

Ecosystem function

Ecosystems involve **complex interactions** between all living things and their **environment**. These **dynamically change over time** but at their core involve the **cycling of energy**.

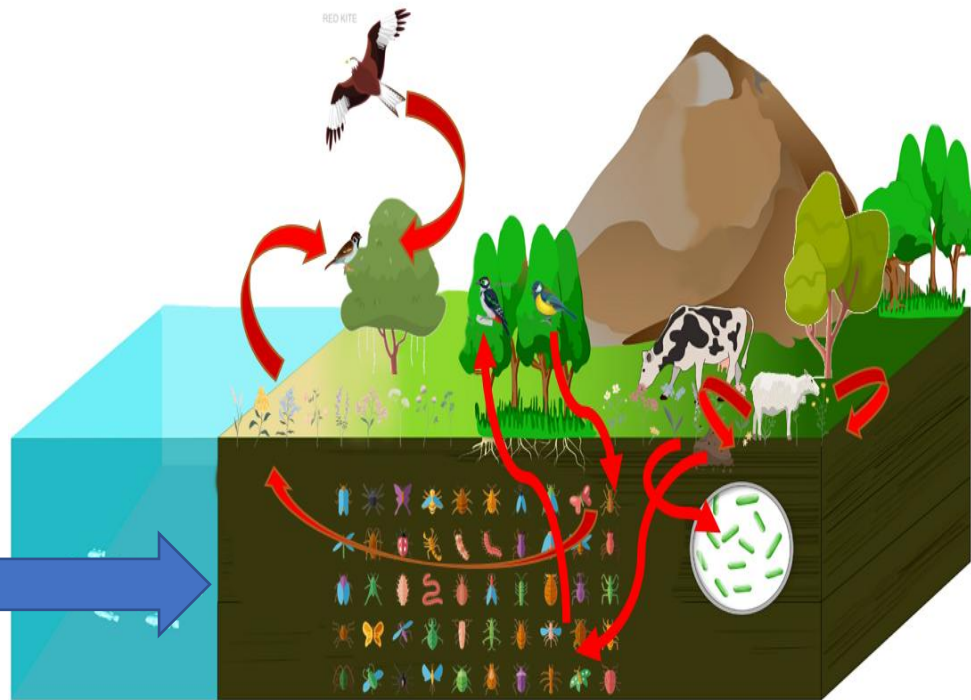
Interactions in ecosystems are linked via flows and cycles of **food, nutrients, energy sources & materials** they also contribute to;

- ◆ **Habitats**
- ◆ **Shelter and protection**
- ◆ **Regulating competition between species & resources**

Systems naturally act to find **equilibriums** between these

Only a certain amount of livestock can survive on the available land resources so mortality and births achieve equilibrium

The more **biodiverse a system** is **the more resilient and flexible to adaptation it is**



Change

Insect species reduce due to increased numbers of a specific prey bird

Storms fell larger shallower rooting trees

Changes lead to fewer livestock deaths producing more manure, nitrogen (N) and carbon dioxide (CO₂)

New insect species migrates and starts eating and causing disease in certain trees

Adaptation

Diverse insect options allow other impacted bird species to find new insect food source

Other species will survive and be able to act as protection and shelter for the understory plants, birds, insects and livestock

Variety of niche plant sources can increase in abundance to use these resources sequestering C and reducing free available N for leaching

Other trees survive and higher bird biodiversity increases the chance there will be a natural predator for this insect forming **natural biological controls**

Humans cause a lot of environmental changes due to physical and biological impacts

Industrialisation



↑ CO₂ + global temp
↑ Environmental pollution

Changes weather patterns and what animals and plants can survive

Can increase mortality of some organisms whilst acting as a food source for others

Non-native species introduction



Biodiversity shifts due to competition and food source preference

Can carry / influence new diseases developing to native species

Deforestation



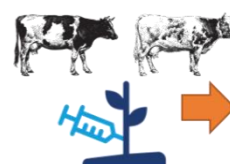
↓ C sequestration
↓ Habitats
↓ Soil health and water maintenance

Changes weather patterns and what animals and plants can survive

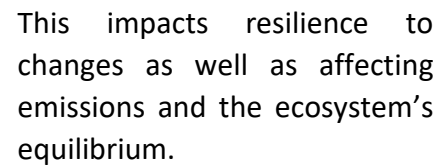
Reduces biodiversity

Impacts biodiversity and can lead to further habitat changes

Targeted breeding and modification



Ecosystems change from natural balance
Productive breeds replace more biodiverse native breeds
Niche efficiencies lost



Change	Impact
Insect species reduce due to increased numbers of a specific prey bird	Ecosystem lacks other food sources and birds migrate away reducing biodiversity – Potentially increasing pest production impacts
Storms and human activity fell monoculture tree species	Shelter and habitats for other organisms are removed reducing biodiversity, soil health, productivity and welfare of livestock and C sequestration
Changes lead to fewer livestock deaths producing more manure, N and CO ₂	In low biodiversity systems, low species diversity pastures that are regularly re-seeded with set species, cannot naturally compensate for the increased manure from more animals, this can also increase N runoff and associated emissions
New insect species migrates and starts eating and causing disease in the monoculture trees	System collapses occur as these trees are removed and thus shelter and habitats for other organisms are removed reducing biodiversity, soil health, productivity and welfare of livestock and C sequestration

There are, however, potentials for **improvements in ecosystems** through some agricultural changes

Practice	Impact
Species rich pastures and crop mixes	Plant, insect, wildlife food and habitats
	Fertilisers & climate damage
	Resilience + soil health
Agroforestry / tree planting	C sequestration
	Habitats and protections
	Soil health & water maintenance
Cover crops	C release and run-off
	Habitat stability
	Soil health & water maintenance
Targeted biological control	Off target impacts of Pesticides & herbicides
	New food sources
	Species loss due to damage and disease
Zero/min tillage	Soil health & water maintenance
	CO ₂ release
	Habitat stability
Mixed grazing strategies	Selective grazing
	Niche habitat availability
	Animal losses due to disease / parasites