



One Health collaboration with and among EU Agencies – Bridging research and policy

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ABSTRACT

In the coming decade, Europe will dedicate billions of euros to the necessary research and innovation (R&I) to support a transition to safe and sustainable food systems. EU Agencies, individually and even more so collectively, can make a difference in supporting the European research agenda. EU Agencies are knowledge centres, bringing together know-how to inform policy makers. EU Agencies that have traditionally dealt with aspects of human health, animal health, plant health and ecosystem health in silos, now need to take a broader perspective and move towards a One Health (OH) approach.

In this paper, the authors highlight the need for more transdisciplinary cooperation in support of the One Health approach, identify challenges in strengthening interagency cooperation and provide recommendations to address them.

EU Agencies are natural bridges between the scientific community and policy-makers and need to dedicate time and effort in fostering this dialogue, e.g. by engaging with relevant initiatives, research projects and European Partnerships. Research generates evidence that can be used also for regulatory science, in support of policy-making.

It is urgent to define transdisciplinary research needs and formulate a One Health research agenda. This would be facilitated by establishing transdisciplinary One Health Research & Innovation governance, both at national and EU levels. Ongoing large initiatives, such as the One Health European Joint Programme, have demonstrated that active dialogue with national ministries and EU agencies is beneficial for all parties. Involvement of EU Agencies in the programming of the EU Research Framework programmes is beneficial, because of their regulatory science perspective, their expertise and current or future tasks on research topics. It is timely for EU Agencies to demonstrate leadership in moving the One Health agenda forward and it is encouraging that EU Agencies have committed to establish a cross-agency task force on One Health.

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1. Introduction

At the heart of the European Union's (EU) Green Deal, the European Commission's strategies on biodiversity, zero pollution, and farm-to-fork, aim for an improved balance between human health, food systems, and ecosystems, recognizing the interdependencies between them [1–3]. In the coming decade, Europe will dedicate billions of euros to the necessary research and innovation (R&I) to support a transition to safe and sustainable food systems [4], for example by exploring alternative sources of protein and significantly reducing the use and risk of chemicals, such as the more hazardous pesticides, fertilizers and antimicrobials in agriculture and aquaculture. EU Agencies, individually and even more so collectively, can provide scientific advice to support this transition and make a difference in supporting the European research agenda.

In 2018, the European Union Agencies Network for Scientific Advice (EU-ANSA) published the EU-ANSA agencies' engagement in the EU research knowledge cycle [5]. The technical and regulatory agencies that provide scientific advice to EU policymakers are both a source and a user of knowledge. Agencies have a deep understanding of the research knowledge available, as well as where knowledge gaps limit the quality of scientific advice produced. This is supported by active dialogue with research initiatives and projects in the field.

Evaluations of earlier Research Framework Programmes (e.g. Horizon 2020) have identified a number of areas for improvement where EU Agencies can help, such as: greater outreach and engagement with the civil society, explaining results and impacts better, 'widening' participation by involving more countries with low participation rates in research programmes, more international cooperation, and making results more openly accessible to the wider scientific community and the public. Also, research projects have been encouraged to strengthen policy engagement, like for example the One Health European Joint Programme (OHEJP), which is an ongoing comprehensive Horizon 2020 action on One Health.

In October 2020 the European Court of Auditors released a Special Report 22/2020: *Future of EU agencies – Potential for more flexibility and cooperation* [6]. It assessed how well the EU Agencies have been able to deliver EU policies for the public good. The report indicated further opportunities for cooperation by strengthening the role of agencies as centres for sharing expertise and networking. Assessing how EU Agencies can contribute more effectively to EU policies is essential for the future of Europe, because Europe relies on EU Agencies more than ever – especially in a time of crisis [7]. Late Alex Brenninkmeijer, reporting Member of the European Court of Auditors, argued: "*Cooperation between EU agencies also needs to reach another level. So far, synergies have been sought primarily in horizontal administrative processes such as IT and HR. Policy coordination and cooperation is a more promising area, and EU agencies can share views and need to learn to find their voice. Even agencies that do not seem very policy-driven [...] can actively contribute to cooperation on policies such as the Green Deal and Covid Recovery. [...] In short, policy cooperation is crucial to EU agencies' success, and needs to be fostered by their institutional partners. As far as EU citizens are concerned, individual EU agencies succeed only if the policy as a whole succeeds*" [8].

EU Agencies are knowledge centres, bringing together know-how to support decision makers in formulating, adopting, implementing and assessing policies. EU Agencies that have traditionally dealt with aspects of human, terrestrial and aquatic animal, plant and ecosystem health in silos, now need to take a broader perspective and move towards a One Health (OH) approach.

Here, the authors describe the role and importance of EU Agencies at the science-policy interface, highlight the need for more transdisciplinary cooperation in support of the One Health approach, provide an example of successful collaboration activities between EU Agencies, identify challenges in strengthening interagency cooperation and provide recommendations to address them, so to allow the One Health agenda move forward.

2. Methods

The One Health approach and the need for transdisciplinary cooperation in providing scientific advice to policy makers were discussed in depth during the ONE – Health, Environment, Society – Conference in Brussels from 21 to 24 June 2022 (<https://www.one2022.eu/>). The event was co-designed by the European Food Safety Authority (EFSA) and its sister agencies – the European Centre for Disease Prevention and Control (ECDC), the European Chemicals Agency (ECHA), the European Environment Agency (EEA), the European Medicines Agency (EMA) – as well as with the European Commission's Joint Research Centre (JRC). The conference examined the broader perspective of sustainable food systems, focusing on the need to implement a OH approach. During one of the thematic sessions, the Agencies identified the main challenges to interagency cooperation and discussed solutions. This paper, co-authored by the speakers and panelists of the research session, documents the outcomes of this debate. Further details of the ONE conference can be found in a recent paper by Devos et al. [9].

3. Results

During the 21st century, several health threats have emerged, linked to zoonotic and (re)emerging infectious diseases, antimicrobial resistance, climate change and environmental sustainability [10]. In addition to these threats, the increasing demand for food products as well as food habit changes, have a disruptive effect on food production systems. Our food policies and systems will have to shift dramatically towards sustainability to achieve the ambitious goals of the EU Green Deal. The COVID-19 pandemic, caused by SARS-CoV-2 – a zoonotic virus, impacting society in all levels, reminded us that silo approaches will not work [11]. A comprehensive strategy and transdisciplinary collaboration on all aspects of health for people, terrestrial and aquatic animals, plants and the environment are required. Evidence from research programmes, that is actionable and useful to regulatory science, is needed to support the necessary changes.

Systemic shocks such as the COVID-19 pandemic and the Ukraine war are highlighting the importance for Europe and the world to be more resilient, and for our Union to reinforce its open strategic autonomy and its internal cohesion. Strengthening the science-policy interfaces and fostering synergies between research efforts among different institutions and various fields of expertise will help R&I to deliver local, regional and global impact. Horizon Europe, the ninth European Research and Innovation Framework Programme (2021–2027), is one of the key instruments of the Union to steer and accelerate Europe's recovery, preparedness and resilience to face current and future challenges. Making use of the outcomes of research projects, such as those under the OHEJP, provides useful information and experiences to policymakers to strengthen science-policy interfaces. In this context, collaboration with and among scientific organisations is paramount.

While there is ample policy-making support in Europe (e.g. through the Joint Research Centre, the EU Agencies and the Scientific Advice Mechanism), more transdisciplinary cooperation is needed. Recently, the European Commission's High-Level Expert Group that was tasked to explore the needs, gaps and options to strengthen the international science-policy interface for food systems transformation published their report with recommendations on how to strengthen international science-policy interfaces for improved food systems governance [12]. The authors emphasise that the transformation must be supported through more ambitious, interlinked science-policy-society interfaces with more multi-sectoral task forces, and a network of networks.

EU Agencies have a plethora of scientific committees, panels, working groups and well-established scientific networks, involving many stakeholders, and offer a sustainable base on which to build partnerships. As providers of regulatory science, EU Agencies already broker knowledge between policy makers and scientists. The European

Commission and Member States need independent research and scientific advice that go beyond traditional boundaries between disciplines and organisations. Transdisciplinary collaboration is needed to consider all aspects of health for people, terrestrial and aquatic animals and the environment. For example, the type of effect or the mode of action of a specific drug is relevant to several EU Agencies: for EMA in relation to the evaluation of applications for market authorisation, for EFSA in relation to the maximum limits in feed and food, and for EEA in relation to the effects on the ecosystem. And the mode and quantification of human exposure to hazards (be it chemicals or pathogens) will be very relevant for ECHA, ECDC and EFSA. Hence, scientific collaboration between these EU Agencies is crucial and brings many advantages.

However, more could and should be done, such as enhancing synergies between research efforts in respective EU Agency domains of expertise. Although different in their missions and main tasks, EU Agencies address common risks and cooperate on many scientific topics. This ongoing interagency cooperation could benefit from a comparison of knowledge gaps and data needs that are being identified by the different EU Agencies. For example, polyfluoroalkyl substances (PFAS) is a collective name for a group of more than 6.000 chemical substances that are man-made and do not occur naturally in the environment. PFAS can have negative effects on the environment and on human, terrestrial and aquatic animal and plant health. Research on, for example, the biological activity or persistence, bioaccumulation and toxicity and transfer of individual PFAS into environmental media and the food chain will be of relevance for ECHA for its work in Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), for EEA in relation to environmental risks and for EFSA in risks in feed and food [13].

Another aspect to consider is capacity building. As in many other domains, networking and capacity building are crucial, and interagency scientific cooperation helps to maintain and develop a transdisciplinary network of scientists. EU Agencies and national institutes will recruit their future employees and scientists to expert panels from this network. Scientists maintain their scientific knowledge, stay up to date and move their scientific fields forward by doing research. Hence, funding research not only helps to generate the scientific knowledge needed for informed policy decisions, but at the same time builds current and future risk assessment capacity and capabilities.

3.1. Transdisciplinary cooperation in practice

A good example of long-standing transdisciplinary cooperation is addressing antimicrobial resistance (AMR). AMR is a global problem, and humans can acquire resistant micro-organisms from many different sources, including other humans, animals, food and the environment. Since it is crucial to tackle the AMR challenge from a One Health perspective, EU Agencies have joined forces in the collection and analysis of data, in assessing risks and in providing recommendations to regulators to inform policy options, notably regarding consumption of antimicrobials and AMR monitoring procedures, and the EU research agenda. EU Agencies jointly analyse and summarise AMR monitoring data collected by the Member States (MS) from humans, animals and food in yearly European Union summary reports, and investigate associations between antimicrobial consumption and AMR in the animal and human compartments [14]. AMR has also been one of the themes addressed in OHEJP.

The transdisciplinary cooperation allows the identification of emerging issues to provide a focus for current and future AMR research and helps risk managers to address and assess interventions related to the areas of highest concern. In recent years, EU Agencies have provided joint recommendations to risk managers on suitable control strategies to reduce the use of antimicrobials in food-producing animals, taking stock of the outcome of scientific findings from EU research, and of the practical experiences put in place by Member States [15]. Within the One Health framework, the environment plays a crucial role in the development and spread of AMR among and between humans and

animals, but many aspects of its role remain unclear. Thus, EFSA, in close collaboration with the other EU Agencies, has recently provided a series of recommendations to inform the research agenda and close current data gaps [16].

EU Agencies recently evaluated their cooperation during the COVID-19 pandemic and are ready to cooperate further, particularly in times of crisis. Agencies agreed to intensify their collaboration to increase preparedness for future threats, among other through common crisis exercises, and sharing expertise through foresight activities, encouraging policymakers to capitalise on the added value of the EU agencies – not only of each agency individually, but also on the value that they bring collectively [17]. The COVID-19 pandemic showed that complex issues demand multi-sectoral coordination and collaboration to formulate the multifaceted solutions required. In response to the pandemic, society made profound changes to social interaction, behaviours and economies because of the immediate threat of infectious disease. It is striking that society seems reluctant to make the necessary changes for the longer-term but existential risk of climate change, where the economic and humanitarian cost of inaction are likely to be significantly higher [18]. These observations highlight the need to include social sciences in the transdisciplinary One Health cooperation.

EU Agencies also come together through specific projects and initiatives, such as the OHEJP. The OHEJP has regularly gathered representatives from ECDC, EFSA, EEA and EMA, as well as representatives from World Health Organization (WHO-Europe), World Organization for Animal Health (WOAH) and Food and Agriculture Organization of the United Nations (FAO), to dialogue around the same table. Unfortunately, OHEJP will end in 2023, and while there are different European Partnerships that will take One Health into account, a dedicated European Partnership on One Health is currently not foreseen. The OHEJP has addressed several knowledge gaps identified by EU Agencies and produced many tools and methods that can be used by OH practitioners at EU and national levels, such as the One Health Glossary [19]. All these outputs from the OHEJP are made publicly available, and the lessons learnt from the initiative can inform future One Health structures.

There is substantial overlap in the scientific questions relevant for ECDC, ECHA, EEA, EFSA and EMA, so joint programming and monitoring will bring synergies. The regulatory science perspective the different EU Agencies have, and their awareness of the priorities for research to address knowledge gaps relevant to regulatory activities, will not always be top of mind of the wider scientific community. Their involvement in the programming of the EU Research Framework programmes is therefore important. Alignment of programming and funding cycles and partnership is needed between research funding bodies, risk managers and risk assessors, at EU and national levels. To bring this further, EFSA convenes a Risk Assessment Research Assembly (RARA) in Berlin on 7 December 2022 [20].

3.2. Interagency cooperation challenges

EU Agencies face a number of challenges for their interagency cooperation:

- EU Agencies have different mandates, and the complementary working that is possible within these different mandates need to be better defined to come to One Health outcomes. This will need time and resources to work with each other.
- EU Agencies are busy implementing their core tasks and run the risk of failing to take the time to anticipate future risks and consider whether the full relevant breadth of transdisciplinary science is used.
- Policy processes are time-driven, so scientific advice will need to be delivered within certain timeframes to serve the policy- and decision makers. Knowledge gaps need to be efficiently identified and communicated to the research community.

- There is fragmentation of information and a gap in implementation-science. Scientific knowledge needs to be brought together from a OH perspective, to serve the policy makers most effectively.
- Regulatory frameworks are typically delimited by legislation, often of vertical nature, meaning that risks are considered according to in-silo regulation, and tasks are distributed to EU Agencies according to those silos. A more horizontal approach to regulatory frameworks is required to fully integrate the OH principle.
- Communication needs to reach larger and more diverse audiences. It is challenging for scientists within specific fields to maintain the necessary overview of the priorities, needs and structures of the different EU Agencies. National institutes that adopt One Health approaches need to establish connections with several EU Agencies. Outputs from One Health research need to be made available and findable to the different EU Agencies [21].
- Activities on human health, animal husbandry and ecosystems are often fragmented, and holistic approaches are needed from the research community, risk assessors and managers to identify, understand and address the many and complex interlinkages.

Maybe the biggest challenge will be to move from traditional risk assessment to a more integrative approach, assessing also sustainability. Risk assessments are generally narrowly defined and therefore may for example only focus on a single chemical substance and a limited number of species that may be impacted. In contrast, integrated sustainability assessments focus on systems level and capture interactions and trade-offs between environmental, economic and social priorities and ideally consider the potential for cumulative effects on the environment, human, terrestrial and aquatic animal, and plant health. Such assessments therefore require EU Agencies to pool knowledge and to apply approaches and methods that combine and balance different types and qualities of quantitative and qualitative information. This must be based on a joint understanding of the One Health framework and the overarching policy objectives shaping future directions on health, food systems, biodiversity and climate.

4. Discussion

To overcome these challenges that hinder the collaboration and coordination among EU Agencies, the authors provide recommendations on streamlining the interactions and dialogue between EU Agencies, researchers and policy- and decision makers, in order to support the implementation of the One Health agenda. EU Agencies already work together on many One Health topics and help to formulate policy-relevant research in support of public, terrestrial and aquatic animal and plant health. They do so from science to policy, by helping research to deliver impact, making use of outcomes of research projects, including the knowledge gained in risk assessment, and providing scientific advice to risk managers for informed policy decisions.

They do so as well from policy to science perspective, by providing decision makers with policy-relevant knowledge and access to established expert networks. EU Agencies that work together closely, also in the area of research, can provide the EU with integrated solutions that are needed for society and the environment.

Interagency cooperation should develop further into transdisciplinary cooperation. Overall, there is ample policy-making support in Europe, but more transdisciplinary cooperation is needed to enhance the current landscape with multi-sectoral task forces and a network of networks. EU Agencies are natural bridges between the scientific community and policy makers and need to dedicate resources in fostering this dialogue, e.g. by engaging with relevant research projects and European Partnerships. Cooperation between EU Agencies needs to reach another level to include policy support and One Health coordination.

EU Agencies should work together also on integrated sustainability and environmental risk assessments. Even if there are knowledge gaps, limitations in current methodologies and limited clarity on mandates,

Europe cannot afford to wait and needs to bring sustainability knowledge together.

Not only risk assessors but also policy makers and regulators need to take a One Health approach. EU Agencies are requested by the European Commission to deliver on a tight portfolio of core tasks that are clustered in silos. The different Directorate Generals of the Commission will need to anticipate the need of the EU Agencies to carve out time to deliver coordinated work on One Health and to foster the production of cross-agency knowledge.

Actionable evidence is needed from research, that can be used also for regulatory science in support of policy makers. Knowledge gaps need to be identified and addressed. Alignment of programming and funding cycles and partnership is needed, at EU and national levels, to come to this actionable research. Collaborations across projects, partnerships and initiatives should be supported, in which EU Agencies can facilitate. Research funding and engagement is critical also to build the future generations of scientists, so Europe will avail of the necessary risk assessors and scientific panels in the future.

Finally, it is urgent to define research needs from a One Health perspective. This could be facilitated by establishing transdisciplinary One Health Research & Innovation governance, both at national and EU levels. EU Agencies should be involved in research programming discussions with the European Parliament and Council. In addition, appropriate involvement of EU Agencies in the programming of the EU Research Framework programmes is beneficial, because of their regulatory science perspective and because of their expertise and current or future tasks on research topics. It is timely for EU Agencies to demonstrate leadership in moving the One Health agenda forward and it is encouraging that EU Agencies have committed to establish a cross-agency task force on One Health on which further reports should follow.

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Declaration of Competing Interest

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Data availability

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