

8. Knowledge Exchange at the Science-Policy Interface to Support Climate Action in the European Agri-Food System

MACSUR Science-Policy Knowledge Forum

The policy brief presents best practices of knowledge exchange for different science-policy interfaces within European agri-food systems.

Key Messages

- There is a growing demand for insights on the trade-offs, synergies and costs of envisaged climate mitigation and adaptation measures.
- Scientific evidence yields a range of possible solutions. Choosing the best and most feasible solutions requires co-production that allows for the consideration of socio-economic and cultural contexts.
- Uncertainties must be made explicit.
- Policymaking in the agri-food sector is influenced by strong interest groups.
- Workshop participants identified a current lack of institutional rules and legal frameworks for evidence-based policymaking.
- There is a need for institutional frameworks, improved scientific communication and capacity-building across research and policy.
- Highly specialised, multi-disciplinary networks operating on a long-term basis are best adapted to cover agri-food system complexity.

Relevance

Reflections on science-policy interactions and observing established science-policy initiatives within the agri-food system can be helpful in developing good practice standards. This policy brief is based on results derived from the thematic workshop “Effective strategies for science-policy knowledge transfer to support climate action in the European agri-food system”, held at the Joint Conference of the Slovenian Association of Agricultural Economists and the Austrian Association of Agricultural Economists on September 22nd 2022 in Ljubljana. Workshop participants came from a broad range of countries (Austria, Slovenia, the Netherlands, Norway, the United Kingdom, and Argentina) and professional backgrounds in academia as well as policymaking.

This policy brief tackles the following questions:

- 1) What are the information requirements, i.e. contents, for evidence-based climate change policy design in the agri-food sector?
- 2) What are the major obstacles to evidence-based policy design and enforcement? How can science contribute to overcoming these?
- 3) What are the current practice formats of knowledge transfer?

Climate change is a major environmental and societal challenge of our time. Global agri-food systems emit about one-third of all greenhouse gas emissions indicating the necessity of climate change mitigation. Agricultural land use offers opportunities to sequester carbon and provide renewable energy resources. On the other hand, climate change impacts agricultural land use and livestock husbandry, thus calling for adaptation strategies to maintain production in the long run. The key role of land use in the Earth system, e.g., safeguarding biodiversity, requires policymakers to carefully plan and operationalise mitigation and adaptation strategies to maintain long-term resilience.

Drawing from the expertise of scientific as well as political actors from the field of food and agriculture, we outline the dimensions, character, and prospects of knowledge exchange at the science-policy interface. Our results shed light on the challenges and opportunities associated with science-policy relations for the specific case of food and agriculture. Using Boswell and Smith’s (2017) conceptual lens as an analytical entry point to understand the characteristics of science-policy knowledge transfer, we hope to support the improved design of science-policy interaction for climate action in the European agri-food system.

Four Model Relationships for Science-Policy Interaction

Boswell and Smith (2017) introduced four model relationships of science-policy interaction. First, there is a unilateral dimension to science-policy interaction in the field of agriculture and food: through evidence provision, science impacts policy actors’ perceptions and ways of thinking. Second, there is a prevalent influence of policies and politics on the research agenda: political interest shapes scientific funding opportunities and determines, which scientific evidence will be taken into account for evidence-based policymaking. The third conceptual approach considers science and policy as two autonomous spheres operating according to a separate logic.

This approach describes each as an autonomous system, each with its own logic on how particular information is perceived and given meaning. The fourth approach, related to the practice formats presented here, recognises the co-production of knowledge and governance in an iterative and continuous process by both scientists and policy makers. It recognises mutual feedback effects, e.g. science might be decisive for the construction of societal problems to which political responses have to be found, which again will be supported by scientific evidence. Elements of all four have been identified by the workshop participants. This helps to understand the character and implications of science-policy knowledge exchange for the specific case of climate action in agriculture and food.

Experts identify best practices for science-policy interaction

Experts highlighted that broad insights on trade-offs, synergies, costs and prognostic information of envisaged climate mitigation and adaptation measures are needed. Scientific evidence yields a range of possible solutions. Therefore, feasibility and choice of best solutions can be done only in co-production formats to consider particular socio-economic and cultural contexts. Uncertainties have to be made explicit.

In order to provide a sound evidence base to policymakers in the field of agriculture and food, **interdisciplinarity** is key. To tackle the high complexity of agri-food systems including the many interlinkages to other societal and bio-physical sub-systems, broad datasets and toolboxes are needed. Scientific evidence should further provide information on the costs and benefits associated with specific envisaged policy measures and targets. To provide prognostic information, scenario forecasting is needed based not on one single model, but on a family of them to cover the inherent system complexities. This should give insights into expected trade-offs, synergies, and the effectiveness of proposed measures for climate change mitigation. Experts in the workshop further highlighted that mechanisms must be in place that allow for a **holistic scientific evaluation** of policies, following, for example, the sequence of the Driver-Pressure-State-Impact-Response model (cf. Burkhard & Müller, 2008). A common critique is that science does not provide solutions to the problems at hand. As scientific research always comes with uncertainty and several solutions might be obtained from different methodological and theoretical approaches, scientific knowledge can provide an option space of possible solutions together with the associated opportunity costs and measurements of utility. This highlights the need for the co-production of knowledge where farmers and other practitioners as

well as policymakers themselves come into play, who know best about the feasibility of measures within a particular socio-economic and cultural context.

A further important aspect is **communication**. Again, the complexity of the agri-food system and the broad effects of climate change on the system and associated sub-systems tend to create an "information overload". Tools and trained personnel are required for the better synthesis of scientific evidence as well as the concise and target-oriented knowledge provision to policymakers and society. This must include information on how the scientific evidence came about, associated uncertainties and their implications. Nevertheless, sufficient resources in the policy-making arena are needed to work with the evidence provided.

Policymaking in the agri-food sector is influenced by **strong interest groups**. Workshop participants identify a current lack of institutional rules and legal frameworks for evidence-based policymaking. With institutional frameworks in place, improved means of communication for scientific evidence to target audiences and capacity-building, within both research and political institutions, for this particular purpose is needed.

Several obstacles to evidence-based policy-making in agriculture and food were highlighted by the workshop participants. The main points raised are presented in Figure 1. Practice formats are characterised by highly specialised, multi-disciplinary networks operating on a long-term basis to cover agri-food system complexity.

We introduce examples of formats for science-policy dialogue and knowledge exchange, which have been brought up during the workshop discussion and highlight their specific characteristics (Table 1).

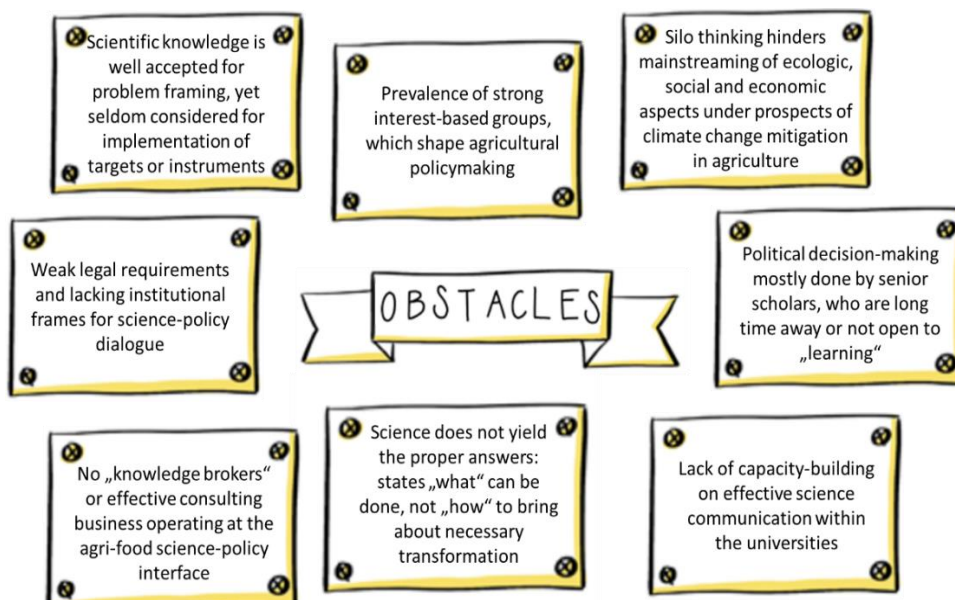


Figure 1: Major obstacles for evidence-based policy design raised by the workshop participants.

Table 1: Practice formats of science-policy knowledge exchange

| Science Policy Initiative | Description | Highlights |
|---|--|---|
| MACSUR SciPol (https://macsur.eu/) | <ul style="list-style-type: none"> • Works with a highly specialised and multi-national team • Builds on a well-established, long-standing network (MACSUR I & II) • National Policy Representatives (NPRs) directly involved in the research process, and communication formats and have technical insights on how evidence is produced • Enables modelling knowledge synthesis and coupling of individual models to cover the complexity of the agri-food system • Does provide a direct interaction of scientists and policymakers without the need for knowledge brokers to translate the information, although the NPRs, support the development of dissemination formats. | <ul style="list-style-type: none"> → Produced scientific outputs are published in policy-dedicated formats → Establishes long-term involvement of actors → Direct contact with persons in policy established |
| Eclipse (https://eclipse.eu/) | <ul style="list-style-type: none"> • Established in 2016 and funded by the European Commission • Answers requests from policymakers by synthesising available knowledge • Works to identify current and future emerging issues • Fosters citizen engagement • Includes a Strategic Advisory Body (with political, societal and scientific stakeholders) and a Method Expert Group | <ul style="list-style-type: none"> → Demand-driven, answers questions from policy → Trans-disciplinary character |
| Dutch Council for the Environment and Infrastructure (Rli) (https://en.rli.nl/) | <ul style="list-style-type: none"> • Established by law in 2012 • Produces a yearly work programme • Places special focus on policy evaluation • Provides solicited as well as unsolicited advice • The government is obliged to respond to the council's reports, stating how it intends to implement the recommendations provided • Members from public administration, academia, private sector, includes 2 junior members | <ul style="list-style-type: none"> → Legally institutionalised format → Binding agreements on policy action following evaluation process |
| Austrian Society of Agricultural Economics (ÖGA) (https://oega.boku.ac.at) | <ul style="list-style-type: none"> • Is an Austrian scientific organisation for agricultural economics and related disciplines • Considers itself as an organisation to create linkages and knowledge transfer between scientific research and administration • This is promoted by the selection of board members from both science and agricultural policy administration, an annual conference directed to both groups, a scientific journal allowing for applied work to be published, a blog with regular information dedicated to both groups and an award directed to young scientists among others for applied high-quality research | <ul style="list-style-type: none"> → Specialised on food and agriculture → Allows knowledge transfer from policy/administration to science |

Further Reading:

Boswell, C. & K. Smith (2017): Rethinking policy ‘impact’: four models of research -policy relations. In: Palgrave Communications 3 (44). <https://doi.org/10.1057/s41599-017-0042-z>

Burkhard, B & F. Müller (2008): Driver-Pressure-State-Impact-Response. In: Jørgensen, S.E. & B.D. Fath (eds.): Encyclopedia of Ecology, vol. 5, Elsevier, Oxford, pp. 967 – 970. <https://doi.org/10.1016/B978-008045405-4.00129-4>

Poppe, K.J. (2022): Sustainable Food Systems and the Role of the

Agricultural Economist in Policy Design. In: Proceedings of the Joint Conference of the Slovenian Association of Agricultural Economists (DAES) and the Austrian Association of Agricultural Economists (ÖGA): Societal changes and their implications on agri-food systems and rural areas. 22nd – 23rd September 2022, Ljubljana, Slovenia.

The MACSUR SciPol knowledge forum is a pilot exercise initiated by the [Joint Programming Initiative for Agriculture, Food Security and Climate Change \(FACCE-JPI\)](#) to bring science and policy actors together for the strategic design of climate change adaptation and mitigation solutions in the agri-food sector in Europe. This policy brief contributes to this mission by providing evidence-based information to policy for achieving carbon neutrality by 2050, adapting to climate change and understanding synergies and trade-offs in achieving these targets.

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