

**Session 2**  
**Design Strategies: Incorporating Agroecological Strategies**

**Speaker: Ben Falk**

- Has worked on his 10-acre homestead in central Vermont for the past 11 years
  - The soil profile is extremely shallow—at most, there are 12 inches of soil before bedrock
  - Out of necessity, has had to farm in way that protects against any further erosion
  
- “Permaculture”: ecological restoration with human services
  - There is no one prescriptive list that leads to improving a farm
    - Context matters
    - The climate, soil type, and slope of landscape are all determine what techniques are feasible and appropriate
  
- **Guiding principles:**
  - Success is achieving maximum output with minimum inputs
    - Example: Black locust trees—with their rapid growth and nitrogen-fixation—can quickly and cheaply improve soil fertility while providing biomass for wood-heated stoves
  - Management should pair biological complexity with technological simplicity
    - Example: using the co-evolution of ducks and rice to the farmer’s benefit
      - Ducks cannot tolerate the high silicate content of rice stems
      - When released into the paddies, they will consume all other vegetation but leave the rice untouched
      - This system of weeding relies on no external technology, allowing it to operate as a “closed system”
  - Structural diversity begets biological diversity
    - Example: similar to the way that a sunken boat can be converted to an artificial reef teeming with marine life, rock walls or terraces can provide microhabitats for different species on the farm
  - Biodiversity is integral to the overall health and function of an agroecosystem
    - Resilience = Diversity x Redundancy x Connectivity x Manageability
      - The diversity of species, the redundancy of ecological roles, and the connectivity between different organisms all act as a buffer against abrupt shocks to the system
      - Manageability allows the farmer to guide the system effectively
    - Regeneration metric = biomass x biodiversity
      - When external forces (i.e., extreme storm) affect the ecosystem, those with high biomass and biodiversity recover quicker and more fully than systems with low biomass and biodiversity