Glensaugh: Scotland's Climate Positive Farm

Deb Roberts

NESAAG

23nd September 2020

The James Hutton Institute

The need for transformative change

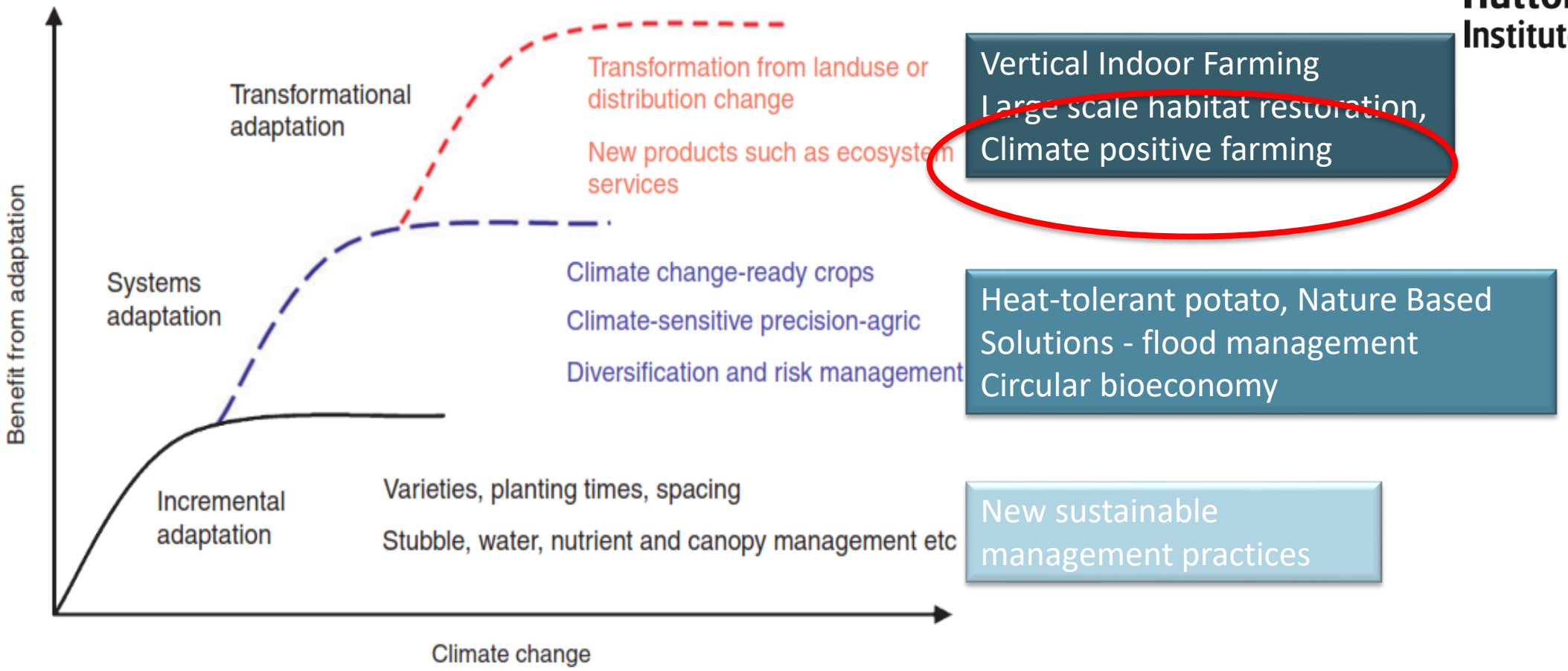


Fig. 1. Levels of adaptation in relation to benefits from adaptation actions and degree of climate change, with illustrative examples (from Howden *et al.* 2010).

Hutton Flagship initiative:

Glensaugh

Scotland's Climate Positive Farm

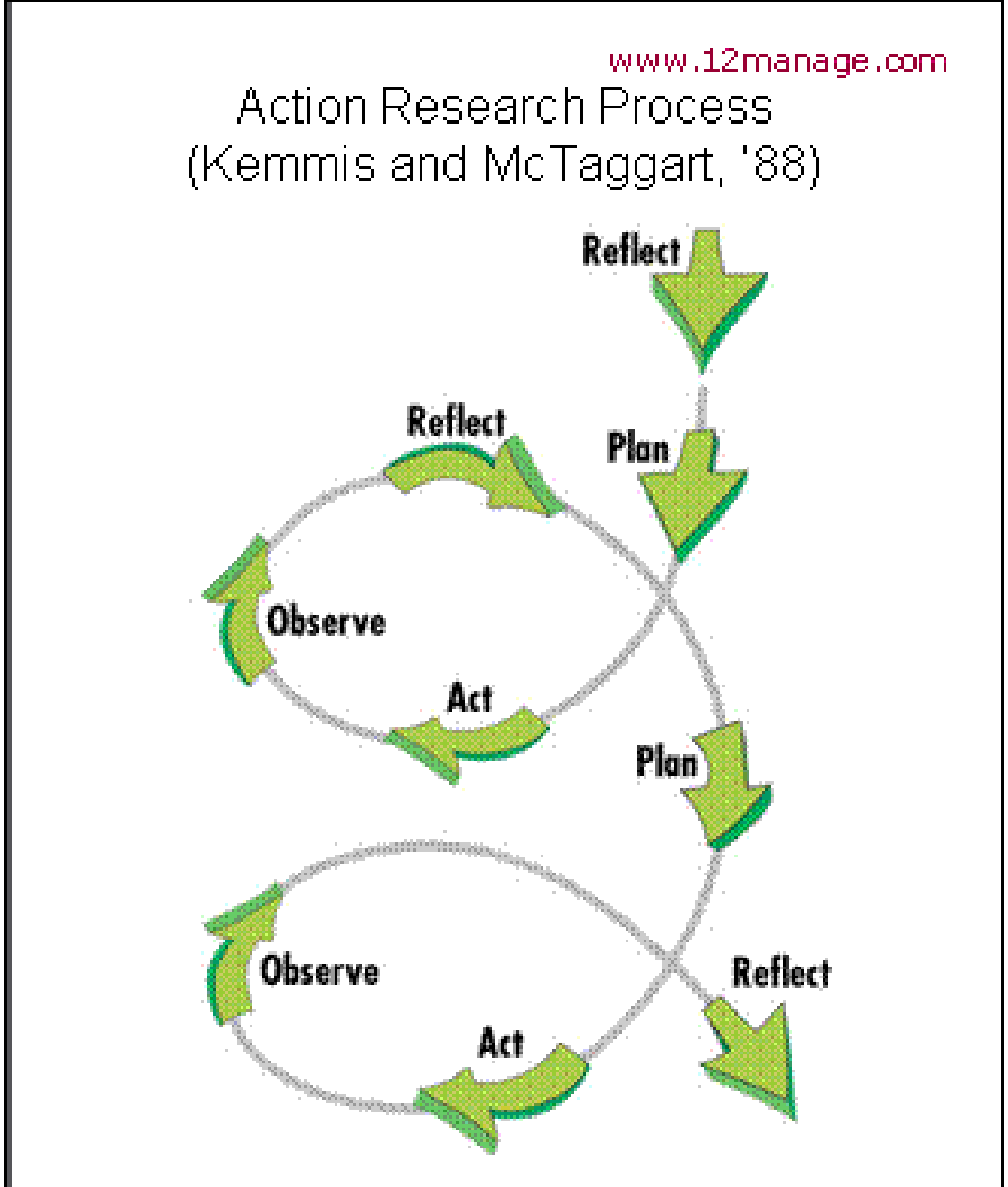
The James Hutton Institute

Glensaugh:
Scotland's Climate Positive Farm

- The area of woodland is doubled (from 7-14%) and includes areas of agroforestry with livestock grazing and shelter
- On farm renewables to generate hydrogen for electricity, heat and fuel for on farm vehicles and machinery.
- Livestock numbers are reduced to cut greenhouse gases with those remaining part of a high nature value farming system receiving market premium
- Tall grass grazing (aka Mob grazing) is used to promote C sequestration and biodiversity
- Livestock are 100% grass-fed using advanced grass conservation, and rich in clover to reduce fertiliser use.

The James Hutton Institute

Glensaugh: An Action Research Project



The James Hutton Institute

Why Glensaugh?

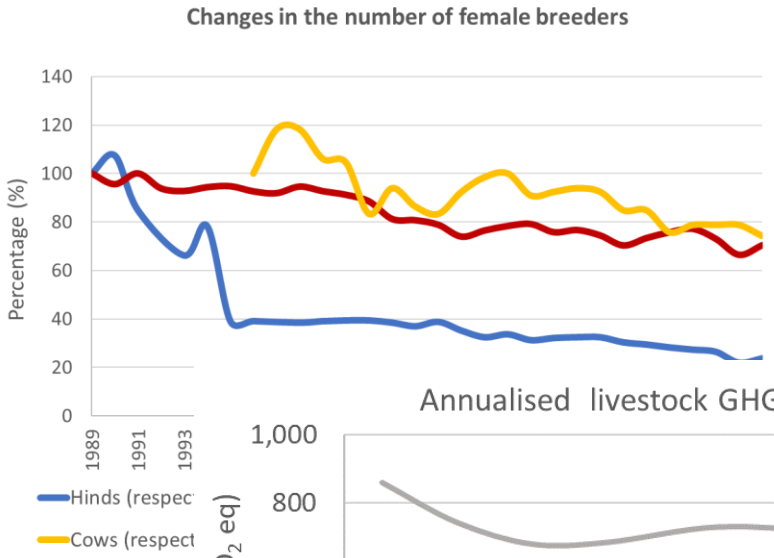
The James Hutton Institute

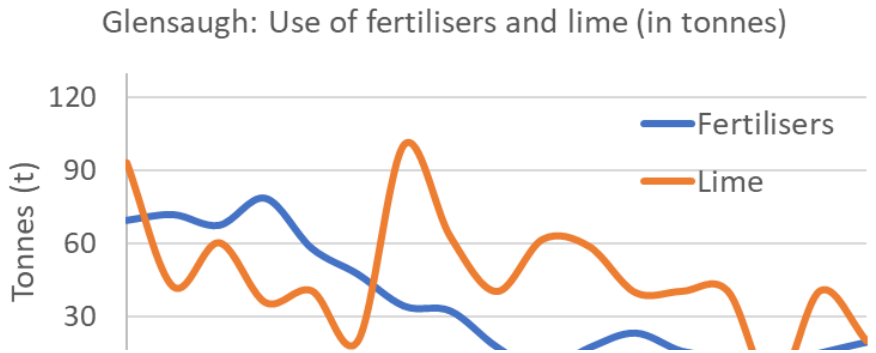
Why Glensaugh?

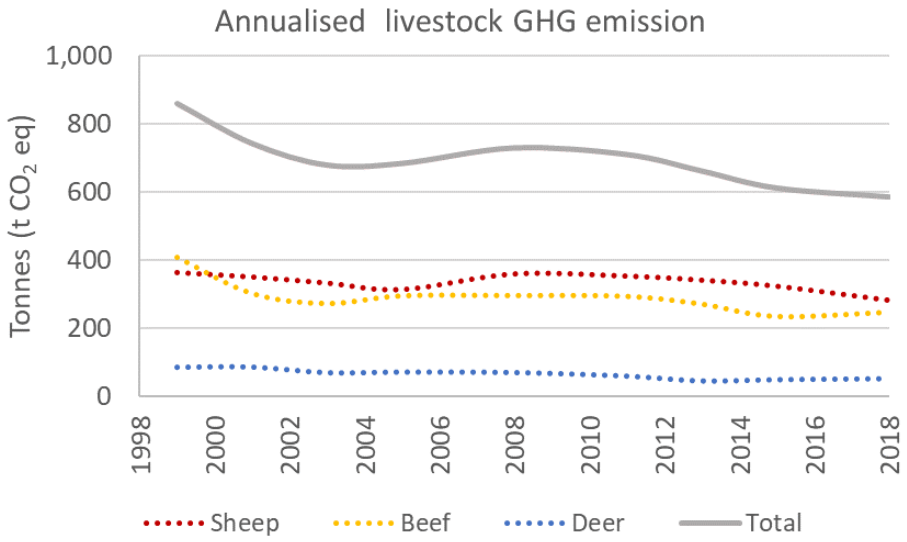
Historic Baseline and monitoring of trends

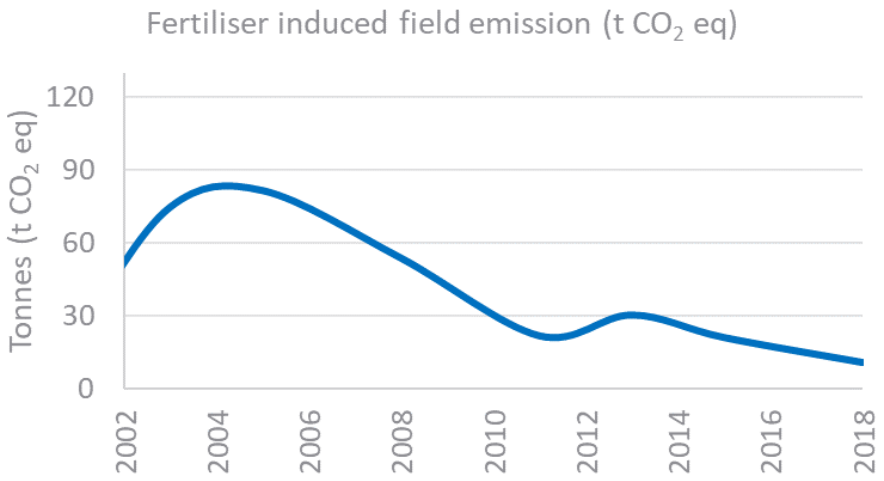
Case study for Natural Capital Protocol as a management tool

The James Hutton Institute



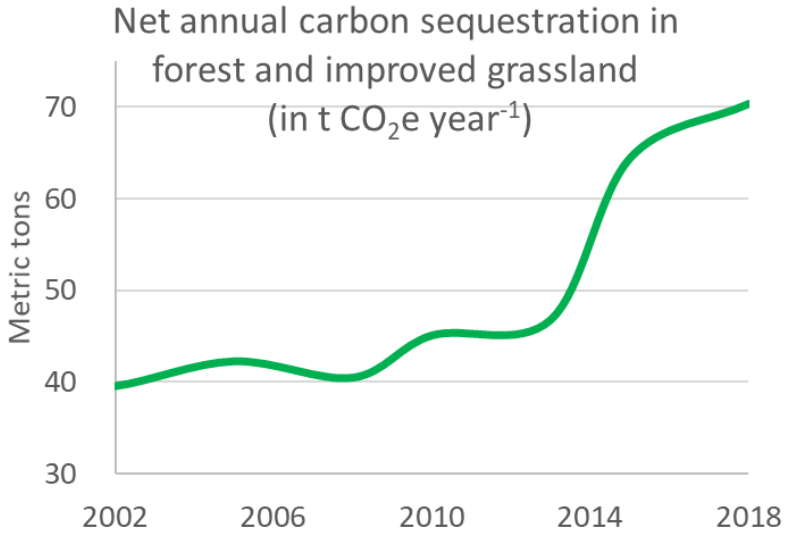






Why Glensaugh?

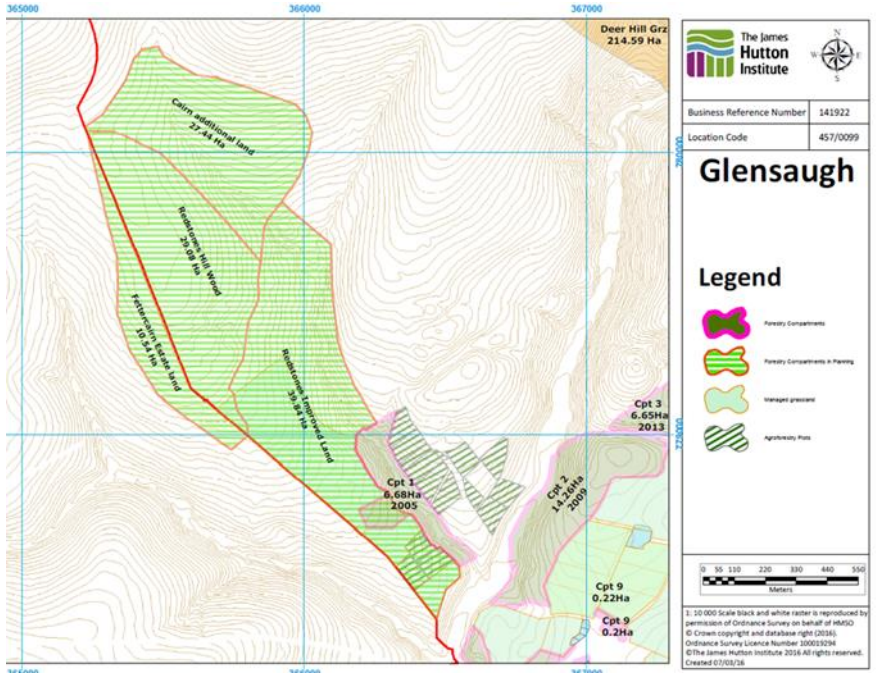
New woodland plantations (and Agroforestry biomass production)



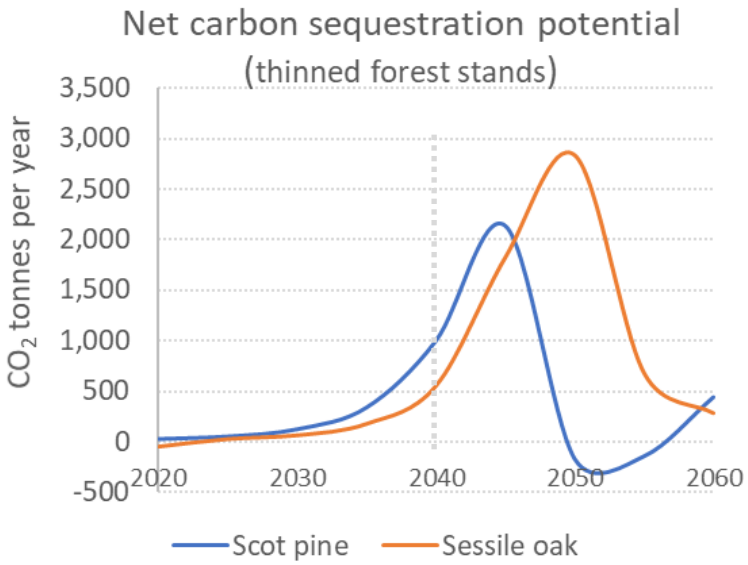
- ✓ Mixed conifer/broadleaf plantations **> 50 ha** since 1998
- ✓ Saving close to **£ 6,000 a year** (70KW biomass boiler)

Carbon sequestration does not yet offset farming emissions (≈ 1,200 t CO2e/year)

Glensaugh carbon sequestration potential (20 years)



Estimated potential for an increase in 96.4 hectares
(≈ 10% of the farm area)



Source: *Own elaboration* Woodland Carbon Code (WCC) and Ecological Site Classification (ESC)

Insights from the Natural Capital Protocol

	Provisioning				Regulating & maintenance									Cultural services			
	Cultivated plants and reared animals	Wild plants and animals	Water supply	Energy supply	Pest and disease control	Global climate regulation	Local climate regulation	Control of erosion rates	Habitats and population nursery	Pollination	Freshwater quality regulation	Regulation of soil quality	Water flow /flood control	Aesthetic	Cultural and heritage values	Knowledge systems Social relations	Recreation and ecotourism
Broadleaved and conifer plantations	↗	↘	↘	↗	↘	↗	↗	↗	↘	↘	↗	↗	↗	↘			↗
Ground preparation mechanised		↘				↘		↘	↘	↘	↘	↘	↘				↘
Ground preparation by hand		↘				→		→	↘	↘	→	→	→				↘
Planting native species	↗		↘	↗		↗	↗	↗	↗		↗	↗	↗	↗			↗
Planting non-native species	↗	↘	↘	↗	↘	↗	↗	↗	↘		↗	↗	↗	↘			↗
Fertilising soils	↗	↗				↘					↘						
Controlling pest and diseases (pesticides)		↘			↘						↘						
Controlling pest and diseases (biological)		→			↗												
Harvesting – selective logging						↘											→
Harvesting – clear cutting		↘				↘	↘	↘			↘			↘			↘

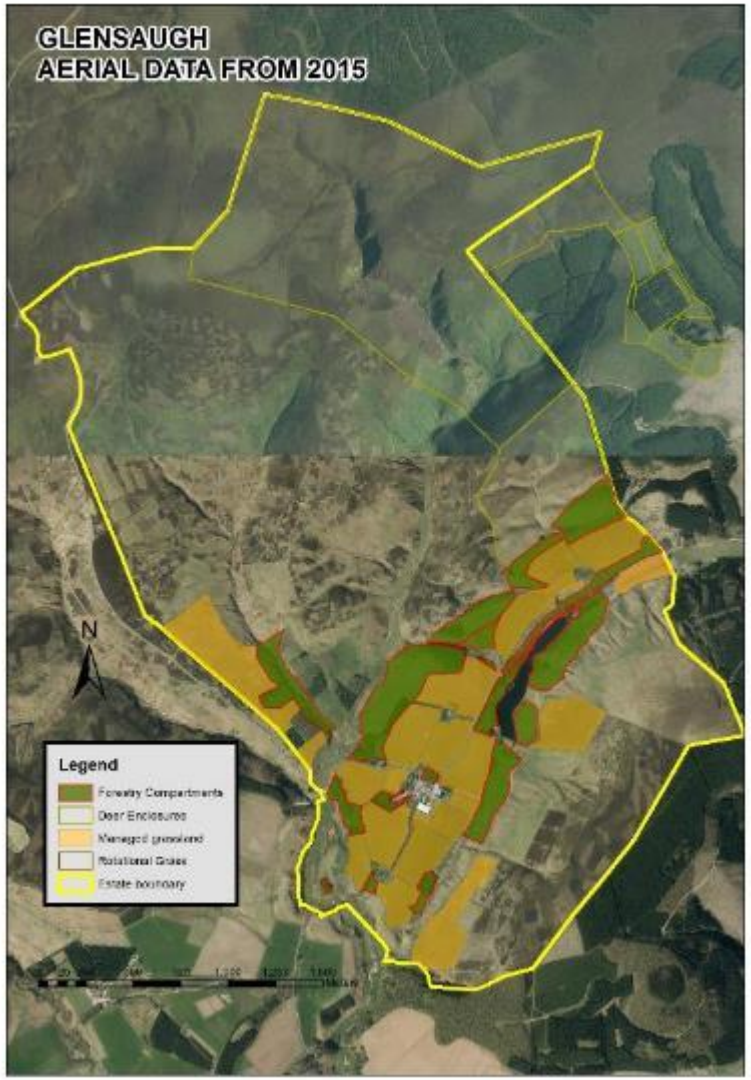
High improvement ↗ Moderate improvement ↗ Low improvement ↗ Neutral →

Unknown/not relevant Low decline ↘ Moderate decline ↘ High decline ↘

Potential impact of woodland expansion features on ecosystem services delivery

Hydrogen – the opportunity at Glensaugh

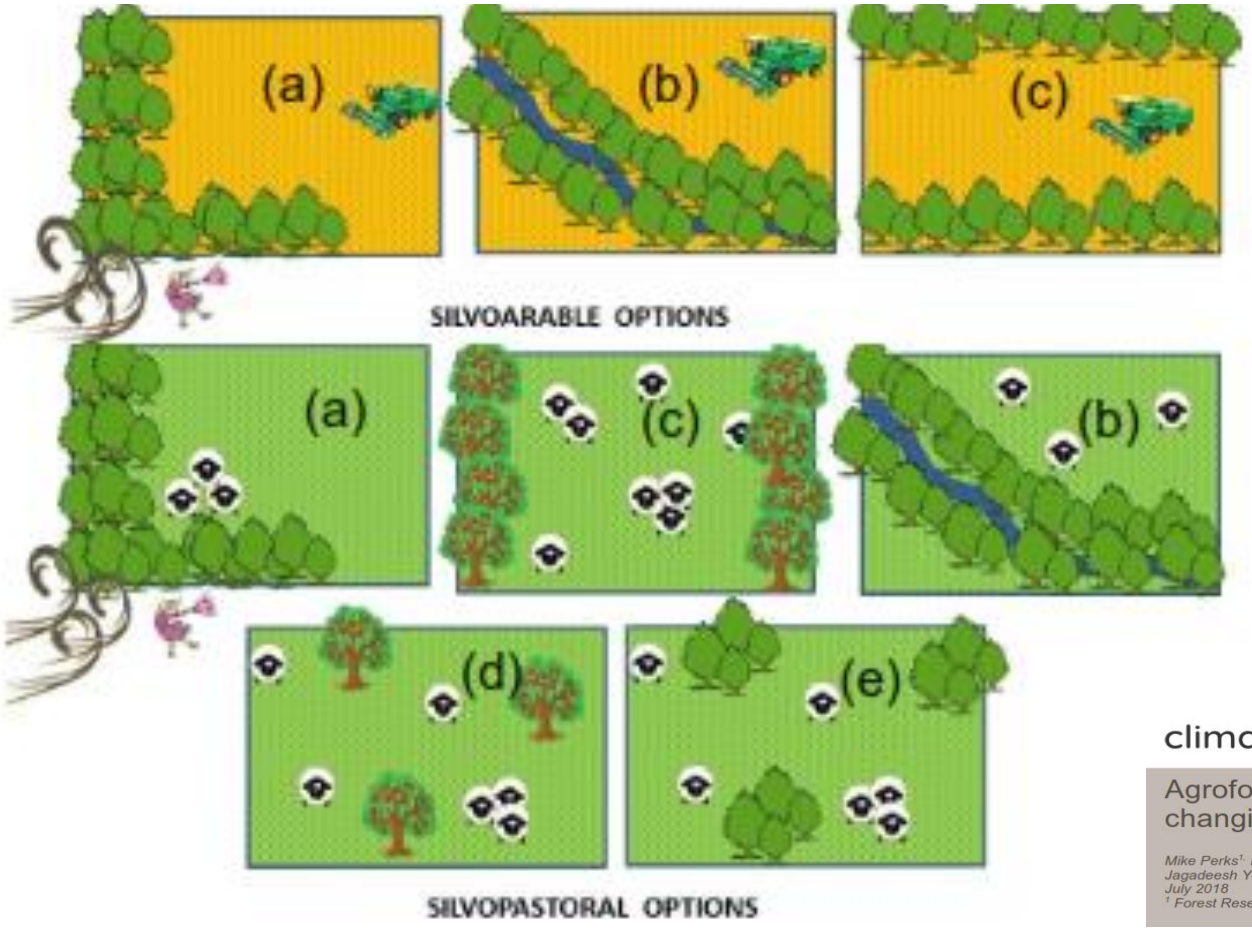
The James Hutton Institute



- Glensaugh has existing renewable energy generation in the form of solar and wind power
- On-site water-source at Loch Saugh
- Potential to use hydrogen as a source for providing heating, transport fuel and electricity both for farm and the wider community
- Establish hydrogen fuelled machinery demonstration facility

Agroforestry

FIGURE 1: Agroforestry Options identified for Scotland: a) windbreaks, b) riparian buffer strips, c) rows, d) single tree, e) tree clusters.



360 Vista Tour of Agroforestry

https://virtualfarm.hutton.ac.uk/glensaugh/

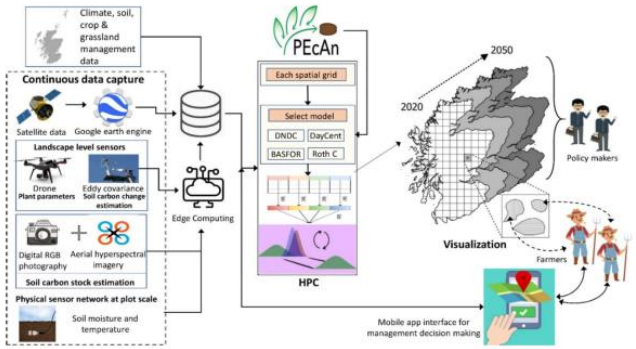
climate change Scotland's centre of expertise connecting climate change research and policy

Agroforestry in Scotland – potential benefits in a changing climate

Mike Perks[1], Myroslava Khomik[2], Stephen Bathgate[1], Steve Chapman[2], Bill Slee[2]
Jagadeesh Yeluripati[2], Deborah Roberts[2], James Morison[1]
July 2018
[1] Forest Research, [2] The James Hutton Institute

Glensaugh: Other progress to date

- Secured funding from Ballie Gifford for a three year Fellowship– Professor Alison Hester
- New £1M NERC Grant on novel approaches to monitor GHG emissions
- Launch of VisitGlensaugh project
- Application for funding for Glensaugh Incubator Hub



The James Hutton Institute

Thank you!

Any questions?

SYSTEM CERTIFICATION ISO 9001 SGS

SYSTEM CERTIFICATION ISO 14001 SGS

Athena SWAN Bronze Award

Stonewall DIVERSITY CHAMPION SCOTLAND

Scottish Government
Riaghaltas na h-Alba
gov.scot