The Impact of Research on EU Agriculture
impresa

Improvements to Monitoring of Agricultural Research Investment

The effective evaluation of the impact of agricultural research on productivity, efficiency and environmental quality requires detailed and accurate knowledge of the level of resources devoted to achieving that desired impact. However, official statistics on aggregate volumes of research expenditure, at both European and national levels, are available only intermittently, and are not fully comparable. The FP7-funded IMPRESA project has reviewed and appraised data availability in 20 EU countries and, using secondary data and key informant interviews, has described and evaluated recent levels and trends in agricultural research expenditures. This information has been used to develop policy options capable of being implemented to improve the monitoring of agricultural research investment in Europe. These options were discussed with experts during a workshop organised by the FAO and led to the formulation of three recommendations for their implementation.

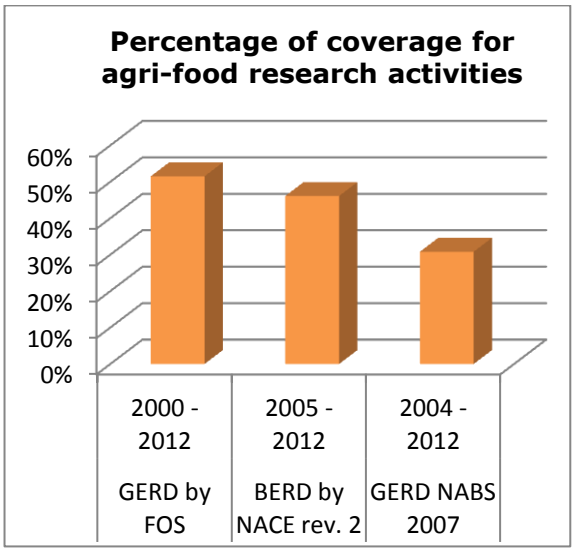
Gaps in data availability reduce monitoring quality

The main issue from the IMPRESA study relates to the significant number of gaps in available data measuring public and private investments in agricultural research. Data that does exist often lacks consistency and sometimes conflicts with the trends identified by experts.

This has two main causes:

Gaps in classification: three major nomenclatures are used but do not cover the *same kinds* of activities, which complicates the data comparability within each country: 'Field Of Science' (FOS) and 'Socio-economic Objectives' (NABS) are mostly used to describe public sector expenditures, and 'Economic Activity' (NACE) is more often used for the private sector.

Gaps in data collection methodology: each country is responsible for the design of its data collection methodology which complicates the data comparability *between countries*. Data coverage, notably data on intramural expenditures (GERD), varies across countries and is on average very low (see chart). The least comprehensive data coverage is for the private sector (BERD); and the provision of data is not always legally mandatory and is often incomplete.



The analysis, understanding and follow-up of agricultural research investments in Europe are therefore difficult and imprecise. As a consequence, policy-makers' understanding of basic cost-benefit ratios that could better target

IMPRESA POLICY BRIEF

socio-economic impacts and efficiency is hampered by lack of evidence.

Progress towards better coordinated monitoring within the EU

A persuasive body of empirical evidence demonstrates that agricultural research has been a major global contributor to agricultural innovation, food safety and productivity enhancement over the past five decades (World Bank 2007[1]; IAASTD 2008[2]). To take full advantage of this potential, policy-makers need to be able to identify gaps in research investments and topics, set future investment priorities, and develop policies pertaining to agriculture based on assessment of agricultural research impacts.

AGRICULTURAL RESEARCH UNDERESTIMATED:

Agricultural research has been a major global contributor to agricultural innovation, safety and productivity increases over the past five decades. Yet its impact in Europe has not been fully explored because of limited data availability.

Standard indicators for measuring and monitoring various economic dimensions of agricultural research are set out in the 'Frascati Manual' (OECD, last version: 2002[3]). The European Commission has defined a general framework for data collection (last revised in 2012 by Regulation (EU) No 995/2012). Agricultural research trends and funding mechanisms were evaluated for the first time in 2008 by the FP6 project EU AGRI MAPPING. In 2014, the FP7 project IMPRESA confirmed EU AGRI MAPPING's results and identified the major gaps.

Setting up policy options to improve monitoring quality

One major objective of the IMPRESA project is to describe the evolution of public and private investments and key topics in agricultural research for the 2000–2012 period.

The project includes preparation of national-level reports in 20 EU countries analysing trends in agricultural research expenditures. These assess and supplement data availability on public and private investments in agricultural research. A further report synthesises these findings, providing a comprehensive assessment of data gaps, and elaborates recommendations that could improve data availability. Its recommendations provide the basis for development of future research monitoring which in turn could enhance the impact of investments in European agricultural research.

The IMPRESA policy recommendations were discussed with experts during a workshop hosted by the FAO in Rome in April 2015, which resulted in the refinement of three major options:

- *Policy option A*: *Improve the production of research and development statistics* (most comprehensive approach), obliges countries to produce detailed agricultural research statistics and submit these to Eurostat annually;
- *Policy option B*: *Annual survey of public research organisations based on the FADN model* (intermediate approach), requires a survey of public research organisations;
- *Policy option C*: *Annual report on research investments,* requires a survey of ministries responsible for research in Member States.

[1] World Bank. 2007. World Development Report 2008: Agriculture for Development. Washington. DC

[2] IAASTD (2008) Agriculture at a Crossroads: The Synthesis Report. Washington, DC, USA: International Assessment of Agricultural Knowledge, Science and Technology for Development. www.agassessment.org/

[3] Organization for Economic Cooperation and Development (OECD), 2002. *"Frascati Manual 2002: The measurement of scientific and technological activities - Proposed Standard Practice for Surveys on Research and Experimental Development"*. Online source: http://www.oecd.org/innovation/inno/frascatimanualproposedstandardpracticeforsurveysonresearchandexperimentaldevelopment6thedition.htm

Description of policy options

Expert discussion of the potential options has allowed progressively less restrictive and therefore less comprehensive options to be designed which address important constraints in data acquisition (Option A being the most comprehensive, while Options B and C are easier to implement):

Option A: consists of an update of the existing institutional framework for the production of research statistics in Europe, obliging all Member States to provide data on an annual basis, using identical indicators regardless of the sector of performance. It requires an update of the Regulation by the European Commission and European Statistical System Committee noted above, and would concern all organisations in charge of the collection of research statistics.

This option would have the advantages of developing a new statistical infrastructure, providing exhaustive data sets, and identifying alternative sources of data. It would enable objective analysis of the policy relevance of European research expenditures. However, its implementation would be expensive and would not assure data quality, as gaps based on national collection methodologies may still occur. Option B offers an opportunity to tackle this issue.

Option B: consists of emulating the FADN methodology by building a European network responsible for the collection of research expenditure and activity data from research performers. FADN surveys the business operations of agricultural holdings to inform evaluation of the impact of the Common Agricultural Policy. This network could be created by DG-Agriculture and would involve the major public research organisations from the agricultural sector.

This option would have the advantage of implementing a harmonised cross-national methodology. It would motivate research establishments to provide their data by providing feed-back about the survey goals and results. This option could also act as a means for collection of private-sector data, through observation of increasingly common public-private collaborations. However, the human and financial resources required to implement Option B would not be much less than those required for Option A. Also, the sensitive nature of the information collected could be a constraint to comprehensive access to data.

IMPROVE MONITORING OF AGRICULTURAL RESEARCH INVESTMENT BY IMPROVING DATA COVERAGE RATES:

Implementing new data collection and classification methodologies (e.g. within the scope of innovative surveys) would improve data coverage.

Option C: consists of an annual review of agricultural research expenditures at Member State level. It would provide qualitative insights on research investments (such as performance and innovation adoption at farm level, research topic relevance and public-private partnerships). This review could be prepared by the Ministry of Agriculture or of Research in each Member State, and delivered to the European Commission, or to the Joint Research Centre.

This option would have the advantage of being less demanding than the two previous options. Nevertheless, it would provide important qualitative intelligence, essential for monitoring prioritisation, in a systematic and timely manner. However, ministries asked for information might consider this as an audit of their own services, and the option would not, in itself, be sufficient to generate comprehensive data for rigorous monitoring purposes.

POLICY RECOMMENDATIONS: Options to improve the quality of Agricultural Research Investment monitoring

Option A: Improve the production of R&D statistics

- Development of a new methodology for an annual and exhaustive data collection, prioritising mandatory data, guaranteeing their final quality and harmonising the classifications used. This new methodology should be based on the existing instructions and regulations. The manual for statistics and innovation should be revised within 2 years (with Eurostat taking the lead) to allow a tighter focus on innovation and impact assessment. In this revised methodology, the manual should provide a new definition of 'innovation'.
- Introduction of a new classification category capturing bio-economy aspects and of a specific meta-classification of agricultural R&D (following the example of the International Energy Agency in the field of energy).
- Data collection sponsored by leading stakeholder institutions.
- Pilot implementation of the above recommendations in volunteering countries.

Option B: Annual survey of public research organisations

- Data collection by specific representatives emulating the FADN model.
- Accurate definition of the main end-users of statistics, identification of their needs and building a methodology specifically designed to meet them.
- Reasonable time interval of data collection (every 3 to 5 years) to provide the analysing bodies with sufficient time to publicise the survey results.
- Enhancement of the interest and involvement of researchers by explaining the data needs during a workshop prior to data collection, and informing them of the results in a subsequent workshop.
- Gaining support from public sector institutes as an entry point for access to data from the private sector and from national-level capacity building.

Option C: Annual report on research investments

- Annual review conducted at the Member-State level based on four conditions: representative sampling; clarity; standardisation; and cost efficiency.
- Clear instructions for disciplines which are located at research field boundaries (such as molecular biology).
- Maximise learning opportunities from cross-country comparisons.
- Combination with option A and/or B.

This Policy Brief is part of a series published by the EU co-funded IMPRESA Project aiming to provide high-quality analysis and practical recommendations for policy-makers and scientists on important agricultural and research issues.

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