The impact of Framework Programme agricultural research

Looking back to look forward

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PREAMBLE

All agricultural (including farm animal health and welfare) and forestry research is applied research because its purpose is to improve the performance of farms and forests – for food, raw materials, and the full range of social and environmental services that these natural resources can provide. This purpose is served when research is used to deliver new practices, technologies, products, and to support evidence-based policy-making. This is research impact. In late 2010, the European Commission (EC) asked us to assess the impact of its research in these areas conducted since 1998. The EC also asked us to reflect on the direction of future research considering current scientific developments, societal trends and European policies. This presentation summarises the results of our work.

It was clear to us at the outset that conventional ‘top-down’ methods of analysing research performance such as using citation indexes, patent searching, and searching policy documents were unlikely to provide the evidence we needed. Consequently, we decided to take a bottom-up approach. We examined the full range of outputs of individual research projects as quantitatively as possible. We looked at about half of the projects in the EU’s relevant research portfolio in detail. Our assessment was based on a standardised audit of outputs. Data on outputs alone are not sufficient and so we examined how research was made available to users. We used our experience in qualitatively assessing the implications of the research results for impact.

Following our individual analyses of project data, we came together for three days in Brussels to discuss the impact of the research as a whole. Our report is largely based on those discussions. Each author brought a unique perspective and we hope our report reflects a clear consensus between the various carefully considered positions we each developed independently.

Our work revealed some clear and consistent messages about research impact that have implications not just for the content of future research but also for its structure and management. We decided therefore to provide six recommendations relevant to the strategic direction of research along with the conclusions of our assessment.
PREAMBLE (continued)

The European commission is to be commended for seeking an external assessment of the impact of its research in this way. Quickly bringing together such a diverse group of scientists and research users as we are was a significant undertaking for the EC officers who assisted us. The EC also provided a comprehensive library of supporting documents, and officials were always willing to help us during our work. In addition to examining project outputs, we had the benefit of in-depth and very helpful discussions with EC research managers. Our experience with all the EC staff who supported us reflect their deep commitment to effectively leading and managing the research funding resource with which they are entrusted. We are very grateful for their help.

The European Union’s agricultural and forestry research programmes extend back to the earliest days of the European Union (then the EEC), even before the Framework Programme were introduced. They have had a major impact on European agricultural and forestry science to the extent that this research community is one of the most European of professional groups. We hope our work is a contribution to the development of the research so that impact for Europe is increased further.

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Agricultural research – one of Europe’s long-standing common endeavours

The Broadbalk long term experiment
Photo: Rothamsted Research

Joseph Henry Gilbert
Agricultural research – one of Europe’s long-standing common endeavours

Ever since the earliest days of the application of science to the development of agriculture, agricultural science has been a European endeavour. The pioneering scientists of the 19th century such as Joseph Gilbert who set up the world’s oldest agricultural experiment (the Broadbalk long term wheat experiment) at Rothamsted in England collaborated with scientists in other countries. In Gilbert’s time, there were close collaborations between England and Germany in particular.

The fact that Gilbert’s experiment is highly relevant to today’s challenges and that it is still yielding great impact for science and wider society provides a lesson relevant to how we design and prioritise research programmes today.

We should also remember that within the EU, investing in international agricultural research pre-dates the Framework Programmes. European financing of research can be traced back to the earliest days of the EEC.
## The scale of agricultural research in Framework Programmes

<table>
<thead>
<tr>
<th>Framework programme</th>
<th>Areas covered</th>
<th>Budget – million Euros</th>
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<tbody>
<tr>
<td>FP4 (FAIR) 1994-1998</td>
<td>Agriculture, fisheries, forestry and food</td>
<td>647</td>
</tr>
<tr>
<td>FP5 1998-2002</td>
<td>Agriculture, fisheries and forestry</td>
<td>Ca. 520</td>
</tr>
<tr>
<td>FP6 2002 – 2006</td>
<td>Food quality and safety, policy support</td>
<td>Ca. 928</td>
</tr>
<tr>
<td>FP7 (KBBE) 2007-2012</td>
<td>Food, agriculture, fisheries and biotechnologies</td>
<td>Ca. 1 900</td>
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The EU agricultural research programme (including animal health and forestry research) has been subject to major structural change between FP4 and FP7. This included the removal of the word ‘agriculture’ from the programme title in FP6 along with a 90% reduction in forestry research.

So is impossible to be precise about the development of EU investment in agricultural research (including animal health and forestry research) as the categorisation changed over the course of the Framework Programmes. There is also agricultural research in other programme areas, for example in environment.

However, it is clear that in contrast to most national research programmes, EU investment in agricultural research has risen steadily. We estimate that it is now between 200 and 300 million Euros per year.

This makes the EU investment comparable to that of the larger member states such as Germany. It is particularly significant because it is all applied or strategic research. So it can be said that the Commission’s agricultural research programme is probably the largest strategic and applied agricultural research programme in the EU.
Impacts

Scientific and technical

Innovation (e.g. patents and start-ups)

Economic and social (e.g. employment)

Environmental

Policy

European Research Area (capacity, structural, regional)

European value added (leverage, networking)
Impacts

The impact categories were provided by the European Commission in the Terms of Reference.

The term ‘innovation’ refers to the conventional commercial innovation using patents, spin-offs, new companies as indicators.

This is a relatively narrow definition that excludes a wide range of innovation activities that are independent of proprietary outputs of research. So it excludes innovation based on the free and open spread of knowhow and ideas, which is very important in agriculture.
Opportunities and trends

Innovation Union

Resource efficient Europe

Draft Becoteps White Paper

SCAR 2\textsuperscript{nd} Foresight Report

SCAR 3\textsuperscript{rd} Foresight Report consultation document

UK Foresight report on land use

A wide range of other literature sources
Opportunities and trends

We were asked to review a wide range of research policy documents. Some of these are listed.

The purpose of this part of the work was to provide advice on current scientific and agricultural developments to inform the development of Horizon 2020.
Some project examples
ECOWOOD
Development of a protocol for eco-efficient wood harvesting on sensitive sites

Protocols for sustainable wood extraction on sensitive sites

1.2 M Euros invested

Very wide range of research outputs

Targeted at primary users and policy-makers

Excellent project management
FMD ImproCon
Improvement of Foot and Mouth Disease control using vaccines

Output: a ‘vaccinate-to-live’ strategy

Supported the evolving EU and international FMD control policy

2.4 M Euros invested by EU

Very wide range of research outputs – publications etc

Targeted at policy-makers

Photo: Ben Gamble
The impact depends greatly on further outbreaks of FMD. Without vaccination, we could be faced with the control measures used in 2001 – mass culling and pyres.

Ideally we will avoid further outbreaks and thus avoid using the full impact of this project.
REBECA

- Enables rational regulation
- Collaboration between key actors
- 1.0 M Euros invested by EU
- Targeted at policy-makers
- Impact depends on political decisions
The impact depends entirely on the progress of policy on plant protection products. Recent reform has focused on the sharpening-up of hazard-based risk assessment in the regulation of conventional synthetic pesticides. In addition, the Sustainable Use Directive seeks to establish minimum standards of pesticide handling and use on farms.

Ironically, it seems that this focus on tightening the safety of the conventional plant protection systems might have distracted policy-makers from the opportunities that biological control systems offer. The full impact of REBECA depends on political decisions.
EU-Sol
High quality *Solanaceous* crops for consumers, processors and producers by exploration of natural biodiversity

Major contribution to world-wide effort to sequence the genome of tomato – model for many vegetables

Genomics ‘toolkit’ to enable new elite germplasm

19 M Euro invested by EU (Total 26 M)

54 partners, 19 from private sector

Very high scientific output

Collaboration sustained
EU Sol

EU Sol was an excellent Integrated Project. It shows how this ‘large project’ approach allows ‘big science’ to happen in the EU.

Integrated Projects sought to address weaknesses in impact by including many actors along the supply chain. The end result is significant resource in large projects devoted to supply chain activities outside the core scientific challenge. At the same time, the scope of the core scientific work as set out by the EC was constrained by programme policies such as the ‘fork-to-farm’ adage that demanded that all research be driven by issues relevant to consumers. The ‘Integrated Project’ instrument enables ‘big science’ but is not an alternative to effective portfolio management.

Thankfully, projects such as EU Sol overcame these constraints through global international cooperation and real commitment from scientists and EC research managers.
EuroMARC
European mountain agri-food products, retailing and consumers

Research support to quality guidelines and assurance

Comprehensive supply-chain quality ‘toolbox’

1 M Euro invested by EU

10 partners led by a sector association

Mountain products charter
Product label
Quality assurance system
CAPRI DynaSpat
Common agricultural policy regional impact assessment - the dynamic and spatial dimension

Centre-piece of evidence for the development of the CAP

Economic and bio-physical modelling system

750,000 Euro invested by EU, building on two past EU projects

Operational for almost a decade

Impressive leverage
CAPRI DynaSpat
Common agricultural policy regional impact assessment - the dynamic and spatial dimension

“For sure ... there would be no CAPRI without the continuous support of the EU”

(Wolfgang Britz)
Assessing impact

Some considerations
Traditional approach to impact

It is important to realise that impact is not delivered by researchers, it is generated by users.

Researchers deliver new knowledge and understanding, not impact in terms of socio-political outcomes.
How is impact generated from research?

Research projects → Research output → Primary users → Impact → Secondary users → Research projects
Who drives research?

In reality, public research is largely driven by researchers. Even for applied agricultural research, researchers play a major role in setting the agenda.

The participation of other users in the identification of research questions is very important and particularly appropriate in agriculture.

There are however potential pitfalls in how users aspirations are used. Participatory processes may be dominated by ‘professional stakeholders’.

A particular risk is that programme managers operate as mere programme administrators responding directly to stakeholder input rather than translating it into coherent projects and programmes that are effective in science terms.
Generating impact takes a long time

Lagged impact of R&D on agricultural productivity

(Ref: Thittle, C. and Holding J. (2003). Productivity of UK agriculture causes and constraints. Defra project report ER0001/3.)
And there is diffusion – leaks in and out
Research impact is impossible to measure

Impact is the widest effect in society

Impact takes time to fully develop

Over time, causation is less clear
Assessing impact

- approaches
Using indicators

Research projects → Research output → Primary users → Impact

Research projects → Research output → Secondary users

Research projects → Patents
Research projects → Citations
Research projects → Legislation
Using indicators

The European Commission made a range of analyses of indicators available to us, including bibliographic analyses, and searches of references to FP research in EU legislation. There were also data from a survey of project coordinators.

It was quickly clear to us that this was not adequate for our purposes. Patents are relatively rare in this research area and there are other outputs relevant to innovation. Bibliographic analysis was weak in identifying publications from projects because many publications fail to precisely acknowledge the EC as the funding source. Legislation also rarely refers precisely to the source of underpinning evidence.
Using direct observation

Research projects

Research output

Primary users

Impact

Secondary users

Publications
Patents
Discoveries
Models
Guidelines
Education
Using direct observation

Research projects → Research output → Primary users

Secondary users → Development of impact pathways

Publications
Patents
Discoveries
Models
Guidelines
Education
Using direct observation

Research projects → Research output → Primary users

Research projects → Research output → Research projects

Publications, Patents, Discoveries, Models, Guidelines, Education → Development of impact pathways → Expert judgement

Impact

Secondary users
Using direct observation

Our approach was to use direct analysis of project outputs. We focused on two key aspects: the project outputs and the use of impact ways by the researchers. This was a quantitative as possible using a standard project audit form developed by the panel.

The membership of our panel provided a diversity of expertise and experience. This means that in addition to generating primary quantitative evidence, we were also able to use judgement in assessing this evidence. This is in contrast to some impact assessment procedures where analysis of project outputs and the assessment of the implications at the programme level are separated.
Results
Impacts – science and technology

Consistently good to excellent

Conscientious research teams

Projects are well managed

‘Balanced excellence’
This is a very positive result. It might seem like a given that public research should perform to high international scientific standards. However, getting this consistency of performance across such a broad programme which includes strategic and highly applied research is quite an achievement.
Impacts – innovation

Less clear – agricultural knowledge is often a public good

Some patents (ca 15% in relevant areas)

Few start-ups, but there is a community of academic start-ups linked to FPs
Impacts – economic and social

Large indirect impact through policy

Some good specific direct examples - EuroMARC

Projects with socio-economic objectives generally performed well

Huge indirect social impact through education and training across the whole programme

Photo: EuroMARC
Socio-economic impact

This impact is very difficult to assess as the lag-time is particularly long.

We noted however very good examples of research being used strategically to address political challenges, particularly the enlargement of the EU.
Impacts – environmental

Major disruption in FP6

Recovery in FP7 expected

Most impacts are indirect – which is important in sustainable development
Environmental impact

Our evaluation was focused on FP6. Agricultural research in FP6 was focused on food safety and quality and used the ‘fork-to-farm’ adage to guide research policy.

This resulted in a move away from research focused on environmental performance. It caused a collapse in forestry research.

Our report is critical of the tendency to develop research policy using buzzwords and political slogans. To a significant extent, FP6 was a political reaction to the BSE crisis. Nevertheless and thankfully, project managers (including in the EC) sought to maintain a wider agricultural research programme under the word ‘quality’ in ‘Food safety and quality’, and using the associate policy support research.
Impacts – European Research Area

Very large impact throughout the programme

Collaboration, collaboration, collaboration

Education and training

The agricultural science profession is truly European

ERANETS
Impacts – European value-added

Collaboration enabled

Critical mass generated

Transnational problems addressed
Impact pathways

Research projects → Research output → Primary users → Impact

Research projects → Research output

Research projects

Publications, Patents, Discoveries, Models, Guidelines, Education

Secondary users

Expert judgement

Development of impact pathways
Impact pathways – well used

Scientific publications

Policy development

Models, guidelines, vaccines etc.

Education and training

Internal pathways – SMEs, policy partners (e.g. REBECA)
Effective impact pathways

The analysis of projects reveals the breadth of impact pathways used. Project consortia engaged actively with a wide range of users. In some cases, especially in the Integrated Projects, there was extensive public outreach, for example through schools in EU Sol.

Overall, we conclude that the FP research used traditional science orientated impact pathways well. Some areas, particularly animal health and forestry, used direct engagement of experts informing policy well. The use of the education and training impact pathway is excellent.

The challenge of raising impact is not about more ‘dissemination’ or more communication per se embedded in research projects. It might actually be about less in some cases with more communication activity bundled across projects and better focused on key users.
Impact pathways – not so well used

Access to primary outputs – project reports

Ad-hoc knowledge interaction embedded in projects

Websites - temporary

SMEs

Cost and risk concentrates the mind!

Lack of programme-level follow-through
Ineffective impact pathways

We are struck by the *ad-hoc* approach to impact pathway planning. This is indicated by the many *ad hoc* ‘dissemination’ products, workshops, and stakeholder interactions, particularly in seeking to reach farmers.

An underlying problem is the project specific nature of these activities. Regardless of the quality and relevance, few research projects can deliver a complete and coherent answer to practical challenges and in any case the project-based interaction with farmers ends when the project ends.

Provision of free public access to project reports is poor. We were frankly shocked by the poor documentation of research outputs through final reporting placed in the public domain. Providing access to full project reports would be an enabling and empowering impact pathway that could be easily implemented. It would enable the professional translation of research results into communication products farmers can use effectively.
Impact strengths
Impact strengths

The quality of the science

Collaboration

Critical mass

Education

European Research Area

Relevance
Weaknesses
Weaknesses

Reporting and free public access to results

Project structure – unclear use of SME partners

ERANETS – excellent idea but implementation problematic

Integrated Projects integrated along the supply chain but research policy did not actively protect against fragmentation in some core science
Programming

Is whole of the programme more than the sum of the parts?

Is there coherent programme structure and management to extract impact from individual projects?

Answer: No – but!
Programming

There is a lack of consistent sub-programme (portfolio) structure and long-term strategies for investing in high-level research goals. There is an almost complete lack of programme structure above the level of the project. This makes it very difficult to actively combine project outputs and fill gaps to develop impact above the level of the individual project.

But there are exceptions which have been developed by stealth, good luck, hard work on the part of EC managers or because of the urgent nature of the work.

These are found in animal health in particular and in the socio-economic research. Examples include the coherent commitment to swine influenza research over FP5, FP6 and FP7. Another example is the commitment to CAPRI, and a degree of coherence in organic farming research. The ‘policy support’ part of FP6 was well used by EC research managers to keep key areas of research going during a period when there was political focus in FP6 on food safety.
FP 6 Developing coherence for impact

Socio-political objectives

Research projects

Primary users

Secondary users

Impact

EU projects

National projects
The default ‘response mode’ situation

“the country’s needs are not so trivial as to be left to the mercies of a form of scientific roulette” (Lord Rothschild, 1972)

Rothschild’s observation could be used to describe aspects of FP research.

The forming of the FP research themes is often down to a form of roulette, in response to key interest groups. This, combined with lack of programming results is “a pile of projects”, each set up by with input from well-placed stakeholders and each individually but separately linked to some socio-political aspiration.

‘Transfer’ or ‘dissemination’ is embedded in these projects with each project delivering outputs separately to users.
FP 6 Developing coherence for impact

Socio-political objectives

Research projects

Networks of Excellence

Impact

Primary users

Secondary users

EU projects

National projects

Primary users

Secondary users
FP6 introduced several project-level instruments to bring some coherence. The first was Networks of Excellence.

These networked existing EU and national research projects and funded additional synergy work such as publications, training, and temporary working in collaborating laboratories.

These were successful in raising the efficiency and output of the existing research base. The added-value for scientific impact was very high – for example in Med Vet Net.
FP 6 Developing coherence for impact

- Primary users
- Impact
- Secondary users

- Networks of Excellence
- Integrated Projects
- Socio-political objectives
- Research projects

- EU projects
- National projects
Integrated projects (IPs)

Integrated projects were large projects, typically 15 to 20 million Euros of EU funding. They had many partners. There are examples of IPs enabling ‘big science’ of global significance (e.g. EU Sol).

The thinking behind integrated projects was that by integrating actors along supply chains – for example from researchers working at the molecular genetic level through to processors and consumers, the entire value chain is covered thereby raising impact.

The result seems to be mixed. While these projects allowed a type of supply-chain integration this was project specific. At the same time, a coherent approach to core scientific challenges was not necessarily supported. This was especially so because FP6 was so strongly focused on food quality and safety. So for example, genetic analysis was first focused on parts of the genome directly relevant to product ‘quality’ traits leaving yield, environmental and input traits aside. This is not efficient in the long run. The result is a fragmented science base unless the researchers mitigated this – which they did.
FP 6 Developing coherence for impact

Primary users

Networks of Excellence

Secondary users

Socio-political objectives

Integrated Projects

ERANETS

Research projects

EU projects
National projects
ERANETs

The ERANET instrument was introduced to foster cooperation in research investment between the owners (funders) of national and regional research programmes. In assessing these we are very mindful of their unique purpose which is to raise the performance of national research programmes within the ERA through cooperation and burden sharing between national funders, for example between national ministries that invest in agricultural research. The idea of investing in the identification of common research needs across national programmes and the establishment of mechanism to share the cost of this research is excellent, and one of the most innovative aspects of FP6.

However, significant difficulties in implementing this are evident in agriculture. These difficulties are rooted in unclear boundaries between research programme owners and research providers, and misunderstanding about the purpose of ERANETs.

Of the 11 ERA-NETs we examined, only one is coordinated by national research programme owner (ERA-NET EMIDA coordinated by Defra). One other is coordinated by a professional independent research management organisation based in the Netherlands (ERA-NET PLANT GENOMICS). Therefore more than 80% of the agriculture ERANETs are coordinated by research institutions acting on behalf of the coordinating programme owner. In addition, many of the ERANET programme owning partners delegate their representation in ERANET projects to research organisations. So there is a real risk that ERANETs are dominated by the ethos of research institutions rather than the ethos of programme owners seeking efficiencies. The conflicts of interest between programme owners and research providers running or participating in ERANETs on their behalf have been poorly managed and we are aware of significant past difficulties as result.
ERANETs

The original goal of ERANETs was to pool national funds and establish common research funding mechanisms. None of the agriculture ERANETs has established common funding pots from which research is procured to meet common research needs. This is even where some ERANETs clearly undertook to do so at the outset in their original proposals. Many ERANET partner organisations (i.e. Member State Ministries and Research Councils) cannot or will not allow their national funds to be combined with other partners’ funds to invest directly in international collaborative research. To overcome this, virtual pots have been established in which international research projects funded by several national bodies are broken down into their respective national contributions. With this model, each national research funding contribution is agreed and administered separately at national level, aligned to the part of the research project being delivered in that country. This adds huge administrative complexity. We are also aware of difficulties where partners in ERANET projects (i.e. national funding bodies) have not collectively followed the recommendations of independent proposal evaluation panels, and who have unilaterally subjected research applicants to multiple and extended application procedures after project approval by the ERANET. There is even one case known to us of a funder unilaterally withdrawing funding from their agreed part of a project after research had commenced. These are serious weaknesses in how the ERANET concept is being implemented.

The data provided to us on the EC investment in ERANETs and the research funding actually delivered show that ERANET research is so far characterised by large administrative overheads – for example ERA-NET BIOENERGY spent 2.6 million Euro of EC funds to coordinate the investment of 7.3 million Euro of national funding in 14 projects. These ERANETs are drawing on significant EC funds and we think more should be done to ensure there is a common understanding of what is expected of ERANET partners if the benefits for the ERA are to be achieved.

In general ERANETs have enabled cooperative priority setting for national programmes. They have encouraged the synchronisation of national research programs. However, the introduction of ERANETs has added further complexity to the funding system, although overall it is recognised a great deal has been achieved. National EU policy and ERA strategies have been strengthened or developed in many countries and the principles and benefits of joint funding are increasingly recognised by Member States.
‘breaking with the past’ – ‘fork-to-farm’
‘Breaking with the past’

Short-term political priorities imposed on the programme with inadequate scientific interpretation have reduced impact. Impact has been compromised by the mismatch between research investment cycles and the political cycle operating in the European Commission. Successive 4 - 5 year programmes have been developed with insufficient consideration of past outputs.

Some politicians like to make their mark with phrases such as ‘break with the past’. Research policy has been framed using buzzwords and political slogans (e.g. ‘fork-to-farm’). This has hindered the impact overall. Delivering impact for ‘Europe 2020’ and ‘Innovation Union’ and ‘Resource efficient Europe’ will depend on how the EC now focuses research coherently on the knowledge needed to address political visions, developing well-managed portfolios of projects that deliver impact key to those policy outcomes.
Developing coherence for impact - programming

Primary users

Secondary users

EU projects

National projects

Impact

Research projects

Socio-political objectives
Developing coherence for impact - programming

Socio-political objectives

Research projects

Translation

Primary users

Secondary users

Impact

EU projects

National projects
Developing coherence for impact - programming

Translation

Socio-political objectives

Research projects

Primary users

Secondary users

Impact
Programming

There are two key principles to keep in mind:

Very differing futures, scenarios and stakeholders’ agendas often have common and overlapping research and innovation needs. This was clearly shown by the EU EUROCROP project which is a useful resource in planning research.

Researchers and innovators deliver knowledge, understanding and new approaches; they do not deliver socio-political outcomes or complete solutions to Grand Challenges.

The above may seem obvious, but these two principles are not understood or are often overlooking in developing research programmes and strategy. The result is research and innovation programmes (if they exist as ‘programmes’ at all) are chopped and changed in relation to the political cycle, stakeholders’ new futures and new Grand Challenges. Programmes are fragmented and are not seen through to outcomes. The result is low impact.

The key to overcoming this is research and innovation programming. When we identify these common research and innovation needs from a wide range of futures, stakeholder aspirations and Grand Challenges, we have a basis for combining complementary research projects and delivering research results that can be coherently translated to meet users’ needs. This combines coherent in terms of science with breadth and agility in terms of policy. This is the ideal. This requires identifying common research and innovation needs for different futures and aspirations.
Programming

The stakeholders largely set out desirable futures and policy scenarios or endorse Grand Challenges rather than identify research and innovation needs to support these. This means it is important that stakeholder needs are translated into coherent and robust research and innovation programmes and targets. This translation process has a strong top-down character and requires broad scientific and technical insight so that the bottom-up engagement is used effectively.

The current structure of research and innovation management in the EC is actually well suited to this process. Research and Innovation management is centralised in DG RTD. It jointly serves quite diverse needs in other DGs. We have good examples of that centralised facility used well to bring coherence between projects; notably in animal health and welfare, and in modelling of the effects of the CAP.
Lasting impressions
Prof. Hojka Kraigher
Slovenia Forestry Institute

‘Fork-to-farm’ did damage

Forest research dropped from

82 M Euros in FP5
to
6 M Euros in FP6

Research problems cannot be solved by:

A single project per problem.
A single project per call.
The Framework Programmes have provided a community of skilled scientists and new research in all countries of the EU on the reduction of environmental impacts of agriculture.

‘Greening’ means public support for public goods. We need to optimize public goods to restore biodiversity in agriculture, reduce energy use, increase the protein self-sufficiency of the EU and improve public health.
Animal health research has had a vital impact on the development of legislative measures and on the adoption of trade standards used at global level.

The future inter- and multidisciplinary research should be strongly linked to disease prevention and animal welfare.
Dr Paul Lazzari, Agrasys S.L., Spain

Projects have put Europe in a lead position – FP funding allows “big science” to be done at a level few national programmes can achieve.

The exploitation of this enabling science needs to be improved. This should include funding research analysing why Europe is weak in this area and looking at how technology transfer and exploitation is managed elsewhere.
Otto Schmid,
FiBL Switzerland

Socio-economic research projects supported policy makers (CAP, Rural Development) particular when there was early user involvement.

The public interest in resource efficiency relates to how it enables resource conservation. **We need more emphasise on resource conservation.**
About 90% of plant health research contributed to new and sustainable systems of agricultural production. The diversity of research is impressive. A link between project size and research effectiveness is not evident.

Improved impact requires bottom-up mechanisms with decisive participation from end-users, such as consumers, farmers or policy-makers.
The *regional component and approach* reveals an important direction to be followed.

Future research on the social and economic impact of the CAP should consider strengthening the *follow-up* phase for the exploitation of existing research outputs as well as placing the CAP in a *broader context* – for example in relation to cohesion policy.
Worldwide research partnerships have ensured there is a critical mass of experts available to the EU. This could not have been developed without EU research funding.

Animals are important and that new or emerging disease can occur at any time e.g. the Schmallenberg virus.

The programme must be capable of anticipating challenges rather than just reacting.
So where does this leave us?
The science is in good shape – excellent considering the programme scope

Excellent contributions to the European Research Area

Wide range of impact pathways well used especially education and training

High impact research widespread
Full impact potential not being used

Project reporting – get access right first to enable knowledge acquisition. Access is empowering

Lack of follow-up and follow through

Avoid political slogans and buzzwords (‘fork-to-farm’)

Recognise the programme for what it really is: Agricultural (in its widest sense), animal health and forestry research

Programme the research to ensure the whole is more than the sum of the parts
Our message to the Commission:
Our message to the Commission:

Be proud
Our message to the Commission:

Be proud

Be brave
Being proud
The European Commission can be proud of what the programme has achieved. Developing a programme of this quality and breadth is a significant achievement. This is in no small part due to the commitment of the EC staff involved in research management.

Being brave
The combination of Horizon 2020 and the European Innovation Partnership in Agricultural Productivity and Sustainability opens up a new era for agricultural research in Europe. There is a large range of groups with interests in this research and innovation. Drawing on their input rather than just reacting to it, the EU will need to be brave enough to provide leadership in designing managed research programmes and brave enough to develop new approaches to enabling and empowering the users of knowledge.

We need a change in mindset across the science and innovation community. This change will celebrate the applied nature of agricultural research and focus everyone involved on its impact. This will require in particular a shift away from regarding the EC as a funder of research towards regarding the EC as an investor in research. Being an investor brings with it more responsibility than that of a ‘funder’.

Translating the aspirations of everyone in food and agriculture into effective research questions will take courageous leadership that goes beyond mere administration of research projects.