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## 1. CLIMATE-SMART FORESTRY

- Forests are diverse<sup>1</sup> and provide vital services<sup>2</sup> e.g. provisioning services such as medicinal ingredients (fig.1 and 2).
- However, forests face increased climate change threats which require greater action to protect them.

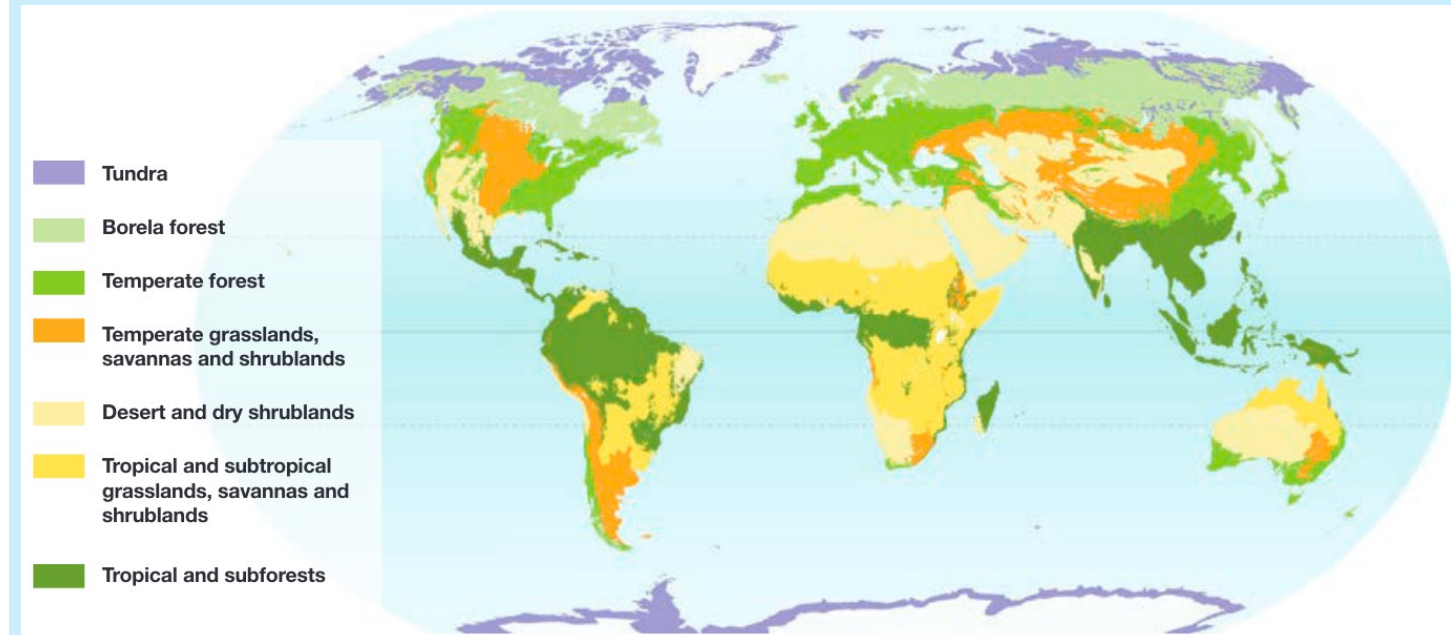


Figure 1. World forests according to habitat and vegetation. (<https://www.grida.no>)



Figure 2. Madagascar periwinkle in a forest - used in leukemia curing medicines. (<https://shorturl.at/axA67>)

- CSF is a new emergent paradigm which ensures that forests transform, adapt to and mitigate climate-induced changes<sup>3</sup> (fig.4).
- The concept is evident in three communities: science, policy and practice (fig.4).
- CSF is starting to be mobilised and is gaining support within the communities.
- It has powerful implications for the commercial forestry sector.
- Forestry stakeholders face pressure to ensure trees are mitigating and adapting to climate change.

## 2. COMMERCIAL FORESTRY

- The UK commercial forestry sector's gross value added (GVA) total in 2021 was £2.09 billion and it employed 32,000 individuals<sup>4</sup>.
- A 51% timber production increase was seen between 2000 and 2018 in the UK<sup>5</sup> (fig.3).

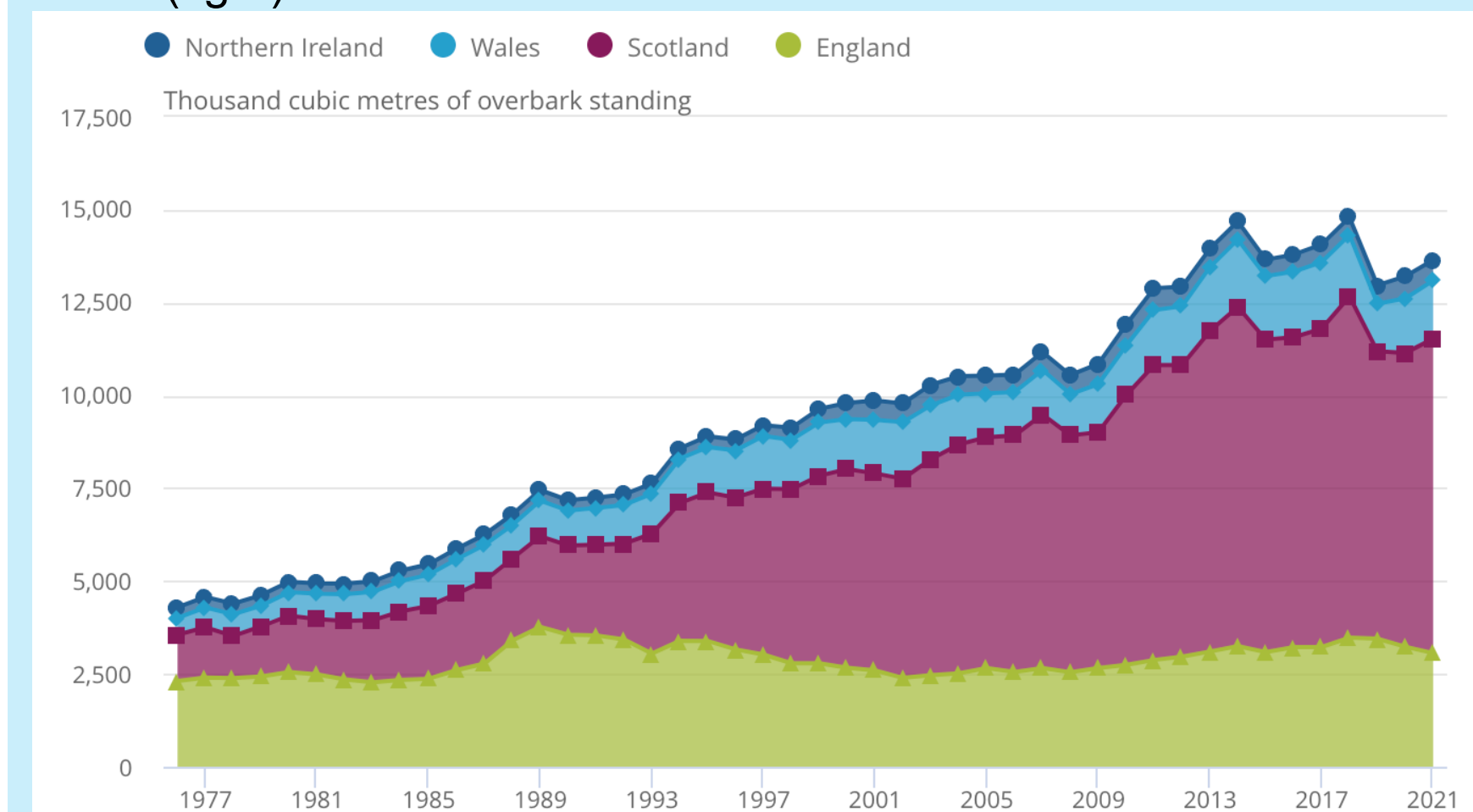


Figure 3. Total UK timber fellings, 1976-2021. ([tiny.cc/x2y2yz](https://tiny.cc/x2y2yz))

- Efforts are being made to address climate change by commercial forestry businesses (e.g. tree thinning) due to unpredictable climate variations<sup>6</sup>.
- Tradeoffs are required to balance two imperatives - 1) implementing climate change mitigation and adaption measures 2) maintaining revenue.

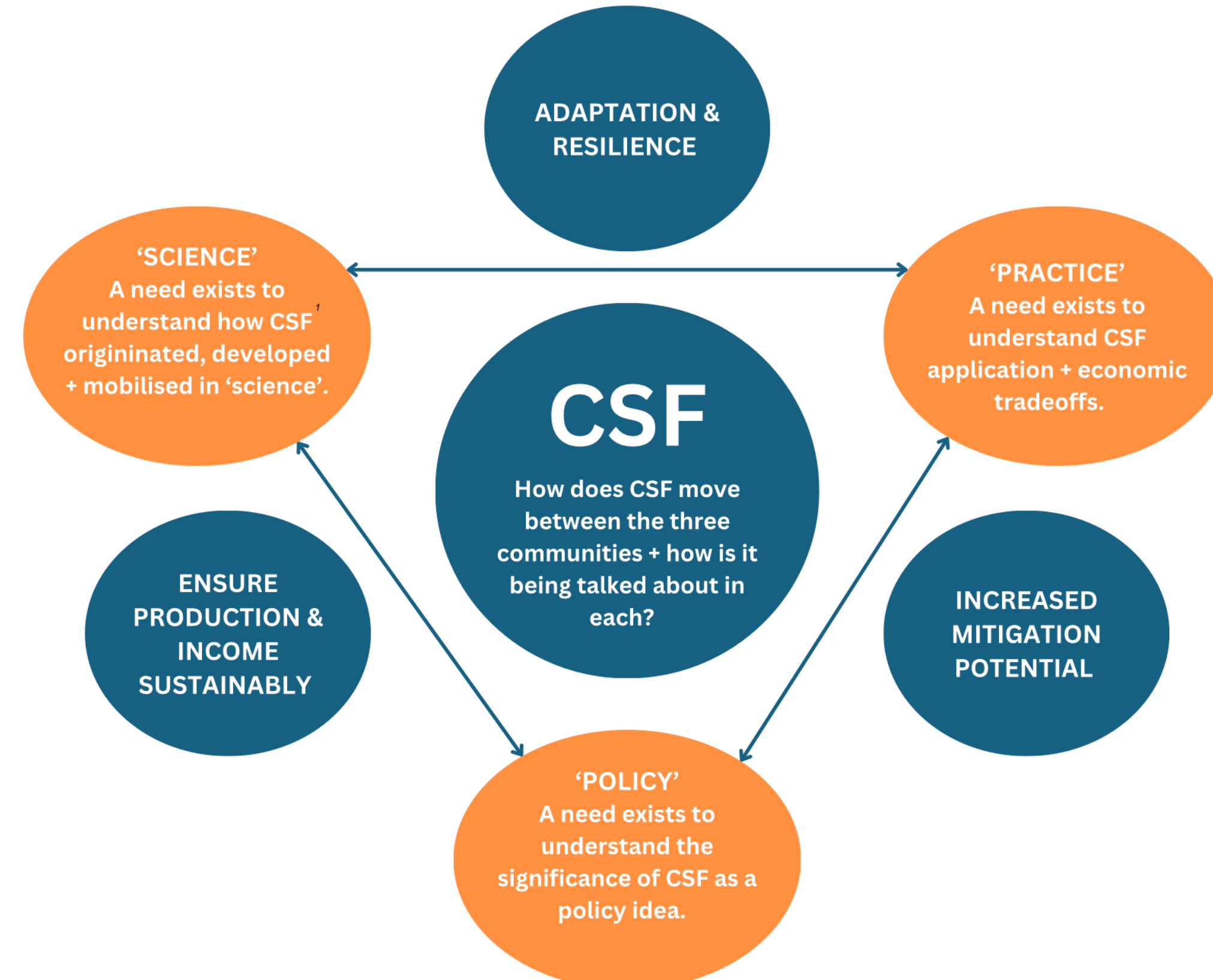


Figure 4. Key elements of CSF (blue) and further research needed in the three communities (orange). (Source: Jonathan Swinney).

## 3. AIM AND OBJECTIVES

The research aim is to understand the CSF concept and its overall application (fig.4). The following objectives will achieve this:

- Understand where the CSF idea has come from within science and assess the significance of it as a policy idea.
- Analyse how CSF is applied in commercial forestry companies by investigating the choices that managers make.
- Evaluate which policy and practice implications might arise from CSF.

## 4. METHODOLOGY

A review of literature will be conducted followed by specific data collection and analysis methods for each objective:

### Objective i:

- Interviews, focus groups and surveys with forestry stakeholders in the science and policy communities.
- Data analysed thematically (NVivo) and statistically (Stata).

### Objective ii:

- Interviews, focus groups and surveys with decision-making forest managers at commercial forestry businesses in Scotland (case study).
- Data interpreted using choice modelling to understand what drives decisions.

### Objective iii:

- Interviews, focus groups and surveys with stakeholders in policy and practice.
- Data analysed thematically (NVivo), statistically and using choice modelling (Stata).

## 5. PROBLEM STATEMENT AND SIGNIFICANCE

In the field of forestry, there is still a need to:

- Develop and critique the CSF concept and identify advocates.
- Investigate (through stakeholder engagement) CSF in science, policy and practice and how it moves between these three domains.
- Explore the commercial forestry sector's climate change mitigation and adaption efforts – especially considering its carbon storage potential (fig.5).
- Expand research into businesses by analysing economic impacts associated with implementing sustainability efforts.

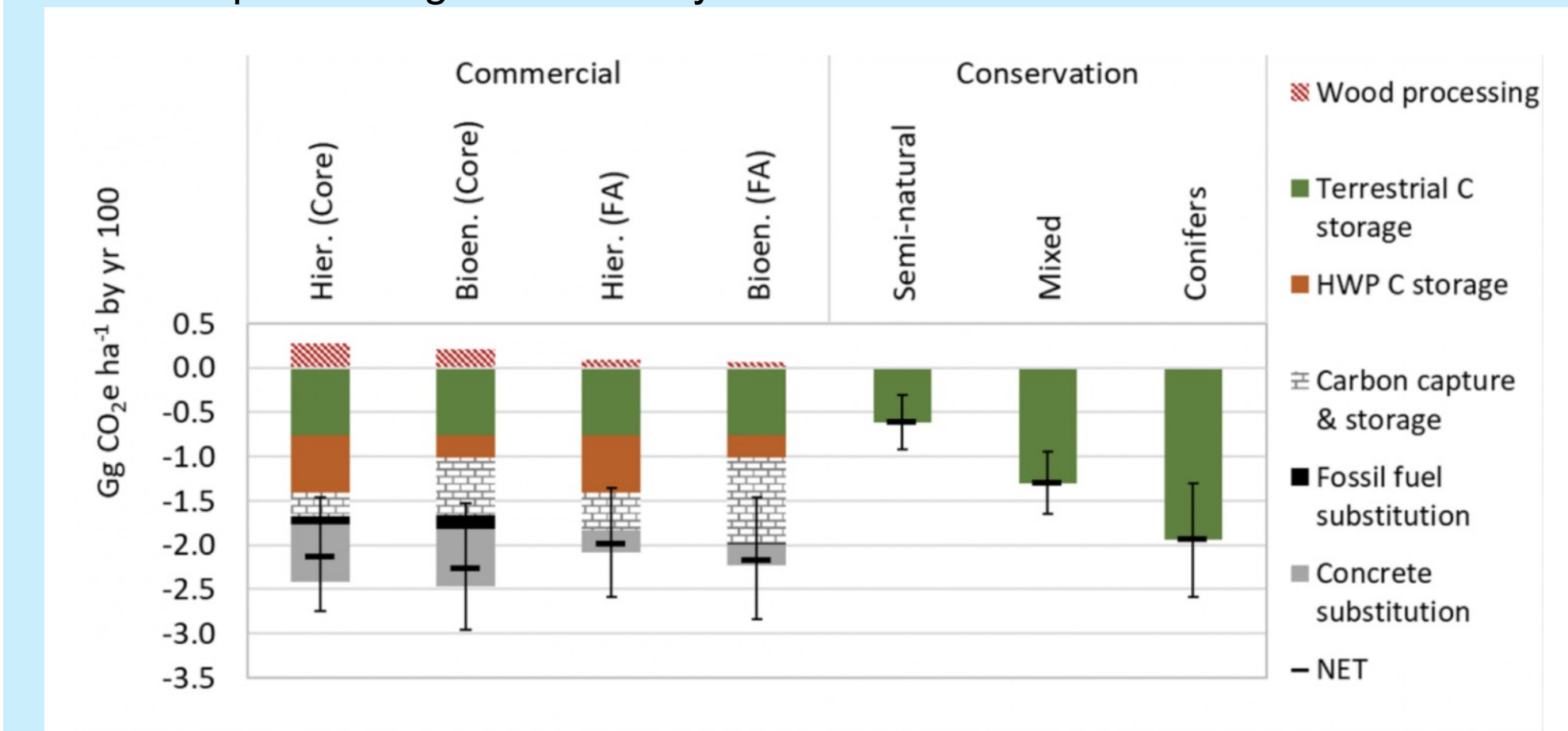


Figure 5. Contribution of major processes to cumulative GHG fluxes from one hectare of afforested land (planted in 2020) by year 100, for commercial and conservation forests. (t.ly/Mok1p)

## 6. RESEARCH OUTPUTS

This research project will have the following outcomes:

- Collaborations** - working with forestry scientists, policymakers and commercial forestry businesses to exchange expertise, data and encourage interdisciplinary work across multiple sectors.
- Engagement** - working with a variety of forestry audiences and stakeholders to communicate research outcomes, disseminate knowledge and encourage engagement and dialogue.
- Knowledge generation** - findings from this research will be published in high-impact forestry journals and presented at conferences.

## 7. REFERENCES

- WWF (2024). Available at: [tiny.cc/4p6zxx](https://tiny.cc/4p6zxx)
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