



Deliverable 5.4

INTERNATIONAL COOPERATION

Work package:	WP5
Lead- beneficiary:	ZON
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Relevant Task:	Task 5.2
Dissemination Level:	Public
Due Date (month):	M38
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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No774088



1. Introduction

The purpose of this document is to provide background information, a framework and recommendations to shape the international dimension of Food 2030. Food 2030 is the EU research and innovation policy response to international policy developments including the Sustainable Development Goals (United Nations, 2015) and COP21 commitments (United Nations, 2015).

The timeline of Food 2030 milestones started at the World Expo, the biggest international exhibition at which nations showcase their achievements related to a universal theme. Commissioner Moedas launched a Food Research Area at the Milan World EXPO 2015 with the overarching theme “Feeding the Planet, Energy for Life”. A year later, in October 2016, the Research and Innovation (R&I) policy framework Food 2030 was published, which “makes an attempt to map and provide common terminology to convene all players and underpin the debate” (European Commission, 2020). In this core document of Food 2030, the importance of international collaboration in the context of Food and Nutrition Security is highlighted. The document states that “R&I policy alignment in areas like framework conditions, standards, and thematic initiatives, wherein the EU is well-positioned to have an impact at a global level, and in coordination with Member States” is of importance and that “multilateral and bilateral collaboration is being maintained and fostered through existing dialogue platforms”.

In the following years activities have taken place at various levels to further develop Food 2030, to broaden support for Food 2030 and to implement Food 2030, such as the CSA FIT4FOOD2030. Although the story started at an international stage, since then the focus has been mainly on the European level.

This document is based on desk study as well as practical experiences. It lays out a strategic guidance on **how** to connect Food 2030 with R&I policies, strategies and programmes in so called *third countries*, with the aim to deliver more effectively towards answering knowledge questions that can contribute to a food systems transformation. The focus is on those third countries that currently have the resources available to engage in, contribute to and capitalize on the benefits of collaborating with EU countries and the EC on R&I policies and programming in the context of Food 2030. Although collaboration on these topics with low- and middle-income countries outside of Europe is at least as important, this requires a different approach. Such an exploration lies outside the scope of this document, but needs further attention in the future.

Within the frame of FIT4FOOD2030, the circumstances in the last year were far from ideal to conduct activities in an international setting due to the COVID-19 pandemic. Therefore the present document maps and builds on (practise based) experiences with international alignment of R&I strategy, both within the frame of the Research and Innovation directorate of the European Commission (DG RTD) as well as the Joint Programming Initiatives (JPIs). In addition it takes into account some important lessons learned in relation to (international) alignment of R&I policies and programmes, as well as recent publications on food systems transformation, within the context of Fit4Food2030, the Strategic Working Group on Food systems of the Standing Committee of Agricultural research (SCAR SW FS) and the Healthy Planet directorate of DG RTD (C2 Unit).





2. International alignment and innovation of R&I policies

The following section provides background information, based on desk study as well as practical experiences. It looks at how to collaborate on the transnational and international level in relation to R&I policies, both in general and with specific emphasis on the particular needs in relation to the food systems domain.

2.1 R&I Policies & international collaboration

In general, when looking at R&I policies around the world, there are 3 trends when it comes to changes in the development and application of R&I policies:

- Research agendas that are anchored to the needs of society, to foster mission-oriented research
- The promotion of public-private partnerships – as a key mechanism for achieving linkages between economy of market/ innovation, research and higher education
- The system perspective, which means taking an interrelated set of topics and themes, and considering all the behaviours of this 'system' as a whole in the context of its environment (such as the food system, energy system, housing etc.). (OECD, 2020)

According to the OECD, it has proven to be a challenge for governments to embed the systems approach in their R&I policy. It requires that R&I policy makers understand the prerequisites and context in which policy innovations are being implemented, as well as knowing more about the organisations they fund in order to achieve effective funding mechanisms. In 2009 the Technopolis Group and the University of Manchester looked into the drivers of international collaboration in research. Besides the narrow, science focussed (intrinsic) drivers for international collaboration, in the broader view non-science policy objectives interact with the scientific objectives, and R&I (policy) can be seen as a means to an end. **The first question that should be answered before reaching out to the international community is *why* (with what objectives) to engage with other countries about R&I and Food Systems transformation.** Technopolis looked into the main driver for international collaboration the four drivers they found were (Boekholt, Edler, Cunningham, & Flanagan, 2009):

- Improving national competitiveness
- Supporting less developed countries by developing Science Technology and Innovation capabilities
- Creating good and stable diplomatic relationships (science diplomacy)
- Tackling global societal challenges

In this document the focus is on international collaboration with the objective to tackle global societal challenges. However, the other three drivers should be kept in mind when implementing an international collaboration strategy and need to be addressed in communications with the international partners, since the other drivers will also be “present”, both from the EC perspective as for the other parties at the table. For other countries the other drivers, such as improving the quality of certain scientific fields or attracting certain skills towards their country, might be even more important to participate in the collaboration. This could influence the direction and expectations of the collaboration.





2.2 The scope of the international collaboration

Besides the question on the drivers or objectives of international collaboration, the scope of the collaboration is key. In the Food2030 policy framework two major needs of innovation/transition are mentioned: 1) to adopt a food systems approach in R&I to support the transition towards future-proof food systems, and 2) the need to overcome barriers within the R&I system that hinder or limit the impact of R&I investments on food systems transformation.

To adopt a food systems approach

In its 4th and final policy brief the FIT4FOOD2030 EU Think Tank (2020) offers four key lessons for R&I funding systems to increase their impact on food systems transformation. The first key lesson was **“inclusion of systems thinking and transformation on the R&I agenda – in short: If R&I is to contribute to FOOD 2030 ambitions effectively, it is important to ensure that the relevant FOOD 2030 R&I topics are on the relevant R&I agendas”**. The Think Tank also underlined the importance to make the connection to the higher political level beyond the R&I scene on a regular basis. The Policy Brief of the Standing Committee on Agricultural Research, Strategic Working Group on Food Systems (SCAR SWG FS) states that a “food systems approach can be applied at various scales” (Halberg & Westhoek, 2019). This does not only refer to the geographical scale, but also to the perspective on the food systems issues – which can be taken more integrated as well as more thematic. However, a food systems approach always requires interdisciplinary or transdisciplinary research and multi-actor collaboration, according to the SCAR SWG FS. When defining possible strategies or pathways towards international collaboration, this could also be realised at various levels – namely more thematic levels or integrated levels. The advice from SCAR is to focus on both and to allow thematic food R&I programmes to be specific and tailored. An interconnection should be made between these various thematic programmes, which includes learning from the strengths of the different domains.

The broadness of the food systems R&I area is even more challenging when it comes to international collaboration. In early 2020, the EC published its 10 Pathways of Action for which R&I should deliver concrete impact towards food systems transformation. The pathway areas are: Governance and systems change; Urban food systems transformation; Food from the oceans and fresh water resources; Alternative proteins and dietary shift; Halving food waste; The Microbiome World; Healthy, sustainable and personalised and nutrition; Food safety systems of the future; Food systems Africa and Food systems and Data (European Commission Directorate-General for Research and Innovation, 2020). In light of international collaboration one could look towards multiple ways to ensure that international collaboration is on the right R&I agenda's. The focus could be on setting up one international collaborative forum, with for example dedicated working groups on each of the Pathways, but could for example also look into existing international collaborative activities for the defined Pathways and work towards including the ‘interconnectivity’ or ‘systems’ perspective.

Innovating the R&I system

Current research and innovation systems are often dealing with multiple problems that make it difficult for R&I to achieve maximum impact on societal challenges and to embed a systems perspective:

- There is a fragmentation into disciplines, and little financial or systemic support for interdisciplinary or transdisciplinary research
- Research programmes, funding agencies or departments that target societal challenges tend to be poorly connected to each other or to those that are focused on public-private collaboration





or fundamental research – which often have different underlying missions or goals. So there is a lack of policy coherence and head to tail research programming.

- There is often a lack of a good policy-science and science-practice interface in the way research is programmed, funded, carried out and implemented.
- R&I actors often lack the competencies that are needed to programme, fund, carry out and implement research in a different, more effective way, fitting with a systems approach.

In order for R&I to have more impact on the transition of food systems, R&I systems need to be innovated. The international collaboration could focus on the key lessons for R&I funding systems that follow out of the FIT4FOOD2030 project according to the FIT4FOOD2030 EU Think Tank in their 4th Policy Brief (Fit4Food2030 Think Tank, 2020). The first of these key lessons was already discussed above in the context of adopting the food systems approach. The other three key lessons focus on innovation in R&I systems:

- ***inclusion of a Responsible Research and Innovation approach*** - in short to move from science in society to science *for* society and *with* society, to support innovation by tailoring innovation to the needs and values of the public.
- ***R&I funding institutions acting as ‘innovation brokers’*** – in short to align funding and innovation in the role a funder could and should play, towards an innovation broker. This implies moving from the more traditional role of a funder as a conduit for R&I budget, to a system in which a funder has a more active role in programming, signalling developments, connecting areas and projects, and implementation.
- ***to create an environment to grow innovations*** – in short to support growth of a small initiative that could be an incubator for new ways of current practises, to provide practical ways and learnings on changing the status quo and inspire people that change (albeit on small scale) is feasible

These lessons are key to also discuss at the international level in order to increase the impact of R&I investments on food systems transformation. When defining the purpose and scope of international collaborations, which might very well happen in different formats and fora, it is important to take into account how and to which extent the lessons above can be taken into account when shaping and implementing the international collaboration.

2.3 Tools for international alignment and innovation

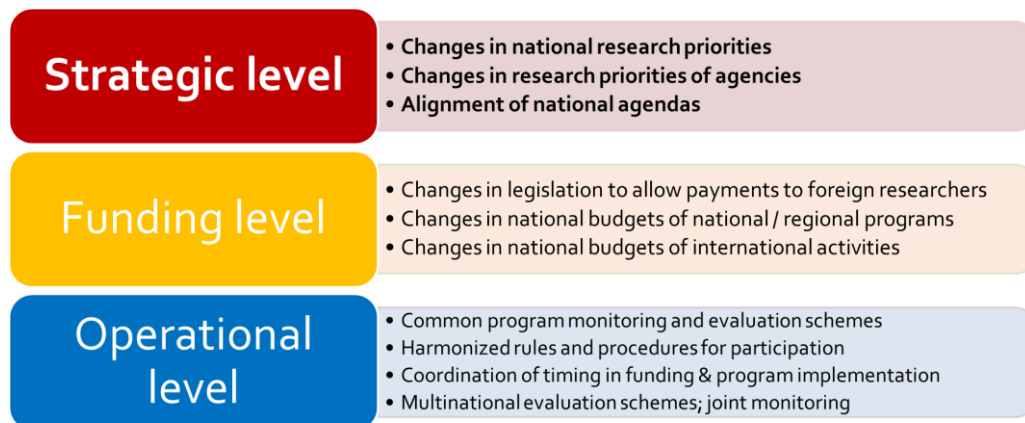
When the objective and scope for international collaborations are set, the collaboration still needs to be made more concrete.

R&I Policy Alignment

In order to increase international collaboration, R&I policy alignment could be seen as the main tool to increase the impact on food systems transformation from the perspective of the EC and Member States. Alignment of R&I policies is the core business of Joint Programming Initiatives (JPIs) and to some extent also of the ERA-NET Cofund instrument. ERA-LEARN (ERA-LEARN 2020, 2015) has defined three R&I policy alignment levels shown in the figure below, which could also be used with a view to international collaboration (Fig 1).



Figure 1. Alignment levels (ERA-LEARN 2020, 2015).



If the goal is to create alignment and synergy in R&I policies and programming on the international level, then in the end activities targeting all three levels (strategic, funding and operational level) are key. Where the strategic level is focused very much on agreement of priorities/topics that should be addressed, the funding and the operational level also have to do with harmonization of framework conditions of the national R&I systems such as monitoring and evaluation schemes, funding rules and procedures. The strategic level would focus for example on ensuring that food systems transformation is high on the R&I agenda throughout the world. The operational level is important as well. For example, alignment in timing of dedicated calls for proposals would be a very practical measure on the operational level that would allow researchers to create interlinkages between their projects – even without having a transnational call for proposal. The funding level itself could make top-up funding possible to allow for connections with projects running in other countries, as well as for additional joint activities.

Tools for international alignment and innovation

ERA-LEARN published concrete actions that could increase alignment – these actions such as mapping of synergies, joint foresight activities and joint decisions on policy areas are shown in figure 2. Although these actions are suggested from the JPI/ERA-NET perspective which have the main focus on collaboration within Europe, to a certain extent these type of actions could also be instrumental for global collaboration around food systems. One could think about how to implement ‘societal relevance’ and the broader Responsible Research and Innovation concept into defining and scoping the actions and dialogue at the funding and operational level.

Figure 2. Alignment levels and enabling actions (ERA-LEARN 2020, 2015)

Levels/approaches	Possible enabling / confirming actions (alignment criteria)
Strategic level	Mapping of synergies, complementarities and gaps between programmes; joint foresight activities; Consensus building meetings; Joint decisions on priority areas; procedure of considering SRIAs in national programming cycles;
Funding level	Ability to fund foreigners / foreign institutions located abroad; Implementation of real common pot; harmonised timing and rules of funding;
Operational level	Common/harmonised rules for project reporting, monitoring and evaluation; common/harmonised rules and timing of participation;



Looking at the wider experience of Horizon Europe and the JPIs, examples of other instruments used to work towards more collaboration or alignment on the various levels of R&I policies and programming are:

- Science workshops, bringing together scientific experts from the participating countries from various disciplines around a certain topic or goal such as standardisation on methodologies or consensus on the state of the art
- Personnel exchange, which could be both on the scientific and the funders level (for example the Dutch funding agency on health research and innovation had an exchange with the Canadian Institute on Health Research to learn more about their approach on gender throughout the funding process)
- Science networks such as the joint programming's instrument “knowledge hub” and the EC funding programme [COST](#)
- Twinned science projects connecting scientific projects funded in different countries for example via top-up funding
- Joint funding activities, of which there are many examples available, for instance in the field of the joint programming initiatives and the Belmont Forum (see next section)

This menu of tools can be seen as building blocks to further shape the international collaboration and to move from a ideals and visions towards more concrete activities and products.

R&I Policy labs: Food systems transformation *and* R&I policy innovation?

In the context of Food 2030 there has been experimented at the EU member state and regional level with an approach to maximise the impact of Research and Innovation on future-proofing food systems – the Policy Lab instrument. A policy (innovation) lab for transformative change is:

- created to **tackle complex public/social problems** that more traditional governmental structures or instruments are not managing to resolve
- set up as **participatory and experimental space** in which **stakeholders work together to develop and test novel policy approaches (co-creation)**
- directly connected to the **public (policy) sector**
- usually focused on **long term commitment** and provides an **open-ended design** without **predefined goals** or **fixed time lines**.

Within the FIT4FOOD2030 project the policy labs were R&I policy labs, that work at a national or sometimes regional level, to increase the impact of R&I on making food systems future proof.¹ The policy labs had to build a network of diverse stakeholders, including unusual suspects that are not normally involved in policy discussions. Together these stakeholders analysed the current food systems and the related R&I landscape in their country or region, defined barriers, opportunities and knowledge gaps and worked towards making the R&I landscape more coherent, innovative and fit for purpose. Central aspects were a holistic approach and Responsible Research and Innovation.

The policy labs have shown great impacts – besides concrete outputs like novel funding tools, input on R&I or thematic policy documents and specific funding activities, also more intangible impacts such as agenda setting, broader awareness and understanding of the food systems approach and increased

¹ The nine countries and two regions participating in Fit4Food2030 with a policy lab were: Austria, Basque Country (Spain), Estonia, Flanders (Belgium), Hungary, Ireland, Italy, Lithuania, the Netherlands, Norway, Romania





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collaborations between food systems actors. These are all important aspects of achieving the innovations needed in the R&I landscape to deliver towards food systems transformation. Of course there were also learnings and points for improvement that came out of the policy labs. An example is the difficulty to maintain political support at the higher level and barriers to achieve involvement of all relevant policy areas. The R&I landscape varied a lot between the countries and regions, which was one of the reasons why the ways in which the policy labs developed were all unique, offering a rich diversity. Based on the FIT4FOOD2030 experiences with the policy lab instrument in Europe, this could be an interesting and effective tool to further develop in order to stimulate policy coherence and innovation in R&I.

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3. Examples of EC R&I collaboration with national and philanthropic funders around the globe

This section describes examples of international collaboration between countries on R&I programming and funding, some including active engagement or membership of the EC. The first set of examples are those which include an active role of the EC and have a direct link with the food system, the second set of examples also include an active role of the EC but are within the health domain, which shares some interesting commonalities with the food domain. The last set of examples do not have an active role of the EC, though with a relevant connection to the food systems transformation topic. This set of examples also includes a couple of initiatives that are a bit outside the R&I funding and programme scene, though could be important to take into account when building the international collaboration strategy of food2030. The section ends with a brief analysis/ summary of the relevance for Food 2030, including some of the lessons that can be drawn from the initiatives in this section.

3.1 Relevant ongoing international collaborations

Within the food systems domain there are two collaborations of particular interest, namely the Belmont Forum and the International Bioeconomy Forum. The latter has been established by the European Commission whereas the Belmont Forum has been established as an initiative of multiple national funders around the globe.

Belmont Forum

The Belmont Forum is a partnership of funding organisations, international science councils and regional consortia committed to the advancement of transdisciplinary science (Belmont Forum, 2020). The Belmont Forum has its roots in the International Group of Funding Agencies for Global Change Research (IGFA) that was established in 1990 and of which the Belmont Forum became the Council of Principals for the IGFA. The IGFA and the Belmont Forum merged in 2014. The European Commission is listed as a member of the Belmont Forum and one of the two co-chairs is Kurth Vandenberghe (Director for Policy development and coordination at DG RTD). The EC states that the “The transnational research initiatives that are being promoted by the Belmont Forum are developed in synergy with Horizon 2020 and with Innovation projects developed by EU Members States and “The Research and Innovation Directorate General's involvement in the Belmont Forum witnesses the European Commission's conviction that addressing the ever further increasing needs resulting from the global change challenges has to be supported by an open, transdisciplinary and results-oriented international scientific cooperation.” (European Commission, 2009). EU funded partnership tools, such as ERA-NET Cofunds, play an important role in the implementation of the Collaborative Research Actions (CRAs) of the Belmont Forum.

International Bioeconomy Forum

The [International Bioeconomy Forum](#) (IBF) was initiated by the EC (2016) and looks for collaboration between the EC (and EU members states) and countries outside Europe with a (strong) Bioeconomy Strategy. The aim of the IBF is to provide **a flexible multilateral instrument for international cooperation, specific to the bioeconomy**, capable of adapting to emerging global needs and to contribute to the achievement of global objectives. The IBF members are Argentina, Canada, China,





European Commission, India, New Zealand, South Africa and the USA. The observers are Australia, South Korea and the following international organisations/ collaborations: UN Food and Agricultural Organization, Standing Committee of Agricultural Research (this connects the International Bioeconomy Forum with the EU member states), The Central-Eastern European Initiative for Knowledge-based Agriculture, Aquaculture and Forestry in the Bioeconomy (BIOEAST)² and the Inter-American Institute for Cooperation on Agriculture³). If three members of the forum are interested in exploring a topic a working group is established. The link with the EU countries in the International Bioeconomy Forum is made via the Standing Committee on Agricultural Research. Currently there are four working groups:

- Plant Health
- ICT in precession Food Systems
- Forest Bioeconomy
- Microbiome

The Microbiome working group is initiated by the EC, DG RTD, and amongst others a CSA (Microbiome Support) has been funded to support or provide input to this working group. The CSA The international bioeconomy forum is relatively new and the report of 2019 meeting showed that the forum is looking towards establishing and increasing higher political support. One of the ways this should be established is through more presence at the higher political level. Recently (November 2020) the International Bioeconomy Forum has been cited at the Global BIOECONOMY SUMMIT – a summit with participation on the higher political level. A survey amongst the IBG members about the key risk and challenges to implement the roadmaps designed by the working group showed that key risk were available resources as well as lack of clarity/ direction. The tools/ solutions to success that were mentioned were targeted outcomes, clear communication/ direction (International Bioeconomy Forum, 2019).

3.2 Other inspiring examples of collaboration between countries & EC around research programming and funding

DG RTD has also international collaborations around alignment of R&I policies and programmes outside the domain of the food systems. This section lists examples of such collaborations in the Health domain. This domain is chosen since the health domain is a domain that has substantial R&I funding at the level of national and private funding, but also a broadness of knowledge needs and societal challenges resulting in a need for international collaboration, since the resources at the national level fall short to answer the knowledge questions in the timeframe required by policy and society. In this way the domain is relevant and to some extent comparable to the food systems domain.

The International Cancer Genome Consortium

The **International Cancer Genome Consortium** (ICGC) was launched in 2008 with the aim to coordinate large-scale cancer genome studies. It is a voluntary scientific organization that provides a forum for collaboration among the world's leading cancer and genomic researchers. The membership is open to all entities that agree to follow its principles and guidelines and includes public and private funding organisations and research institutes of Asia, Australia, Europe and North America. The European Commission is also part of the [executive committee](#) and [earmarked in 2010 €21 million euro](#) of the FP7 for 2 research projects as part of a research effort coordinated by ICGS. The Consortium is

² a shared strategic research and innovation framework for working towards sustainable bioeconomies in the Central and Eastern European (CEE) countries

³ The Inter-American Institute for Cooperation on Agriculture (IICA) is the specialized agency for agriculture of the Inter-American System that supports the efforts of Member States (Northern, Central and South America's) to achieve agricultural development and rural well-being.





funded by participating countries which work on the basis of smart specialisation, meaning that they focus on one or more types of cancer. The consortium as a whole covers at least 50 types of cancer. The ICGC states that it “solved numerous data governance, ethical, and logistical challenges to make global genomic data sharing for cancer possible, providing the international community with comprehensive genomic data for many cancer types. The second ICGC initiative, the Pan Cancer Analysis of Whole Genomes (**PCAWG**), defines similarities and differences between cancer types. Based on this information, The ICGC for **Medicine Initiative (ICGCmed)** resolved the future strategy for the ICGC in a “White Paper”, laying the foundation for the current ICGC Initiative **ICGC-ARGO (Accelerating Research in Genomic Oncology)**, where key clinical questions and patient clinical data drive the interrogation of cancer genomes” (RIKEN Center for Integrative Medical Sciences, 2007).

International Rare Diseases Research Consortium

The [International Rare Diseases Research Consortium](#) (IRDiRC) was launched in 2011 with the European Commission and the US national institutes of health (NIH) as the initiating institutions. IRDiRC has the aim to increase international collaboration in the area of rare diseases. Its mission is to develop 200 new therapies and to be able to diagnose most rare diseases by 2020. This goal on therapies was reached in 2017 and a new set of goals was set, among others to work towards 1000 new therapies. The consortium consists of ca. 50 funding organisations (or groups of) that invest more than 10 million dollar (USD) over a period of 5 years and umbrella patient advocacy organisations that cover all rare disease on a national level or beyond, from ca. 20 countries. Its funding members mainly contribute through their own research efforts that adhere to the IRDiRC policies and guidelines and sometimes members collaborate to launch joint funding calls. The EC is represented by the Innovative and Personalised Medicine Unit of DG RTD.

Global Alliance of Chronic Diseases

The [Global Alliance for Chronic Disease](#) was established in 2009 with the aim to support a global collaboration on research to address chronic non communicable diseases. The multi-country, multi-disciplinary research focuses in particular on the needs of low- and middle-income countries (LMICs), where 80% of deaths from chronic diseases occur. Another focus is on research with vulnerable populations of more developed countries. It brings together national and international member agencies representing more than 80 percent of all public research funding in the world. The members are publicly funded agencies whose primary objective is to fund health research and whose mission includes the funding of research on chronic, non-communicable diseases. Members of the GACD participate in funding implementation research as part of joint GACD research programmes. 6 joint calls have been launched next to collaborative activities such as capacity building activities on Implementation Research. The European Commission is a member and has a board position, and is represented by the Head of Unit of the unit within the Health Directorate of DG RTD responsible for Non-communicable diseases and the challenge of healthy ageing.

3.3 Inspiring examples of international collaborations without the EC

At the level of national funders there are also initiatives for international collaboration. Some of these, like the Joint Programming Initiatives, focus on a societal challenge/theme whereas others focus on the performance/role of the funder in the research landscape or on the policy-science interface. A number of these initiatives could be of use in the international strategy of Food 2030 and, if available, relevant learnings are listed in this subsection.





Joint Programming Initiatives

Within the Joint Programming Initiatives international collaboration or international alignment has been one of the assessment criteria – although in the initiation phase international collaboration was not part of the framework conditions or missions of the JPIs. The impact assessment activities of ERA-LEARN on the international cooperation dimension show that the international dimension should be integrated in the overall strategic research agenda or programme rather than an addition or supplement.

The **Joint Programming Initiative on Antimicrobial Resistance** (JPI AMR) has been one of the few JPIs, if not only, that has acted at the highest political level – the importance for international collaboration has been mentioned at the first ever organised G8 meeting of science ministers (G8 Science Ministers, 2013). The JPI on Antimicrobial Resistance has been very successful in the inclusion of third countries within its governing board – including Canada, Egypt, India, South Africa and South Korea – most of these countries have been active in at least one joint funding action in the past 3 years. Most of these countries have also information on their national AMR (research)programmes listed on their website.

The **Joint Programming Initiative WATER** in particular has been very active in the organisation of workshops around international collaboration between all 10 JPIs, including facilitating the exchange with the USA and Brazil in collaboration with two Horizon2020 funded CSA that aimed to increase the collaboration between research programming and funding within Europe (EC and national level) and the USA, BILAT2.0, and Brazil, COBRA. The JPI Water expects to publish its international collaboration strategy end of 2020, early 2021 (Water JPI, 2020).

The **Joint Programming Initiative A Healthy Diet for a Healthy Life** (JPI HDHL) has been one of the first JPIs to establish an international collaboration strategy to be implemented in close collaboration with its two third country members, Canada and New Zealand, and through the Latin American connections of its Spanish CSA partner The Carlos III Health Institute (JPI HDHL, 2016). As part of the strategy a survey and desk study were conducted on countries in the ASIA-PASIFIC region on relevant R&I policies and programmes in relation to JPI HDHL. Based on the results a selection of countries have been made to approach about the JPI and with these countries a visiting programme has been made including bilateral meetings with key funders and ministries as well as leading scientist and an overarching workshop with various key actors of the country and the JPI HDHL. In this way JPI HDHL has interacted with Australia, Brazil, Singapore, New Zealand and the USA. The meetings with the USA were on an invite from the USA, following an earlier interaction in Brussels at a workshop organised by JPI water and Bilat 2.0, rather than the other way around. The mid-term reflection and evaluation of JPI HDHLs international collaboration plan identified the following learnings:

- Building a relationship with countries outside the EU takes significant time and requires frequent exchanges. With the USA (mainly USDA) for example, 4 to 5 meetings and several conference calls were required to move towards some first small collaborative activities.
- The desk-study in combination with questionnaires and preparation with a key-contact person in the selected country in advance of an actual visit does provide some insights in the situation of the funding landscape and interest in the domain of JPI HDHL, however:
 - Like in European countries, the funding landscape in the area of food, nutrition and health overseas is also fragmented. During the visit it often turns out that certain organisations that could be relevant had not been identified in the preparation phase, resulting in a missed opportunity to meet with them while the JPI HDHL delegation is in the country.





- It has been difficult to ensure that people from the decision making level on future collaboration are present during the face-to-face meetings, among other things because the concept of the JPI and possible ways of collaboration are very new and difficult to understand from exchange via email or phone before the visit.
- It has been difficult to get a good impression of the actual interest to collaborate with JPI HDHL.

Taking into account the considerations above and the amount of resources available, it has been decided by JPI HDHL that it would be more effective to work through existing multinational collaborations of research funders that are closely connected to the domain of JPI HDHL (such as the Global Alliance of Chronic Diseases and the E-ASIA JPR), and to use the network of the MB and SAB, to present about JPI HDHL and its interest in possible collaboration. This next to connecting with the countries that JPI HDHL already invested in. Due to the COVID-19 pandemic, the international outreach of JPI HDHL has been put on hold.

The **Joint Programming Initiative on Agriculture and Climate Change** (FACCE JPI) has also published a [European and International Collaboration strategy in 2016](#). In this strategy collaboration with international initiatives and individual countries are elaborated on. The strategy of FACCE JPI is to cooperate at an institutional level more systematically with a few international institutions and to focus on those which are highly visible politically, namely FAO, FACS and the Committee on World Food Security. Such cooperation could improve the visibility and impact of FACCE JPI internationally. On the individual country level FACCE JPI has experience in joint funding activities with countries outside Europe, by organising calls with international initiatives of which those countries are a member namely Belmont Forum and the Global Research Alliance on Greenhouse Gas (GRA). Since end of 2015 FACCE JPI allows *third countries*⁴ to become associated members, meaning that they are allowed to participate in all joint actions. New Zealand has become an associated member since then. As barriers for collaboration with third countries FACCE amongst others stated 'differing expectation and research needs, lack of mechanism to finance joint actions especially in relation to emerging countries, different funding and implementation mechanisms that makes alignment of research programme difficult and intellectual property right issues that need to be addressed. Experienced benefits are amongst other the increase in critical mass of R&I investments, greater cost-efficiencies by leveraging joint research, access to new knowledge and expertise and additional research infrastructures and possible harmonisation of methodologies and research protocols. In its recent self-evaluation report the FACCE member countries underline the importance of collaborating with international organisations and third countries and the need for a more intensive and targeted approach of FACCE towards such organisations (FACCE JPI, 2020). The **Joint Programming Initiative on Productive and Healthy Oceans** has chosen to cover all European sea basins and therefore has a limited international outreach related to third countries.

E-ASIA Joint Research Programme

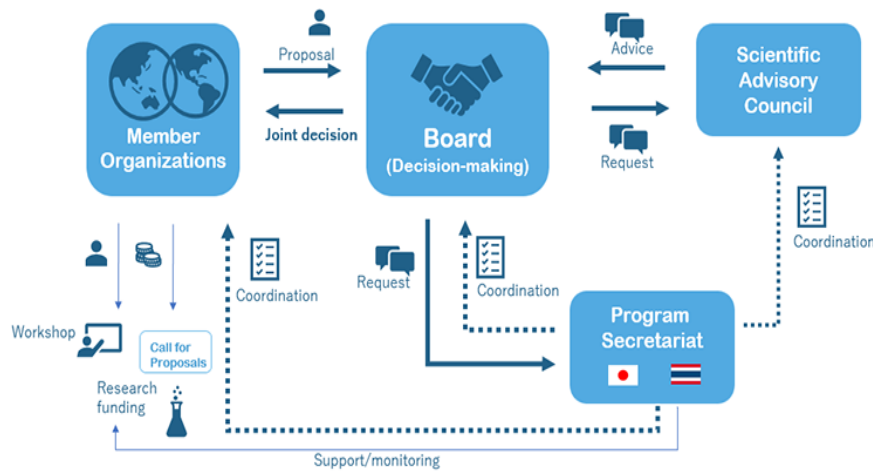
The East Asia Science and Innovation Area Joint Research Programme (E-ASIA JRP) is a multilateral international joint initiative between public funding organisations of the East Asia Summit member countries (Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Singapore, the Philippines, Thailand and Vietnam) and 8 additional countries (Australia, Japan, New Zealand, China, India, South Korea, Russia and the USA). The E-ASIA JRP formulates and implements international joint research and also

⁴ All other countries that are not part of the EU or associated to the EUH2020 Framework Programme



performs additional activities such as workshops. The secretariat is based in Thailand and jointly run with Japan. New organizations are elected to E-ASIA JRP membership at program board meetings. Organizations eligible for membership of the Program include ministries, agencies and other public and governmental bodies which provide research funding in EAS participating countries. Program membership is free and participating in program activities is voluntary. Several fields of possible collaboration have been identified including agriculture/ food, health research and advanced interdisciplinary research towards innovation. Figure 3 provides an overview of the governance and operational aspects of E-ASIA JRP.

Figure 3 E-ASIA governance and operation aspects



The Global Research Council

The [Global Research Council](#) is a virtual organisation, comprised of the heads of science and engineering funding agencies from around the world, dedicated to promote the sharing of data and best practices for high-quality collaboration among funding agencies worldwide. The GRC meets once a year. In 2019 the GRC published a Statement of Principles on Addressing Expectation of Societal and Economic Impact (Global Research Council, 2019). It states among other things that “GRC participants agree that there is a need to address these increased expectations of societal and economic impact. Doing so can raise awareness for and maximise the contribution of research to society and the economy and thereby strengthen the case for GRC participants to justify the use of public funds for research.” About their own role they state that “GRC participants agree that, in the assessment of research impact, they should not only focus on the impact of singular research investments, but also look at the impact of their broad portfolio of investments”. And “Encouraging the acquisition of diverse skill sets and outreach activities GRC participants should encourage the acquisition by researchers of transferable skills such as leadership, entrepreneurship, languages, communication, management and mentorship, and recognise the value of these skills. Incentives for outreach activities (dissemination, public engagement, knowledge exchange) and engagement with the public and private stakeholders should be put in place”.

The Ensuring Value in Research Funders’ Collaboration and Development Forum (EViR)

The [EViR](#) forum has a different perspective than the international collaborations described above, since its focus is on improving/innovating the mechanisms and tools of the funder rather than that they collaborate on a research theme. All funders involved are active in the area of health, however. The



forum was initiated in 2017 by the Patient-Centered Outcomes Research Institute (PCORI) in the USA, the National Institute for Health Research (NIHR) in the UK and the Netherlands Organisation for Health Research and Development (ZonMw). The funders collaborate from the perspective that they have a responsibility to not only advance knowledge, but to advance the practises of health-related research and research funding in order to increase their impact on the societal challenges. The forum shares and develops new approaches to increase the value of health-related research. The (Health) Funders Forum has developed a consensus statement and guiding principles for good funding practices. Most of the public and private funders are based in EU MS, however there are also links with funders in Australia, Canada and the USA as well as foundations such as the Wellcome Trust. Furthermore, the ESSENCE on Health Research initiative of the WHO is an associated member.

[International Network for Government Science Advice \(INGSA\)](#)

The [INGSA](#) is a collaborative platform for policy exchange, capacity building and research across diverse science advisory organisations and national systems. The network aims to enhance the global science-policy interface and improve the use of evidence-based policy information at both national and transnational levels. It is a non-governmental organisation with 5000 members from 100 countries. The secretariat is based in Auckland and INGSA works with regions (Europe, Northern Americas, Latin America's, Asia and Africa). The mission of the INGSA is: “to provide a forum for policy makers, practitioners, national academies, and academics to share experience, build capacity and develop theoretical and practical approaches to the use of scientific evidence in informing policy at all levels of government. Although its primary focus is on the place of science in public policy formation rather than advice on the structure and governance of public science and innovation systems, the international network is of interest in light of connecting with the higher political level. INGSA collaborates with other organisation when there is a common interest, organises conferences, and workshops, amongst others on the topic of capacity building. The European Commission is mentioned as a workshop partner on INGSA's website and INGSA is amongst others involved in the discussion around and shaping of the structure of scientific policy advice in the EC.

[International Food Safety Authorities Network \(INFOSAN\)](#)

[INFOSAN](#) is a global network of 186 national food safety authorities. The network is managed jointly by the WHO and FAO. Besides the assistance in the 'core' business of the food safety authorities e.g. managing food safety risk, rapid sharing of information in case of food safety emergencies, the network facilitates sharing experiences and testing solutions in and between countries to optimize future interventions. Although the core activity of the network is not on collaboration in R&I policy, this network could be an important player in the policy-science interface in relation to the Roadmap to action on Food Safety.

[Milan Urban Food Policy Pact](#)

The [Milan Urban Food Policy Pact](#) was signed in October 2015 by more than 100 cities and presented to the UN SG Ban Ki-moon at the World Food Day Celebration. Currently it is signed by 210 cities around the world. The network of cities committed to develop and implement sustainable food systems and to support the exchange of ideas and experience on how to address common problems – some of the cities already developed their own food policies and others are working on these. The MUFPP secretariat in Milan has developed jointly with the FAO a monitoring framework to provide inside in the progress of the cities that signed the pact. Although the focus of the pact is not on science, knowledge sharing and policy coherence at all geographical levels are important components of the Pact and its Action Plan.



3.4 Connection with Food 2030

The previous paragraphs show a variety of collaborations between countries around the globe on R&I programming and funding, although the way transnational or international collaborations are shaped and function (e.g. International Bioeconomy Forum, E-ASIA JRP, Belmont Forum and JPIs) looks more or less similar. The building of these networks takes time and due to the international aspect frequent meetings are more challenging – which makes the timelines towards effective collaborations long (years, e.g. IBF and JPI HDHL). It is hard to grasp the full extent of these initiatives based on a brief desk study, but a couple of barriers and ingredients towards success seem to come back more than once. The barriers for international collaboration are linked towards the resources needed (to participate as well as to find the allies), clarity on the concrete benefits of the network (showcases, clear goals) and to keep engagement high while progress is relatively slow. High political commitment (e.g. JPI AMR and Belmont Forum) or acknowledgement from the higher political level seem to be an ingredient for success, as are linkages towards existing collaboration structures (e.g. FACCE JPI and JPI HDHL) and/or collaborative actions (mission JPIs USA) from the EU towards the other funders in the world.

Looking at the existing initiatives in which the EC is involved as strategic partner, the food systems as such are not the core theme or topic – although some of the chosen subthemes touch upon a few of the 10 Pathways of Impact (e.g. Microbiome, Food Systems Africa). Taking a broader look, some of the other topics are very well covered in joint programming initiatives, which do represent a transnational collaboration and have made a start, albeit limited, towards international outreach (e.g. alternative proteins and dietary shift, healthy, safe and sustainable nutrition). Table 1 shows a first inventory of the Pathways to Action and relevant transnational and/or international initiatives that cover a substantial part of the thematic area of the pathways.

Table 1: the relevant existing trans- and international collaborations for the respective Pathways to Action

Pathway to Action	Transnational or international collaboration
Urban food systems transformation	Milan Urban Food Policy Pact
Food from the oceans and fresh water resources	JPI Oceans
Alternative proteins and dietary shift	JPI HDHL
Halving food waste	SUSFOOD □ Food systems Partnership
The microbiome world	International Bioeconomy Forum Working Group
Healthy, sustainable and personalised nutrition	JPI HDHL/ Global Alliance of Chronic Diseases
Food Safety Systems of the future	International Food Safety Authorities Network (not R&I focus)
<i>Food Systems Africa</i>	<i>Out of scope for present paper</i>
Food Systems and Data	FACCE JPI, JPI OCEANS, JPI HDHL

In relation to the role of the funder when innovating/ improving the R&I system, there are some existing initiatives and platforms where these are discussed. These are often at the strategic level of the funder however, rather than in a specific domain of a societal challenge – such as the global research council and EviR. With a view to linking towards the higher political level – besides the familiar UN related institutions (FAO, WHO, OECD) which are not part of this paper -, the INGSA could be an interesting player, that advertises itself as an expert in improving the policy-science interface.



4. The walk of the talk – Possible roads towards increased international collaboration

Considering the identified existing collaborations, the R&I food systems context and both the theory and practice based experiences around international collaboration on R&I policies and programmes, this section presents some possible roads towards increased collaboration and a summary of lessons and considerations from the various examples and studies described in this document, which should be taken into account when travelling (one of) these roads.

4.1 Three roads towards international collaboration

The following section describes three roads towards an increased international collaboration on food systems transformation with the aim to globally increase the impact of R&I investments. The first road focussed on building a brand new collaboration, the second on expanding existing collaborations which would especially be focussed on the Pathways to action and the third road would be to focus the international collaboration on the R&I systems innovation rather than the (scientific) content and programming – in such an approach the Policy Lab instrument could be a tool to shape such a collaboration into concrete and meaningful activities.

Starting new collaborations

One key question that would be important to keep in mind when defining the international collaboration strategy is with *whom* the EC would prefer to start the international collaboration. The choice could be to look towards a few countries who have more or less the same view on food systems transformation, have already made a start with programming or agenda setting and have an appetite to collaborate. Another approach is to start as big as possible and also try to get on board those countries that have some interest but a less clear link with existing policies and programming. It would be beneficial to gain a better view on the position of various countries around the globe to get a better impression of the current level of alignment. This could be done based on a desk study, questionnaires or interviews, like those conducted by JPI HDHL and FACCE JPI for their international strategies.

Expanding on existing collaborations

When looking at the various existing international collaborations, most of the 10 Pathways to Action are more or less covered or could be covered through existing initiatives that already bring together funders on the transnational and partly international level (table 1). It could be considered if the EC should have a more official role in these existing international initiatives in order to join forces to broaden their international scope, and/or broaden the thematic scope towards the interlinkages of the system perspective. In this process there most likely will be Pathways that do not find a good fit with the EC and existing initiative and these themes could possibly be added as a working group of the International Bioeconomy Forum.

To broaden the participation of non-EU countries in existing transnational initiatives, networks such as the Belmont Forum and E-ASIA JPR could be approached. Furthermore, one could map the countries and organizations that are (very) active in transnational initiatives, and through questionnaires and desk study analyse the importance of the various Food 2030 Pathways to Action for them. Then a mission to these countries could be prepared (e.g. targeted workshops) to connect them to one or more of the transnational collaborations.

An International Food Systems Platform – including R&I innovation

Following the recommendations from both the SCAR WG FS as well as the FIT4FOOD2030 Think Tank, an international collaboration on R&I policies and programming should target various levels of the food





systems. It should also target the impact of R&I investments by innovating the way research funding is organized, rather than only to focus on what topics are on the agenda. It would be beneficial if there was one international platform that would be the umbrella; that would look into the food systems focus and interlinkages of the thematic areas. Such a platform should ensure recognition at the higher political level of the importance of food systems transformation and the contribution of R&I towards such a transformation. It could be explored if there is an interest to broaden the International Bioeconomy Forum towards an International Bioeconomy and Food Systems Forum. It needs to be emphasized that this should go beyond a single food systems working group under the International Bioeconomy Forum umbrella. Such a single group would not be able to both take into account the targeted thematic areas (the Pathways to actions) as well as an overarching view on these thematic areas that amongst others looks into the interconnectiveness – like e.g the SCAR WG FS advised (2020). – since following among others the SCAR WG FS recommendation. The working groups would be more on the level of the thematic areas rather than the overarching view, though also multiple working groups would be needed whereas the forum currently ‘only’ includes 5 working groups of which only one of direct relevance for the food system. Another angle would be to look into the Belmont Forum. The platform would focus on the strategic alignment and agenda setting and should link with thematic international collaborations for the more targeted agendas. Besides these tasks the R&I innovation should be on the agenda of such a platform as well. For expertise on and approaches to R&I innovation one could look into the EviR network. To reach a broader group of funders the Global Research Network could be of interest. A close collaboration with INGSA could support the strategies and actions towards ensuring presence at and acknowledgement on the higher political level in the most effective way.

Food Systems Partnership and R&I Policy Labs

A possible way to work towards more concrete activities and experiments regarding R&I innovation would be the use of the R&I policy lab instrument. This could be presented as a possible tool towards food systems transformation. FIT4FOOD2030 has delivered a [webinar](#), [handbook](#) and presentation at the FIT4FOOD2030 final conference which can be used to implement the policy lab approach. However, to encourage multiple countries around the globe to simultaneously use the tool at a more or less similar speed, it could be considered to implement such a tool as part of the Food systems Partnership. It would be an important point of attention to ensure that the exchange and experiences would be shared at the level of the Platform, to allow enough political attention and to centralize the experiences and knowledge sharing at the centre of the International Food Systems Transformation. Albeit each country would use a personalized roadmap for the policy lab to take into account the national R&I and food systems context, learnings can still take place and could be of great added value.

4.2 Lessons and considerations

Finally, a summary of lessons learned from transnational initiatives that worked towards broadening their network beyond Europe, and those that studied these type of collaborations.

- High political recognition is a key towards a broad international network
- International collaboration should be embedded in an initiative or funding instrument rather than as an add on activity.
- The R&I landscape and the division of R&I resources between regional, country and EC level is difficult to grasp by third countries and cannot be considered as common knowledge.
- The other way around – the R&I landscapes in third countries are as complex and diverse as within the various EU countries – it takes time to grasp the complexity of another R&I landscape and its underlying rationale, strengths and weaknesses.
- International collaboration is time consuming and has long timelines, thus the resources need to be fit for the purpose.
- Due to the large number of existing international collaborations, one should consider to build on and connect with already existing networks.





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- Showcases of the added value to join the international network are important, as well as translation of the mission of an international collaboration into concrete activities (JPI HDHL)
- Keep in mind the drivers to collaborate on the international level – these go beyond the societal challenge.

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No774088



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