

# Economic perspectives

# Science and technology in devolved Scotland: the example of the Scottish Agricultural and Biological Research Institutes

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“I have not been able to discover how devolution works in the area of science and technology policy”: Council for Science and Technology, Quinquennial Review

## Introduction

In previous papers, (Cuthbert and Cuthbert, various dates), we have been concerned with a number of aspects of the operation of the devolution settlement, particularly but not exclusively relating to financial issues. One of our concerns has been whether the interface between the handling of devolved matters by the Scottish Executive and the handling of complementary reserved matters by UK government departments works satisfactorily. Such an interface issue arises in the field of science: we concentrate here on a particular problematic example, the Scottish Agricultural and Biological Institutes (SABRIs). There are five SABRIs, as listed in the footnote below.<sup>1</sup>

The SABRIs receive their core funding from the Scottish Executive Environment and Rural Affairs Department (SEERAD), that is out of devolved funding, but they are nevertheless clearly regarded as being an integral constituent of the UK science base. We ask in this paper whether the arrangements for funding the SABRIs and determining their research programmes are in the best

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1. The Scottish Crop Research Institute (SCRI), which is concerned with plant science; the Hannah (HRI), which focuses on the interactions between mother and offspring and related health issues, as well as technologies for the Scottish Food and Drink industry; the Moredun (MRI), which researches infectious diseases of livestock; the Rowett (RRI) which performs research aiming to define how nutrition can prevent disease, improve human and animal health, and enhance the quality of food production in agriculture; the Macaulay (MLURI) which carries out biological and socio-economic research to meet the needs of sustainable rural development and environmental management in Scotland and elsewhere; Biomathematics and Statistics Scotland, BIOSS, is administered by SCRI and is concerned with the application of statistics and mathematics in the biological sciences.

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interests of the SABRIs themselves, and more generally, in the interests of the wider Scottish economy.

We conclude that there are significant weaknesses. First, the funding arrangements are sub-optimal in that almost uniquely among the core science base the SABRIs are barred from accessing Research Council and major charity funding. Secondly, the existence of the SABRIs in their current form has arguably distorted priorities within the Scottish Executive's overall support for science. Thirdly, and conversely, the SABRIs are not fully integrated into the planning and strategy arrangements for the UK science base.

While this paper is concerned primarily with the SABRIs, the issues identified have wider implications for the public funding of research in Scotland and for devolution.

### **The SABRIs: Background**

Originally, the SABRIs were primarily focused on research and testing in agriculture and land use, reflecting the historical importance of agriculture to the Scottish economy. Their current number and structure derives from their history, with several institutes being established through private endowments, and some in their origins serving a very local market, for example, the North East. Through time the institutes' primary funding was taken over by the then Scottish Office and subsequently by the Scottish Executive.

In recent years the emphasis of the SABRIs has evolved from a strictly agricultural focus to embrace wider developments in biotechnology, immunology, genetics, etc. It is worth noting two points about this change in emphasis. First, it means that the SABRIs are actively engaged in research relevant to some of today's most important cutting edge industries. Second, these subjects are ones in which Scotland's universities are also actively involved. The SABRIs have a distinguished track record both nationally and internationally in the excellence of the research they have produced.

The objective of SEERAD in supporting the SABRIs is:

**"To maintain in Scotland an agricultural and biological science base of high quality, relevant to Ministers' wider policies and to support Ministers' legislative, policy and enforcement roles by the provision of scientific and other services". (Scottish Executive Draft Budget 2003-04)**

SEERAD expects the SABRIs to focus on the needs of end-users. SEERAD also regards the SABRIs as being "highly and increasingly relevant to policy", and it is the SABRIs which conduct the majority of SEERAD's research programme.

Despite the apparent clarity of the above objective, there does appear to be considerable confusion as to whether the remit of the SABRIs is primarily focused on Scotland or is much broader. On the one hand, prior to April 2003, the SABRIs were Non-Departmental Public Bodies and Scottish Public Bodies: in this context, "a Scottish Public Body has a remit which is concerned with devolved matters. It is not a body with a remit covering reserved matters or having a UK or GB wide remit." (Ref: Scottish Office, 1997).

This places the SABRIs firmly within the devolved context, (at least until April 2003), and if taken strictly at face value would imply that they should not have had a UK wide remit.

On the other hand, in the 1999-2003 SEERAD strategy for SABRI research, the stated objective of the strategy was "to support and maintain, as part of the UK science base, a strategic research capability in key areas of agricultural, biological, and related environmental, physical and social sciences, building on existing strengths and taking account of new opportunities and changing end-user needs." Indeed, the strategy also notes that the department "takes the UK lead for soil science, sheep research, dairy research, and potato, spring barley and soft fruit research." This implies that the SABRIs do have a UK wide role as an integral part of the UK science base. It is clear from other statements made by SEERAD in their research strategy that the SABRIs are expected to play an international role. It is also relevant to refer here to statements made by the SABRIs themselves on how they regard their mission. For example, the Rowett notes in its Corporate Plan that it is one of four publicly-funded Nutrition Research Institutes in the UK of which the other three are all funded by Research Councils, and that its research complements rather than competes with other centres.

At least as regards public statements, therefore, there is confusion about the SABRIs remit. As we shall see in the next section, this in turn is reflected in problems with the SABRIs funding mechanisms.

### **Funding of the SABRIs**

For 2003-04, SEERAD provided core grant-in aid to the SABRIs of £35.6 million, with a further potential of flexible funding of up to £6.3 million. The Scottish Executive's strategy for the SABRIs relies on the SABRIs securing external funding to supplement core grant-in-aid funding and SEERAD's own Flexible Fund contracts.

The Scottish Executive method of providing core funding to the SABRIs could be perfectly appropriate for a body whose primary focus was as an Executive Agency mainly serving the needs of its funding department. However, as we have seen in the previous section, in reality the SABRIs are expected to fulfil a wider role, providing excellent research of international standing and forming an integral part of the UK science base. Unfortunately, their position as sponsored bodies of the Scottish Executive constitutes a

real handicap for the SABRIs in securing appropriate funding to pursue this wider remit.

The difficulty arises because of the operation of the Haldane doctrine: (see CST Quinquennial Review). Dating from 1918, this doctrine set out the principle that research money derived from government sources should not be linked to government agendas. Under the Haldane doctrine, the research councils do not provide funds to support government policy-driven research. Thus, as far as the research councils are concerned, since the SABRIs receive their core funding from the Scottish Executive and some of their activities are policy related research, the SABRIs fall within the restrictions imposed by Haldane. The SABRIs are therefore not eligible to apply for most research council funding. Indeed, for this same reason, major charities such as the Wellcome also bar them from applying for their funding.

The position of the SABRIs thus contrasts sharply with most other research bodies, such as universities, that are of course able to apply for funding from research councils and charities: indeed the research councils are the major funders of research in the biological and agricultural fields in the UK.

The position of the SABRIs also contrasts with the way in which major English departments fund R&D. For example, DEFRA, like SEERAD, has requirements for a spectrum of research ranging from policy related research to long-term strategic research. Instead of funding one type of body to carry out research along this entire spectrum, DEFRA funds its Executive Agency, the Central Science Laboratory, (CSL), out of English devolved money to concentrate on the department's policy related issues, but funds broader research either from Research Council institutes or HEIs. Since CSL's primary function is policy related research, any Haldane restriction on it does not hamper it from pursuing its basic remit. Any services CSL provides to other public or private organisations are on a commercial basis. Since DEFRA's broader research is carried out by bodies which are eligible to receive research council funding there are clearly opportunities for beneficial synergy, using devolved money to work with reserved research council money for the long term economic benefit of England. Such synergy opportunities are not available to the SABRIs.

In the rest of the UK, those bodies which are most closely analogous to the SABRIs tend to be independent charitable bodies sponsored out of UK reserved funds by the research councils, drawing most of their funding from the sponsoring research council but with substantial funding coming from a wide variety of other sources including government departments.

The effect of these different funding arrangements can be seen from the following table which contrasts the funding sources of the five SABRIs with the major BBSRC core

funded sister institutes. (These institutes are the Institute of Animal Health, the Institute of Grasslands and Environmental Research, the Rothamsted, the John Innes Centre, the Institute of Food Research, and Roslin: note that one of these institutes, Roslin, is in fact located in Scotland); also included in the table is DEFRA's CSL.

#### Institute Funding £ million

Institute	SEERAD/DEFRA	Total	Dept as % of
	/FSA		Total
SCRI	10.08	14.53	69.37
Hannah	3.36	4.48	75.00
Moredun*	3.91	11.10	35.23
Rowett	7.07	10.38	68.10
Macaulay	7.63	11.91	64.00
Total SABRIs	32.05	52.41	61.17
Animal Health	9.34	26.84	34.80
Grassland&Environment	6.50	15.28	42.51
Rothamsted	6.36	26.92	23.61
John Innes	1.46	21.76	6.71
Food Research	1.58	13.84	11.43
Roslin	1.86	12.79	14.50
Total	27.09	117.42	23.07
Central Science Lab.	27.70	39.40	70.30

Note: SABRIs (exc Moredun) and CSL data: Annual Reports 2002-03  
Moredun and BBSRC institutes: Annual Reports 2001-02

The Scottish Executive spends £32 million on the SABRIs, representing 61% of SABRI total income and leveraging £20.4 million from other sources. In contrast, the six sister institutes shown receive 23% of their funding from the relevant English departments, representing £27 million out of a total income of £117 million. Note that the English departmental money is non-reserved money: that is, it is analogous to devolved money in Scotland. The overall effect is that, for the BBSRC institutions, relatively small amounts of non-reserved money are complemented by very significant amounts of reserved funding: while for the SABRIs, the bulk of funding comes from devolved, (that is, non-reserved) sources.

It is true that, in certain designated targeted research projects, a SABRI may apply for BBSRC funding, however such funding coming to the SABRIs is small as shown below:

	Estimated spend (2002/03)
Hannah	0
Macaulay	0
Moredun	£35,000 (research grants)
Rowett	0
SCRI	£230,000 (research grants)

Overall, the funding arrangements for the SABRIs appears highly anomalous: they are bodies which are regarded as integral parts of the UK science base but are nevertheless barred from accessing important sources of funding.

### **How appropriate are the arrangements for the SABRIs?**

As we have, the SABRIs, which constitute an important part of the UK science research base, are funded largely out of devolved money. In this section we ask the question: how appropriate are the arrangements for the SABRIs, and are these arrangements operating efficiently? Before embarking on this, we should make several things clear.

First, there is nothing in the arrangements for devolution to imply that it is wrong for a devolved department to fund part of the UK science base. Indeed, the SABRIs are by no means unique in this respect: for example, funding provided by SHEFC and the DfEE to HEIs for core research must in large part be regarded as contributing to the overall core science resource in the UK. It would surely be wrong, and an unwarranted restriction on the role of the devolved administrations, if in some sense they were limited to funding scientific research of parochial significance only.

Secondly, however, there does not appear to be any laid down benchmark as to how science policy and funding should operate under devolution. The quotation at the head of this article taken from the conclusions and recommendations of the Quinquennial Review of the Council for Science and Technology (CST), illustrates that others have come to a similar conclusion.

Thirdly, in considering the funding and organisation arrangements for the SABRIs, (and in coming as we shall to some critical conclusions), we should nevertheless make it clear that we are in no sense criticising the SABRIs themselves. It is quite clear that the SABRIs undertake some work of the highest international quality.

Since there is no published benchmark to tell us how the funding and organisation of bodies like the SABRIs should operate under devolution, it is natural to start by asking what features the system would be expected to possess in an ideal world. We suggest that there are three such features:

- a) fully integrated planning of respective contributions to the UK science base by devolved departments and by departments managing reserved functions (that is, UK wide functions).
- b) in the situation where a devolved department is, (through historical accident, or choice, or both), responsible for a section of the UK science base, then this should not distort the priorities of the department's own science budget.

- c) Where the UK science base is funded both by devolved and reserved funds, then these different financing streams should interact efficiently.

### **What does the available evidence show as regards these three aspects?**

As regards (a), there is strong circumstantial evidence to suggest that the role of the SABRIs is not adequately taken account of in the overall planning arrangements of the UK science strategy as a whole, even though SEERAD is the third largest sponsor of research in this area after BBSRC and DEFRA. To give some examples, a Cross Cutting Review of Science and Research was carried out by the Office of Science and Technology, (a reserved UK function) in 2002 as part of the Spending Review. The review was "government wide", yet among the long list of departments taking part there was no mention either of the SABRIs, or of SEERAD, (nor indeed, of the Scottish Executive). Nor was there any mention of the SABRIs in "Investing in Innovation – A Strategy for Science, Engineering and Technology" carried out by DTI, HMT, and DfEE in 2000: interestingly it did not appear that the Scottish Executive was involved in the preparation of the latter strategy. Nor are SEERAD or the Scottish Executive members of the Ministerial Committee on Science Policy. In fact, the lack of representation or mention of the Scottish Executive generally leads us to question whether the general interests of the Scottish Executive are adequately represented in planning UK science, despite the statements in the Scottish Executive's own Strategy for Science that "the Scottish Executive was committed to working together with the other administrations to ensure that the aims and objectives outlined were achieved across the UK, and particularly in Scotland." Additional evidence pointing in the same direction is also provided by the following recommendation in the CST Quinquennial review, namely that "Work should be undertaken urgently to clarify the present relevance of UK-wide science and technology policy to the devolved administrations".

As regards (b), in principle mechanisms exist to enable the Scottish Executive to take an objective overview of its own priorities over the whole field of science policy. In particular, the Scottish Executive has established the Scottish Science Advisory Committee, (SSAC), as an independent body intended to take a broad overview of science activities in Scotland and act as a promoter of science: and the SSAC has at least one member drawn from a SABRI. Moreover, SEERAD, (or more accurately, its predecessor SOAEFD), carried out a review of its science research strategy in 1999, which concluded that the research programme of the SABRIs should be focused on its main end-users. Despite all this, however, questions do arise about how well the Executive's planning arrangements are working. For one thing, there is a strong impression on reading the SEERAD review that it is not actually as end-use driven as it purports to be. For example, the review justified the relevance of the

programme to end-user communities with reference to the following criteria:

- Priorities identified in Foresight exercises;
- Developing needs of end-users identified during the consultation exercise;
- Existing coverage of the SOAEFD programme and that of other funders;
- Scientific strengths and capabilities of sponsored bodies;
- The ability to adapt the programme to new areas.

Of these five criteria, however, the last three are clearly supply related rather than end-use driven. Also, the following recommendation in the review is more suggestive of a supply driven process looking for end-users than the reverse: "Having identified this broader range of end-uses for the outputs from the research programme the challenge is to ensure that current and potential end-users are aware of the work and able to benefit from it."

The amount of the Scottish Executive's available funding for science which is devoted to the SABRIs also raises questions about the process. Scottish Executive funding going to the SABRIs, the Scottish Agricultural College and the Royal Botanic is some £50 million per annum, compared to the total of £177 million which the Executive devotes to supporting basic research at Scotland's Higher education institutions. The question that this raises is whether this accurately reflects the relative priorities which the Scottish Executive would objectively attach to these different areas of science. There must be at least a suspicion that the amount of the Scottish Executive's resources which is devoted to organisations which were in their origins primarily related to agriculture, no longer appropriately reflects the importance of agriculture to the Scottish economy: and may in part reflect a degree of inertia in the system. It is not possible for us as outsiders to draw more categorical conclusions than this; but there is at least *prima facie* evidence that there are serious issues about the mechanisms for setting scientific priorities within the Scottish Executive which need to be looked at.

Finally, as regards (c) we have noted in the preceding section how the interpretation of the Haldane principle prevents the SABRIs from accessing the major part of research council funding, and also funding from major charities. This seems to be a clear, and significant, inefficiency in the funding arrangements for the SABRIs. There is indeed logic to the Haldane principle as it relates to applied research carried out for the narrowly defined purposes of government. But a major part of the research carried out by the SABRIs is not of this nature. It is long term and strategic research, intended to be of UK and international relevance: it is carried out as part of the UK

research base: and, at least in principle, it is intended to complement, rather than compete with other research being carried out elsewhere in the science base, by agencies who do have access to research council funding. Moreover, the SABRIs are being specifically encouraged by SEERAD to seek wider external funding sources. In these circumstances, to prevent the SABRIs from applying to the major reserved sources of funding of the science base seems perverse – and represents an unwarranted handicap for the SABRIs which may, in addition, turn to sub-optimal sources of funding (for example, European Framework funding): this may in turn distort their research programmes.

It should be said at this point that this problem has been recognised to the extent that SEERAD has agreed an accord with the research councils whereby, if a SABRI teams up with another institution which is eligible and is applying for research council funding, then the SABRI can apply for complementary funding from the SEERAD flexible fund: but this still means that the SABRIs funding comes from devolved monies, and the SABRIs are still denied access to the reserved funding of the science base – so this device does not get round the basic problem.

Overall, we conclude that on each of the criteria identified above, there are strong grounds to suggest that the present system for planning and funding science under devolution is not operating well - at least as regards the SABRIs. In the next section we consider what might be done about this.

## Possible Solutions

The following recommendations go, in many respects, beyond the narrow focus of the SABRIs into wider issues regarding the organisation of science and technology under devolution.

The first recommendation is that the Scottish Executive should be brought fully into the strategic co-ordination of the UK science base. Primarily, a senior Scottish Executive minister should be brought into the Ministerial Committee on Science Policy: and this minister should be shadowed by a senior adviser responsible for taking an overview of science in Scotland: (this could, for example, be the Chair of the SSAC). This proposal does raise constitutional issues - and the status of the Ministerial Committee might have to be changed to enable it to embrace ministers from the devolved administrations. There would also have to be some mechanism for dispute resolution because the last resort of cabinet decision and Cabinet responsibility would no longer be available.

As regards co-ordination of priorities within Scotland, a mechanism already exists – the SSAC. There are questions, however, about how effective this mechanism is, and reading SSAC reports perhaps gives some clue as to why this might be the case. On several occasions, problems are defined, but solutions are hinted at in such a coded form as

to make any worthwhile solution unlikely. For example, in the SSAC report, (SSAC 2004) they clearly identify the problem that: "The Scottish science base is supported through a diversity of mechanisms and structures, but these are not always well correlated. Departments within the Executive operate more or less independently to fund individual parts of the science base." The solution, however, is a fudge: "To ensure the sustainability of science in Scotland, the SSAC believes that a framework of connectivity must be built into the scientific landscape to ensure that there are more effective interfaces, as well as a shared understanding of the aspirations and objectives of these organisations. These linkages are crucial in terms of meeting the challenges of prioritisation and gaining best value for the investment in science."

It is likely that this feature reflects a weakness in the way that the SSAC is organized. Making sure that all or most interested parties are represented on an advisory committee does not guarantee that that body will operate efficiently: indeed, the effect can be precisely the opposite. A desire for consensus may prevent the body from ever making tough recommendations. One possibility might be to consider a two-tier structure for the SSAC, which would involve a wide consultative forum, but with the responsibility for making recommendations resting with an inner core who are not constrained by the need to be bound by consensus among the wider group.

As regards the inefficiency of the current financial arrangements, the simplest approach would be for the UK government to relax the strict interpretation of the Haldane principle. This could be done by recognising that government funded research falls along a spectrum – from short term research for specific applications, to long term strategic research: and that where government is funding an institution to carry out research largely at the latter end of the spectrum, there is no conflict, (and in fact considerable potential benefit to all concerned) if the institution is also able to bid for research council funding. If this change in the interpretation of Haldane is made, then the government should also make an effort to persuade major charities to take a similar view.

Failing this change, then an alternative approach would be to alter the constitutional position of the SABRIs themselves, so they no longer fall foul of the Haldane rules. To give an example, the NHS too is a major funder of research for its own purposes: but it tends to commission this research either from units in HEIs, or from MRC supported units, rather than putting in core funding. So the Haldane problem does not arise. This option is, however, not without its problems. For example, if the individual SABRIs were to be encouraged to merge with appropriate universities, this would arguably damage the SABRIs end user focus, particularly given the requirements of the research assessment exercise discipline. Moreover, it is not obvious that absorbing the SABRIs into convenient universities, (much as was done with the former Colleges of

Education or with the Scottish College of Textiles) would result in a rational structure of departments and units across Scotland. Such a radical option should only really be progressed as part and parcel of a wider assessment of the requirements for and structure of biological research in the HEI sector as a whole.

It is suggested that the above changes would go a long way to resolving the problems identified in this paper. Nevertheless, even if such changes were implemented, it is likely that there would still be a basic problem about satisfactorily managing the UK science base in the context of devolution. The basic problem stems from the following three peculiar features of the task of managing the science base:

- a) First of all, science is in an anomalous intermediate position, neither wholly devolved nor wholly reserved. The role of the OST in keeping an overview of science policy for the UK as a whole is reserved: and the major part of the support for science, through research council funding is also reserved. But, as we have seen, Scotland, as a devolved administration, has its own interest in science policy: and is responsible for funding a significant part of the UK science base, including core research in Scottish HEIs, from devolved money.
- b) Secondly, even for those parts of science which are devolved, it makes no sense for a devolved administration like Scotland to work in isolation. Science thus differs fundamentally from other traditional devolved services: for services like health and education, it makes sense (indeed it is inherent in the very idea of devolution) for each administration to organise the service within its area as it sees fit. But as regards science, each part of the UK has a vested interest in ensuring that the science base for the UK works well not just in the interests of each individual country but as a coherent whole. This was recognised in the report by the Royal Society and the Royal Society of Edinburgh, (1999), which stated: "These are benefits, which Scotland shares, which flow from the large size and competitiveness of the UK basic research system. The diseconomies of small scale are severe, and barriers between Scotland and the rest of the UK would be to the great disadvantage of all. It is vital therefore that Scotland remains a well integrated part of the UK SET base."
- c) Thirdly, a devolved administration like the Scottish Executive is likely to be in an inherently weak position in influencing the direction of development of the UK science base compared with an "English devolved" department such as DfEE. This will arise for a number of reasons. Geography and population size will play a part. In addition, the natural consultative channels between "reserved" bodies such as OST and the research councils will tend to be primarily with the

relevant Whitehall Departments: this can be seen clearly in the consultation leading up to the OST's cross cutting review of Science and Technology. Also, the Westminster Parliament is at one and the same time both the "provincial" parliament as regards devolved matters in England, and the decision making body for reserved matters for the UK as a whole. So when a problem arises on a "devolved" matter in England the full weight of both devolved and reserved powers is likely to be brought to bear on the issue, in a way that is unlikely to happen when a corresponding problem arises in one of the devolved administrations.

If, as these features imply, there are continuing problems in managing the UK science base satisfactorily in the context of devolution, then it may be that in due course radical changes have to be considered. One possibility, for example, would be to devolve the work and funding of the research councils. Such a move would certainly greatly increase the bargaining power of a body such as the Scottish Executive in national negotiations about the science base. The paradox might be that, far from threatening the work of the science base, devolving the research councils might actually lead to a better functioning science base in the interests of the whole of the UK.

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