Bioenergy from Forest Biomass: Ensuring Climate, Forestry and Environmental Benefits

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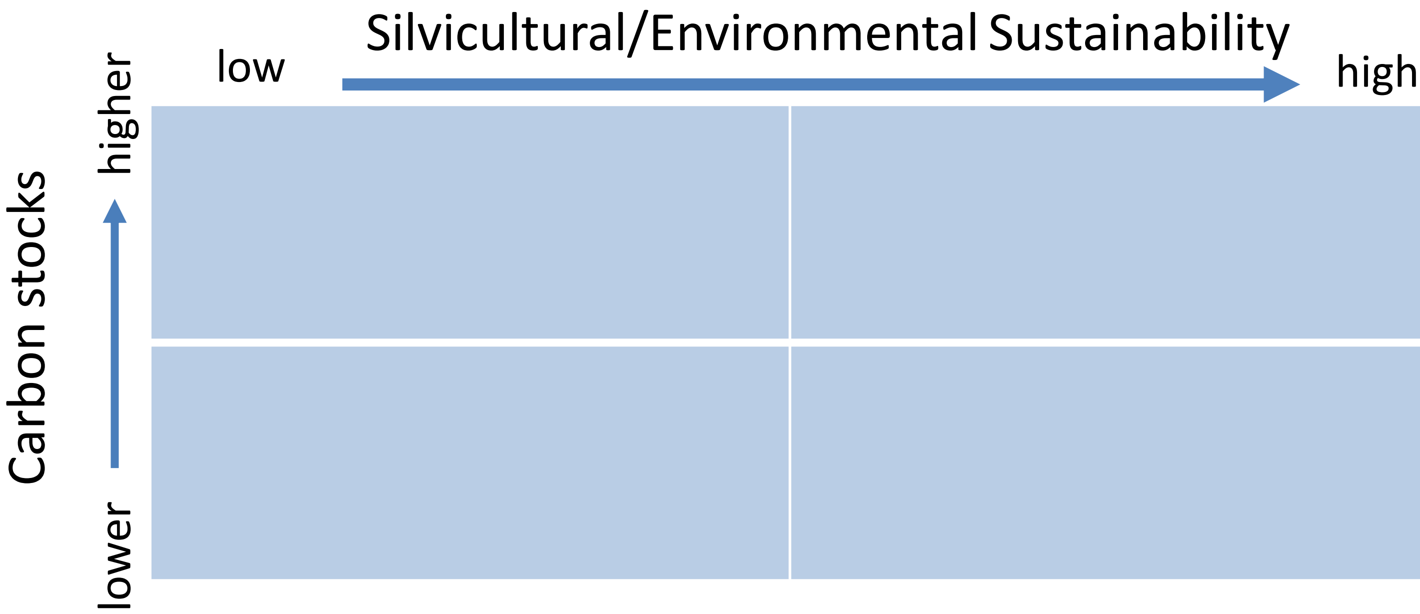
The challenge of ensuring Bioenergy is climate beneficial



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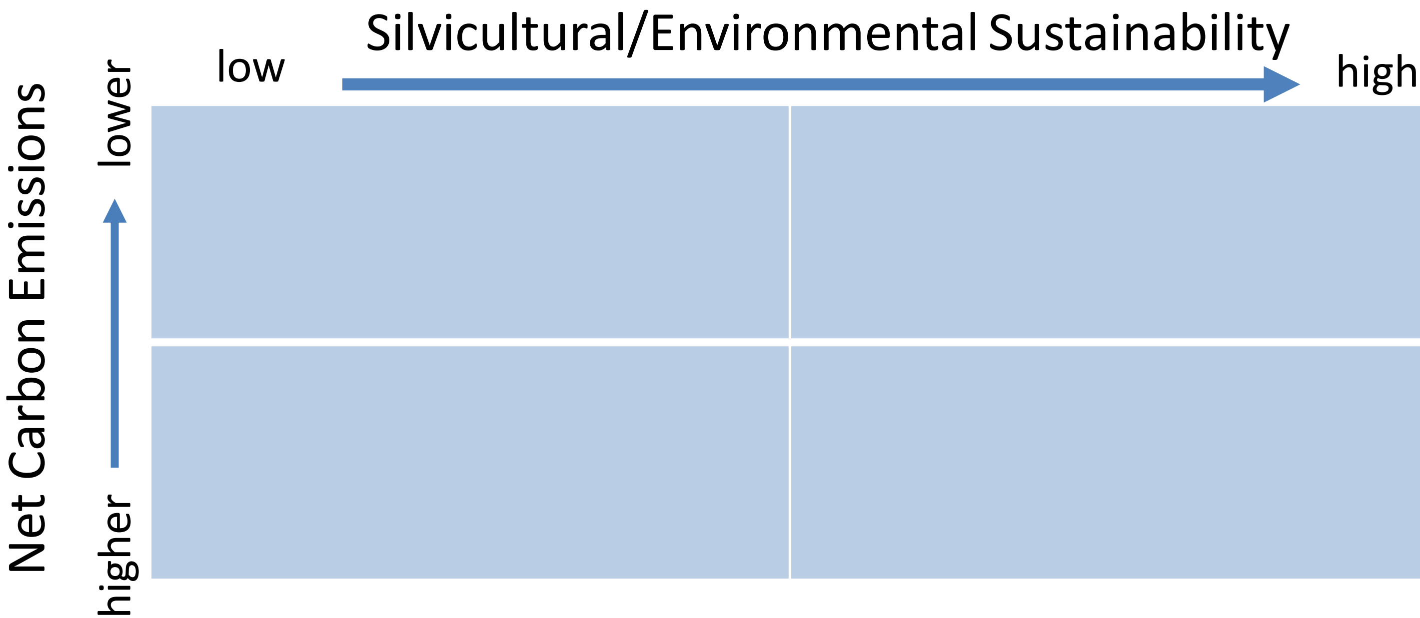

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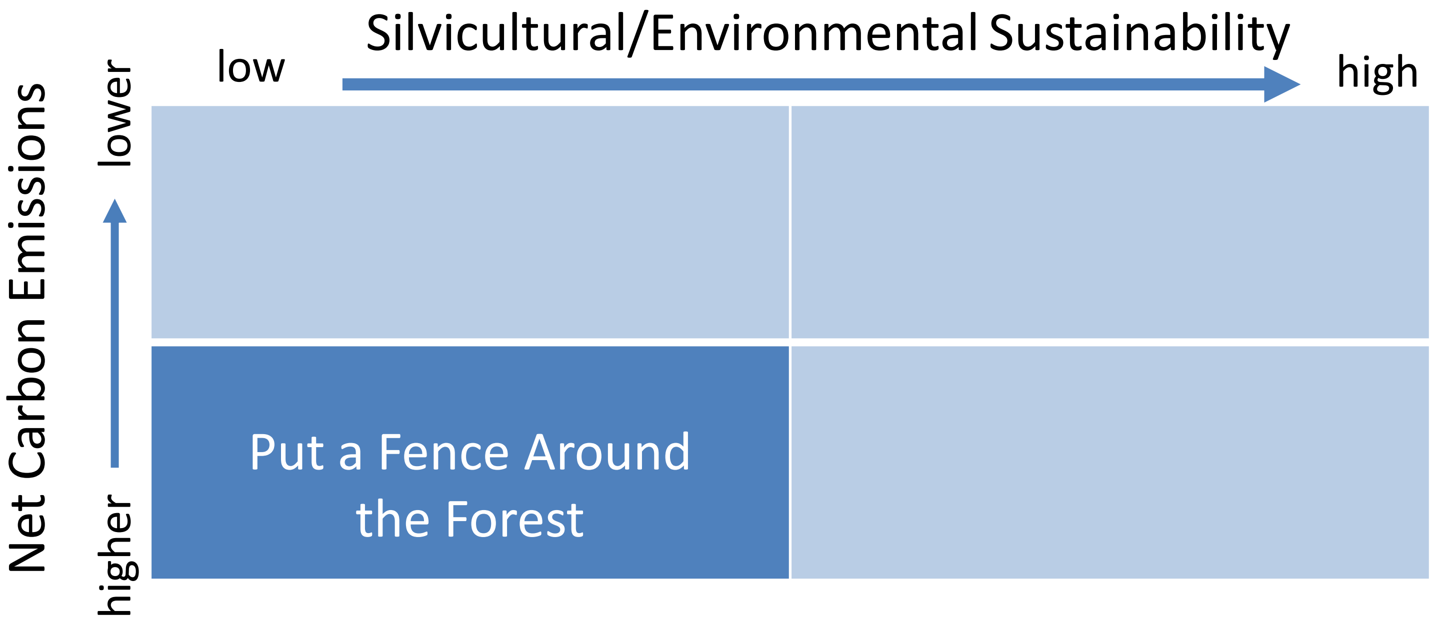

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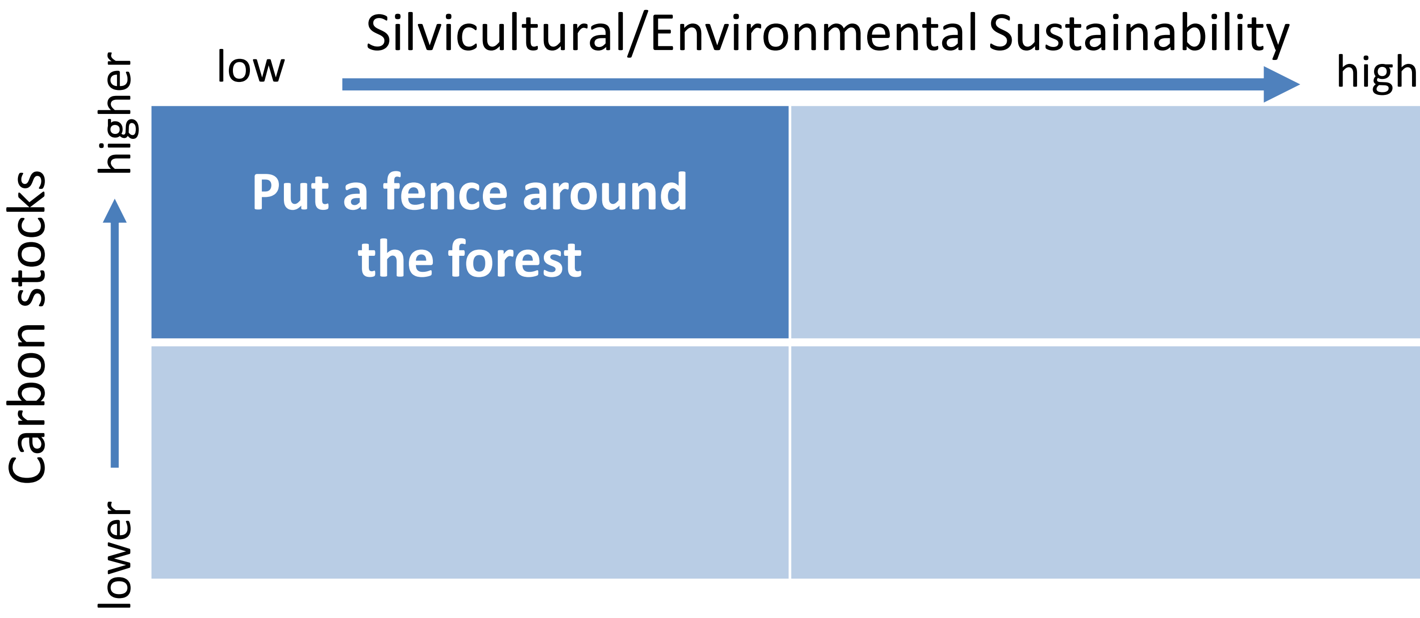

Key issues that need to be addressed

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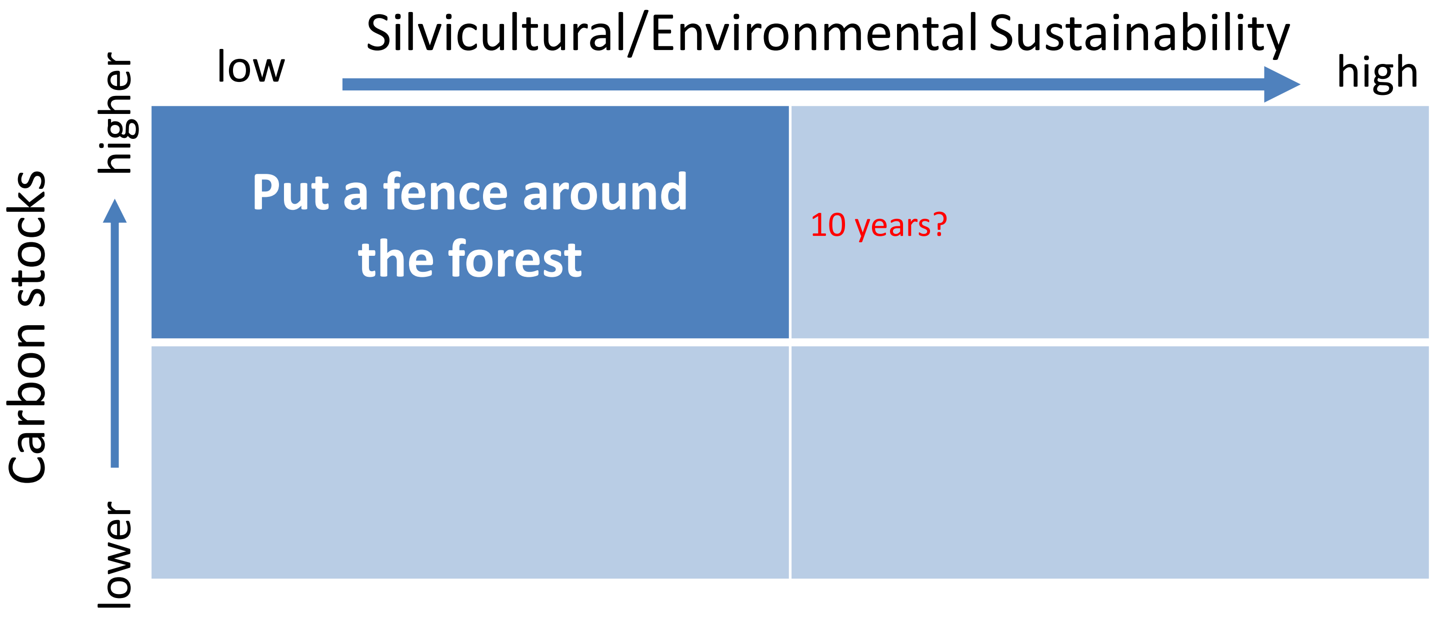
Over what period of time ?



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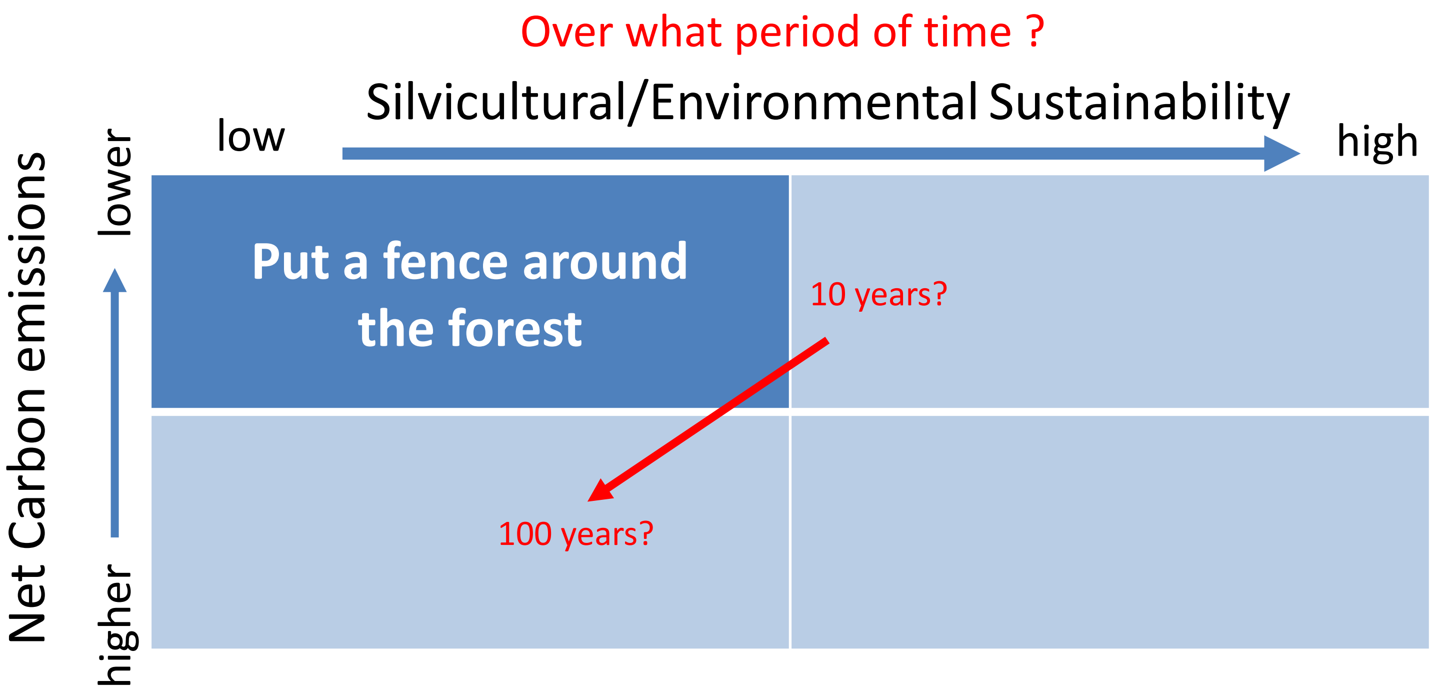

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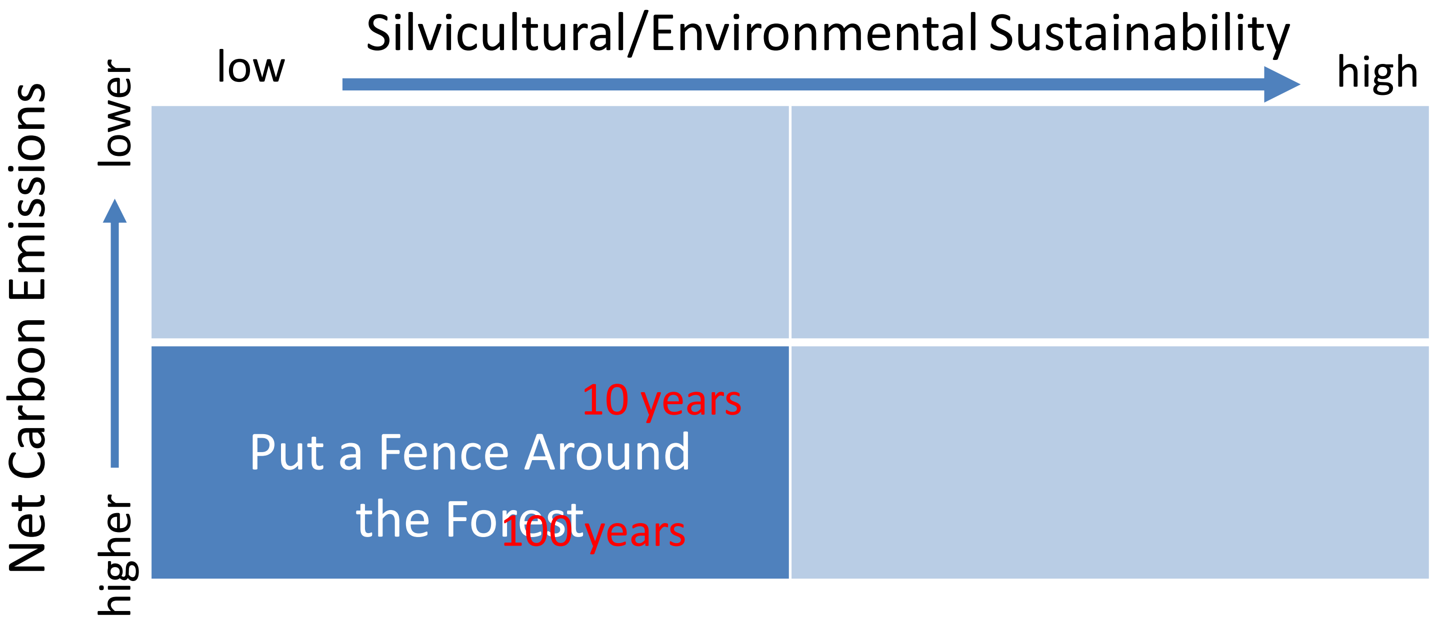
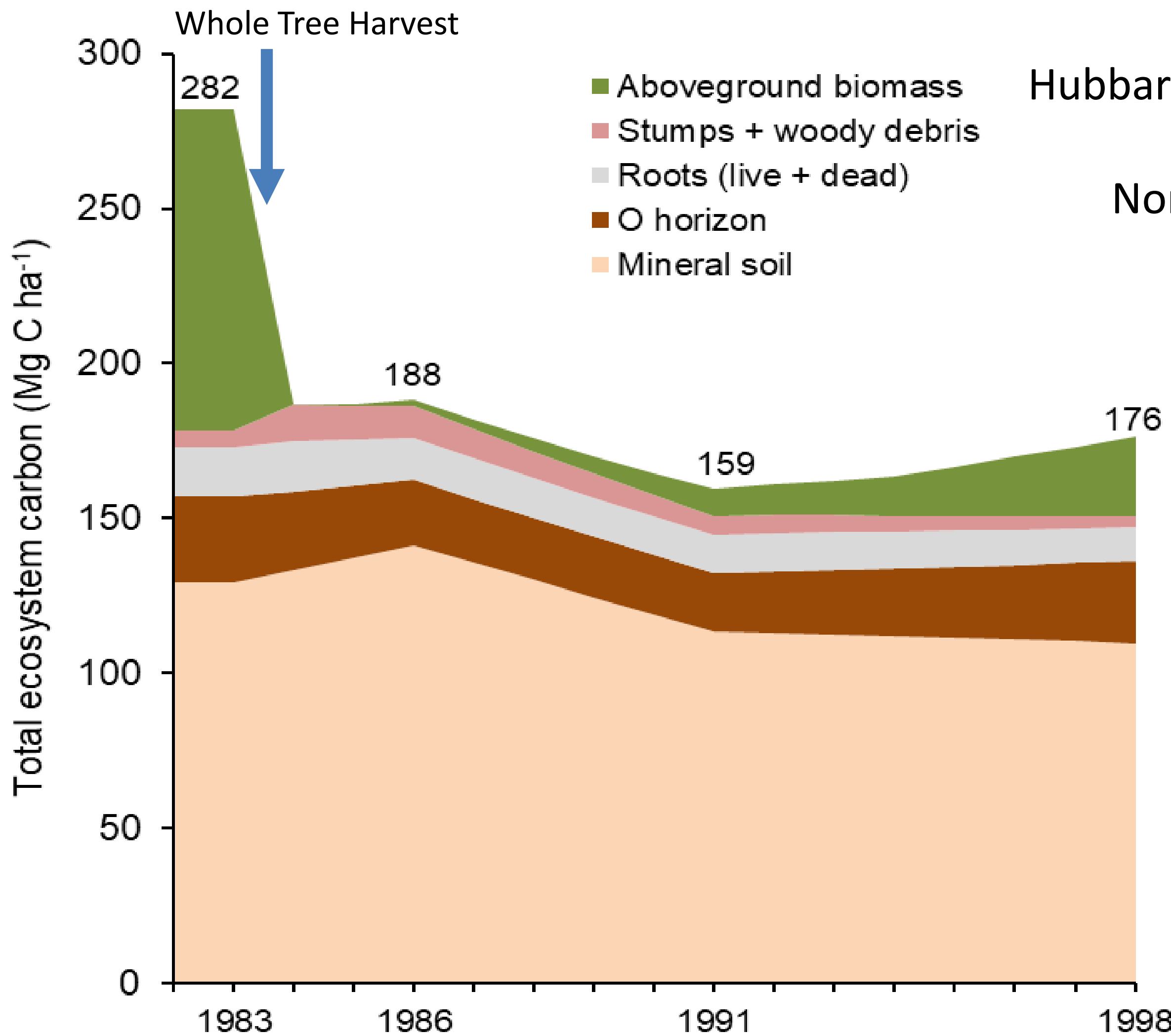


Timeframe is critical

- The climate benefits of bioenergy are different if:
  - Minimize net Carbon emissions to the atmosphere by 2030 - 10 years
    - Maximize use of Mill waste to produce bioenergy
    - Use solid wood products
    - Divert forest residuals that get burned to bioenergy
    - Minimize harvesting of forest materials



Hubbard Brook Experimental Forest
Watershed 5 (22 ha)
Northern Hardwood Forest

15 years post harvest ecosystem carbon is About the same as preharvest

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  - Minimize net carbon emissions to the atmosphere by 2120 - 100 years
    - Maximize use of mill waste to produce bioenergy
    - Use solid wood products
    - Use harvesting residuals in regions with rapid decomposition/where they get burned
    - Increase harvesting for bioenergy even if it decreases carbon stocks in the short term

Key issues that need to be addressed

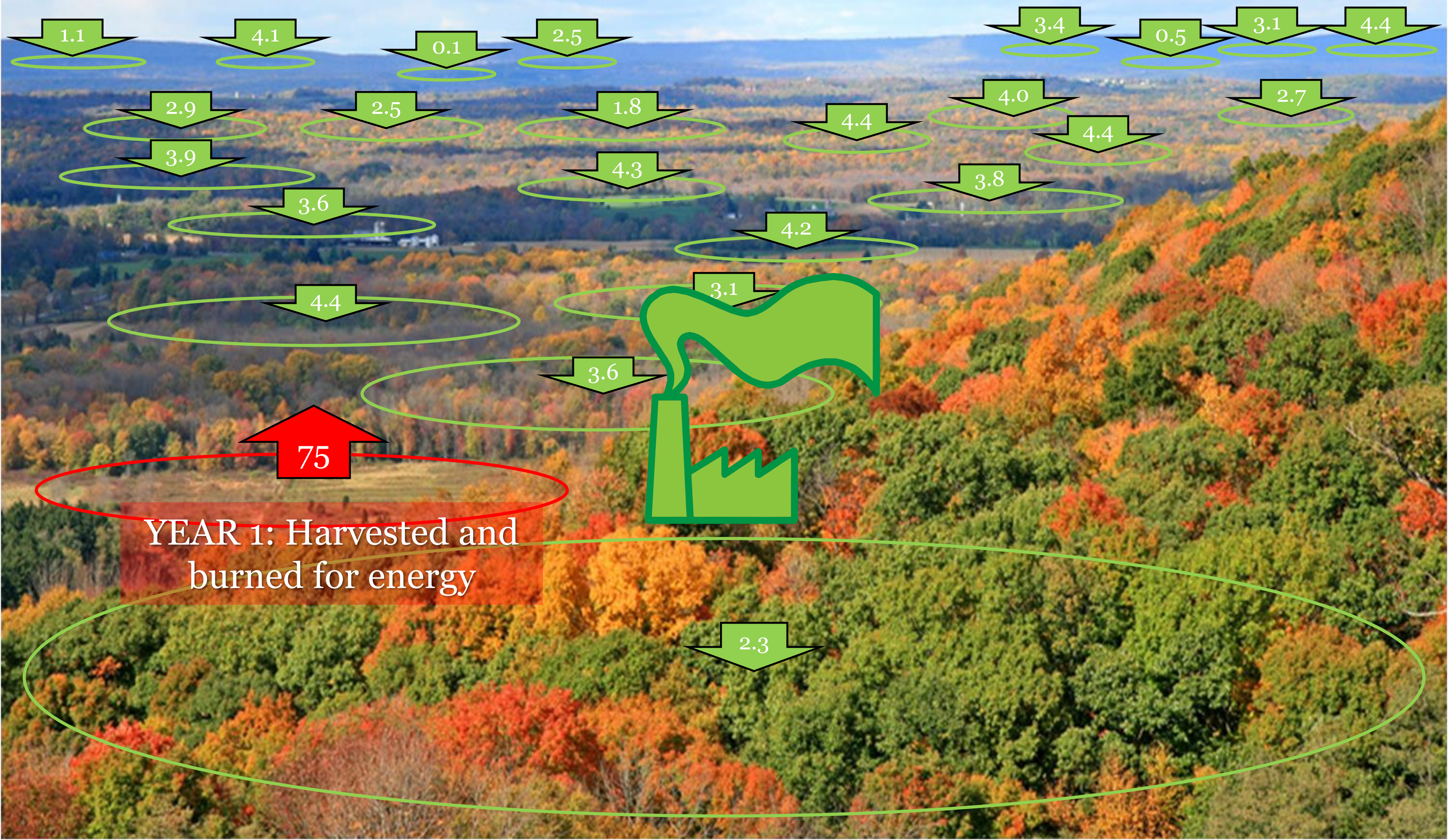
- **Baseline/Counter Factual** has an enormous influence on the benefits you calculate

- **Time** matters in figuring out the implications of using different feedstocks

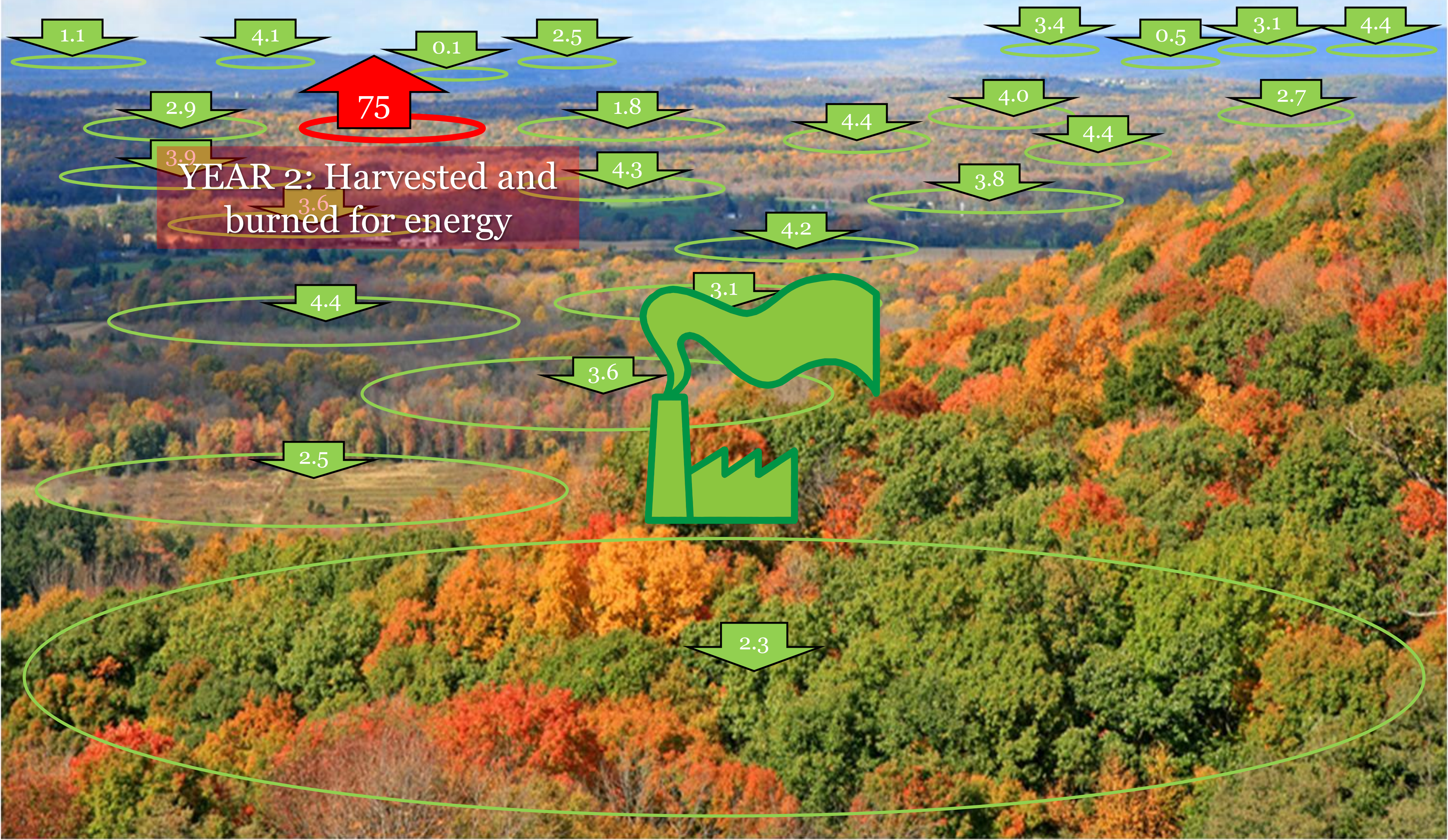
- **Spatial Scale** – stand, woodshed, region


Over time, if carbon stocks are returned to pre-harvest levels…
Σ =
…the net emissions over this time are zero.
Year X, until next harvest
???

Looking at all areas that will be needed to supply wood to a given operation



Forest regrowth equal harvest at the end of the first rotation – how you account for the baseline is critical



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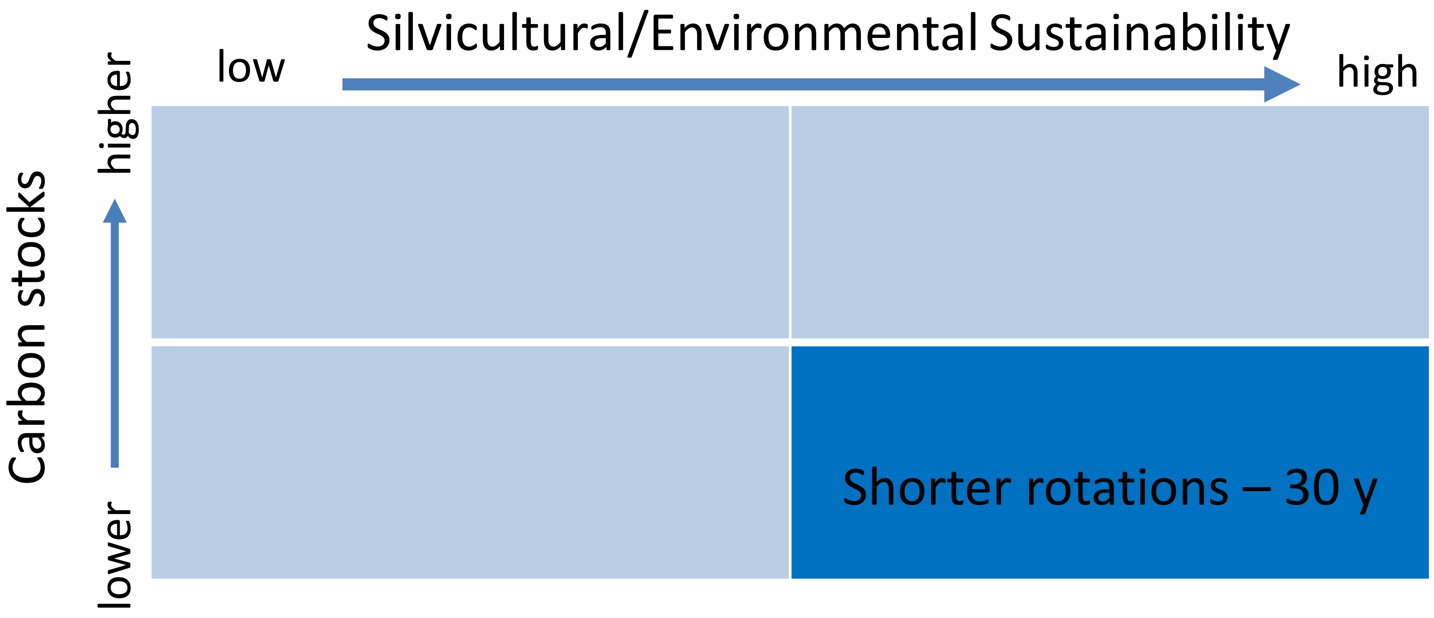

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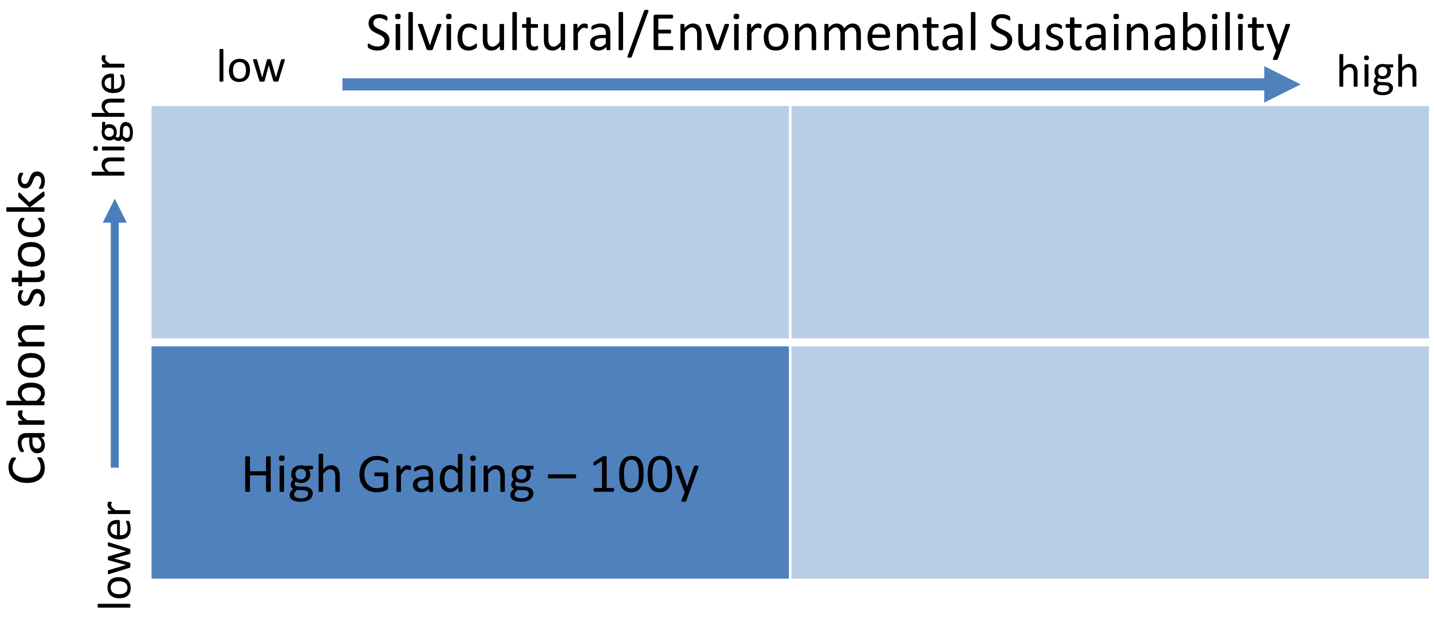

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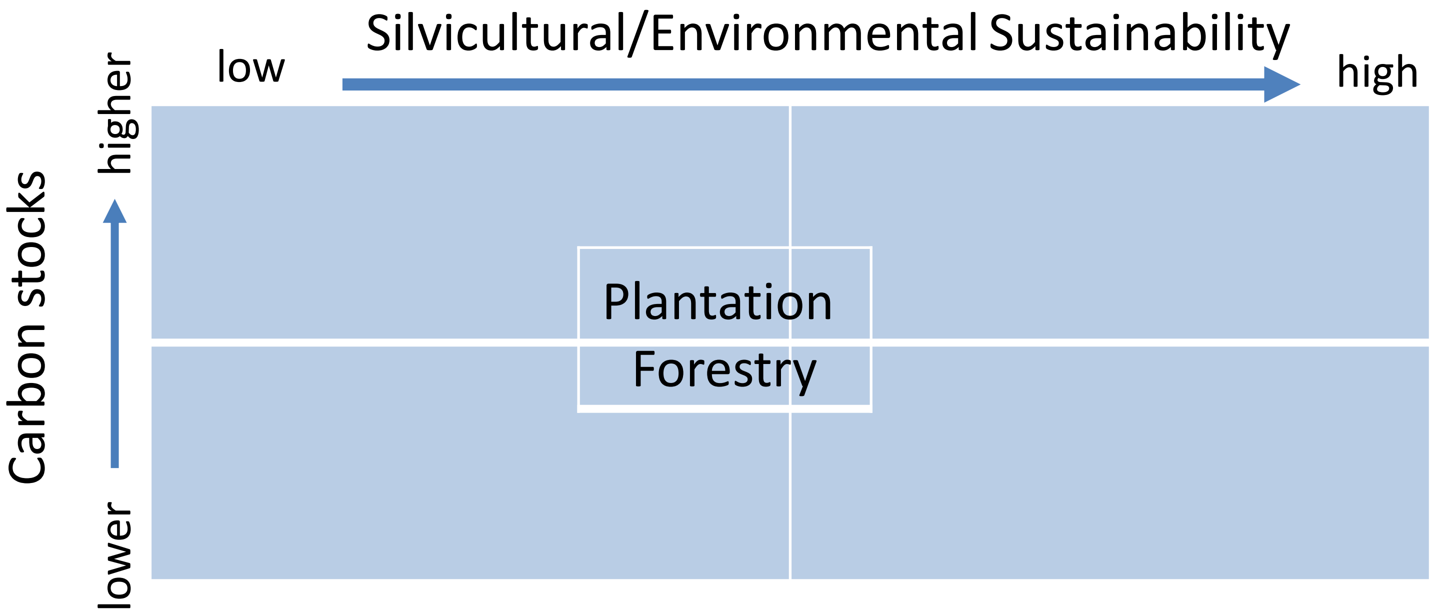
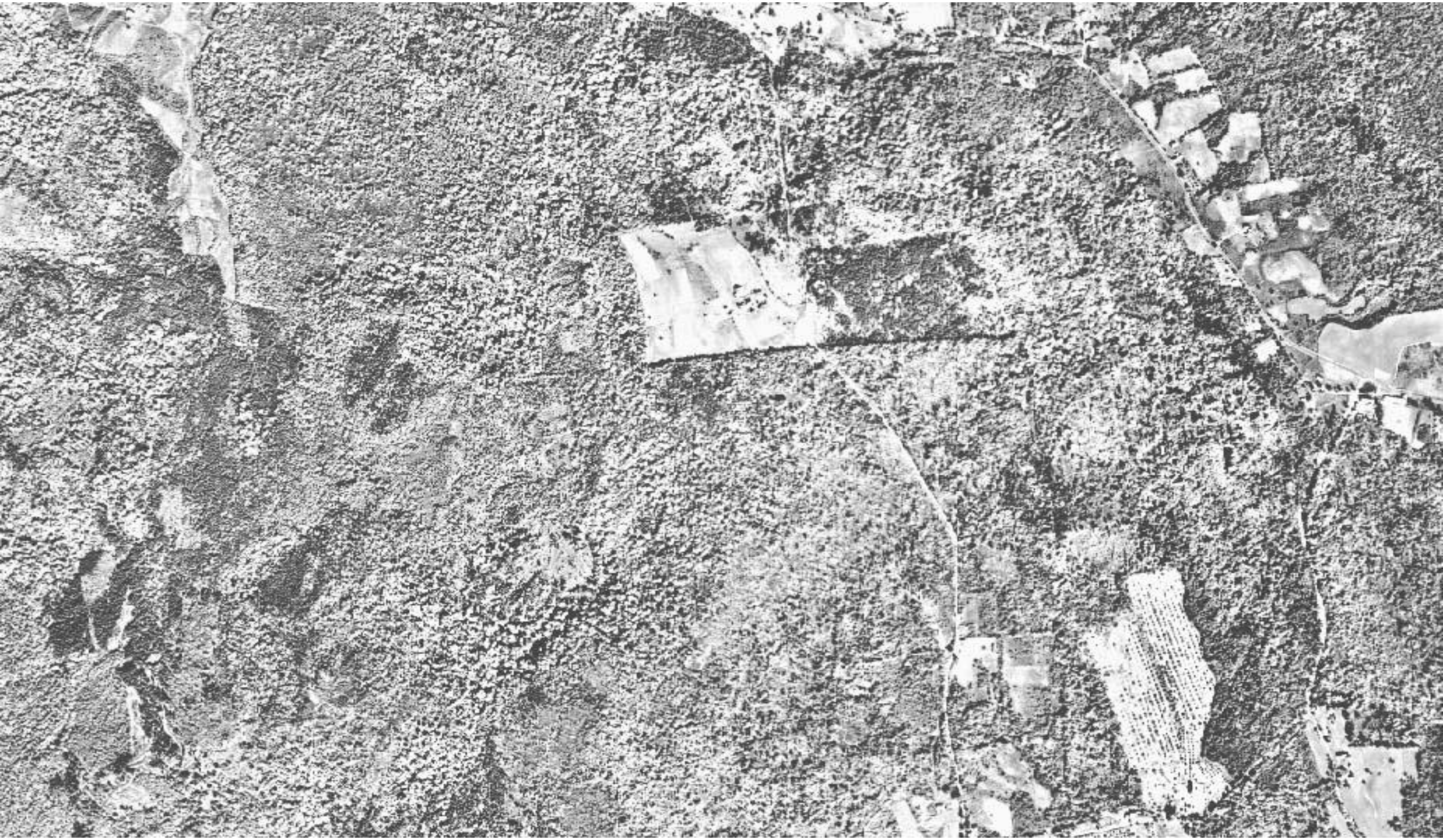


Historic aerial photography - Bald Mountain, 1942



General considerations

- Don’t confuse plantation silviculture with forestry in general
  - In US <10% of managed forest lands are planted
  - Environmental benefits of natural generation are large
- Silvicultural sustainability is critical
  - Pressure for selective logging can easily lead to high grading
    - Whole trees as a category – destructive notion
    - We need to avoid history repeating itself
  - Plantation-based silviculture not relevant in protecting most terrestrial carbon stocks
- Net emissions not gross emissions are what matters
- Selection of appropriate counter-factual baseline is critical
  - Use of coal to generate electricity is not appropriate comparison

General considerations

- Need to consider carbon stock changes versus carbon flows

- Need to define timeframes of interest
  - The implications vary widely with differing timescales

Bottomline need to agree on objectives before we can agree on an accurate bioenergy Carbon accounting approach