The importance of systems thinking in agroforestry

Plenary 3 - Agroforestry Innovation and Farmer Engagement

Tim Pagella (t.pagella@bangor.ac.uk)

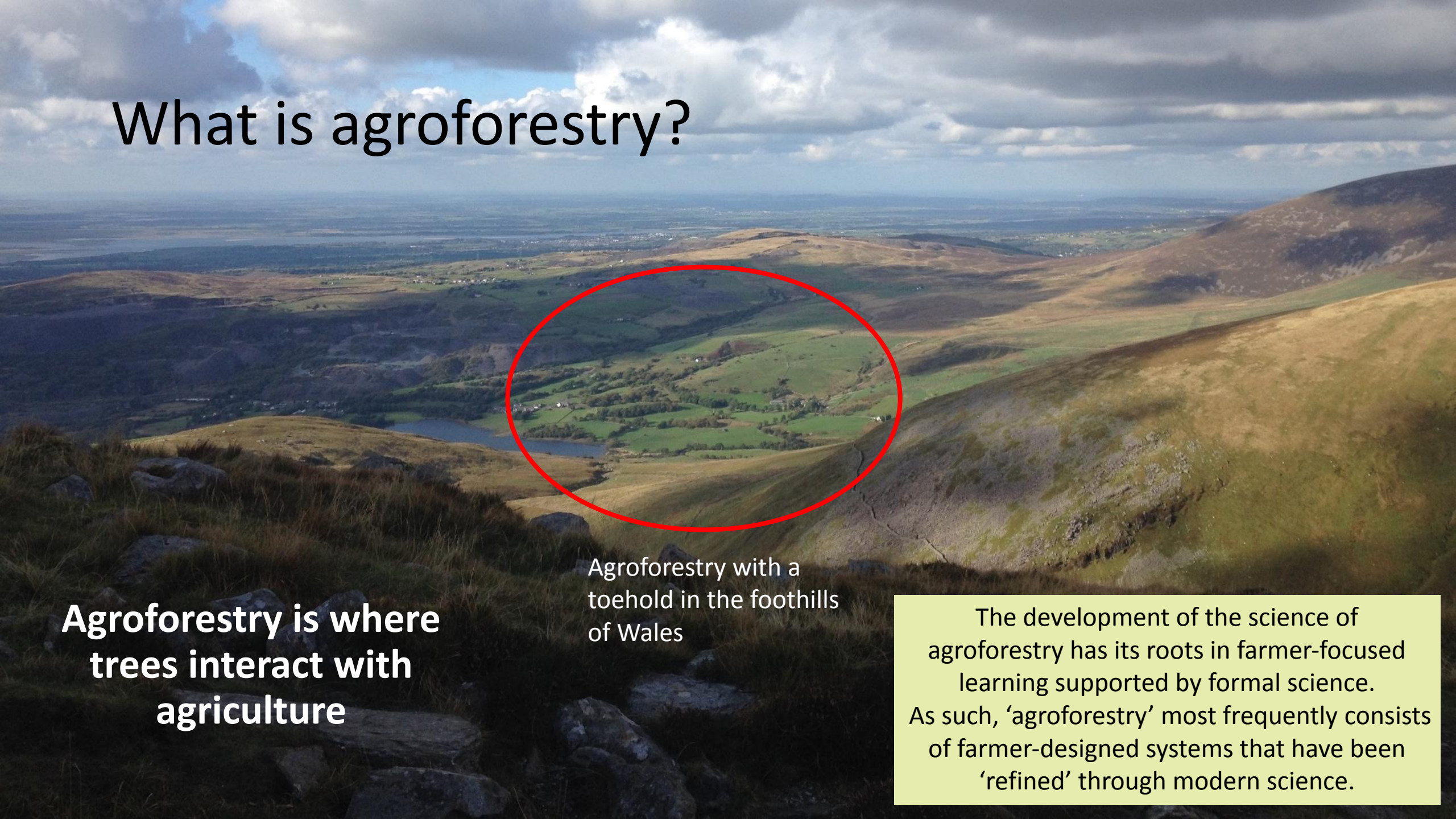
irish agroforestry forum

PRIFYSGOL BANGOR UNIVERSITY

Who am I?

- Agroforestry Researcher for 20+ years
- Work in close partnership with World Agroforestry (CIFOR-ICRAF)
- I research mainly in the tropics (Africa and Asia) and in Wales
- My research focuses on systems (agroforestry systems, socioecological systems, resilience)

What is agroforestry?

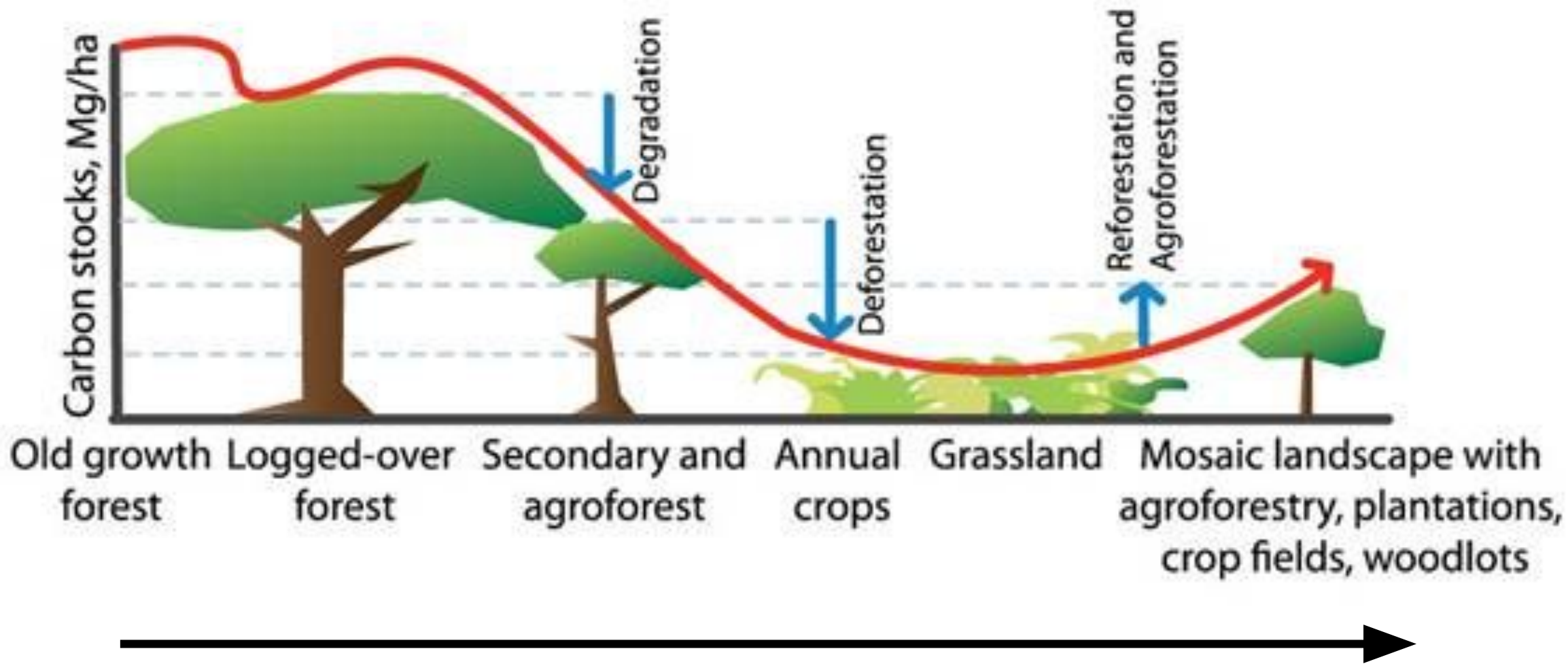


Agroforestry with a toehold in the foothills of Wales

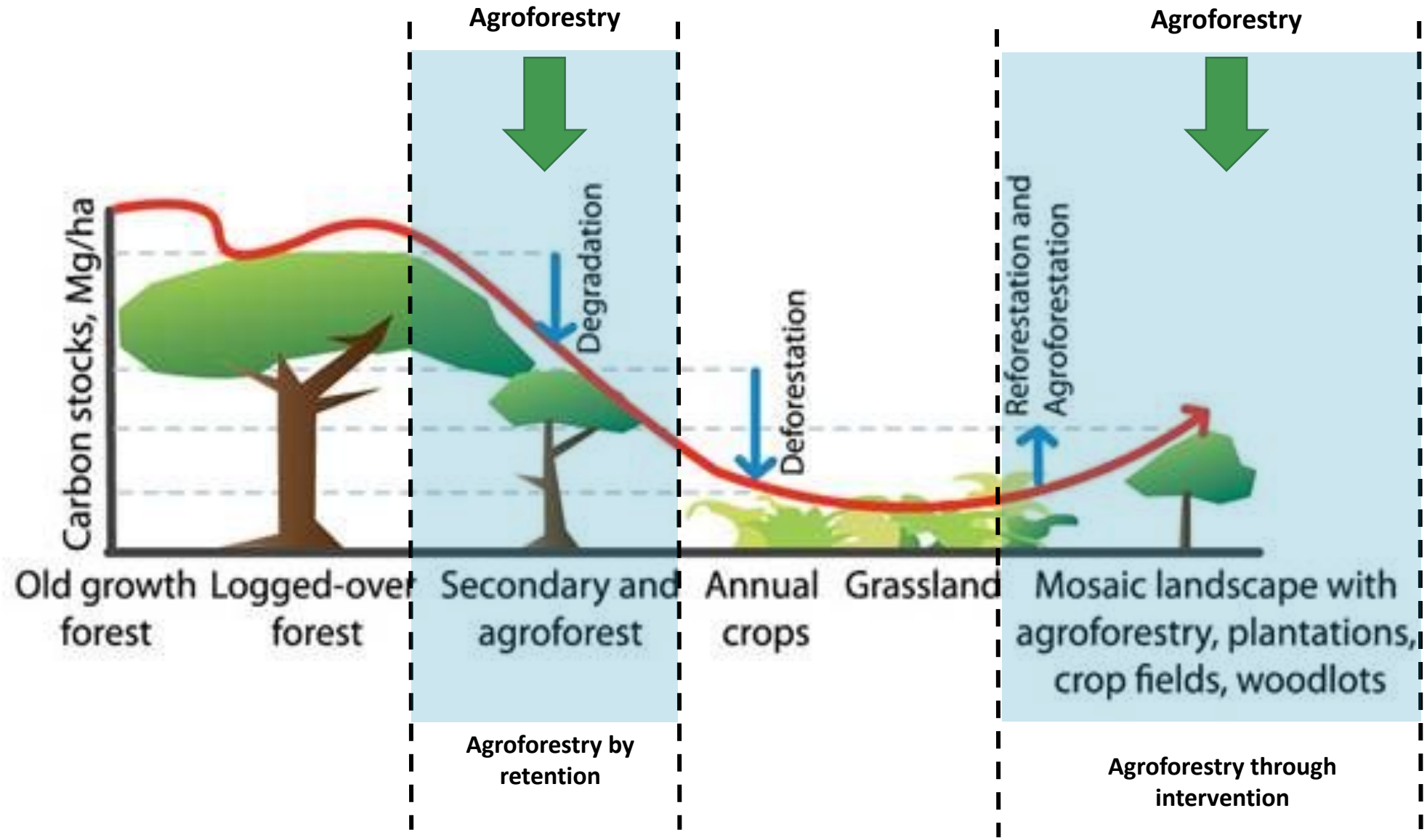
Agroforestry is where trees interact with agriculture

The development of the science of agroforestry has its roots in farmer-focused learning supported by formal science.
As such, ‘agroforestry’ most frequently consists of farmer-designed systems that have been ‘refined’ through modern science.

Forest Transition Curve



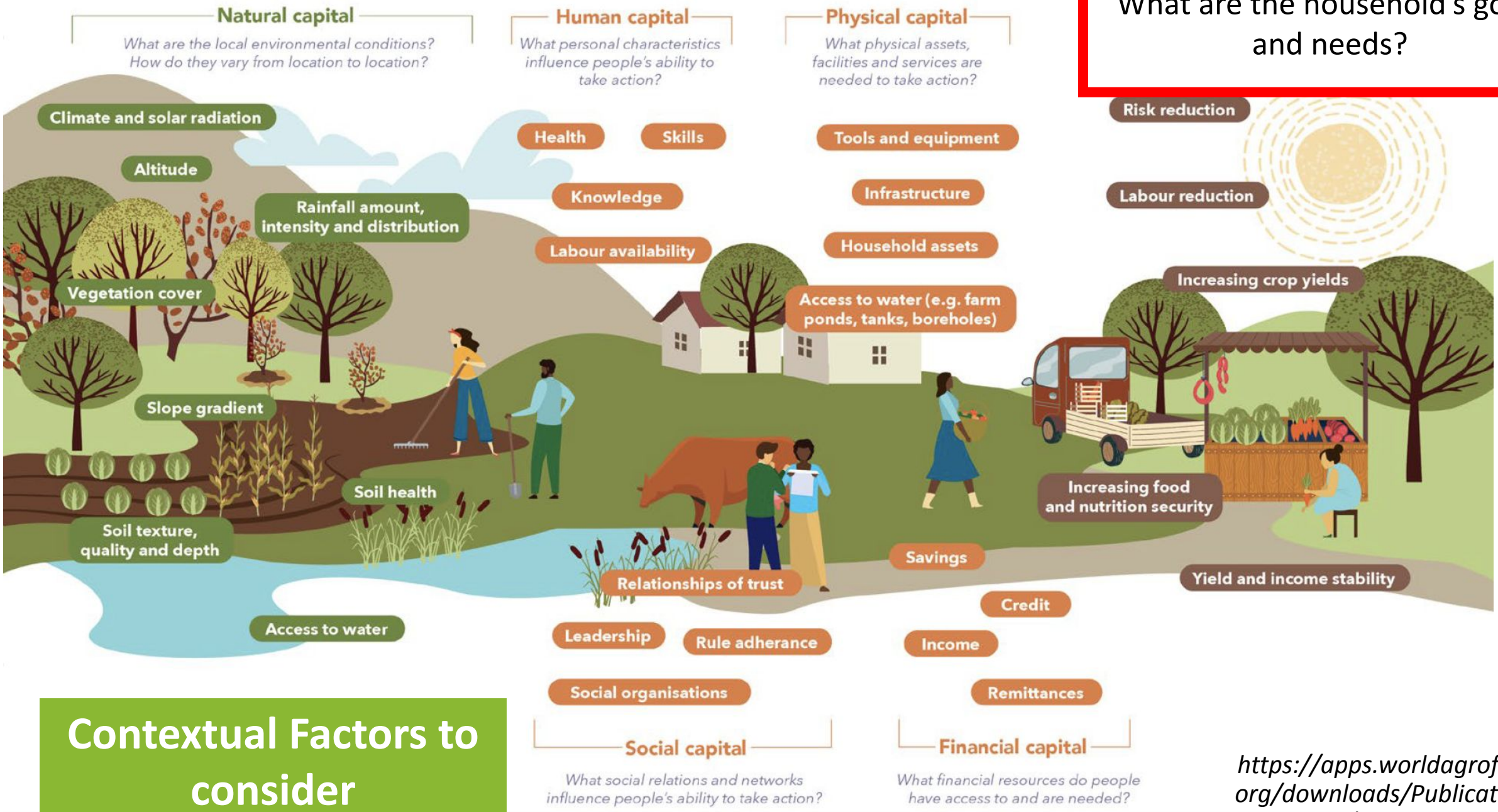
…most farms in the UK have purposively retained trees in a number of different forms, in many cases for long periods of time, to provide on-farm benefits.



The agroforestry ‘agenda’

- Things are bad and are getting worse
- Trees are the soil engineers we need to return functionality to our degraded systems
  - *They can do other good things (opportunity)*
  - *They can make things worse (risk)*
  - *This is hugely sensitive to context (getting this wrong is where most of the risk lies)*
  - ***Variations in context** present challenges for scaling (the policy ambition)*
  - *‘We’ need to scale to deliver impact*
  - *Needs to be weighed against the cost and risk of doing nothing (see point 1)*
- Trees have a mixed press (cultural baggage)

What are the household's goals and needs?

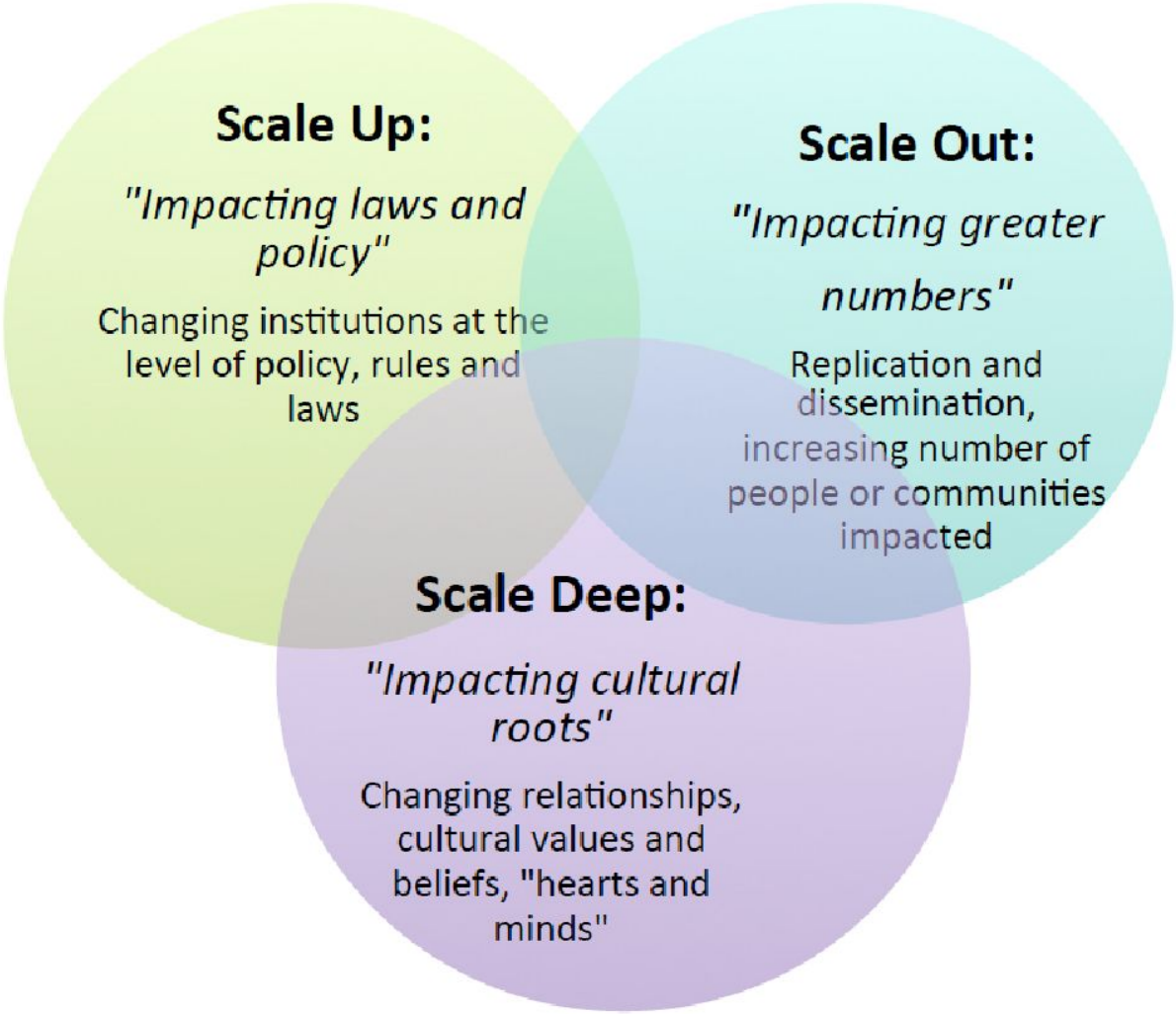


Contextual Factors to consider

https://apps.worldagroforestry.org/downloads/Publications/PDFS/TN22019.pdf

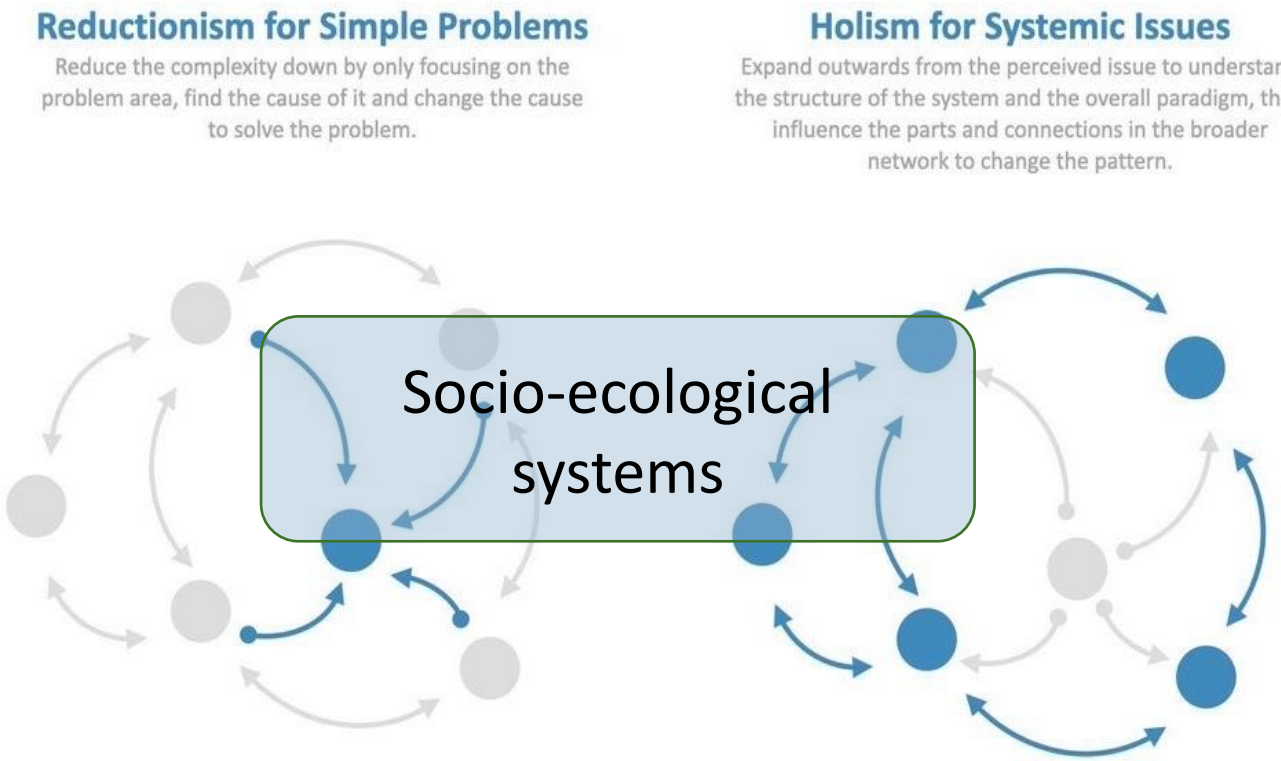
Thinking about context at scale - Scaling up and out

- Out-scaling: the process of mapping out how technologies will spread geographically; from farmers to families, villages, communities, districts and regions, nationally and internationally.
- Upscaling is the vertical integration of processes and policies into economic and social systems
  - Up-scaling can be bottom-up or top-down and means engaging groups in institutional relationships in the vertical pathway.
- Scaling deep – interaction with cultural norms



https://mcconnellfoundation.ca/wpcontent/uploads/2017/08/ScalingOut_Nov27A_AV_BrandedBleed.pdf

Systems thinking



Traditional decision-making

- focuses on selecting the most logical and sensible alternative that will have the desired, short-term effect **for a particular issue.**
- does not consider their decision in a larger context or "system".
- decisions may lead to unintended consequences, often over the longer term

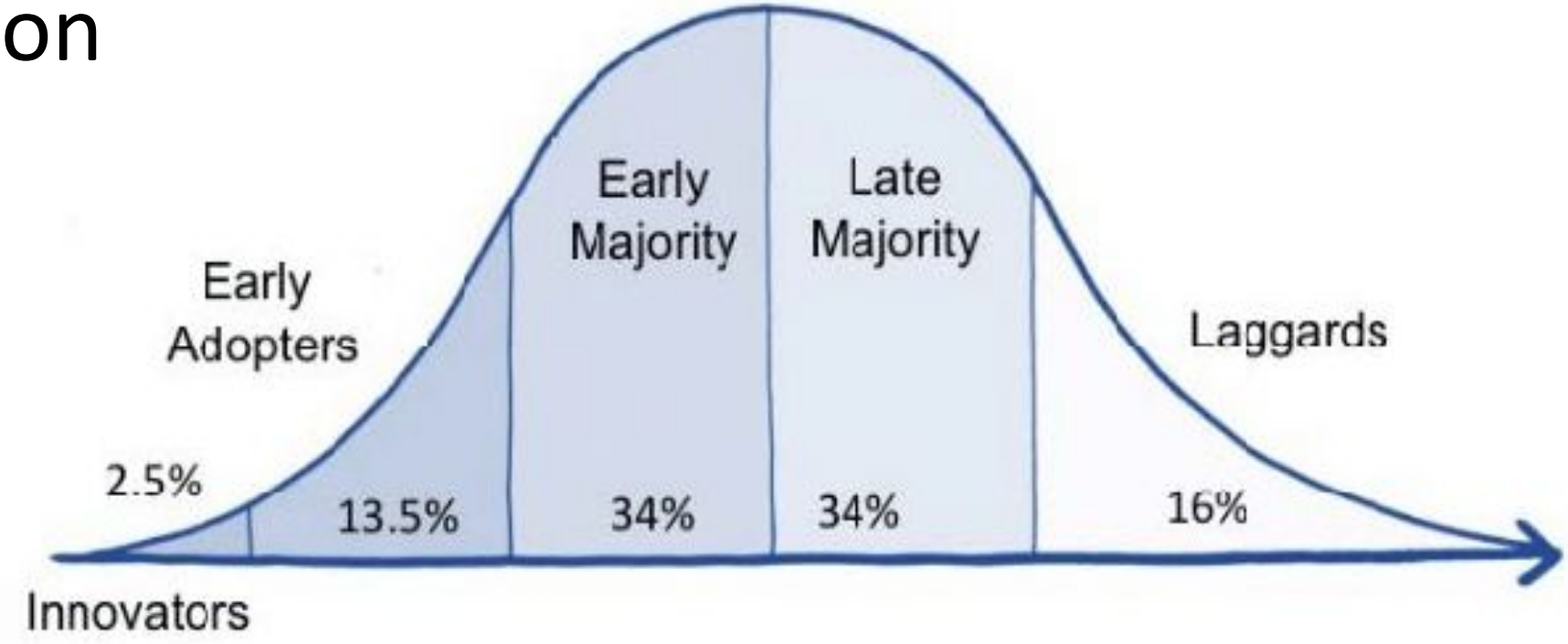
Systems-oriented thinking

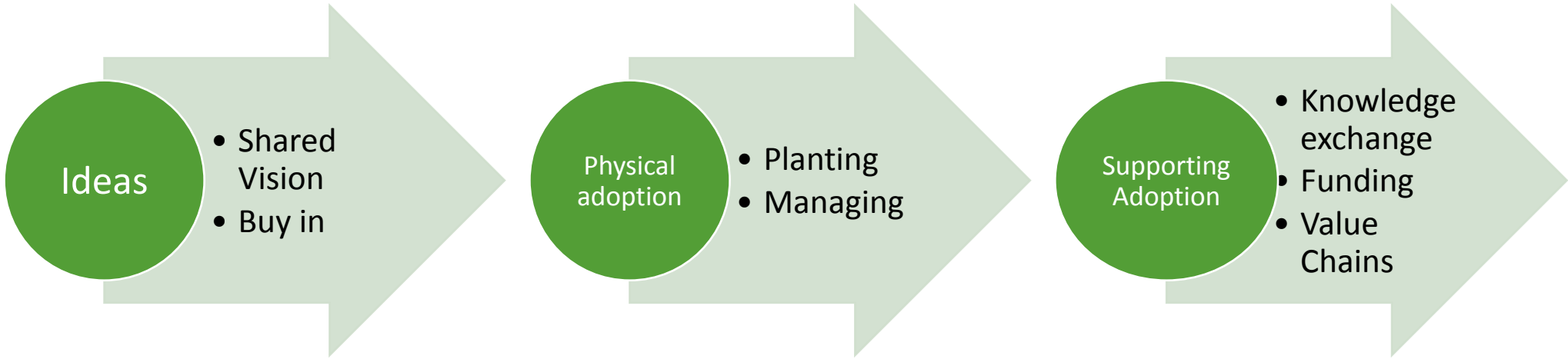
- focuses on how the decision elements under consideration interact with all parts of the system.
- analysis of interrelationships can generate different conclusions - especially when the system is dynamic and complex.
- Interdisciplinarity and transdisciplinary thinking

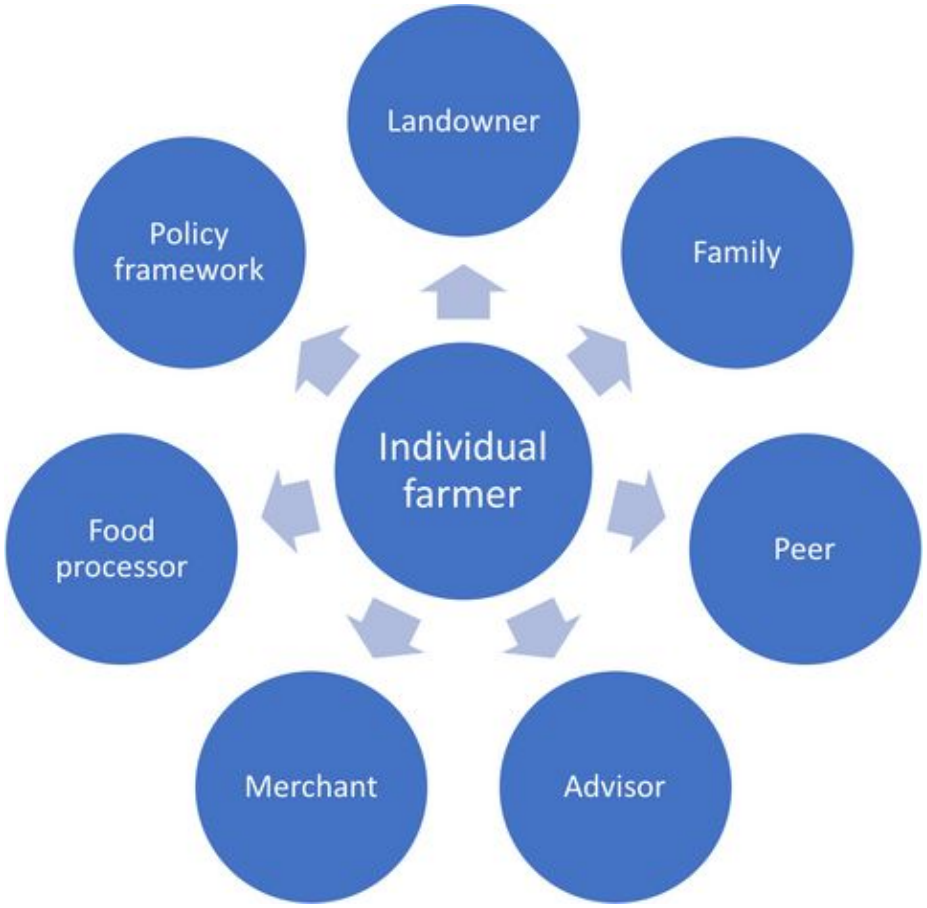
Figure from: www.systemsinnovation.network

Rogers adoption/ innovation curve.

Adoption







Who makes decisions?

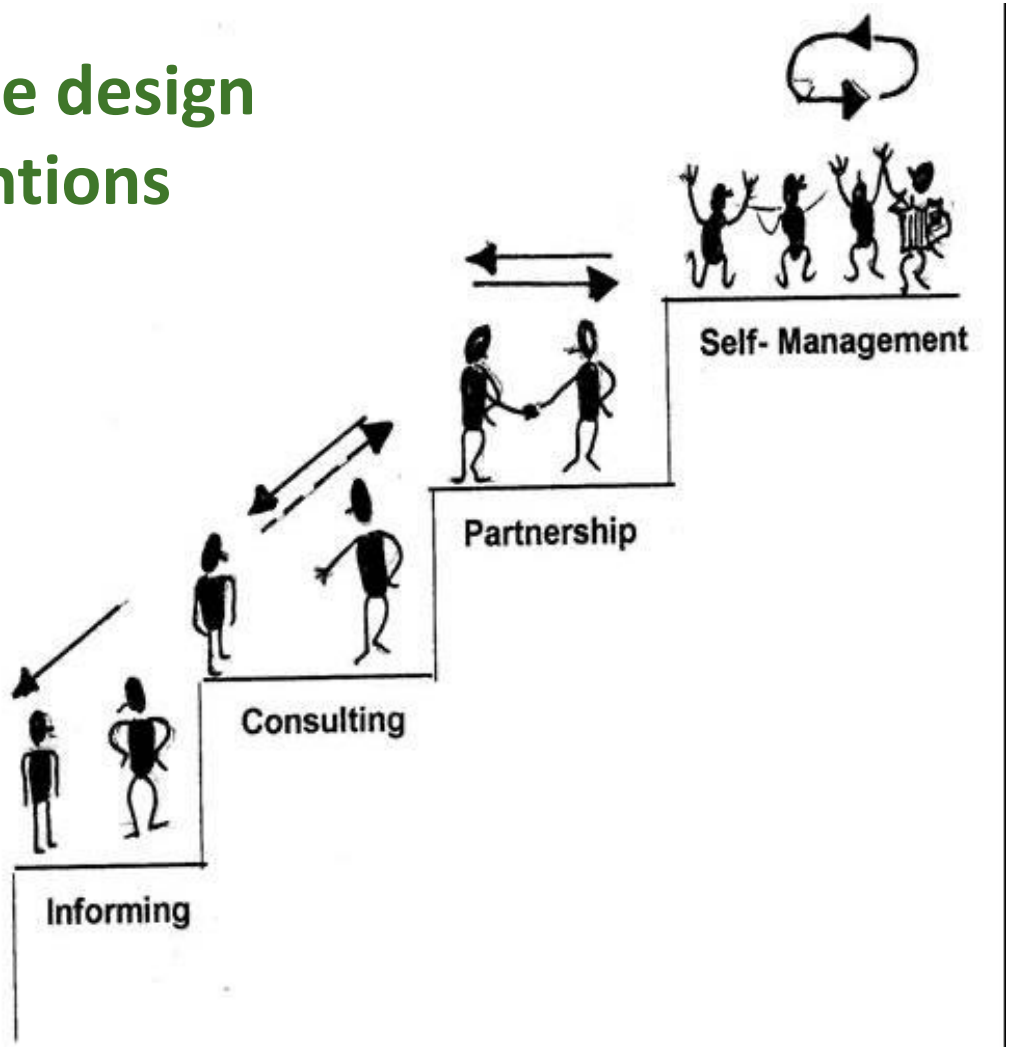
- Assumptions about how and who makes decisions around adoption
- Who do people discuss new technologies with?
- How do adoption measures interact with these groups?
- Adoption decisions take time!! (path dependency)

Rose et al (2018), Beyond individuals: Toward a “distributed” approach to farmer decision-making behaviour. Food Energy Security

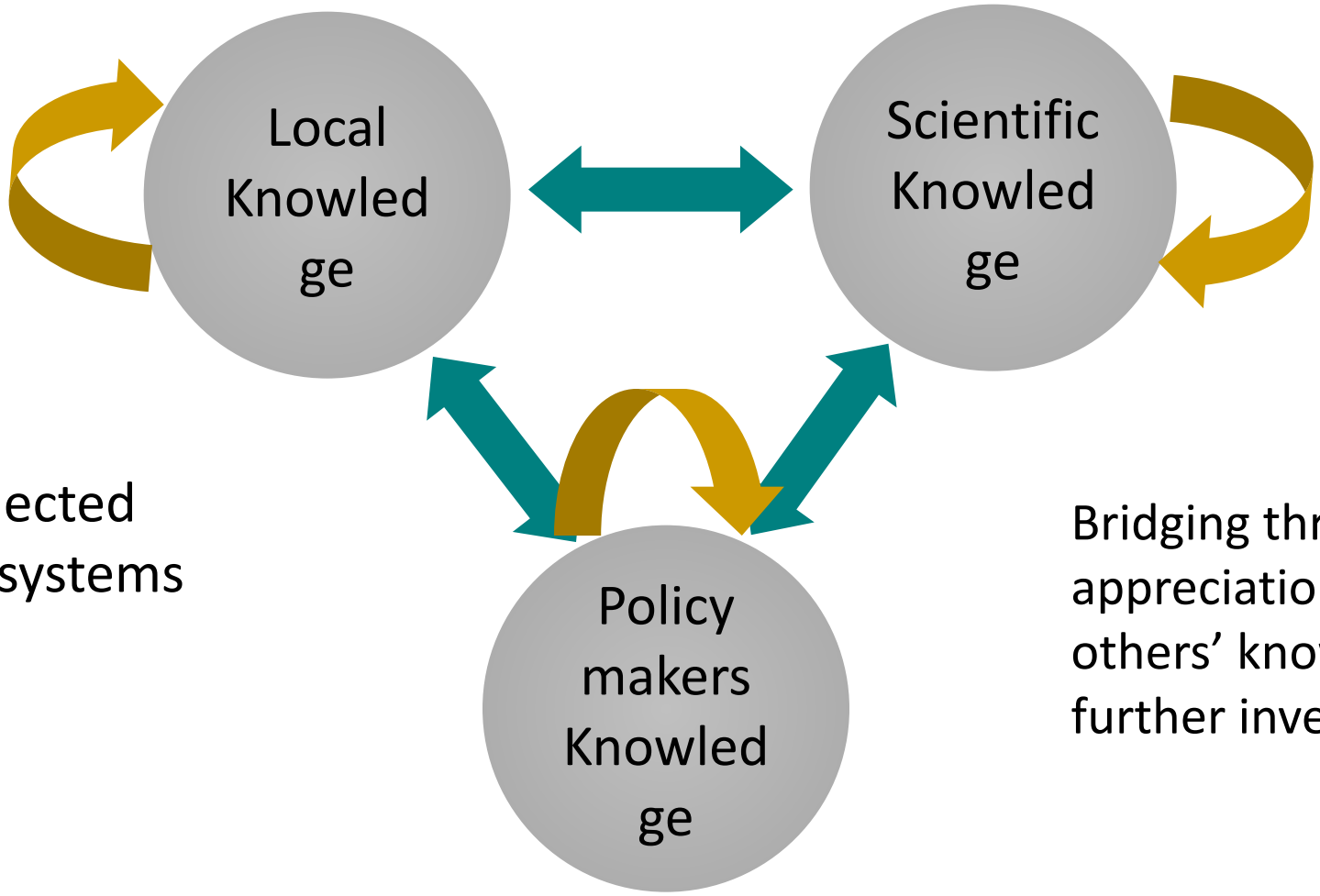
Taking decision making to scale - Participation

Involve farmers and other stakeholders in the design and implementation of agroforestry interventions

- **Participation** means 'involving' *local people* in the development of plans and activities designed to bring about change.
- It is a process of joint dialogue, sharing and analyzing situation to attain consensus towards action and change
- Participation should be a continuous *process of negotiation and decision making* that occurs at various levels and with al stakeholders
- It also means we need to learn from each other (official and unofficial on farm trials)



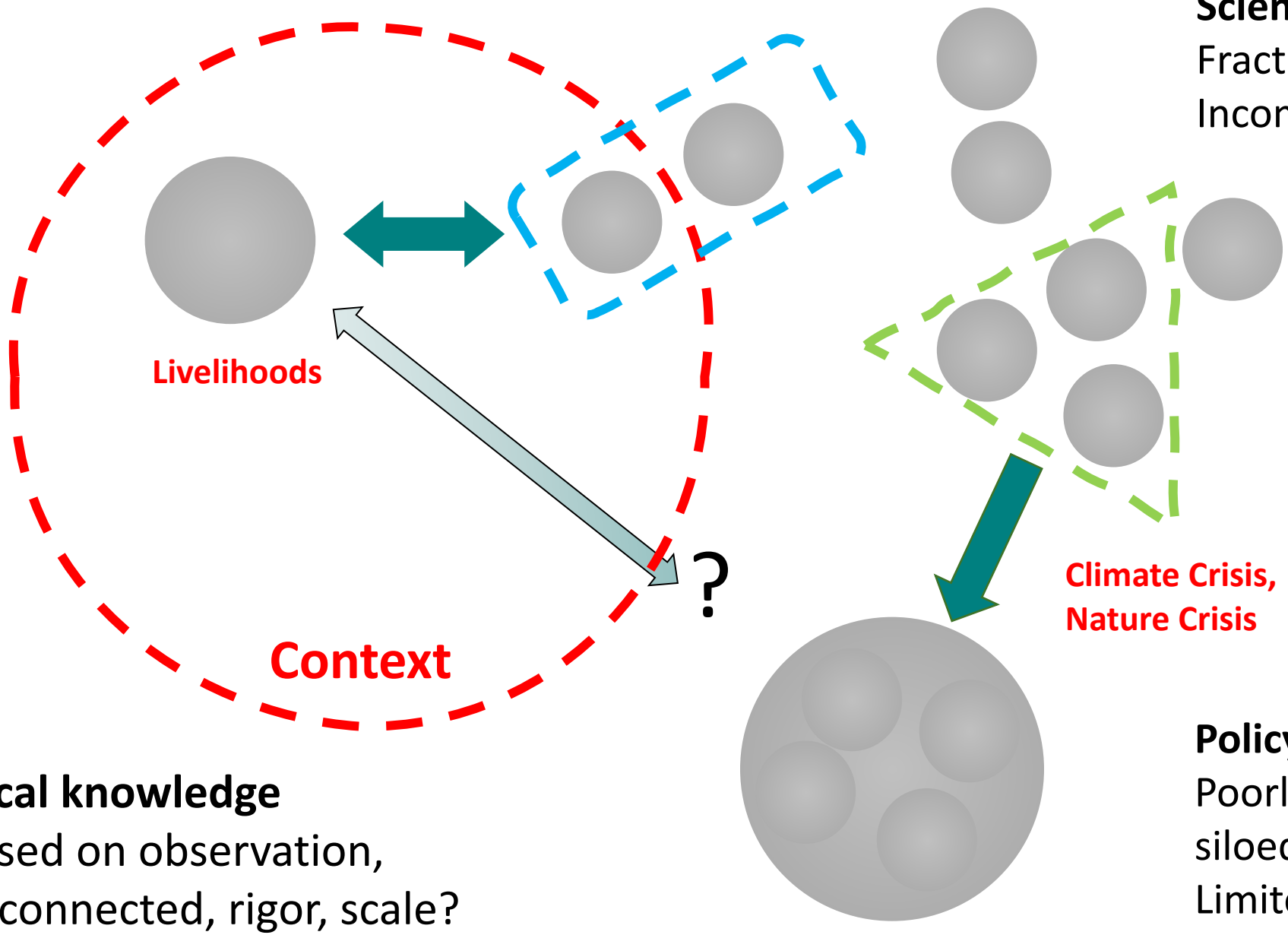
Local knowledge and Agroforestry



Three poorly connected major knowledge systems

Bridging through dialogue, appreciation, and respect of others' knowledge systems and further investigation if required

Context and contacts



Scientific knowledge
Fractured, Uncertain, Incomplete, Generic

Local knowledge
Based on observation, unconnected, rigor, scale?

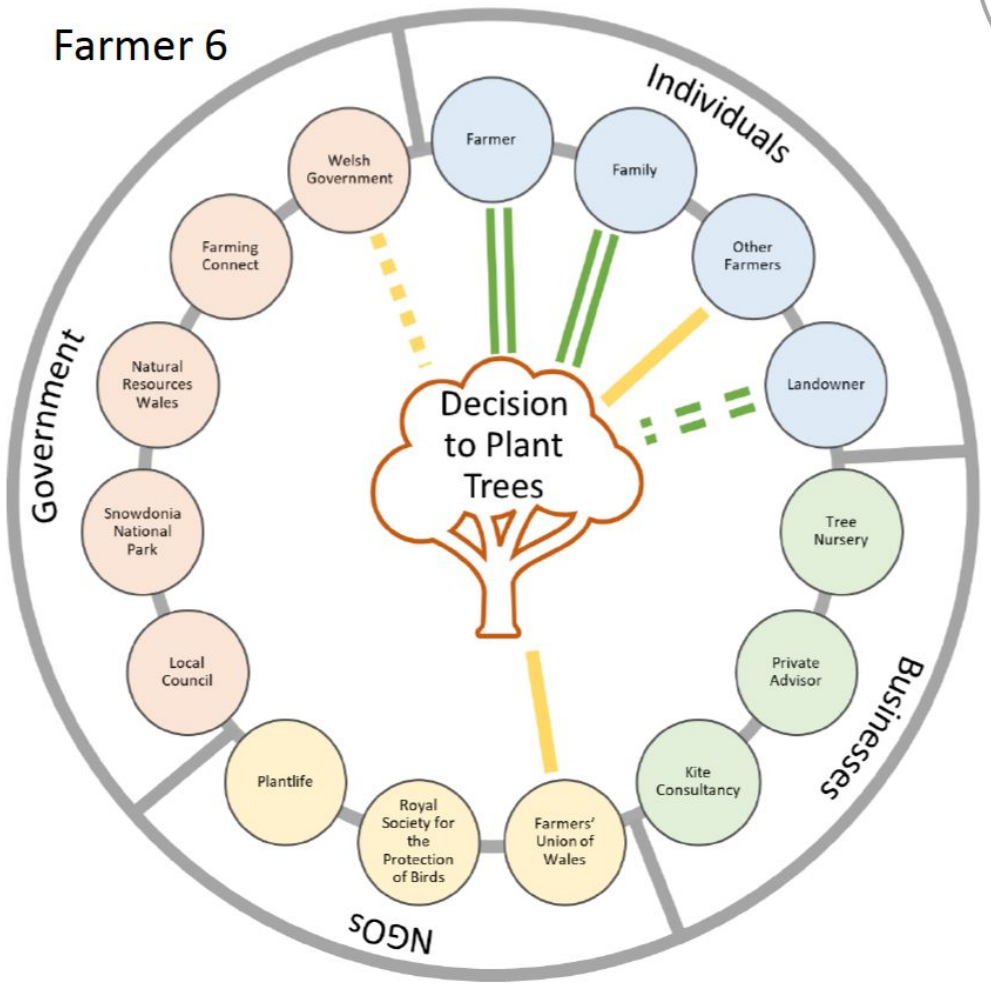
Policy knowledge
Poorly informed, reactive, siloed?
Limited Institutional learning

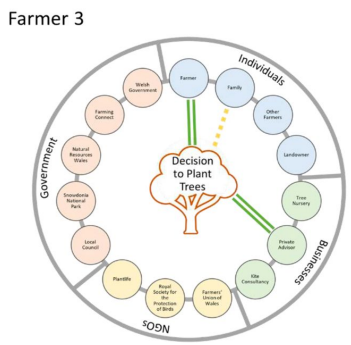
Agroforestry, gender and land restoration

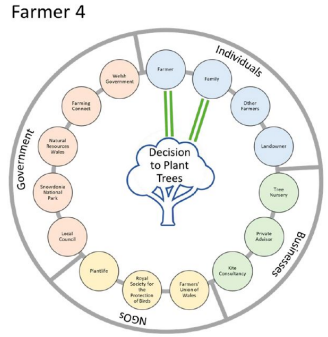
- Woman had the local knowledge about trees (and are highly dependent on trees)
- Men owned the land
- Woman not consulted about restoration
- Worked at underlying gender norms that constrained women's' participation
    - Labour, decision making, land tenure/ownership
    - Used role play (Gender Transformative Actions)
- Saw significant changes in Gender norms over two years
- A critical pre-requisite for land restoration and essential for equitable restoration

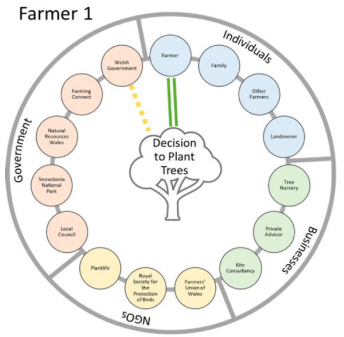
Decision making

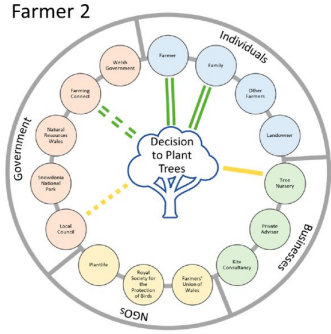
- Farmers make decisions to plant trees largely independently after discussion with other family members, and do not rely heavily on external advisors
- Farmers are more likely to include external advisors in decision making where planting is funded or larger scale
- Trusted advisors who were named as influential in decision making were those indirectly linked to government organisations, such as Farming Connect and the FUW

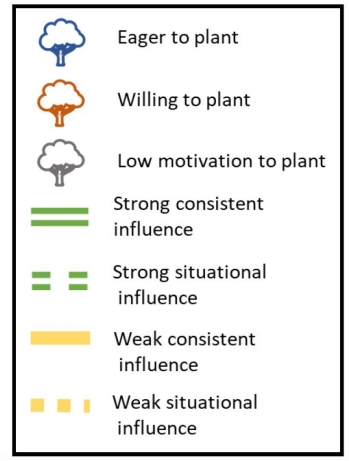












Shared Vision

- Empathy is critical
  - Do not focus on the farmer – what is everyone's role?
  - Joined up thinking
- Local knowledge is critical
  - Vital for understanding local context
  - Cultural Norms need to be acknowledged and integrated in decisions
- Think about the future
  - Today carbon, biodiversity….tomorrow water?

A theory of change

- Adaptive management
  - Unlikely to line everything up at once
  - Change is a process not a binary switch
- New opportunities emerge along adoption pathways
  - Success criteria change
- Prioritize the needs of all components of the system, including crops, livestock, trees…..and PEOPLE.

Managing the push: Reasons for non adoption?

The innovation addresses the wrong problem – incorrect diagnosis of the problem

Farmer practice is equal to or better than the innovation

The innovation does not work – it may create other problems

Institutional issues not farmer issues?

Extension fails

- Inadequate demonstration of innovation
- Targeting the wrong farmers

The innovation is too costly

- Labour, materials or opportunity costs are too high
- Costs incurred immediately, whereas benefits are risky or in the future

'Social' factors

- Traditional division of labour (male/female)
- Insecure land tenure
- Farmers are using common property resources

Fujisaka (1994) "Learning from Six Reasons Why Farmers Do Not Adopt Innovations Intended to Improve Sustainability of Upland Agriculture." *Agricultural Systems* **46:**409-425

Supporting success

Behaviour change –we are seeking to enable a paradigm shift

- Initially work with people who want to change
- Aim is to normalise tree cover and associate this with successful farming practice
- Celebrate success!

- Speed of change
  - Allow farmers to set the pace but encourage them
  - Work with early adopters (and their families)
- We are looking for Innovation in practice
  - support experimentation and learning
- Social capital is critical
- **Thinking in systems is critical to support the growth of agroforestry**

Thanks

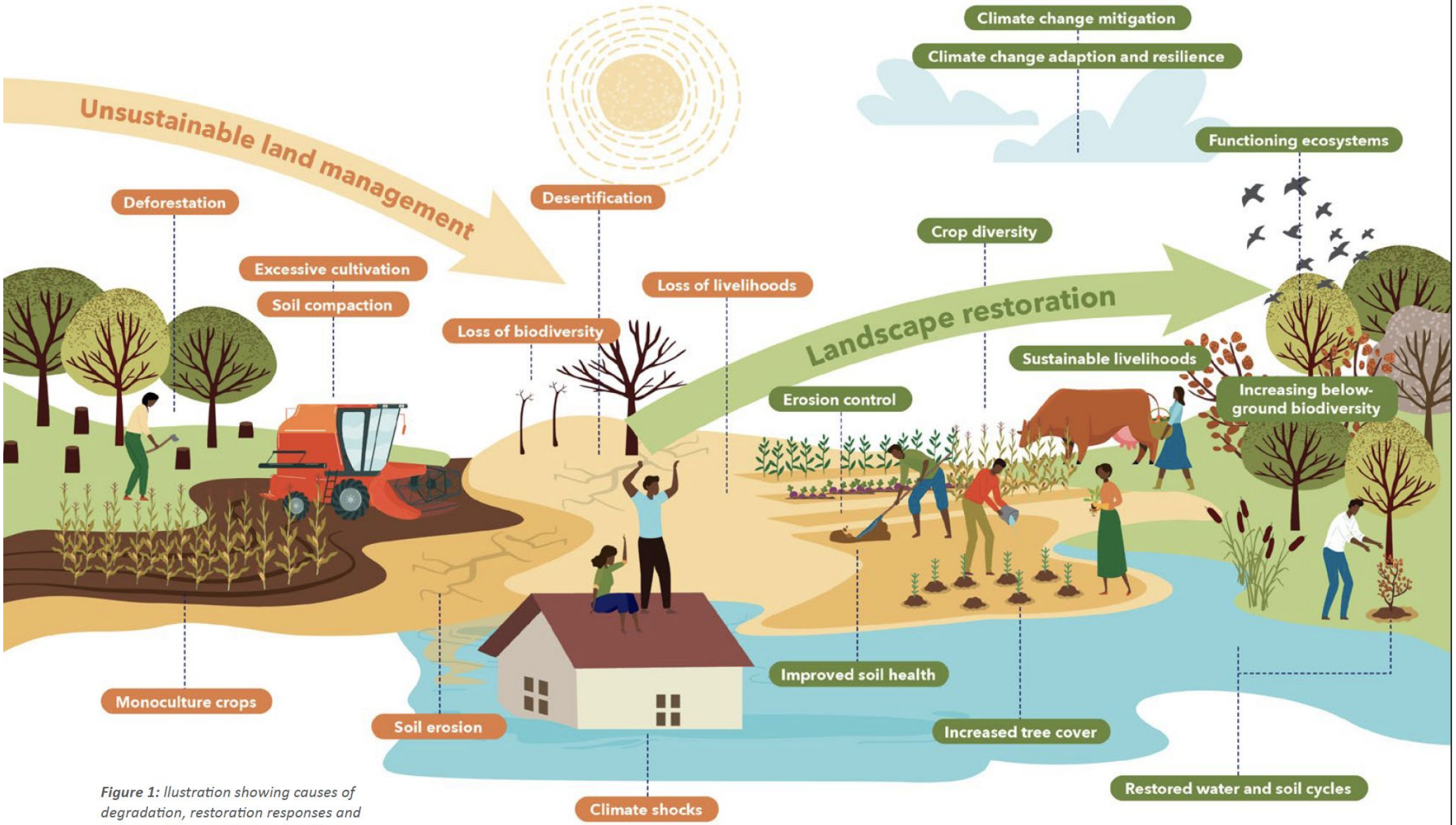


Figure 1: *Illustration showing causes of degradation, restoration responses and outcomes for ecosystem restoration*

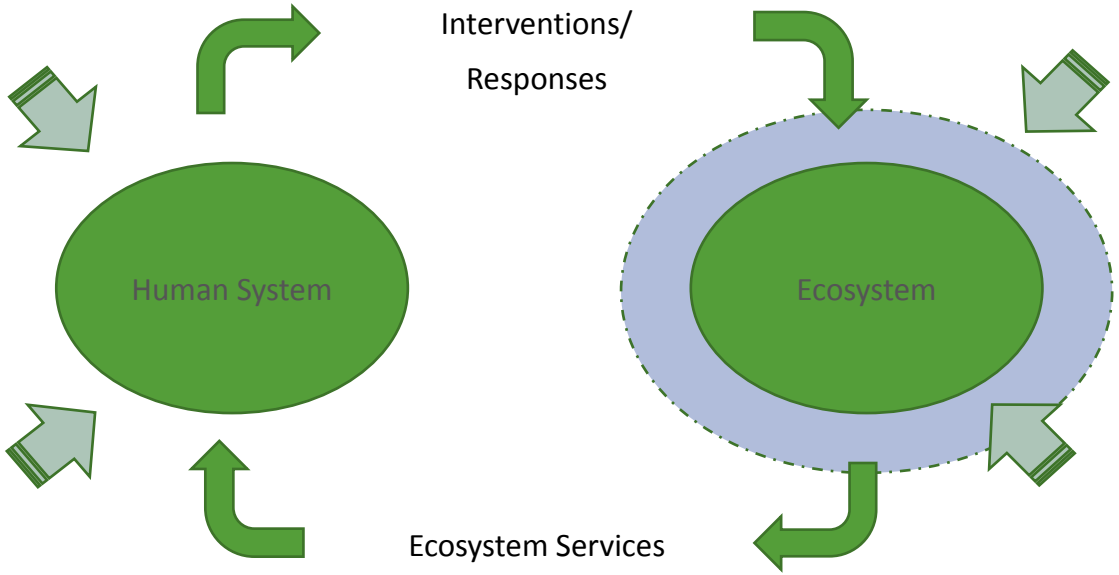
Socio-ecological systems research

Complex and interrelated systems that consist of both social and ecological components and the interactions between them.

Characterized by dynamic and non-linear relationships, feedback loops, and emergent properties that arise from the interactions of the individual components.

The **resilience** and **sustainability** of socio-ecological systems are determined by the balance between the demands of human societies and the ability of ecosystems to provide the services necessary for wellbeing

social & ecological dimension the same weight during analysis



Interdependence between social and ecological systems

The Routledge Handbook of Research Methods for Social-Ecological Systems (2021)

Notes

- Gender –why now why relevant to this conversation
- Livelihoods should/could be a central focus
- Systems thinking
- Knowledge systems
- Decisions
- Scales and groups (Pontbren Foot and Mouth, Cotswolds AONB, Lockdown)
- Path dependency