

BiGGAR Economics

Economic Impact of the Strategic Research Programme 2011-2016

Executive Summary of a report to the
Scottish Government

August 2017

BiGGAR Economics

Pentlands Science Park

Bush Loan, Penicuik

Midlothian, Scotland

EH26 0PZ

+44 (0)131 514 0850

info@biggareconomics.co.uk

www.biggareconomics.co.uk

1 Introduction

Between 2011 and 2016 the Scottish Government's Rural and Environment Science and Analytical Services Division (RESAS) invested £246 million, an average of over £49 million per year (2011-2016), in a portfolio of strategic research and related activities. In 2016 BiGGAR Economics was commissioned to assess the economic impacts generated by this investment. This report summarises the findings of the analysis.

There are two main types of economic impact associated with the 2011-16 Strategic Research Programme (SRP): operational impacts generated directly as a result of the funding provided and wider economic benefits realised as a result of the research supported by the funding.

In collaboration with the Scottish Government and the Main Research Providers (MRPs), a framework to identify the wider economic impacts of the SRP was developed. Where possible, these benefits have been quantified and are discussed in Section 2 below. The funding provided through the 2011-16 SRP has also helped to generate a variety of wider economic benefits that cannot be fully quantified. These benefits include benefits to human health, the efficiency of public expenditure and the sustainability of rural communities. The 2011-16 SRP has also generated an even wider range of wider, non-economic benefits that are outwith the scope of this report.

For many areas of activity considered in this report the funding provided through the 2011-16 SRP enabled researchers to leverage in additional research funding from elsewhere, by providing match funding and underpinning research capacity. For this reason it is reasonable to attribute all of the benefits of levered research to the 2011-16 SRP and this is the approach taken in this report.

2 Wider Economic Benefits

The 2011-16 SRP was used to fund research that has stimulated a broad range of wider economic benefits. Uncertainty about the future value and long-term duration of each benefit means that it is appropriate to measure these benefits as an annual contribution realised in 2016. **It was estimated that the wider economic benefits associated with the 2011-16 SRP contributed a total of £151.8 million GVA to the Scottish economy in 2016 and supported around 1,460 jobs.**

These wider economic impacts included:

- **Commercialisation benefits of £1.6 million GVA and more than 50 jobs.** These benefits included activity supported within spin-out companies that were established between 2011 and 2016 based on research supported by the SRP. These benefits also include the activity associated with license agreements reached between 2011 and 2016 that allow intellectual property based on research funded by the SRP to be used for commercial purposes.
- **Animal health benefits of at least £3.0 million GVA.** These benefits relate to the cost savings realised as a result of improving the control of Bovine Viral Diarrhoea, an important livestock disease. These impacts were underpinned by animal health research but realised as a result of funding provided through the 2011-16 SRP. These figures are however based on an illustrative

examples rather than the full range of animal health research undertaken by the MRPs. This full impact of this area of activity is therefore likely to be significantly higher than the figure above.

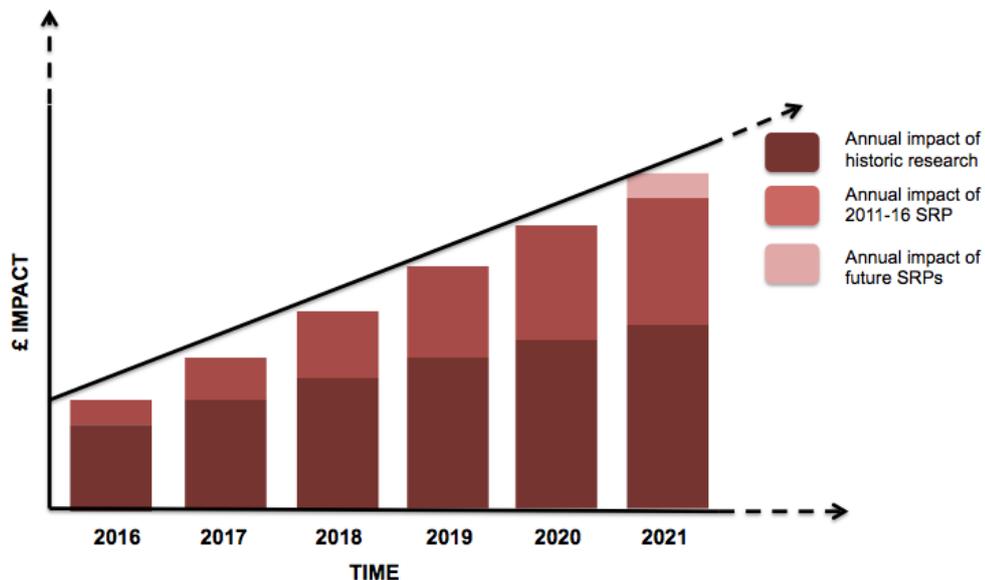
- **Plant health benefits of at least £16.6 million GVA.** These benefits relate to the cost savings realised as a result of improvements in the control of three important crop pests and diseases: Late Blight, Potato Cyst Nematodes and Ramularia. These impacts were underpinned by research undertaken in previous funding cycles but realised as a result of funding provided through the 2011-16 SRP. As the 2011-16 SRP funding also supported research on a various other pests and diseases this estimate of impact is likely to be conservative.
- **Genetic improvement benefits of £35.9 million GVA and supporting around 260 jobs.** These benefits related to genetic improvements in livestock and food crops that were underpinned by important genetic resources that were funded through the 2011-16 SRP. These benefits are permanent so the cumulative value of these impacts will increase over time. Due to the time-lag between research effort and commercial application it is also expected that the annual value of this impact will increase over time.
- **An increase of £3.3 million GVA within the food and drink sector, which supported around 140 jobs.** This impact was realised as a result of support that the MRPs provided to companies within the sector to develop new products and market opportunities. This impact was underpinned by research findings generated during previous funding cycles but the MRPs ability to support the companies involved in commercialising the benefits was directly supported by the 2011-16 SRP.
- **Environmental benefits estimated to be worth £71.7 million GVA to the Scottish economy and to have supported around 620 jobs.** This impact is a measure of the annual value of the contribution that the MRPs are able to make to Scotland's system of environmental protection as a result of the funding they received through the 2011-16 SRP. Methodological challenges¹ mean that this estimate should be regarded as illustrative of the potential order of magnitude of the economic value of this work, rather than a definitive value; however, there is some justification for believing that the estimate is likely to be conservative.
- **Exports worth £19.4 million to the Scottish economy and which supported around 390 jobs.** This impact related to the Scottish potato seed export sector, the continued success of which is largely attributable to on-going research funded through the 2011-16 SRP.
- **Workforce productivity benefits of £0.2 million.** This impact related to the additional earnings that PhD graduates whose studies were funded by the 2011-16 SRP could expect to earn over the course of their working lives.

¹ The methodological challenges are discussed in more detail in Chapter 10 of this report. Benefits of environmental research can be wide ranging including preservation of natural resources (a benefit in its own right and underpinning sectors of the economy that depend on natural resources), avoidance of re-instatement costs and realising value from non or under exploited resources. The challenges include the difficulties of valuing environmental quality and of quantifying costs avoided. This estimate is based on one example of an environmental benefit, based on published research on the social and economic implications of nitrogen in the environment.

3 Future Expected Benefits

Research is a long-term activity the benefits of which frequently require many years to realise. For this reason the value of the wider economic benefits associated with the 2011-16 SRP that were realised in 2016 will almost certainly increase over time and some of the benefits realised in 2016 will be partially attributable to research undertaken before 2011. A visual representation of this process is provided in Figure 3-1.

Figure 3-1 – Annual impact of SRP over time



Source: BiGGAR Economics. *For presentational reasons the annual impact of the SRP has been depicted until 2021. In subsequent years there would continue to be annual impacts of future SRPs.

Uncertainty about the future value and long-term duration of each benefit means that for most of the benefits described above it is not possible to fully assess the expected future benefits of the 2011-16 SRP. This report has however identified some evidence relating to the future potential benefits of animal health research and research on livestock and crop genetics. Based on this evidence it was estimated that **within 10 years the annual impact associated with the 2011-16 SRP will have increased from £151.8 million GVA now to at least £157.8 million GVA/year and around 1,470 jobs.**

As this impact does not consider the future impact of the other areas of activity considered in this report it is almost certainly an underestimate.

4 Operational Impacts

Operational impacts are those that are generated as a result of the daily operations of the institutions considered. These impacts are proportionate to expenditure and arise immediately after expenditure has occurred. Operational impacts include:

- direct impacts – the wealth generated and employment supported directly by the MRPs;

- supplier impacts – economic activity within businesses that supply the MRPs with goods and services;
- staff spending impacts – economic activity supported by the expenditure of staff employed by the MRPs and the businesses within their supply chains;
- capital spending impacts – economic activity supported within the Scottish construction sector as a result of capital projects undertaken by the MRPs.

It was estimated that the total value of the operational impacts supported by the funding provided through the 2011-16 SRP amounted to £282.6 million Gross Value Added (GVA) and that, on average, this activity supported more than 820 jobs annually between 2011 and 2016.

Over the period 2011 – 2016 the MRPs were also able to leverage £148.5 million in additional research funding from industry and public sources as a result of the funding provided through the SRP. The total value of the operational impacts supported by this funding was estimated at £186.2 million GVA between 2011 and 2016. It was estimated that this activity also supported around 560 jobs annually².

In total the operational impacts associated with the 2011-16 SRP amounted to £468.9 million GVA between 2011 and 2016 in Scotland. This activity supported a total of almost 1,380 Scottish jobs.

² Throughout this report, employment is measured in terms of headcount jobs supported.