Developing Tools to Meet the Demand for Sustainable Forestry

A Scottish case study
Four Scenarios:

1. Business as Usual, i.e. the current management regime.
2. Climate change increasing the intensity of biotic threats, along with a parallel target of forested land being restored to broadleaves.
3. Restoration of intensive forested areas to a more “natural” system in order to increase both biodiversity and attractiveness for tourism.
4. Responding to climate change mitigation policies as woodfuel industries increase their demand for wood chips.

- The impact of these scenarios was measured against various sustainability indicators including Gross Value Added, Greenhouse Gas Emission and Carbon Stock, Forest Biodiversity, Employment, and Recreation.

- The aggregated indicator results from the completed analysis will be presented to various stakeholder groups representing a range of industrial, environmental, and community enterprises.
This case study was an illustration of how ToSIA principles may be applied at forest stand level.

A major advantage of the ToSIA methodology is that it allows the user to analyze not only current sustainability impacts but also impacts from potential future scenarios as well.

The case study generated a large amount of results which were analyzed to determine the impacts each scenario had on the sustainability indicators.

In the following bar graph, the relative values of all the calculated indicators are shown against the baseline (business as usual). Displaying the results in this way allows for a comparative analysis of the scenarios.
Case study results

Relative values of key indicators for 3 scenarios in comparison to the Baseline (current management)

Indicators:
- GVA (£/yr)
- GHG (kg CO2eq/yr)
- Employment (FTE/yr)
- C Stock (tCO2eq)
- Recreation
- Biodiversity

Baseline
Scenario 1
Scenario 2
Scenario 3
Indicators by process

GVA values by process for Baseline FMA 4.

- It is also possible to assess the results in greater detail, for example, at a hectare level instead of forest stand level.
- In these figures the accumulated values of GVA, greenhouse gas emissions and employment are shown as the proportion contributed from each stage of the wood chain for FMA 4 (baseline scenario).

GHG values by process for Baseline FMA 4.

Employment values by process for Baseline FMA 4.
Next steps: GIS spatial analysis for baseline and scenarios Forest Management Alternatives

- FMA 1 is a forest nature reserve
- FMA 2 is continuous cover forestry
- FMA 3 is combined objective forestry
- FMA 4 is intensive even-aged forestry
- FMA 5 is wood biomass production.
Next steps in NorTosia

- Expand case study methodology throughout the Cairngorms National Park
- Visualise sustainability indicators spatially
- Develop Recreation and Biodiversity/Connectivity indicators using landscape modelling techniques
- Engage with stakeholders to understand relative impacts of scenarios and validate the outputs of the approach
- Investigate how the approach would be incorporated into planning