

# Food Security and the Environment

Why do we need to study agriculture?



# Outline

- Forest environment
- Agroforest environment
- Pigs (environment)
- Food security





A satellite image of a coastal island, likely in the Pacific Northwest, showing various land use zones. The island is surrounded by dark blue water. Three red circles are overlaid on the image to highlight specific areas. The outermost circle encompasses the entire island and is labeled 'mangrove forest coastal lowlands'. The middle circle is labeled 'steep upland forest'. The innermost circle is labeled 'managed lava terraces'. The terrain is a mix of green, brown, and white, indicating different vegetation and land management practices.

**mangrove forest  
coastal lowlands**

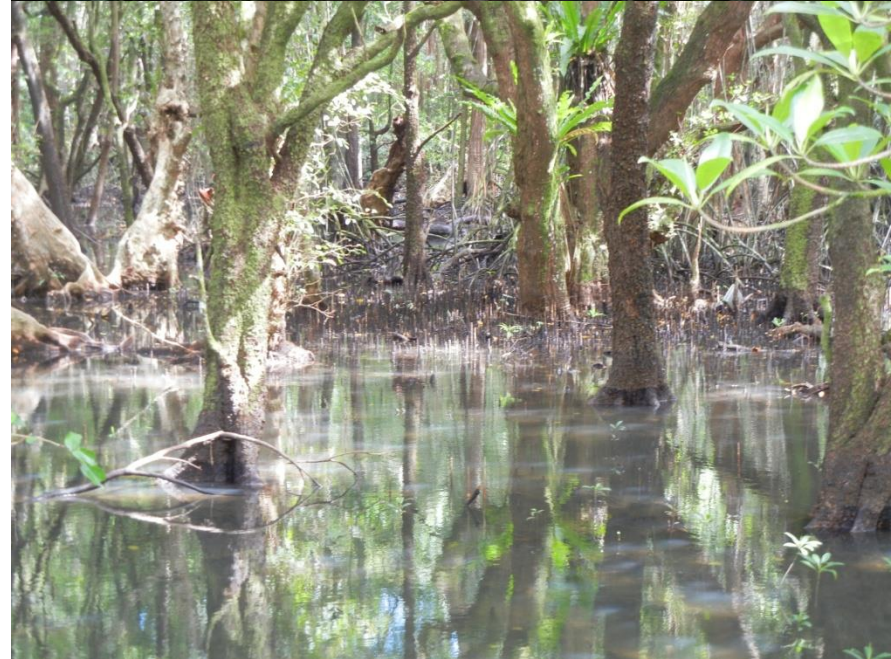
**steep  
upland forest**

**managed lava terraces**



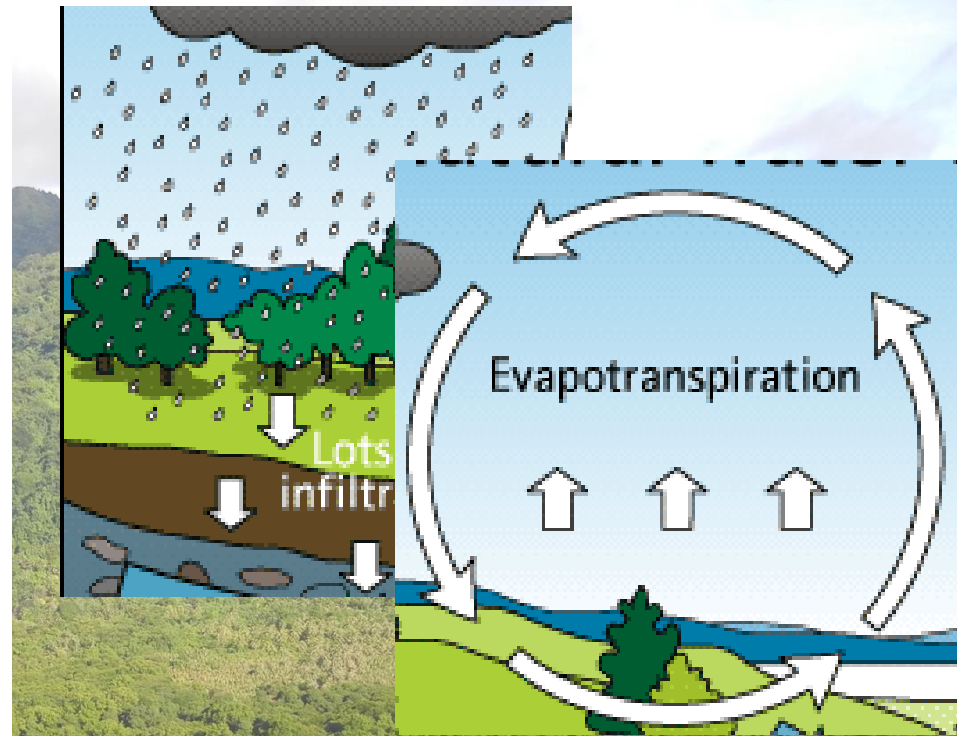
# Forest Ecosystem

- Upland forest (*wahl*)
  - High biodiversity
  - Wildlife habitat
  - Water/nutrient cycling
- Swamp forest (*lepwal*)
  - Wildlife habitat
  - filter
- Mangrove forest (*naniak*)
  - Wildlife habitat
  - Coastal protection  
(barrier/filter)



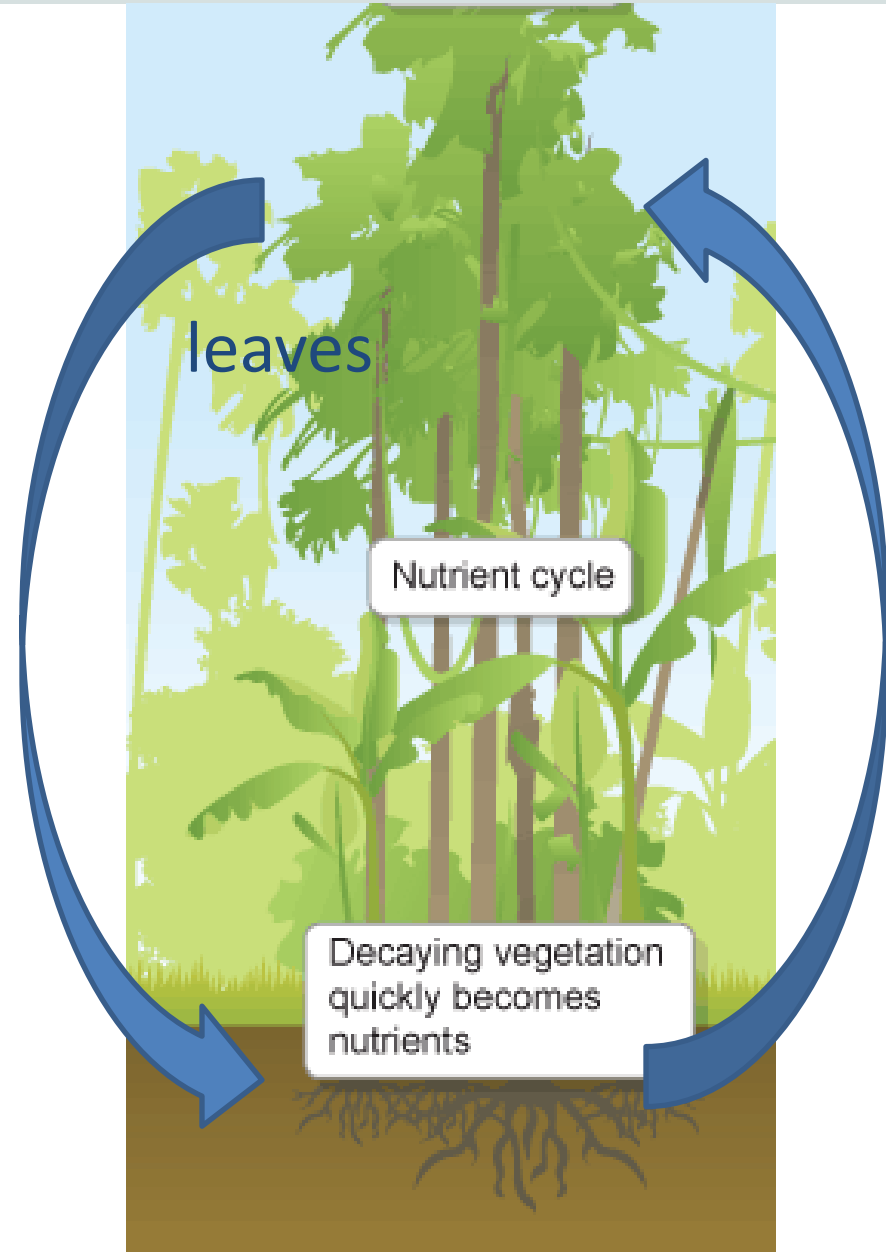
# Forests and the Water Cycle (Pihl)

- Upland forest (*wahl*)
  - Increases water infiltration
    - Water storage
  - Reduces runoff/erosion
    - Clean streams and ocean
  - Returns water to air
    - Water recycling
- Mangrove forest (*naniak*)
  - Protects land against wave action
  - Prevents sediments from entering ocean



# Forests and Nutrient Cycling

- Inputs and decomposition
  - Leaves, wood, animal inputs
  - Decomposition
  - Nutrient supply and storage
- Roots
  - Nitrogen fixation
  - Fungi
  - Nutrient recycling

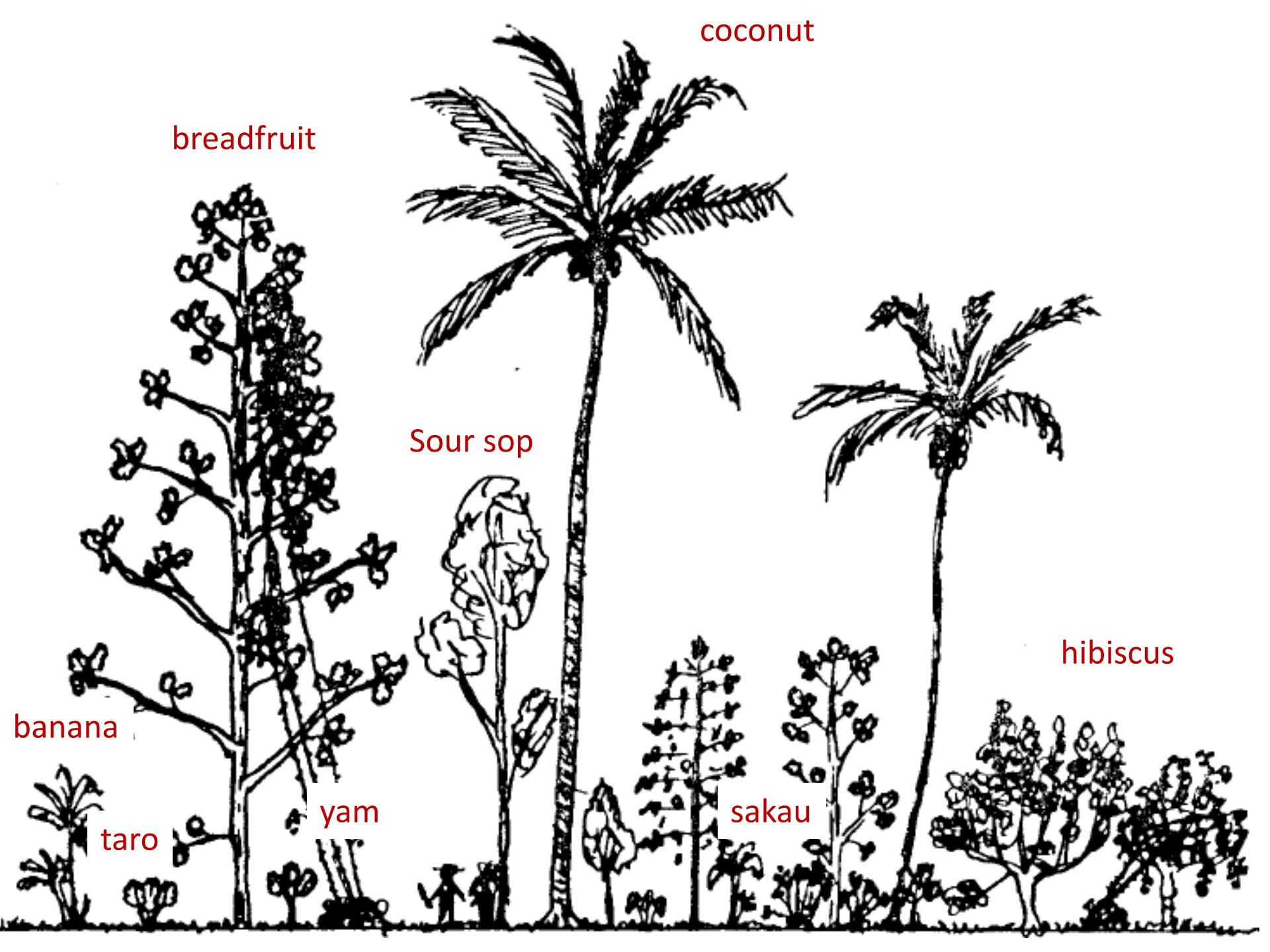




# Agroforest (pahnwel)

- Traditional system with > 2,500 years of history
- Mimics a forest
  - Minimal external inputs
  - Minimal soil disturbance
  - Depends on natural nutrient cycles
  - Protects soil and water resources
- Multi-level and biodiverse
  - Stable
  - resilient





coconut

breadfruit

Sour sop

hibiscus

banana

taro

yam

sakau



# Agroforest and Pigs



- Wash down system
- Source of pollution and disease



# Manure: the bad



- Smelly and an eyesore

- Pollutes water
- Source of disease



# Manure and Water

## Water Quality

- nitrogen and phosphorus in manure causes algae growth in water
- Negative effect on aquatic life and coral reef

## Human Health

- Bacteria in fresh water causes human diseases
- Diarrhea and leptospirosis





# Manure: the good



- Energy (biogas)

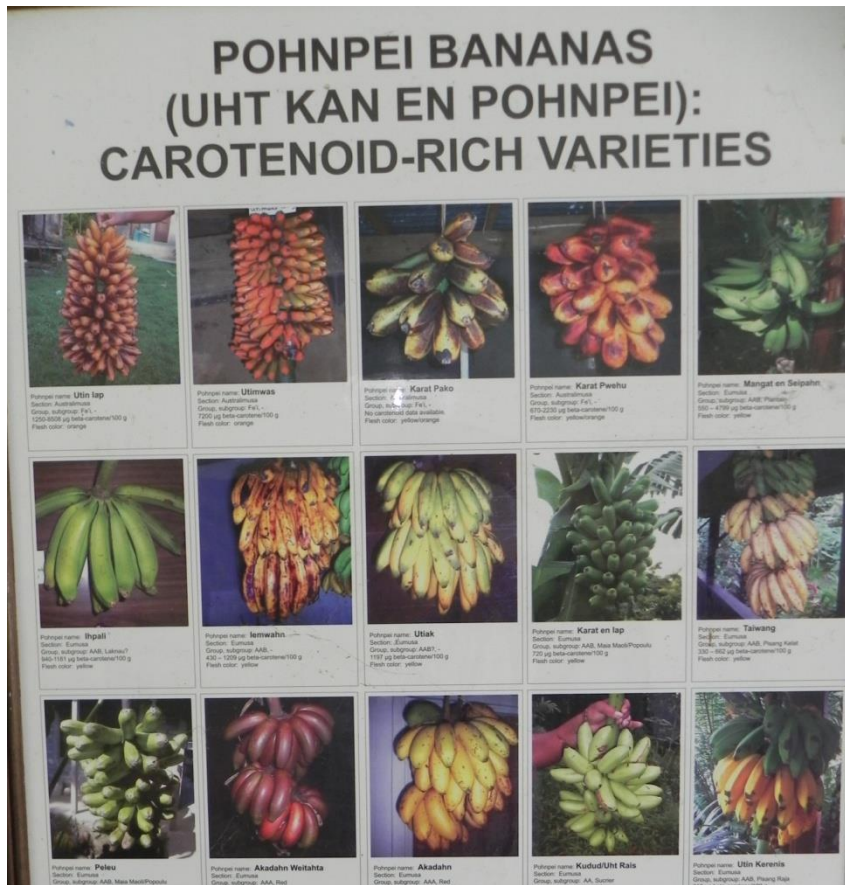


- Fertilizer and soil conditioner (compost)



# Agroforest and Food Security

Food security: adequate **supply** and **access** to **nutritious** food



# Current Challenges

- Increasing population
- Environmental degradation
  - Land activities affecting fresh water and marine resources
- Declining agricultural productivity
  - Soil fertility
  - Interest in farming
- Increasing dependence on unhealthy imported processed food
- Declining human health





# Way Forward

- Promote local food production and consumption
- Enhance soil fertility and quality by integrating animal production systems into agroforest
- Engage and train the youth
- Engage in social marketing







**KALAHNGAN!**