

**Scottish Science Advisory Council: Review of Scientific and Research Infrastructure**

**Key contact:** Colin Campbell [colin.campbell@hutton.ac.uk](mailto:colin.campbell@hutton.ac.uk)

**Date of submission:** 30<sup>th</sup> April 2014

**Question 1. What facilities are of strategic importance to your principal scientists and the longer-term aims of your organisation It would be helpful here to distinguish between medium-scale facilities, national facilities and international ones. 'Medium-scale' is defined as equipment and facilities typically in cost range of ~£250k–£10M, often used to support the work of relatively small single-PI teams.**

**Response:**

We have a range of analytical equipment which collectively is worth many millions and underpins large parts of our research program, and is of strategic importance to our work. Amongst this group are individual items of equipment in the medium scale worth in excess of £250k such as our Scanning Electron Microscope and Thermal Ionisation Mass Spectrometry and Confocal Microscopy facilities.

The National Soils Archive is a key resource which would cost many millions to recreate as it represents at least 400 person years of effort) and is used by a wide range of researchers. Externally we are already integrating soils data at the UK level to derive new products and contribute at an EU level. Recent collaboration with NERC (BGS and CEH) will see the development of web mapping services to allow researchers to download and utilise soils data more easily and this will lead to new data and information products and the harmonization of a number of key UK datasets.

Similarly we have scientific collections of valuable germplasm e.g. Commonwealth Potato Collection, European Soft fruit collections, barley and pest and pathogens collections. National Crop Seed Store. These are used by international groups as well as in Scotland and UK.

The Institute also has research farms, high quality glass houses and monitoring stations which require maintenance which is expensive, especially in terms of developing these facilities. Monitoring stations include WMO registered met stations and monitoring sites (ECN) that are part of UK, European and international networks. We also have controlled environment rooms with a replacement value of several million. The research farms have several long term (circa 20-30y) experiments several which have international collaboration.

**Question 2. Do current access arrangements fully meet your needs?**

**Response:**

Mostly but we have aging infrastructure and lack of sufficient maintenance budgets are starting to restrict scientific work and put pressure on maintenance of collections and facilities. We are reviewing all facilities and their costs in light of funding cuts. Entering an age of increasing computational science and the needs of Big data also mean we need better IT infrastructure and storage capacity. Also change in ways of doing science in terms of translational, co-constructed science means we lack good engagement facilities that bring all stakeholders together where the science is being done.

**Question 3. Will usage grow, maintain or reduce over the next 10 years?**

**Response:**

In the main we anticipate the usage will grow of our key resources, this is driven by need, funding success and commercial pressures.

**Question 4. What medium-scale (or larger) facilities do you have in your own institution? (It might be helpful here to enumerate equipment and other infrastructure that your institution defined as 'facilities' for TRAC purposes).**

**Response:**

We have numerous research facilities which include four research farms 10000 square meters of glasshouses (capacity for 250,000 plants per year), growth rooms along with a virtual landscape theatre and functional genomics facility.

The Institute has analytical equipment (over 20 separate analytical instruments) for wide range of chemical, food and plant, inorganic, organic, isotope and mineralogical analysis. A major facility is our isotope suite with over 6 instruments for measuring wide range of isotopes.

We have five collections: Commonwealth Potato, Barley, Ribes, Rubus Germplasm and Pest and Pathogen and the National Soils Archive. The institute also has the National Soils Database, vegetation and land data bases.

A full breakdown of facilities are provided in the attached Appendix.

**Question 5. What would be your priorities for new facilities, of whatever scale?**

**Response:**

A state of the art climate facility that allows testing of a wide variety of global climates with phenotyping capability is necessary to start combining genomic and phenomic approaches. We are developing plans for a Climate Control facility (approx. cost £40m) at our Invergowrie site to address this. Other priorities would be modern labs and associated equipment, increased glasshouse space and climate chambers to update ageing infra-structure

We do science differently today also and new facilities for engaging target audience, public, policy, industry and agencies as integral contributors to and part of the science process are also lacking.

More specifically there is a need to invest in new thermal ionisation mass spectrometry facilities as a matter of priority, we also need to a much more

effective rolling program of equipment replacement across the Institute than current financial constraints have allowed.

**Question 6. Are you aware of any Scottish priorities for large-scale capital investment (including international collaboration)?**

**Response:**

Nothing specific.

**Question 7. It is probable that future investments in mid-range facilities will seek to maximise efficiency through equipment sharing, and 'leverage' through contributions from the private sector. Can you offer current examples of effective sharing or leverage, and in particular any that arise from Innovation Centres? Can you identify future opportunities for sharing and offer advice on successful sharing arrangements?**

We have in the past shared equipment and data, and continue to do this. Equipment sharing tends to be in the form of access time to equipment or undertaking analysis for a partner. We have not jointly purchased any equipment, but have considered entering into partnerships with private companies to purchase major pieces of capital equipment. To date this has not become a reality, largely because of a lack of precedent and framework to enable this to happen.

We do share all facilities at Invergowrie with University of Dundee, Plant Sciences Division as part of a bilateral partnership agreement. This is starting to expand through the Scottish Food Security Alliance ([www.sfas.org](http://www.sfas.org)) which involves us and the Universities of Aberdeen and Dundee and has as one of its objectives sharing of facilities. So for example an inventory of resources has been collated and shared to raise awareness of what is available.

Our research platforms in the form of long term experiments and farms and collections are operated on an open access basis subject to the science proposed being appropriate and cost effective. We have also started a review of all research farms in Scotland on behalf of the Scottish Government with a view how we can get better coordination and sharing of on farm resources between the SRUC the James Hutton Institute and other main research providers in Scotland.