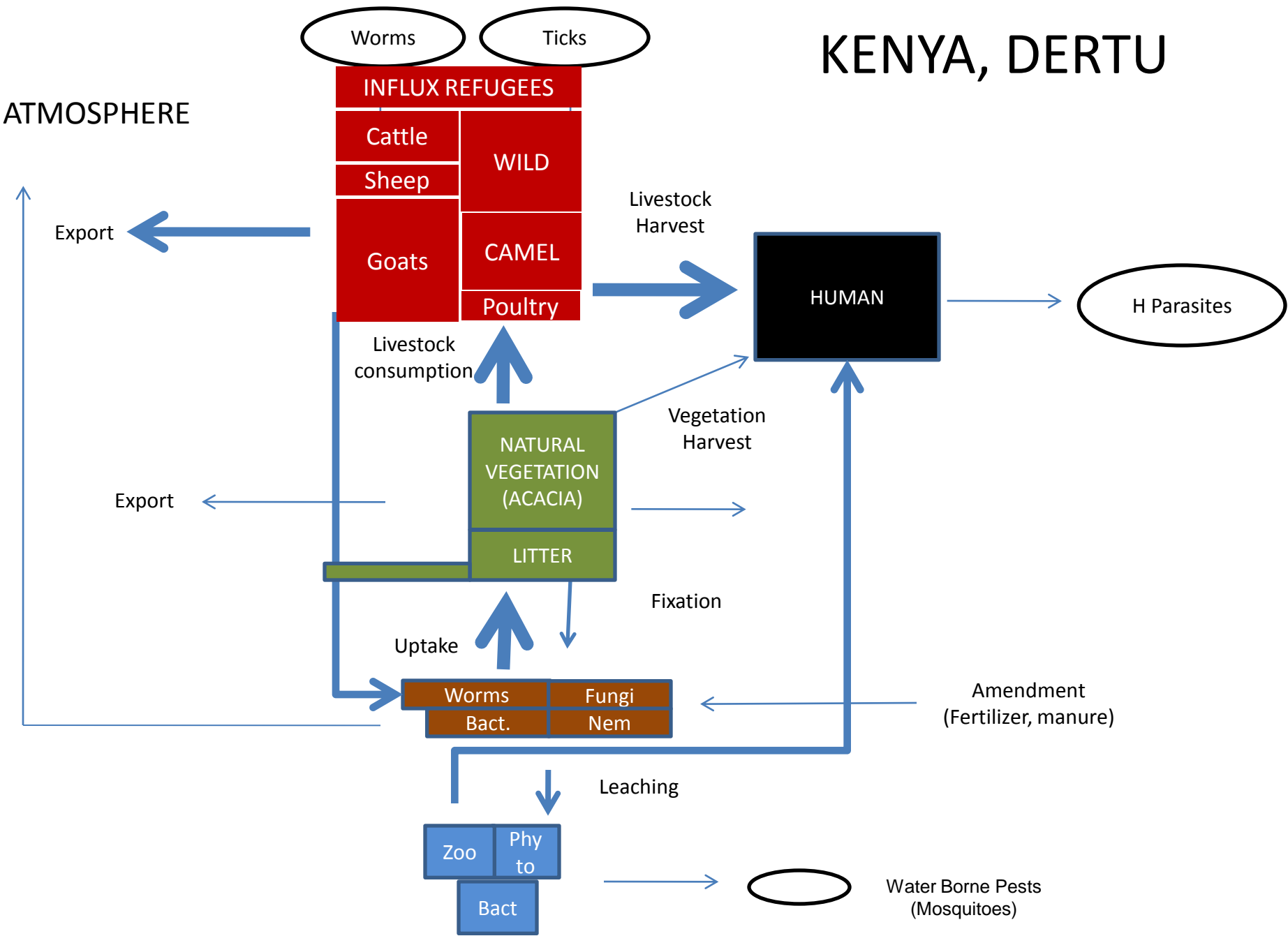


MALI, TIBY

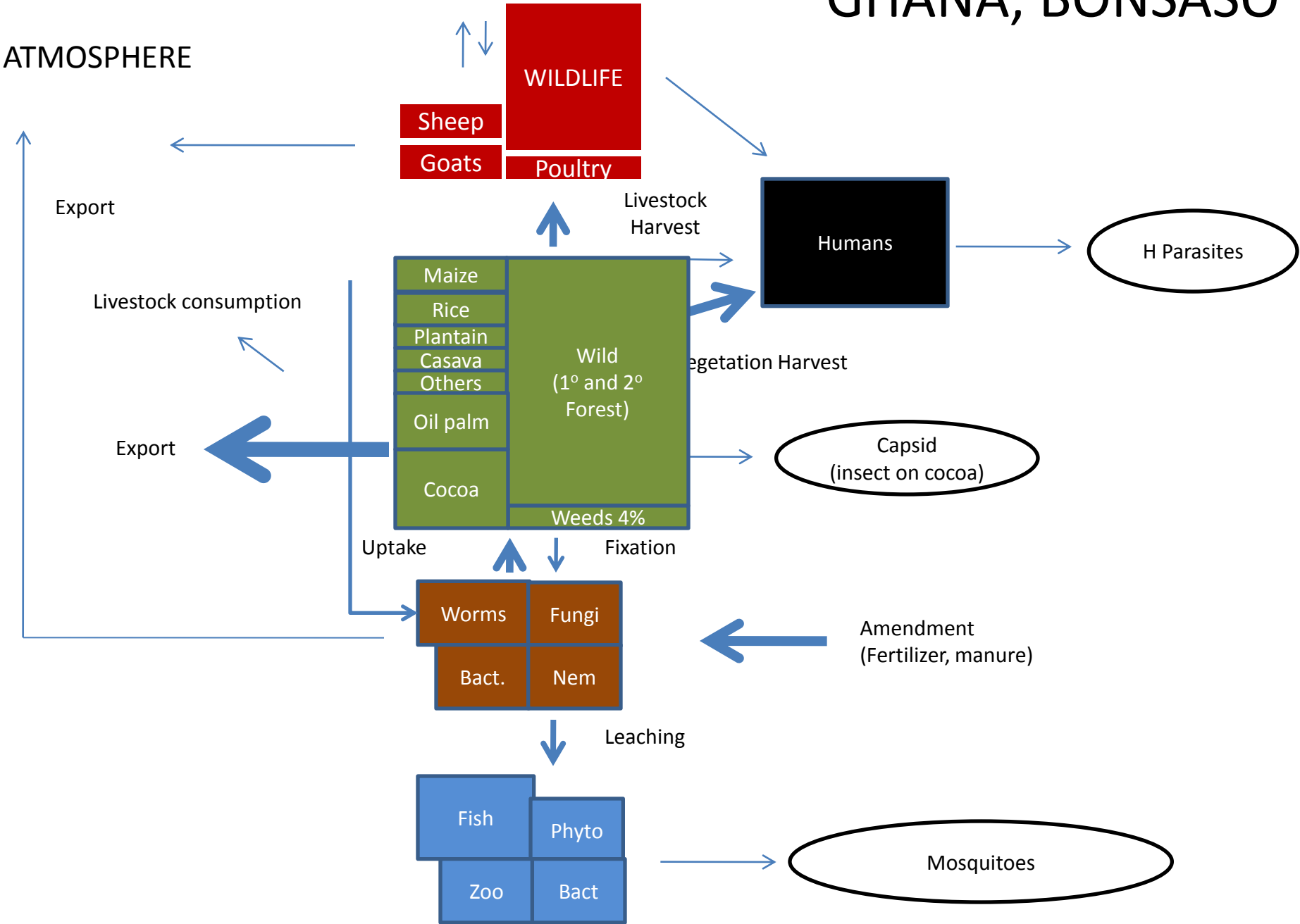
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KENYA, DERTU



GHANA, BONASO





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