

***Peter Thorpe** is an undergraduate economics student at the University of Strathclyde, about to start his fourth year, and has a summer internship in the Fraser of Allander Institute supported by the Research Interns@Strathclyde scheme.*

This year marks the 20th anniversary of the first quarterly Gross Domestic Product (GDP) series for Scotland. This was a significant step forward and over the years it has helped our collective understanding of the Scottish economy. Since then, many more advances have been made by the team of government statisticians at St. Andrew's House, with the quality and coverage of economics statistics continuing to improve. Scotland remains the only nation of the UK with a quarterly GDP series.

Earlier this year, an important new addition was made to this stock of information on the Scottish economy, in the form of [Scottish specific natural capital accounts](#).

Policymakers - quite rightly - have an increasing focus on climate change and on Scotland's natural environment. But such important issues are not typically captured in measures such as GDP.

While experimental, these statistics are useful in analysing where Scottish natural capital currently stands, and developing a better understanding of Scotland's environment, and the role it plays in the economy.

So what is natural capital?

Analogously to the value of physical capital like buildings and machinery, the value of natural capital is the value of natural resources such as plants, animals, minerals, air etc. as used in the economic production of goods and services. It has been described as the value of "what nature provides for us for free".

The value of natural capital represents the capital value of these natural assets, while the annual flow of benefits, or income, from these assets is known as ecosystem services.

These can take three forms, either: 'provisioning services': items produced by nature and consumed, such as renewable energy, and oil and gas; 'regulating services': where nature provides a service in mitigating the impacts of human wastes, such as carbon sequestration; or 'cultural services' such as outdoor recreation activities.

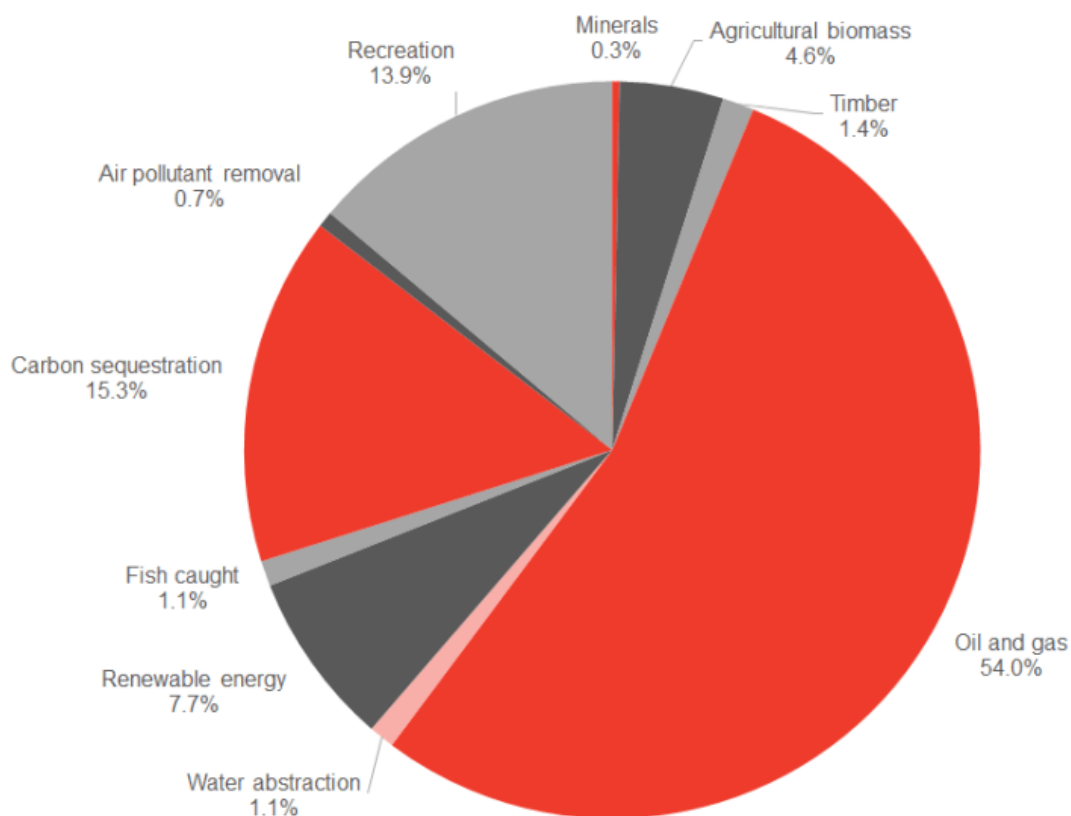
The total asset value of Scottish natural capital in 2015 was £291 billion, [roughly 38% of the UK total](#).

Not only does this data make a valuable contribution by quantifying the economic benefits accrued from nature, but by tracking performance over time it can help improve our understanding of how environmentally sustainable growth is.

Examining GDP on its own is dangerous, as policies could temporarily increase GDP at the expense of the environment. For example, over-farming will initially show up as an increase in GDP, but by leading to a long term decline of natural capital stocks, growth will be less sustainable.

The chart below shows the breakdown of natural capital in Scotland during 2015.

Chart: Breakdown of Scottish Natural Capital, 2015



It should be noted that these 10 values do not fully capture all of the benefits of the environment - as they only capture what has so far been measured.

By far the largest contributor is Scotland's estimated geographical share of the UK's oil and

gas reserves. The recent publication notes that the overall natural capital asset value may change in subsequent years “due to further decline in the oil and gas asset valuation.”

Not only is this information useful to better understand the Scottish economy at a macroeconomic level, it also allows an improved understanding of individual sectors and the importance of the nation’s natural capital to it.

Two examples illustrate this approach.

Example 1: Agricultural biomass

Agricultural biomass is crucial to the [Scottish Government’s climate change plan](#).

Agricultural biomass refers to the production of crops and food for animals. Farmed animals are not considered natural capital as they are “produced” asset, but the grass animals graze on, for example, is provided by nature and counted as biomass – a ‘provisioning’ ecosystems service. In 2015, biomass was valued at £13,250 million, which makes up 5% of the Scottish natural capital stock. This percentage has increased in the most recent year.

The Scottish agricultural biomass natural capital stock represents 15% of the UK value. Given that around a third of the UK’s farmland is in Scotland, Scottish biomass adds less value per unit area. However, this is expected given Scotland’s colder climate and less fertile terrain.

The way in which this value is calculated is interesting: it shows how ‘nature’ can be valued from an economics perspective.

The annual value of the agricultural biomass ecosystem service is calculated through a “resource rent” approach. This is the residual profit to the service user after all other profits and costs have been extracted. It can be thought of as the monetary contribution of nature, or the theoretical “rent” nature would charge for its services if able. The value of the natural capital stock is then calculated as the present value of future ecosystem service flows and can be thought of as the monetary value of the services nature provides to the Scottish economy. Of course, many would argue that the ‘true value’ of nature cannot be estimated by such methods alone.

Example 2: Forestry

Another “provisioning” service with a large role in the Scottish Government’s climate change plan is forestry, with enhanced woodland cover a major target. Earlier this year the

Scottish Government published a [10-year plan](#) for forestry and related industries to play an increasingly important role in sustainable and inclusive growth in the Scottish economy.

The timber natural capital stock is related to the wood felled for use in the timber industry. Timber production in Scotland has nearly doubled in the last 20 years (and now makes up around 1.4% of Scotland's natural capital stock).

Like biomass, timber is also valued through resource rent, but through a different method. Loggers must pay a stumpage price per tree to the owner of a forest for the right to fell trees. This stumpage price approximates to the residual rent of timber, so the monetary value of timber can be found by multiplying the stumpage price per tree by the quantity of timber felled. The value of timber stocks has been steadily increasing since 2007 as both prices and production increases, and sat at a high of £4,410 million in 2017.

In 2015, Scotland's timber production made up 62% of the UK total. Around 64% of the asset value of UK woodland comes from Scotland.

Summary

The production of Scotland's first set of natural capital accounts are a significant step forward in our understanding of the Scottish economy. Their production arguably marks as important a development as the first set of quarterly GDP figures some 20 years ago.

Of course, the value of nature extends beyond our focus on agricultural biomass and timber to areas such as recreation opportunities, pollutant removal and health benefits.

But as we look to build a more sustainable economy that supports the transition to net zero, thinking about how to link up our nation's physical as well as natural assets to its economic potential is a crucial step.