Responsible Research and Innovation in Food Systems Research

A short guide for funders

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Background

In today's society, we face many global challenges, framed in the Sustainable Development Goals (SDGs). One important challenge is the vulnerability of our food systems in light of e.g. demographic changes, climate change, limited natural resources and shocks such as the Covid-19 pandemic.

To address this challenge, it is recognised that there is a need for transformation of our food systems based on research and innovation, but often there is a gap between research results and impact. In 2017 the EC commissioned a report (EC, 2017) to formulate a vision on future EU R&I and to make recommendations on how to maximise the impact of R&I.

One of the key recommendations was to adopt a mission-oriented, impact-focused approach to address global challenges through setting R&I missions that mobilise researchers, innovators and other stakeholders to realise them. In the area of food, the European Food 2030 policy framework also states that current R&I investments/ programmes fall short on delivering impact and provides 10 pathways to impact (EC, 2020) to overcome these shortcomings (see also Tommaso et al, 2020).
Among these, one is Governance & Systems Change, which seeks to provide a way forward for future R&I policy in Europe and beyond.

In this booklet, we highlight how public R&I funders can meet the increased expectations to deliver research that has societal and economic impact (Global Research Council, 2019).
For this, R&I must be seen to respond to societal needs and that means understanding what society is asking.

The 10 R&I pathways are :

- Governance & Systems Change
- Urban Food System Transformation
- Food from the Oceans & Freshwater Resources
- Alternative Proteins & Dietary Shift
- Food Waste & Resource Efficiency
- The Microbiome World
- Healthy, Sustainable & Personalised Nutrition
- Food Safety Systems of the Future
- Food Systems Africa
- Food Systems & Data

What is Responsible Research and Innovation (RRI)

To make R&I, be it fundamental or applied, more responsive to the needs and values of society and to deliver greater impact, the concept of Responsible Research and Innovation (RRI) emerged in the European Union's Framework Programmes for Research and Technological Development.

RRI has been defined as follows: "Responsible Research and Innovation is a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products (in order to allow a proper embedding of scientific and technological advances in our society)" (Von Schomberg, 2013).

R&I is considered responsible if the conditions specified below are met with regard to outcomes and process (Kupper et al. 2015).

With regard to **outcomes** it is argued that RRI aims for (reflexive) learning and R&I outcomes that contribute to solving societal challenges. In this way, there is a reciprocal exchange allowing research actors and end-users to understand each other's' needs and expectations.

The process requirements for RRI are :

- **Diversity & inclusion**
  As RRI aims to be responsive to societal needs, it is important that a broad selection of stakeholders is involved in R&I in a co-creative process, thus ensuring their needs are heard.
  Diversity and inclusion can be achieved by involving a variety of stakeholder groups and relevant voices during the entire R&I process.

- **Openness & transparency**
  Openness and transparency about R&I is achieved through involvement of stakeholders including the public. This ensures accountability/liability of scientists and innovators towards the public, but it also supports sharing insights and information with the public, or educating them about science and innovation.

- **Anticipation & reflection**
  Anticipation of the future is also important. For example, foresight studies can contribute to ensuring that R&I will provide improvements in the future for problems that may not be obvious today. Continued reflection on the R&I process ensures relevance.

- **Responsiveness & adaptive change**
  Responsiveness and adaptive change are about the ability of scientists and innovators to adapt the outcomes of their R&I activities to the societal evaluations, in order to make sure that they are valued. It includes flexible process management and monitoring/evaluation during research, development and/or implementation.

In the methodology of RRI, use is made of transdisciplinary research and a systems approach. Transdisciplinarity refers to a research strategy that crosses many disciplinary boundaries to create a holistic or a systems approach, addressing the complex inter-related and interdependent nature of scientific and societal challenges as well as the nature of different types of stakeholders.

Although RRI is gradually becoming integrated into Research and Innovation policies and funding, much remains to be done. It is particularly important for funders as they can help bring about the changes needed to fully integrate RRI principles throughout the research programming cycle.

RRI for funders : What are the benefits ?

National authorities responsible for research programming and funding **have a key role in promoting research with impact** on a sustainable and resilient food system through the application of RRI principles. They can provide incentives for applying RRI so it will become the norm for excellence. Therefore, achieving impact requires re-thinking the role of funders to ensure knowledge is taken up (funders as knowledge brokers) and RRI can support this.

Linking science to society and policy brings greater impact by better understanding the needs of citizens, policy makers and end-users and responding to those needs.

By ensuring the implementation of RRI, public funders would enable:

- higher impact of research, as it would better respond to societal needs and policy needs. This would improve the “fit to purpose” of research and strengthen evidence-based policy making.
- essential “ buy-in ” from different actors, such as producers and consumers, crucial for bringing about change in food systems.
- more innovative research, as by dialoguing with new stakeholders, new ideas might be developed.
- better societal acceptance, breaking down barriers.
- better value for money. Research outcomes are taken up and used as opposed to “fund and forget”.

Why public funders are crucial in developing RRI

If RRI is part of the requirement for funding, then funders can play a critical role in ensuring that RRI principles are applied, and in turn, that impact is achieved. Indeed, public funders are at the forefront "to move RRI from being a primarily academic concept to something that can actually infuse the values of RRI within the institutions that undertake research and innovation" (Shelley-Egan et al. 2018). So public funders need to be more involved in implementing RRI and can lead by example.

Recommendations to public funders to better implement RRI

Public funders can create legitimacy for RRI through the following key ideas.

- Include relevant societal actors throughout the process of research programming and funding, as illustrated in the figures below and through the following steps:

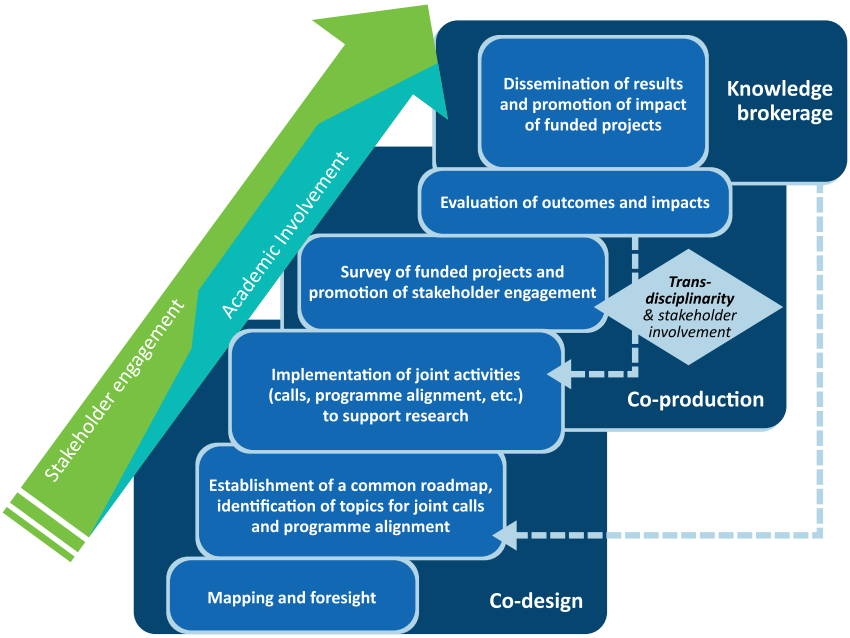

Fig. 1 : Approach and methodology used to engage stakeholders and promote the science-policy and science society interfacing in throughout the research (development) process (after Mauser et al. 2013) as practiced in BiodivERsA (see box below)

- Communicate the commitment to RRI early in the funding cycle and provide pre-application support to understand its goals.
- Scope calls in a co-creation approach, listening to needs of societal actors with an aim to respond. This implies inter- / transdisciplinary research and systems approaches, looking at the whole and not just the parts, thereby crossing disciplinary boundaries.
- Adapt the evaluation process. Review RRI components thoroughly and appropriately and assess RRI as more than an indicator of impact. Allow for emergent approaches to investigation and avoid being overly prescriptive. Integrate societal relevance in the definition of excellence in the review of proposals. This implies setting evaluation criteria that take this broader definition into account and also adapting the evaluation panels to include societal actors and/or experts in RRI.
- Incentivise RRI by providing additional funding or earmarked funding for carrying out the relevant activities (organising meetings, getting support etc.), awards for projects or research institutions for the implementation or promotion of RRI.
- Require projects to interact with stakeholders, for example through user panels or policy workshops. Support and facilitate these connections and serve as knowledge brokers.
- Stimulate dialogue and training on RRI throughout the process of research programming and funding
  - For funders
  - For evaluators
  - For researchers
  - For stakeholders/societal actors

  This would include targeted practical communication and materials
- Take a flexible approach. The most successful approaches to RRI appear to be highly tailored to the projects rather than using an externally imposed framework.

What can public funding agencies do to support RRI ?

Fig. 2 :
Examples of actions funding agencies could undertake to support the implementation of RRI throughout the process or research programming and funding. Green circle refer to actions the funders can take that are not linked to a specific step in the process of programming and funding (source : Workshop on Responsible Research and Innovation for public funders, October 22, 2020)

These steps require a change in culture among research funders– which will be gradual, but could be promoted through appropriate training/ awareness-raising sesssions within funding agencies.
It entails:

- a change in the definition of excellence and impact – taking societal concerns into account ;
- a change in corresponding evaluation criteria – with evaluators who adopt these standards.

This in turn will lead to a greater awareness and implementation by researchers and greater impact for society.

In addition to the inclusion of a Responsible Research and Innovation approach, further recommendations on "governance of research to accelerate innovation, deliver transformation and demonstrate flexibility in the time of shocks" can be found in the FIT4FOOD2030 policy brief 4.

Best practices

Barriers to the application of RRI principles by funders include lack of dedicated staff, lack of time, lack of a clear strategy and a culture that does not take into account these considerations (see Comparison across case studies - RRI - Practice). Although these cannot be overcome overnight, there are increasing numbers of success stories as illustrated below. Additionally, an increased awareness, supported by training and appropriate materials, can begin to bring about change.

Best practice :
The example of BiodivERsA Partnership

https://www.biodiversa.org/956

From its start, BiodivERsA has worked to promote and fund high-level research on biodiversity, ecosystem services and nature-based solutions, advancing knowledge to tackle key societal issues. Throughout the research programming cycle, BiodivERsA has implemented a variety of activities to ensure that research projects link science with society and policy, with input from an advisory board and open consultations.

This entails **co-design of research programmes and strategies** through the involvement of previously identified relevant stakeholders and policy makers in the preparation of calls, including mapping of research gaps, foresight activities and definition of priorities in a Strategic Research and Innovation Agenda.

BiodivERsA also promotes the **co-production of knowledge** of societal relevance in research projects it supports. This is achieved through: i) applying specific criteria and a dedicated process to evaluate the potential societal and policy impact of project proposals received within its joint calls and ii) guidance documents to help researchers understand these criteria and related expectations and to build capacities to conduct transdisciplinary research at the science-society/policy interface.
(See BiodivERsA Stakeholder Engagement Handbook, BiodivERsA Citizen Science Toolkit and BiodivERsA Guide on Policy Relevance).

Finally, BiodivERsA promotes **knowledge dissemination and brokerage** by working with selected projects, with additional funding, to develop specific materials such as policy briefs or short films based on project results, or to support activities to promote interactions between the funded projects and relevant stakeholders and the academic or societally relevant outputs of funded projects.

Best practice : ZonMw's framework for Responsible Research Practices & IMPACT

Since 2018, the Netherlands Organisation for Health Research and Development (ZonMw) has worked with a framework for responsible research practices as part of its overall efforts to strengthen the impact of health research. The framework provides a clear and accessible overview of the main criteria for responsible research, grouped under the headers of societal relevance, scientific quality, integrity and efficiency – see the figure below. For more information on how these criteria can be applied see https://www.zonmw.nl/fileadmin/zonmw/documenten/Internationaal/Strengthening_Impact_in_The_Netherlands.pdf. ZonMw applies this framework in its daily programming practice, to try to make sure that science is embedded in society and answers to its needs, for example by involving relevant stakeholders and building on existing data. While the framework is used at the front-end of the programming and funding process, ZonMw also places a lot of emphasis on implementation of results and assessment. Although these frameworks and models for strengthening impact were developed in the health research setting of ZonMw, they can easily be adapted to other areas. All ZonMw employees receive regular training on Responsible Research Practices.

Societal relevance	Scientific quality	Integrity	Efficiency
Stakeholder participation	Mixed methods designs	Transparency (e.g. registration of research, open access, FAIR data)	Use of existing data eResearch/citizen science
Co-financing	Pratice-oriented research	Replication (research)	Stimulation of systematic reviews/ knowledge syntheses
Divers composition of steering committees	Pioneering/ innovative research	Prevention of publication bias (e.g. reporting guidelines)	Appropriate designs/ alternatives for RCT's
Holistic health concepts (e.g. positive health)	Interdisciplinary and international cooperation and knowleldge development	Education and quality assurance	Handing of (potential) inclusion/ implementation problems
Participative knowledge infrastructure	Diversity of assessment process	Conflicting positions/interests	Efficient arrangement of own programming processes
Added value of knowledge in policy, pratice and education	Variety of (transfer of) output		

Resources

https://rri-tools.eu/
A toolbox for RRI

Https://www.involve.org.uk/resources/methods
This site provides methods for involving citizens from the UK's public participation charity, who are on a mission to put people at the heart of decision-making

https://www.fosteropenscience.eu/content/how-incorporate-rri-principles-funding-call
Recommendations on how to incorporate the RRI principles in a funding call from FOSTER Plus (Fostering the practical implementation of Open Science in Horizon 2020 and beyond), a 2-year, EU-funded project, carried out by 11 partners across 6 countries.

https://www.biodiversa.org/702
Stakeholder Engagement Handbook from the ERA-NET BiodivERsA

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FIT4 FOOD 2030

NUTRITION
CLIMATE
INNOVATION
CIRCULARITY

Towards FOOD 2030
future-proofing
the European food systems
through Research & Innovation