

Title: Linking ecosystem services and human wellbeing in Scotland

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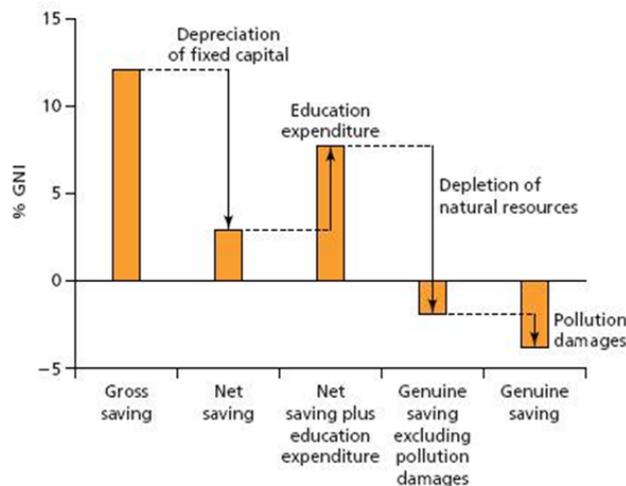
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Project background

Ecosystem services are central to both economic activity and social wellbeing globally and Scotland is particularly well-endowed when it comes to natural capitals such as agricultural land, water, biodiversity and open spaces for recreation. Following the Millennium Ecosystem Assessment MEA (2003), the UK National Ecosystems Assessment (2011) emphasised the national contribution of many ecosystem services and conversely the potential costs of inaction if further ecosystem degradation were to occur. Scotland's natural capital base was not especially prominent in the national study, reflecting the uneven representation of researchers from Scotland's institutions. Thus for example there was no detailed study of the multifunctional value of Scottish peatlands. Independently Scottish Natural Heritage has developed a Natural Capital Asset Index (SNH 2012), which provides a composite indicator of biophysical capitals that can be tracked through time. The Index was also recently foregrounded by the newly created Scottish Forum on natural Capital (<http://naturalcapitalscotland.com/>), of which Edinburgh University (UoE) is a founder-member. The Scottish Government has committed to using the index to influence decision-making and it is therefore a potential focus of study. This thesis aims to substantiate the UoE contribution to the new Forum by building on the Natural Capital Asset Index; specifically by considering the composition of biophysical indicators and how such indicators can be linked to existing and novel indicators of economic performance and human wellbeing. There have been many attempts to integrate or "mainstream" the environment into national measures of wellbeing (e.g. adjusted GDP or Genuine Savings – see figure 1), but as yet there is no consensus on what such a measure might look like in Scotland.

Figure 1 The World Bank's Genuine Savings indicator applied to fictitious country; GNI =gross national income



Key research questions

1) What is the economic or other societal value of Scotland's natural capital and how does this value divide between asset stocks and flows of services? 2) How can degradation and enhancement in stocks and flows be measured consistently and given an economic or other wellbeing value using non monetary metrics? 3) What are the best methods for combining biophysical and wellbeing data into a consistent asset indicator? 4) What does this tell us and what should government be tracking in terms of the drivers of ecosystem change?

Methodology

The aim of this project is to construct a composite index of natural capital that includes the valuation of the capital stocks and annual service wellbeing flows. The emphasis on valuation is the missing link between biophysical indices and indices of economic wealth that are traditionally used to chart economic progress and conventional national economic performance. Although the wellbeing link will be provided initially by an exploration of monetary metrics of wellbeing (i.e. the monetary valuation of ecosystem services), the composite index can also accommodate other non-monetary metrics including more subjective measures of wellbeing that are increasingly dominating the literature on non-

market valuation (OECD 2013). The study will initially review an existing wealth of existing information on biophysical assets and their valuation (using non-market methods), before considering how the existing global valuation data can be used to provide an overall picture of the monetary value of Scottish ecosystem stocks flows. This initial stage will be undertaken using GIS layers as a way of proving a spatial resolution to the distribution of these assets. The spatial resolution of assets and their values will then be merged with existing spatial datasets on the socio-demographic availability and access to the well being flows. A further element of the study will involve a valuation study of self-reported (subjective) wellbeing across a range of post codes determined by differing scales of social deprivation. The combined information will provide a more holistic natural capital index for and recommendations on key variables for government to track through time.

Timetable for research

Year 1	Chapter planning, literature review, presentation and research skills courses. Attendance of appropriate masters degree modules – e.g. ecological economics and GIS training. Conference attendance
Year 2	Data collection including survey design on subjective well being. Conference attendance
Year 3	Data analysis – write up and publication planning

Research training - A comprehensive training programme will be provided comprising both specialist scientific training and generic transferable and *professional* skills. Depending on the student background the student will be trained in ecological economics methods (SRUC staff run the MSc for UoE), data collection and statistical analysis. More generic research skills will be provided for presentation, report/paper writing and project management. We also have an opportunity for the student to spend an intern period at UNEP working with the team charged to develop TEEB (The economics of Ecosystems and Biodiversity <http://www.teebweb.org/>). The student will be encouraged to attend relevant national and international meetings.

Requirements – This award would suit a student from a natural science background aiming to develop cross-disciplinary skills especially economics. Students from the current UoE Masters degrees in Geosciences (e.g. Ecological Economics, Ecosystem Services Environmental Sustainability, Environment and Development, Integrated Resource Management, GIS) are particularly encouraged to apply

Further reading or any references referred to in the proposal

Millennium Ecosystem Assessment. (2003) Ecosystems and human well-being: a framework for assessment. Millennium Ecosystem Assessment. Island Press, Washington (www.millenniumassessment.org)

National Ecosystem Assessment (2011) Synthesis of key findings <http://uknea.unep-wcmc.org/Resources/tabid/82/Default.aspx>

OECD (2013) Guidelines on Measuring Subjective Well-being, OECD, Paris http://www.oecd-ilibrary.org/economics/oecd-guidelines-on-measuring-subjective-well-being_9789264191655-en

Project summary This project focuses on Scotland's ecosystem service values and how these might be included in national growth indicators. The project will build on the Natural Capital Asset Index (SNH 2012).