

food|paths

SUMMARY REPORT

'IMPLEMENTATION OF SYSTEMS APPROACH IN TRANSNATIONAL CALLS - COMPREHENSIVE ANALYSIS AND LESSONS LEARNED'.

FOODPATHS WP3

AUTHORS: Mine Silje Sanddal Lindemann (AU-ICROFS), Ivana Trkulja (AU-ICROFS), Merete Studnitz (AU-ICROFS), Emilie Gätje (FZJ), Frank Hensgen (FZJ), Nikola Hassan (FZJ)

CONTRIBUTORS: Valentina Amorese (Cariplo), Barbara Wieliczko (IRWIR PAN), Pawel Chmielinski (IRWIR PAN), Giulia Lombardi (Philea), Terhi Junkkari (SeAMK), Jamina van Driel (ZonMW), Bernadette Conrads (ZonMW), Larissa van der Bent (ZonMW), Hugo DeVries (INRAE)

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1. Summary

This report summarises an analysis of 21 calls, which includes calls from ERA-nets, HEU Partnerships, regional calls, HEU Framework Programme and Foundations. The analysis focused on how a food systems approach (FSA) can be implemented into future call mechanisms. Based on present analysis, it can be recommended to take the following into account when preparing calls within the HEU FutureFoodS Partnership:

1. Provide a definition of systems approach or a clear explanation of what is meant;
2. Be mindful and consistent with terminology, e.g. when using typical elements of a systems approach such as multi-/inter-/transdisciplinarity;
3. Cross-disciplinarity, stakeholder engagement, and multi-actor approach are highly demanded and also of great relevance for a systems approach call; think about where and how to ask for these aspects and consider the differences between the concepts;
4. When applying a systems approach it is important to consider both synergies and trade-offs;
5. Think about how impact shall be achieved by the projects, how the food systems approach contributes to impact and provides guidance and support towards applicants;
6. What additions to the proposals are sensible and what shall they contain (e.g. impact plan, Dissemination Exploitation and Communication plan, stakeholder engagement plan, implementation/valorisation plan etc.); adapt to the systems approach and consider also follow-up and adjustments over time (revisiting the plan);
7. Networking activities facilitated at programme level can be valuable to align and/or collaborate with other projects or programmes but they need to be backed up with dedicated resources (they might even be a necessity for co-design and co-creation);
8. Be open to new funding instruments beyond classical projects (e.g. knowledge hubs) to create mechanisms for fostering connectivity, co-creation and inclusiveness.

2. Introduction and aim of analysis

The FOODPathS WP3 follows the overall aim of “Building a Food System co-funding network and aligning funding strategies”. This implies thinking and working towards a transformation from established funding schemes and designs towards more co-creation based funding approaches respecting the needs of public authorities and researchers as well as providing the necessary room needed for stakeholder engagement and participation following the idea of a systems approach. The main target group of this WP are thus funders, both public and private, on regional and national scale and from different sectors of the food system.

The present 'Summary Report' is related to Task 3.3 “Aligning transnational call procedures and funding strategies in a systems approach” with FZJ as WP leader and AU-ICROFS as task leader with contribution from Cariplo, IRWIR PAN, Philea, FZJ, SeAMK, and ZonMw. These organisations constitute the working group of present analysis. The report is a first step aiming to document a larger research and analysis activity on integration of the food systems approach in the HEU Partnership call mechanism, with a particular view towards FutureFoodS. The final results of the analysis will be described in the deliverable (M30). Seven partners from seven countries were involved in the analysis and they represent networks of:

- Eastern European network (BIOEAST),
- ERA-Nets (CORE Organic and SUSFOOD2),
- Joint Programming Initiative a Healthy Diet for a Healthy Life (HDHL),
- Philanthropic organisations (Cariplo foundation and Philea),
- Regional actors (ERIAFF network of regions).

3. Methodology

In order to develop recommendations on how to implement a food systems approach in future calls, this analysis was conducted looking at good examples and lessons learned from European Joint Programming with established transnational calls in ERA-NETs, JPIs and other types of funding mechanisms. Thereby, the knowledge and information produced over two decades of implementation of transnational Research and Innovation (R&I) calls supported the WP3 team in the selection of cases and the development of categories setting the basis for the systematic analysis performed.

The present analysis aligns with the definitions of food systems used in the Sustainable Food Systems Partnership for People, Planet and Climate's SRIA¹. In the SRIA, the food system is defined as:

"(...) a system that embraces all elements (environment, people, inputs, processes, infrastructure, institutions, and power relations, markets and trade) and activities that relate to production, processing, distribution and marketing, preparation and consumption of food. A systems approach acknowledges the interactions between natural resources/ecosystems services, primary food production (farming, aquaculture and fishery), food processing, packaging, logistics, marketing, retail, food services, food consumption and waste management/recycling and the many feedback loops between them, which together defines the degree of complexity" (Sustainable Food Systems Partnership for People, Planet and Climate's SRIA, p. 14).

The above definition formed the basis for the selection of cases and the development of categories for systematic analysis.

3.a. Selection of Cases

One might ask, why it is relevant to analyse implementation of a food systems approach in transnational agri-food research funding after two decades of dedicated European Research Area calls. There are many aspects that could be included in answering this question, but essentially, the reason is that European R&I funding and research projects are still largely based on single thematic areas, which are reflected in specialised structures of both public funding and research institutions. Mobilising research and innovation (R&I) using systems thinking across ministries, research councils, and scientific departments is challenging. This challenge was nonetheless recognised by a number of actors; hence 21 transnational calls were analysed in order to develop recommendations on how a systems approach can be implemented into future call

¹ https://scar-europe.org/images/FOOD/Main_actions/SFS_Partnership_SRIA_31012023.pdf

mechanisms. The primary sources for the analysis were call texts and call annexes. When available and relevant the programme website or work programme were also consulted.

During the selection of cases, the priority was set on calls with transnational character in order to enable direct links and relevance for the targeted transnational programme of the co-funded Partnership 'FutureFoodS' under Horizon Europe.

It was decided to analyse calls from different types of programmes in order to have a diversity to learn from and cover as many relevant perspectives and approaches in the analysis as possible. Hence, a diverse group of calls, including ERA-NETs, HEU partnership programs, regional programs, and foundation-backed programs, formed the basis of the case selection. This diversity also enables assessment of potential variations in approaches based on the type of call mechanism.

The majority of the selected calls focuses on food and farming systems. However, the selected calls also encompass call topics beyond food and farming systems, e.g. calls that focus on water issues (JPI Water 2018 and PS Sustainable Blue Economy) and urban studies (PS DUT 2023 and ERA-NET SINO-EUROPEAN CALL 2022) were also included. While these calls do not directly focus on food and farming, they still utilise interesting features that resemble a systems approach.

In Annex 1 you can find details about all selected calls.

3.b. Categories Used and Development

In order to conduct systematic analysis of calls, a single template was developed and used for all 21 calls. The systems approach related categories were developed with the aforementioned definition (see section 2) as a guideline. The template (see Annex 2) consisted of variety of categories and was used by the working group to ease comparisons across calls and ensure alignment across the group involved in the work.

The categories were developed through collaborative brainstorming sessions to identify characteristics relevant to a systems approach. During this process three overarching themes emerged: 1) elements relevant to a systems approach, 2) implementation, and 3) call-specific features. The overarching themes and sub-categories for each theme were refined through consultation with the working group.

The **first theme** on elements relevant to a systems approach contained sub-categories that are relevant to systems approach principles such as multi-actor approach, cross-disciplinarity, theory of change, synergies, and trade-offs. The sub-categories indicate whether a systems approach is being utilised as well as what systems approach elements are prioritised.

The **second theme** regarding implementation of a systems approach, addresses how the calls are encouraging applicants to implement systems approach in projects. This theme can be considered to cover different methodologies on how to implement a systems approach. Subcategories include stakeholder engagement, networking activities, and dissemination, exploitation, communication (DEC).

The **third theme** on call specific features includes sub-categories on evaluation criteria, needs to upload additional document related to systems approach, supportive actions for applicants and activities aligned with future HEU partnerships. Information about evaluation criteria is especially important to understand how, if at all, the systems approach elements are included as mandatory criteria.

The WP3 team all contributed to analysing calls and filling in templates for each call. Hereafter a smaller working group assessed and validated the information received. Finally, the information was compared and analysed by the smaller working group. The findings have been summarised in the present report.

This approach to the analysis provides a structured framework for analysing call mechanisms through the lens of a systems approach. By systematically analysing various calls, targeted recommendations can be formulated to steer the design of future funding activities in the HEU FutureFoodS partnership.

4. Selected calls

The present 21 calls were identified, discussed and selected jointly by the partners of WP3 FOODPathS project. The different calls primarily cover Horizon 2020 and Horizon Europe Framework Programme periods, widely ranging from ERA-NET Cofunds, Art.185 initiatives, regional, national and European Partnership funding schemes. The selected calls involve a diverse range of funders ranging from national and regional public funders, private sector actors, foundations and philanthropic organisations, and the European Commission as co-funder in some of the instances. It is relevant to look into the different funding and geographical scales of the calls where:

- a) Foundations often launch national calls committing less than 1M EUR of funding,
- b) ERA-NET Cofunds that follow a transnational funding model, which covers larger number of countries with an average call budget between 5-15M EUR,
- c) Collaborative calls across different ERA-NET Cofunds that were present in the last phase of H2020 eventually managing to attract more than 15 countries in a single transnational call, but not always providing significantly higher budgets comparing to a single ERA-NET call due to a programme transition towards HEU and no top-up funding from the EC,
- d) Horizon Europe Partnerships that have up-scaled the funding commitments up to 50M EUR per call and offered annual funding call to researchers,
- e) Co-programmed and institutionalised Partnerships following regional funding calls seem to have the largest EU support and funding capacity, with the CBE JU 213M EUR call budgets, INTERREG Aurora with a 205M EUR call budget, or the EU call support from Mediterranean PRIMA Initiative with 220M EUR.

As illustrated above the scales of call budgets range across different type of funders and programmes indicating larger budget commitments by the public funders collaborating with the EC, while the calls launched by foundations and philanthropic funders (Foody Zero Sprechi, Agropolis) adopt more daring call objectives, inter-disciplinary objectives and call terminology, focussing on ensuring support of "virtuous acts (*dinamiche virtuose*)" in the calls of Cariplo Foundation), in order to visualise the agriculture as concept beyond agronomic practice that is impacted by "globalization of narratives, practices and institutions (values, norms, rules) and affecting agriculture as a whole and at many levels on spatial, temporal and jurisdictional scales² as used by the Agropolis Foundation in their call.

² Cash, D. W., W. Adger, F. Berkes, P. Garden, L. Lebel, P. Olsson, L. Pritchard, and O. Young. 2006. Scale and

The list of analysed calls and their basic typologies:

No	Call abbreviation	Call full title	Type of call
1	ERA-NET Circularity Call 2021	2021 JOINT CALL ERA-NET Cofund SusAn, FACCE ERA-GAS, ICT-AGRI-FOOD and SusCrop	ERA-Net schemes (with or without co-funding)
2	ERA-NET CO 2021	CORE Organic Cofund Third Call 2021	ERA-Net schemes (with or without co-funding)
3	ERA-NET HDHL Knowledge Hub 2019	ERA-HDHL Call: Knowledge Hub on Food and Nutrition Security	ERA-Net schemes (with or without co-funding)
4	ERA-NET SF-CO 2019	SUSFOOD2-CORE Organic joint call 2019	ERA-Net schemes (with or without co-funding)
5	ERA-NET SF-FOSC 2021	SUSFOOD2-FOSC joint call 2021	ERA-Net schemes (with or without co-funding)
6	ERA-NET SINO-EUROPEAN CALL 2022	Europe-China Joint Call, Joint Programming Initiative (JPI) Urban Europ	ERA-Net schemes (with or without co-funding)
7	Food-Water-Energy Nexus 2017	Sustainable Urbanisation Global Initiative (SuGi) – Food-Water-Energy Nexus, Belmont Forum and the Joint Programming Initiative (JPI) Urban Europe	ERA-Net schemes (with or without co-funding)
8	HEU Citizens' science	Citizens' science as an opportunity to foster the transition to sustainable food systems	HEU Framework Programme
9	HEU Environmental impacts	Environmental impacts of food systems	HEU Framework Programme
10	HEU FOODITY 2023	FOODITY – Open Call #1	HEU Framework Programme
11	HEU TITAN 2023	TITAN Open Call	HEU Framework Programme
12	Interreg Aurora	(Interreg VI-A) Sweden-Finland-Norway (AURORA)	Regional focus
13	Interreg Baltic Sea	Interreg Baltic Sea Region	Regional focus
14	JPI Water 2018	Water JPI 2018 Joint Call	ERA-Net schemes (co-funded and free)
15	NATIONAL Agropolis 2020	Agropolis Fondation 2020 Call for Proposals	Foundations
16	NATIONAL Foody Zero Sprechi 2021	Foody Zero Sprechi 2021	Foundations
17	PS BioDivMon 2022	Biodiversa+ Partnership Call 2022	PS schemes, co-funded
18	PS CBE JU 2023	Circular Bio-based Europe Joint Undertaking Call	PS schemes, old formats (co-programmed)
19	PS DUT 2023	Driving Urban Transitions Call 2023	PS schemes, co-funded
20	PS PRIMA 2023	PRIMA Call 2023 Section 1	PS schemes, old formats (co-programmed)
21	PS SBEP 2023	2023 First Joint Transnational Co-Funded Call	PS schemes, co-funded

Table 1: Analysed calls and their basic typologies

cross-scale dynamics: governance and information in a multilevel world. *Ecology and Society* 11(2): 8. [online]
 URL: <http://www.ecologyandsociety.org/vol11/iss2/art8/>

5. Quantitative overview of food systems approach in calls

For this analysis a “positive selection” of calls was done, meaning the call cases were chosen as good examples or good practices with regard to systems approach (SA). Unsurprisingly, specific objectives related to a SA could be observed in 18 out of 21 calls (86%). However, only in one third of cases (8 of 21), SA was defined or at least explained. When a SA definition was given, it also had a mandatory character for applicants.

Looking at the elements that were found to be typically related to SA, the following rough pattern can be observed:

- **Multi/inter/transdisciplinarity** was the element with highest incidence, occurring in all calls analysed and showing the strongest obligation, meaning it was mandatory in 90% of the analysed calls where it occurred.
- Several elements were used in about $\frac{3}{4}$ of the analysed calls: **Inclusiveness, Synergies, Geographical balance/widening** and **Multi-actor-approach**. Among those, the Multi-actor-approach stood out as it was also used as a highly mandatory criterion (in 88% of the calls where it was applied).
- In more than half of calls analysed the elements **Co-creation, Theory of change/transformation** and **Trade-offs** occurred.

Although the elements Synergies and Trade-offs are often used in combination as strongly interlinked aspects, it is obvious that Synergy was much more commonly used than Trade-offs and this is in line with using it as mandatory criterion (synergies was mandatory in 11 calls vs. trade-offs only in 6 calls). This indicates that Trade-offs are less apparent so far, similarly to Theory of change/transformation, which was only considered mandatory in 5 calls.

The elements with the lowest occurrence were **Interconnections/connections/interlinkages** with occurrence in about half of the cases.

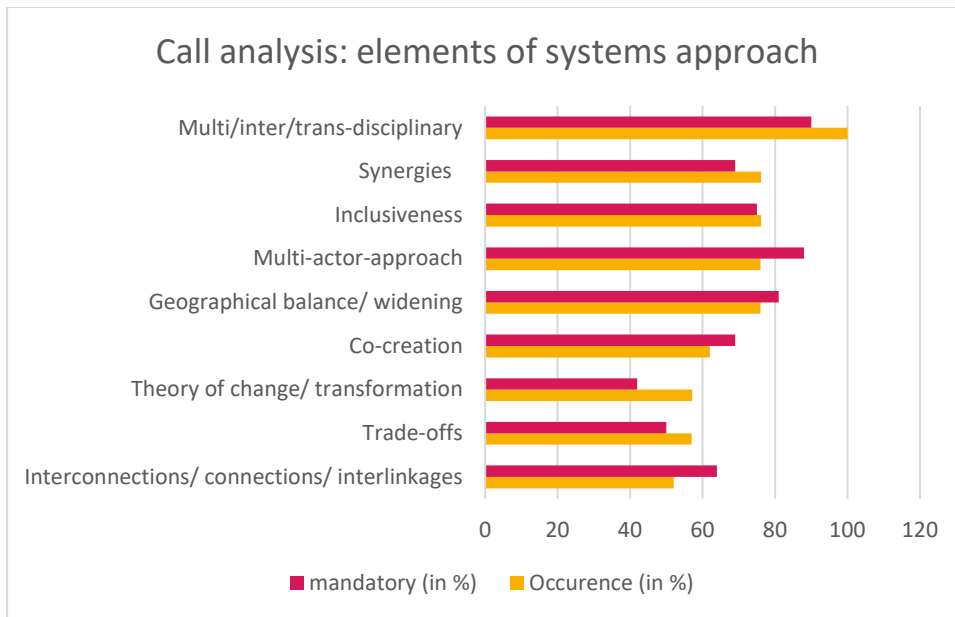


Figure 1: Quantitative overview of analysed elements related to systems approach

	Occurrence (in %)	Mandatory (in %)
Interconnections/connections/inter-linkages	52	64
Trade-offs	57	50
Theory of change/transformation	57	42
Co-creation	62	69
Geographical balance/widening	76	81
Multi-actor-approach	76	88
Inclusiveness	76	75
Synergies	76	69
Multi/inter/trans-disciplinary	100	90

Table 2: Elements related to systems approach, their occurrence in the analysed calls and their subsequent mandatory character

Looking at aspects related to the implementation of SA the following picture can be drawn:

Stakeholder engagement holds the “top position”, meaning it appears in all the calls analysed and is at the same time always a mandatory criterion (Figure 2). **Dissemination, Exploitation and Communication** follows with 90% occurrence and is also highly mandatory.

The need for **multiple levels or scales** occurs in a high number of call cases but is less obligatory. Interestingly **Networking activities** are mentioned only in about half of the calls analysed and mostly do not have a mandatory character.

Calls	Definition of SA	Multi-actor-approach	Cross-disciplinarity	Geographical balance/widening	Inclusiveness	Theory of change/transformation	Interconnections/connections/interlinkages	Synergies	Trade-offs	Co-creation	Stakeholder engagement
ERA-NET SF-FOSC 2021											
ERA-NET Circularity Call 2021											
ERA-NET HDHL Knowledge Hub 2019											
ERA-NET SINO-EUROPEAN CALL 2022											
JPI Water 2018											
ERA-NET SF-CO 2019											
Food-Water-Energy Nexus 2017											
ERA-NET CO 2021											
Foody Zero Sprechi 2021											
Agropolis 2020											
HEU FOODITY 2023											
HEU TITAN 2023											
HEU Environmental impacts											
HEU Citizens' science											
PS SBEP 2023											
PS BioDivMon 2022											
PS DUT 2023											
PS PRIMA 2023											
PS CBE JU 2023											
Interreg Aurora											
Interreg Baltic Sea											

Mandatory
Mentioned
Not mentioned

Figure 2: Heatmap with overview of mentioned and mandatory categories

6. Qualitative reflections on integration of SA in calls

The following section includes qualitative reflections on a selection of elements and concepts that are indicative of the use of the systems approach. First, various examples of, or lack of, descriptions of a systems approach are highlighted. Hereafter follows an analysis of different elements, e.g. multi-actor-approach, cross-disciplinarity, inclusiveness, etc., which includes examples on how each element is implemented in different call texts.

6.a. Descriptions of SA

The following sub-section gives examples on how the call text describes systems approach when there is a description of the concept, when there is not a description of the systems approach and how the use of a systems approach appears when the term is not mentioned at all.

Descriptions of food systems approach (6 calls)

As mentioned in chapter 4 of this analysis, specific objectives related to a Systems Approach could be observed in 18 out of 21 calls (86%). In about a third of cases (6 out of 21), the Systems Approach was explained/defined.

Further detailed analysis of the call texts revealed that in fact detailed definitions (like the definition from the SRIA on p.3 or the one mentioned in box 1 below) were not used in any of the calls analysed – but all six call texts contained more or less detailed explanations of the concept "systems approach" or "systemic". The most relevant explanations for each call can be found in an annex to this document (Annex 3).

*"A **systems approach** is understood as viewing a specific aspect (e.g. requiring more biofuel as energy source) as a component of a larger whole, having direct and indirect interactions with other, sometimes seemingly unrelated, aspects (e.g. land available for food production). This means that solving an issue in a particular sub-system should be approached with a 'holistic' perspective, taking account of possible trade-offs and feedback loops on other interconnected sub-systems".³*

Box 1: Example of detailed definition of "systems approach"

In the **ERA-NET SF-FOSC 2021** call text, applicants can read that with regard to **systems approach** they should "(...) Consider interconnections, synergies or trade-offs between different aspects or actors that directly or indirectly affect your field of research on a systems level, considering all economic, environmental, social, legislative, geographical, behavioural, business and environment dimensions" (ERA-NET SF-FOSC 2021, p. 7). The **ERA-NET HDHL Knowledge Hub 2019 call** mentions systemic approach and refers to Food 2030: „(...) The European Commission aims to tackle food and nutrition security (FNS) with research and innovation policies designed to future-proof food systems through a systemic approach referred to as FOOD2030.“ (ERA-NET HDHL Knowledge Hub 2019, p. 2). By this, the call equates the systems approach with Food 2030 - without directly providing a concrete definition. The call text from **ERA-NET SF-CO 2019** contains several explanations concerning "food systems", which is

³ Towards a Sustainable Food System“, Group of Chief Scientific Advisors, Scientific Opinion No.8, Mar 2020

described as dealing with sustainability, challenges and involving parties/stakeholders. Overall, this helps the applicants to understand what is meant by “systems approach“. The HEU TITAN 2023 call provides the explanations that

“(...) TITAN intends to follow to food system approach, meaning that we are considering the entire chain, taking into account the production, processing, distribution and consumption of food as well as sustainability, climate change and the recovery of biodiversity”
(HEU TITAN 2023, p. 6)

and it is further explains that

“Food systems fulfil many important functions, but at its core are three essential functions: ensuring food security and nutrition for a growing population, supporting the livelihoods of millions of people working in the food supply chain, and doing so in an environmentally sustainable way.” (HEU TITAN 2023, p. 7).

Together these explanations give a good impression of what the authors of the call text understand by systems approach. The same applies for the **HEU Citizens’ science** call text which explains that

*„Sustainable, healthy and inclusive food systems rely on systemic, cross-sectoral and participatory, multi-actor approaches and on integration between policy areas at all levels of governance. Food systems are to be understood as covering, 'from farm to fork', all the sectors, actors and disciplines relevant to and connecting i) environment protection requirements, ii) natural resources, iii) primary production on land and at sea, iv) food processing and packaging, v) food distribution and retail, vi) food services, vii) food consumption, viii) food safety, ix) nutrition and public health, and x) food waste streams.“*⁴

The **ERA-NET CO 2021 call** describes the systems approach by *„Multi-disciplinarity and system approach are therefore key to strengthen the impact on the sector concerned by the project idea.“* (ERA-NET CO 2021, p. 4) and gives a short explanation in the form of a footnote – saying: *“System Approach: Consider interconnections, synergies or trade-offs between different aspects or actors that directly or indirectly affect your field of research on a system level (e.g. economic, environmental, social, legislative, geographical, behavioural, business environment, etc.)”* (ERA-NET CO 2021, p. 54).

No description of food systems approach (6 calls)

During the analysis of the selected calls, it became apparent that seven calls referred to or encouraged the applicants to utilise a systems approach or food systems approach, without a clear description and the scope of these approaches. However, when reading the calls texts, it is clear that the calls indeed do refer to elements that imply a systems approach.

In several calls, such as the HEU FOODITY 2023, HEU Environmental impacts and the NATIONAL Agropolis 2020 call, the applicants must address food systems, however, none of the three calls provides a description of the scope of food systems. The HEU FOODITY 2023 and

⁴ Horizon Europe - Work Programme 2023-2024, p. 129

the HEU Environmental impacts calls aligns with the FOOD2030 priorities, which do offer more details about food systems on the website. The NATIONAL Agropolis 2020 call highlights that there is growing consensus that a food systems approach is needed to address the complexities of production and consumption. However, the NATIONAL Agropolis 2020 call does not provide further explanation of what a food systems approach is.

In the call text of the ERA-NET Circularity Call 2021 the word “system” comes up in various contexts in the call text and covers e.g. “mixed system“, the “farming system“ or “production system“. However, the call text does not have a detailed description of what systems are and even though the text asks applicants to use a systems approach as the guiding paradigm when applicable. Similarly, the PS PRIMA 2023 call also refers to various types of systems, e.g. farming systems, agroecosystems, and food systems, without further elaborating what the scope of the systems are.

In the Food-Water-Energy Nexus 2017 call, there is no specific explanation of what a system is, however, the Food-Water-Energy nexus approach offers a framework and tools for the analysis of complex systems in an urban context and acknowledges the importance of inter- and transdisciplinary approaches and the involvement all relevant stakeholders. Applicants are also asked to consider possible risks, synergies and trade-offs associated with new innovative solutions.

All of the above-mentioned calls do mention elements associated with a systems approach in the call texts, such as multi-actor approach, cross-disciplinarity or synergies. This will be further elaborated on in the following sections.

No mention of food system or systems approach (9 calls)

In nine of the analysed calls, a systems approach is never explicitly referred to or described, however, several characteristics and elements indicative of systems approach are present in all the analysed calls. Some of the strong indicators of using systems thinking may include use of multi-actor approach, cross-disciplinarity, and stakeholder engagement. The calls that do not explicitly refer to a systems approach include PS SBEP 2023, PS BioDivMon 2022, ERA-NET SINO-EUROPEAN CALL 2022, JPI Water 2018 call, PS CBE JU 2023, PS DUT 2023, Interreg Aurora Call, Interreg Baltic Sea call and NATIONAL Foody Zero Sprechi 2021.

Even though these calls do not explicitly use a systems approach, they still implicitly use elements relevant to systems approach or approaches that are similar to what can be considered a systems approach. For instance, the PS SBEP 2023 call and the ERA-NET SINO-EUROPEAN CALL 2022 use an impact pathway approach as the general framework for applicants, which somewhat resembles a systems approach (see section 5.b and 6.b). Similarly, **PS CBE JU 2023** has no direct reference to systems approach, however, the PS CBE JU 2023 uses “(...) *a value chain approach which ensures that all the concerned actors in the bio-based system, including the supply chain, i.e. agriculture/forestry/aquaculture primary producers, bio-waste producers and management facilities (...)*” (PS CBE JU SRIA, p. 19). Thus, the value chain approach does indeed have overlapping elements with a systems approach, however, while the value chain approach is linear, the food systems approach includes significantly more actors and interactions.

In general, the use of a systems approach may not be explicitly articulated, however, the calls do demonstrate a commitment to use systems approach characteristics, such as interdisciplinary collaboration, interconnected dynamics, multi-actor approach and stakeholder engagement. These elements and their use are further elaborated in the following chapters.

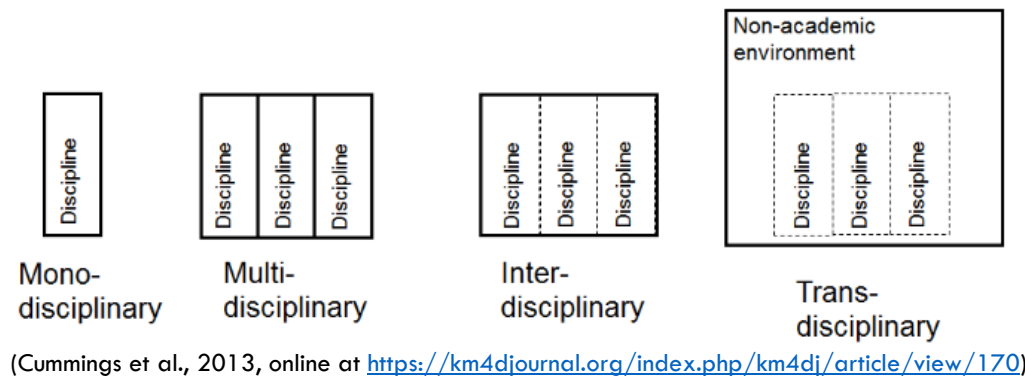
6.b. Elements with regard to SA

In the following sub-section, it is explored how cross-disciplinarity, multi-actor approach, inclusiveness, geographical widening, transformation, synergies and trade-offs are integrated into the analysed call texts.

Cross-disciplinary approach

Cross-disciplinarity was the element with the highest incidence (20 out of 21 cases) and it was mandatory in 15 of the 21 cases that have been analysed (see figure 2). Despite the high occurrence, the nature and importance of a cross-disciplinary approach varied across the analysed calls. Cross-disciplinarity are used in various ways in the analysed calls, however, present analysis subscribes to the definition in box 2.

Cross-disciplinarity is considered a collective term, that covers multi-, inter-, and trans-disciplinary approaches. The three approaches were all identified in the analysed calls. While the three approaches do have clear similarities, there are also differences. The multidisciplinary approach is the least integrated approach, meaning that disciplines “co-exist in a context” and researchers exchange results, however, there is no overlap between disciplines. In the interdisciplinary approach the disciplines are more integrated, and researchers will normally address system issues, where it is necessary to have strong collaboration across disciplines. The transdisciplinary approach is the most integrative approach and normally includes non-academic stakeholders in order to address context specific issues. The overall goal of the latter approach is to develop new frameworks and theories based on the integrative approach and research results.⁵



Box 2: Definition of cross-disciplinarity

Only the PS CBE JU 2023 used the collective term **cross-disciplinarity** and emphasized in the section on cross-cutting elements, that “*All proposals should foster cross-disciplinarity and consider the social, economic, behavioural, institutional, historical and/or cultural dimensions, as appropriate, of the proposed circular bio-based innovations.*” (PS CBE JU 2023, work programme, p. 25). The term is also mentioned in the call’s section on specific objectives, and thereby, PS CBE JU 2023 does not restrict the applicants to use a specific approach to cross-disciplinarity

⁵ Stock, P.; Burton, R.J.F. Defining Terms for Integrated (Multi-Inter-Trans-Disciplinary) Sustainability Research. Sustainability 2011, 3, 1090-1113. <https://doi.org/10.3390/su3081090>.

research and the applicants can therefore use the approach that they considered the most appropriate for the specific research topic.

The **multi-disciplinary approach** is integrated into calls such as ERA-NET SF-FOSC 2021, ERA-NET SF-CO 2019, PS SBEP 2023 and ERA-NET CO 2021. In the ERA-NET SF-FOSC 2021 call, multi-disciplinarity is mentioned throughout the call text from the introductory sections to scope of the call through the submission procedure, where the multidisciplinary aspects must be addressed in the application's section on expected impacts. Similarly, the ERA-NET CO 2021 call also includes multidisciplinary in the description of eligibility of applicants and further, it must also be integrated in the project description. In both the ERA-NET SF-CO 2019 and PS SBEP 2023, the need for multidisciplinary is mentioned in several parts of the call texts, though it is especially highlighted in the description of the thematic areas, where multidisciplinary must be taken into account for all topics. The ERA-NET HDHL Knowledge Hub 2019, NATIONAL Foody Zero Sprechi 2021 and the HEU FOODITY 2023 also highlight that the call will fund multidisciplinary research.

Several calls emphasise the need for an **inter-disciplinary approach**. In the ERA-NET Circularity Call 2021, all single-discipline projects are considered to be beyond the scope of the call and the applicant must address how an inter-disciplinary approach is used. However, no further description of an interdisciplinary approach is offered in the call text. Similarly, HEU Environmental impacts, PS PRIMA 2023 and Interreg Baltic Sea also encourage the use of interdisciplinary approaches but only elaborate to a limited extent on the reasons why this is important. The Food-Water-Energy Nexus 2017 call encourages the use of both inter- and trans-disciplinary approaches and highlights in the scope of the call, that applicants should *"(...) develop projects requiring collaborative, international, inter- and transdisciplinary research and innovation"* (Food-Water-Energy Nexus, p. 7). This leaves some flexibility to the applicants to choose the most appropriate approach for the project.

There are also examples amongst the analysed calls, where applicants are encouraged to make **trans-disciplinary research**. When trans-disciplinary research is encouraged, the calls generally also encourage strong collaboration with stakeholder and end-user groups. In the JPI Water 2018 call's description of trans-disciplinary approach and expected impact, it is emphasised that *"(...) all proposals should emphasise the effective participation of stakeholders and end-users (including industry) in research, and innovation actions (participatory approaches)"* (JPI Water 2018, p. 10). The PS DUT 2023 call similarly addresses the need for trans-disciplinary research in the scope of the call and in this regard it is mentioned that co-production of knowledge in collaboration with relevant stakeholders is preferred. The importance of stakeholder involvement is also highlighted in relation to the trans-disciplinary approach in the ERA-NET SINO-EUROPEAN CALL 2022.

Inclusiveness

The concept of inclusiveness is integrated into the calls in various different ways. The term inclusiveness can address a wide range of things and therefore the mention of inclusiveness in the analysed calls covers **gender balance, data sovereignty, stakeholder engagement and geographical inclusion**.

Several of the analysed calls emphasise that all project proposals must consider the **gender balance in the project**. The calls that explicitly highlight the need for gender balance in the project proposals are NATIONAL Agropolis 2020, PS SBEP 2023, JPI Water 2018, ERA-NET Circularity Call 2021, Food-Water-Energy Nexus 2017, PS CBE JU 2023, HEU FOODITY 2023, and PS DUT 2023. In order to operationalise this, most of the aforementioned calls

have integrated the gender balance into the evaluation criteria. In addition to the gender dimension, the Food-Water-Energy Nexus 2017 call also asks applicants to “(...) *broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)* (Food-Water-Energy Nexus 2017, p. 7).

When selecting calls for the present analysis, calls with a transnational character were prioritised, meaning that all calls intrinsically address and consider geographical widening. However, in some calls there is specific emphasis on the inclusion of different geographical scales. In the Food-Water-Energy Nexus 2017 call, the Interreg Aurora and the PS SBEP 2023 calls the need for **geographic inclusiveness** was highlighted as important. Specifically, the Interreg Aurora “(...) *promote cross-border projects that develop the region together in a smart, sustainable and inclusive manner.*” (Interreg Aurora, p. 3). The PS SBEP 2023 call highlights, in relation to the consortium compositions, that “*All (pre-)proposals are encouraged to consider geographical balance and implementation in appropriate geographic settings and according to the objectives of the proposal, including in low- and middle-income countries/regions, and less-performing countries*” (PS SBEP 2023, p. 41).

A large range of calls also addresses the need for **inclusion of all relevant stakeholders** in various stages of the funded projects. These calls include, among others, PS PRIMA 2023, ERA-NET Circularity Call 2021, HEU Environmental impacts, HEU Citizens’ science, PS DUT 2023, Interreg Baltic Sea call, ERA-NET HDHL Knowledge Hub 2019, and PS BioDivMon 2022. Stakeholder engagement will be further addressed in section 5.c on implementation of SA.

Multi-actor approach

Multi-actor approach (MAA) is a frequently identified SA element in the analysed calls, where 16 calls mentioned MAA and in 14 calls MAA was a mandatory element, although implemented in the call text in various different ways.

The ERA-NET SF-FOSC 2021, ERA-NET SF-CO 2019 and ERA-NET CO 2021 calls all have a similar approach to MAA, where it is implemented in the description of the **scope and thematic focuses** of the calls, here the MAA is highlighted as an aim for the calls, e.g., the ERA-NET SF-FOSC 2021 highlights that “*The aim of the Call is to foster scientifically excellent, multi-disciplinary and multi-actor research, development and innovation projects*” (ERA-NET SF-FOSC 2021, p. 6). In the three calls, the MAA is also integrated on the project description template, which the applicants must fill in. In the section on “Impact”, the applicants must address the expected impact based on cross-cutting issues, which entails use of a multi-actor, multi-disciplinary and systems approach, hence the applicants are prompted to address MAA when preparing the application.

Another approach to implement the MAA in the call, can be found with the PS CBE JU 2023, HEU Environmental impacts, and HEU Citizens’ science calls, where the use of MAA is part of the **eligibility criteria**. In the CBE JU work programme, it is highlighted that all Innovation Action projects must clearly include a MAA and describe it in the methodology section of the proposal. Further, the PS CBE JU 2023 highlights various aspects related to MAA, which the proposals have to address in the methodology section of the proposal. Similarly, the HEU Environmental impacts and HEU Citizens’ science calls, it is clearly defined that projects without MAA are ineligible for funding.

Several other calls, e.g. PS SBEP 2023, NATIONAL Foody Zero Sprechi 2021, PS PRIMA 2023, Interreg Aurora, Interreg Baltic Sea, encourage the use of a MAA in various parts of the call text, **often in the description of thematic areas**, however, without explicitly integrating the MAA in the evaluation criteria.

Other calls imply the MAA, without explicitly using the term. E.g., the Joint JPI call emphasises, that the **purpose of the funded knowledge hub** is to "(...) *increase facilitation of transnational research activities between individual researchers, research groups and research organisations in order to build a productive network of complementary competences in the field of food and nutrition security*" (ERA-NET HDHL Knowledge Hub 2019, p. 2). This can be interpreted as promoting a MAA within the project consortium. Similarly, the HEU FOODITY 2023 and HEU TITAN 2023 calls both stress the importance of **diverse and multidisciplinary consortium**, which may also be considered as a MAA.

Geographical scales and widening

Geographical scale and widening is mandatory in 13 of the 21 analysed calls, and it is also mentioned in a further 3 calls. However, all the calls that have been selected for analysis have a transnational character and all applications must therefore consider the geographical coverage of their projects. In several calls, the need for a transnational consortium is mentioned and encouraged, without further elaborating on the need or reasons to consider various geographies, territorialities, and scales. However, other calls do indeed ask the applicants to consider the project's geographical scales and contexts and widening efforts.

In the ERA-NET SF-FOSC 2021, ERA-NET SF-CO 2019, PS DUT 2023 and ERA-NET CO 2021 calls all proposals must address the **added value of the transnational collaboration** in the project description. The ERA-NET SF-FOSC 2021, ERA-NET SF-CO 2019 and ERA-NET CO 2021 calls encourage the applicants to consider cross-cutting issues and the added value of the transnational corporations and furthermore the geographical relevance of the projects has to be explicitly addressed in the project descriptions. Similarly, the call text of the PS DUT 2023 call includes a short section on 'Transnational Benefits', where it is outlined that "*Projects should support collaboration that goes beyond individual national efforts and demonstrates sharing, operationalising and transferring existing knowledge, resources, and research facilities to mutual, transnational benefit*" (PS DUT 2023, p. 9).

The PS DUT 2023 call further encourages the applicants to consider issues that can be **upscaled to other territorialities and broader contexts**. The ERA-NET CO 2021 also highlights that some thematic areas require that the projects must work with different geographical regions and consider how those can be adjusted and implemented at different territorialities. In the ERA-NET SINO-EUROPEAN CALL 2022, the applicants must also consider different geographical contexts by developing solutions that can be applied to both smaller European cities as well as Chinese metropolises. The NATIONAL Agropolis 2020 call also emphasises that projects should consider how to upscale results from local to international scale.

The Interreg Aurora call and the Interreg Baltic Sea call are both focusing on specific regional contexts. The Interreg Aurora call covers specified areas of Finland, Norway and Sweden and it is argued, that regional collaboration is necessary for smaller countries/regions in order to remain competitive in a globalised world. Hence, the Interreg calls fund cross-border projects in order to develop sustainable, smart solutions tailored to the geographical context. The Interreg Baltic Sea call also addresses common challenges in the Baltic region, which covers nine

countries. For both Interreg calls, the applicants must therefore work within a specific geographical context and address context dependent issues to be successful.

Hence, the abovementioned calls all ask the applicants to consider how project results can be **implemented at different scales and geographical contexts.**

Synergies and trade-offs

In food systems, the elements of the systems are interconnected and interdependent, meaning that actions in one part of the system may result in synergies or trade-offs in other parts of the system. Therefore, it can be beneficial to consider potential synergies and trade-offs before initiating system changes. In the analysed call texts, synergies and trade-offs were often mentioned in conjunction with one other and were for instance mentioned in the overall scope and objective of the call or in suggested research areas. In other cases, synergies or trade-offs were mentioned independently.

In some of the analysed calls, there was a strong focus on synergies and trade-offs in central parts of the call texts, e.g. in sections on the scope, objectives and expected outcomes. In the ERA-NET SF-CO 2019 call and the ERA-NET CO 2021 call, the projects are strongly encouraged to utilise a systems approach and recommended to *“Consider interconnections, synergies or trade-offs between different aspects or actors that directly or indirectly affect your field of research on a systems level (...)”* (ERA-NET SF-CO 2019, p. 6, ERA-NET CO 2021, p. 54). Synergies and trade-offs are thereby a central element of the framework the projects are expected to work within. In a similar fashion, the ERA-NET SF-FOSC 2021 call mentions in the section on expected outcomes, that projects are expected to identify synergies and trade-offs in relation to solutions to shocks, thereby making synergies and trade-offs central to the scope of the call. In the Food-Water-Energy Nexus 2017 call, the Food-Water-Energy Nexus approach provides a framework for analysing complex systems and it is highlighted, that the approach supports researchers in considering trade-offs and maximising synergies in food, water and energy sectors. Hence, the Food-Water-Energy Nexus 2017 call strongly integrates considerations for synergies and trade-offs throughout the call text. All PRIMA calls are using a Water-Energy-Food-Ecosystem Nexus, which also promotes focus on synergies and trade-offs across interdependent sectors.

In other calls, e.g. ERA-NET HDHL Knowledge Hub 2019, PS CBE JU 2023 and NATIONAL Agropolis 2020, synergies and trade-offs are highlighted in relation to potential research areas, where applicants are encouraged to consider synergies and trade-offs in regards to specific thematic areas. By placing the concepts in relation to a specific thematic area, they play a less significant role in the call as some proposals may then decide not to pay strong attention to synergies and trade-offs.

The importance of synergies is also mentioned in several calls in relation to synergies with existing initiatives, such as monitoring systems (i.e. PS BioDivMon 2022), research programmes and projects (i.e. JPI Water 2018, PS PRIMA 2023, PS CBE JU 2023, Interreg Baltic Sea) or EU Missions (i.e. PS SBEP 2023). By specifying which initiatives the future projects are expected to be in synergy with, the call text nudges the applicant to develop projects based on certain frameworks or knowledge and ensures that projects are in line with specific desired

methodologies and objectives. This ensures that projects build upon existing knowledge, ultimately contributing to more comprehensive and impactful solutions within the broader landscape of food systems research.

The emphasis on synergies and trade-offs is present across various calls, with some placing particular emphasis on these concepts within their scope, objectives, and expected outcomes. The incorporation of synergies and trade-offs underscores the interconnectedness of research areas and the importance of strategic alignment with existing initiatives.

Theory of Change/transformation

All the analysed calls are focusing on creating impactful research; therefore, all calls are intrinsically looking to create transformation and impact. In the analysis, calls with notable approaches or special focuses on transformative actions were highlighted. Two of the analysed calls used theory of change in the application process. However, other interesting approaches and rationales did appear in relation to the transformation.

The PS SBEP 2023 and the ERA-NET SINO-EUROPEAN CALL 2022 both use **theory of change** as an integral part of the application process, where the Theory of Change is used as a tool to define and plan the impact pathway of proposals/projects. In both calls, applicants must upload an annex to the application about their theory of change. The theory of change consists, in both calls, of a problem analysis, which includes a description of the problem and the info on whose problem it is. Hereafter, the applicants must develop an impact pathway, which outlines the pathway from research to real-life impacts. Both calls highlight, how the theory of change will be based on a myriad of assumptions, however, it does prompt the applicants to reflect on how the project will contribute to transforming existing systems. The ERA-NET SINO-EUROPEAN CALL 2022 emphasises that since the theory of change is based on assumptions, its theory of change should not be considered fixed but should rather be revisited and reflected throughout the research process.

In the PS DUT 2023 call, there is a clear focus on transformation throughout the call text and all projects must consider transition pathways within three different thematic topics. In Interreg Aurora, green transition and sustainable development is also integral to the call. The call utilises **horizontal principles** in relation to transition, where applicants should consider the three dimensions of sustainability in calls (social, ecological, and economic sustainability) in order to create sustainable transition and development. The NATIONAL Agropolis 2020 call uses the **UN Sustainable Development Goals** as a guideline for the transformative actions that are to be developed by the funded projects.

The Interreg Baltic Sea and ERA-NET HDHL Knowledge Hub 2019 highlight, how **transnational collaboration** will accelerate transformation towards more sustainable and resilient systems. Along similar lines, the ERA-NET SF-CO 2019 and ERA-NET SF-FOSC 2021 calls emphasise the importance of having a **systemic approach** and addressing **cross-cutting issues** to foster sustainable change.

Further, the ERA-NET SF-CO 2019 call also considers innovations as a key driver of change and therefore aims to fund innovative projects. In the HEU Citizens' science call, the projects should aim to contribute to behavioural changes amongst consumers, which will then lead to sustainable transformations of food systems. Therefore, the rationale in this call is, that consum-

ers play a key role in transformation processes. In the PS CBU JU 2023 call, innovation is considered to be the key driver of change.

6.c. Implementation of SA

The following section addresses measures used by the calls to encourage the applicants to use a systems approach. The implementation measures covered in this section include stakeholder engagement, networking activities and Dissemination, Exploitation and Communication.

Stakeholder engagement

Stakeholder engagement is addressed in all the analysed calls, which makes it the most commonly identified category along with cross-disciplinarity. Further, stakeholder engagement is mandatory in all analysed calls, which makes stakeholder engagement the most frequent mandatory category. The stakeholder engagement tends to be presented in connection with other concepts or frameworks, e.g. cross-disciplinarity, multi-actor approach or C&D plans.

The Food-Water-Energy Nexus 2017, PS DUT 2023 and PS BioDivMon 2022 calls can be highlighted as taking a particularly strong position on the importance of stakeholder engagement. In the Food-Water-Energy Nexus 2017, the importance of stakeholder engagement is emphasised from the onset of the call text and is included in e.g. the sections on scope, objectives, themes, proposal requirements, and project consortium. Hence, making stakeholder engagement an integral part of the call text. Stakeholder engagement also plays a key role in the PS DUT 2023 call, where the importance of stakeholder involvement, user-oriented and stakeholder knowledge are addressed throughout the call text and must explicitly be addressed in the proposals. Further, user engagement is also part of the evaluation criteria. Bio-DiverSa+, which has launched the PS BioDivMon 2022 call, has published an elaborate **stakeholder engagement handbook**⁶, which provides detailed information and guidelines on the importance of stakeholder engagement, identification of stakeholders when to engage with stakeholders, methods, planning, management of conflicts and monitoring/evaluation of stakeholder engagement. The handbook is a strong support mechanism where applicants can find resources and information on how to carry out robust stakeholder engagement.

In the ERA-NET SF-FOSC 2021 call and Interreg Baltic Sea, the applicants must outline the project's **stakeholder engagement plan in the C&D plan**, which is mandatory for all project proposals. Similarly, Interreg Baltic Sea and JPI Water 2018 highlight, that it is vital that results are communicated and disseminated to relevant stakeholder groups. By integrating stakeholder engagement in the C&D plan, it is acknowledged that stakeholder engagement requires a strong C&D strategy. However, successful stakeholder engagement also goes beyond C&D efforts and it is therefore necessary to assess the quality of the stakeholder engagement plan somewhat independently from the C&D plan. In the ERA-NET SF-CO 2019 and the ERA-NET CO 2021 call, the applicants are also encouraged to integrate the stakeholder engagement plan into the C&D plan, as the C&D plays a key part in the uptake of new practices.

⁶ [stakeholder-engagement-handbook.pdf \(biodiversa.eu\)](#)

In calls such as ERA-NET SF-CO 2019, ERA-NET CO 2021, HEU Environmental Impacts and HEU Citizens' Science, the need for stakeholder involvement, are mentioned in connection to the **multi-actor approach**, however, without specifying the differences between the two concepts. Stakeholder engagement and multi-actor approaches do indeed share many similarities, as both approaches emphasise collaboration and integration of diverse perspectives. However, while stakeholder engagement tends to focus on engaging specific individuals or groups with a vested interest in a particular issue or project, the multi-actor approach may involve a broader range of actors from various sectors and disciplines. The differences between the two concepts are worth considering when mentioning the two in conjunction with one another.

Networking activities

Networking activities were one of the lesser common categories identified in the calls, as they are mandatory in only four calls and mentioned in another seven calls. However, despite being a less prevalent category, some calls do have good practices when it comes to networking activities.

In some calls, **programme and cross-programme activities** are highlighted in the call text, which is true for the Food-Water-Energy Nexus 2017, PS DUT 2023 call and ERA-NET HDHL Knowledge Hub 2019 call. In the PS DUT 2023 call, which is funded under the DUT Partnership, these are mandatory activities, opportunities, and support for the funded projects. The time and budget for the participation in these activities should be integrated into the project proposal, hence the projects' participation will be financially supported to engage in networking activities within the partnership programme. Similarly, although with less clear financial support, the ERA-NET HDHL Knowledge Hub 2019 call also expects that proposals carry out activities in collaboration with the involved JPIs, such as JPI HDHL, JPI-OCEANS and FACCE-JPI. PS BioDivMon 2022 and PS PRIMA 2023 also support the **collaboration with existing initiatives**. The PS BioDivMon 2022 call specifically highlights that projects should consider collaborating with existing transnational networks, while PS PRIMA 2023 asks proposals to consider activities that are aligned with the other projects funded by the EU with reference to specific calls under the Work Programme 2023.

A few other call texts also encourage **networking or training** although in a more sporadic way. When incorporating networking activities in the call text it encourages and/or prompts the applicants to consider synergies with programmes, projects, or other relevant initiatives. By implementing the networking activities in the call, the applicants are also guided to consider certain themes, perspectives, or approaches in order to be relevant to the programmes, projects or initiatives mentioned in the call text.

Dissemination, Exploitation, and Communication

Dissemination, Exploitation, and Communication (DEC) are mentioned in 19 out of 21 calls and are mandatory in 15 calls, so overall, the DEC of project results are very well integrated in the current call mechanisms, however, there are slight differences in the characteristics and focus of the DEC. DEC is key to ensure impact and uptake of research results beyond the project consortium.

In some of the calls, the DEC aspects are mentioned in relation to **impact**. An example of this is the JPI Water 2018 call, where the DEC must be explicitly addressed and targeted to society

and relevant stakeholders to ease the implementation of project results. Similarly, the PS DUT 2023 call and the Food-Water-Energy Nexus 2017 calls highlight the importance of clearly articulating benefits, and project results and improving scientific and technological understanding in order to **transfer results to end users**. In the PS BioDivMon 2022 and the Interreg Baltic Sea calls it is also found that the applicants must focus their DEC strategies on the transfer of knowledge in order to create strong outreach and impact.

As mentioned in section 5.b, the ERA-NET SINO-EUROPEAN CALL 2022 and the PS SBEP 2023 call, both use theory of change as a central part of the impact framework for applications. In both cases, the applicants must include a communication strategy in their impact pathway, that addresses which **engagement dialogues** are foreseen, how **results will be presented** and **whose responsibility** it is. Thereby, the DEC aspects are also clearly linked to the impact of the project.

Along similar lines, in the PS CBE JU 2023 and HEU TITAN 2023 calls a **business plan** must be integrated into the DEC plan, which can also be considered an impact pathway, as applicants must consider the target groups of the business plan and thereby of the DEC plan.

Other calls, namely the ERA-NET Circularity Call 2021, ERA-NET HDHL Knowledge Hub 2019 and PS PRIMA 2023, indicate that the DEC of the project must happen in **synergy and coordination with existing initiatives**. The ERA-NET Circularity Call 2021 encourages applicants to consider other ERA-NETS and European Knowledge Platforms when carrying out DEC activities. The ERA-NET HDHL Knowledge Hub 2019 mentions, that project partners should be available to participate in joint events with the ERA-nets that are managing and running the call. The purpose of participation in joint events is to exchange results and foster collaboration across projects and relevant initiatives.

6.d. Evaluation of SA

All the analysed calls use evaluation criteria in order to assess the quality of proposals and for comparison and selection of projects to be funded. Thus, evaluation criteria have a guiding role and are of high importance both for funders and researchers. In chapter 4 the quantitative overview already highlighted which elements were mandatory, which means that in those cases they were often part of the evaluation criteria.

But where do elements related to SA appear in the evaluation criteria? Basically, they occur spread over all criterion types (general/excellence/quality of implementation/impact). Most often they are found under the impact criterion (see Figure 3). Seven out of the 21 calls use general criteria, meaning that those are not using the typical categories of excellence, quality of implementation and impact.

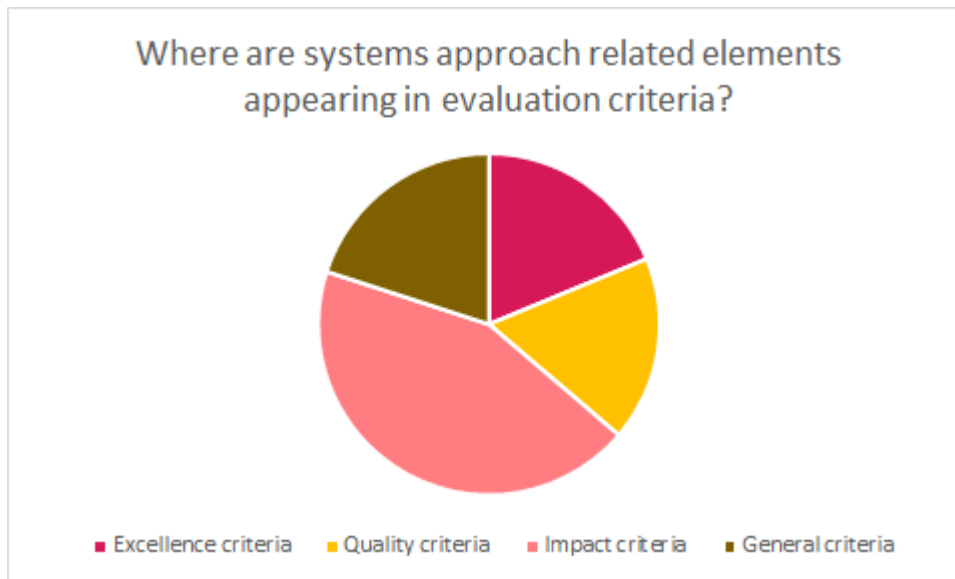


Figure 3: Systems approach-related evaluation criteria

Some of the analysed calls use the systems approach very prominently in their evaluation. Five calls use the wording “systems approach“ or “systemic“ directly in their evaluation criteria, these are: ERA-NET SF-FOSC 2021, ERA-NET Circularity Call 2021, ERA-NET SF-CO 2019, ERA-NET CO 2021 and PS BioDivMon 2022. All of them use the impact criterion for referring to the systems approach.

An example is the cross-cutting criteria used by ERA-NETs SF, FOSC and CO:

- *“Multi-actor-approach: Involve different actors and stakeholders in your research project from the outset (by means of participation as well as transparent communication),*
- *Multi-disciplinary approach: Take account of different viewpoints and involve actors from the disciplines beyond your existing network,*
- *Systems approach: Consider interconnections, synergies or trade-offs between different aspects or actors that directly or indirectly affect your field of research on a systems level (e.g. economic, environmental, social, legislative, geographical, behavioural, business environment, etc.).” (ERA-NET SF-FOSC 2021 pp. 6-7 and ERA-NET SF-CO 2019 p 6).*

The remaining 16 calls which were analysed also take SA criteria into account, but they refer to single elements that are related to a SA.

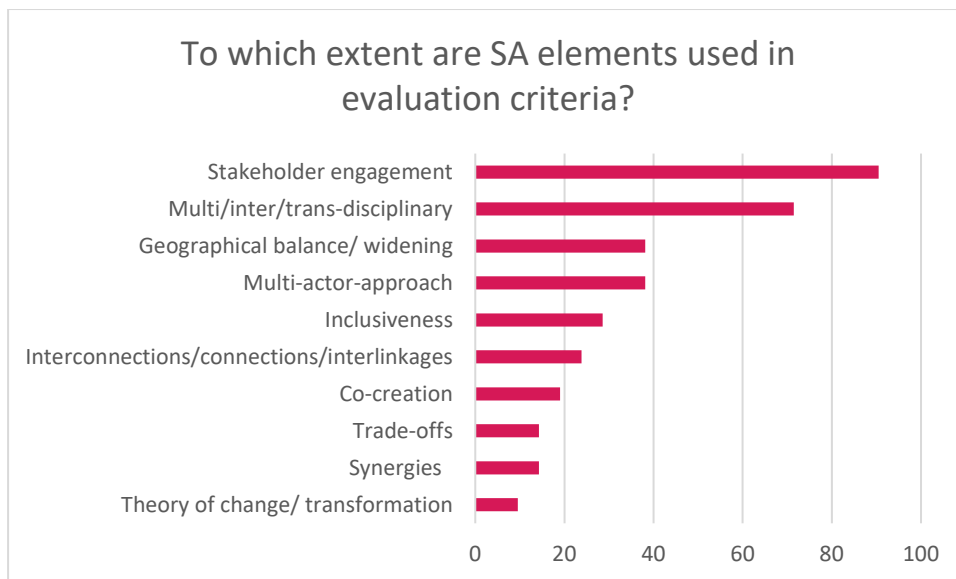


Figure 4: Frequency of SA elements in evaluation criteria

Thereby, the element of stakeholder engagement is most often used in the evaluation criteria and integrated into criteria on impact, general criteria, and excellence (in the order of magnitude)

Also strongly present in the evaluation criteria is cross-disciplinarity and it is used mainly under the excellence criteria. In some cases, it is used in more than one criterion, namely under excellence and quality. Surprisingly it is not commonly found under the impact criterion. This picture is similar to the multi-actor approach, which appears in about 40% of call cases as a relevant criterion for the evaluation of excellence and quality. Interestingly, the multi-actor approach is very often applied in calls which use general criteria (ERA-NET HDHL Knowledge Hub 2019, Foody Zero Sprechi 2021, HEU FOODITY 2023, PS CBE JU 2023).

Evaluation of the elements „Theory of change“, „interconnections“, „synergies“, „trade-offs“ do only appear in the impact criterion and are used to a lower extent (in less than 20% of the analysed calls)

Cases of special interest

There are some cases which put a very distinct focus on certain aspects, which is also clearly visible in their evaluation.

Stakeholder engagement and transdisciplinarity in PS BioDivMon 2022

In the Biodiversa+ Partnership, stakeholder engagement is prominently targeted both in pre- and full-proposal evaluation. In the pre-proposal step, the impact criterion asks „*To what extent does the project appear to have a credible approach/ambition towards stakeholder and/or end-user engagement to achieve the expected societal and/or policy impact?*“ (PS BioDivMon 2022, p. 93). In the full-proposal step, both excellence and impact criteria refer to systems-approach-related elements. Thereby, the excellence criterion is used for cross-disciplinarity: „*Level of mobilisation and integration of different scientific disciplines and competencies in the*

proposed research (level of inter- and multi-disciplinarity)“ (PS BioDivMon 2022, p. 93) and the impact criterion focuses more on stakeholder engagement: „The expected Impact of the proposed research for society and/or policy and the quality and efficiency of plans for stakeholder engagement“ (PS BioDivMon 2022, p. 94).

The criteria used to evaluate the level of transdisciplinarity, as defined*, and stakeholder engagement planned at the different stages of the project - which will be used by the experts and which applicants are invited to consider – are the following:

- a) Rationale for the stakeholder engagement planned in the project
- b) Identification of appropriate stakeholders to be engaged in the project
- c) Description of precise interests and support/investment from identified stakeholders on the specific aims of the project...
- d) Methods/activities proposed for engagement of relevant stakeholders,
- e) Evidence that the necessary skills to engage stakeholders are available in the project team or will be obtained

* *“What is meant by transdisciplinarity? Though several definitions of transdisciplinarity coexist, the definition used here is the involvement of stakeholders at the different stages of the project where relevant, for instance, to define research objectives and strategies, facilitate inputs from non-academic stakeholders, better incorporate the diffusion of learning produced by the research and facilitate a systemic way of addressing a challenge” (PS BioDivMon 2022, p. 96).*

Multi-actor-approach: PS CBE JU 2023

The multi-actor approach is an integral part of the proposal and must be clearly described in a specific section. The following explanation is given:

“The multi-actor approach is a form of responsible R&I, it aims to make the R&I process and its outcomes more reliable, demand-driven, shared and relevant to society. It also aims to have these outcomes shared more extensively. This entails more than just widely disseminating a project’s results, or listening to the views of a board of stakeholders“ (PS CBE JU 2023, p. 23).

The call text clearly describes which actors should be included (depending on the objectives of the proposals) and that involvement should take place all over the course of the project. A co-creation process from science and practice is envisaged to build the project proposals and a number of expected aspects are listed, e.g.:

- *“how the project intends to use existing practices and tacit knowledge. This should be illustrated in the proposal with a sufficient number of high-quality knowledge exchange activities outlining the precise and active roles of the different non-scientific actors in the work. The cross-fertilisation of skills, competencies and ideas between actors should generate innovative findings and solutions that are more likely to be applied on a wide scale;*
- *how the project will facilitate the multi-actor engagement process by making use of the most appropriate methods and expertise;” (PS CBE JU 2023, p. 24).*

In addition, a reference to cross-disciplinarity is given: „All proposals should foster cross-disciplinarity and consider the social, economic, behavioural, institutional, historical and/or cultural dimensions, as appropriate, of the proposed circular bio-based innovations. Applicants should therefore ensure that contributions from the SSH are integrated at various stages of their proposed project, and the actions required, participants and disciplines involved. Whenever relevant, applicants should consider public awareness raising, social engagement and social impact aspects with respect to circular bio-based solutions.”

Impact pathways (connected to Theory of change): ERA-NET SINO-EUROPEAN CALL 2022 and PS SBEP 2023

The ERA-NET SINO-EUROPEAN CALL 2022 uses the following criteria for „Impact and User Engagement (societal and broader impacts of project results)”:

- Fit to societal challenges identified in the call text
- Potential for impact, and quality of identification of societal challenge, underlying knowledge-related causes, and realistic identification of assumptions
- Engagement of stakeholders and response to stakeholder demand
- Quality of the impact plan, including:
 - Logical and cohesive theory of change
 - Logical Impact pathway linked to the theory of change

The Theory of change approach, which is also highlighted in section 6.c is also reflected in the evaluation criteria as part of the distinct impact plan.

The city level in Foody Zero Sprechi (philanthropic funding)

An example with a different perspective is the Foody Zero Sprechi 2021 call, which has a very distinct focus on the city level. Therefore, aspects used for evaluation include:

„ability to involve young people, that guarantees sustainability over time of the activity; ability to involve producers and agri-food wholesalers present in Milan Agri-Food Market; clear definition of social impact, environmental and economic aspects of the project; support from other subjects of the Milan's food system such as, for example: universities, research institutions, ATS, schools, citizens' committees, businesses, trade associations, sector of catering, etc.(...)“ (NATIONAL Foody Zero Sprechi 2021, p. 5)

7. Collection of notable aspects

The following section includes a reflection on the guiding ideas behind the calls as well as interesting aspects based on call types and in specific calls.

7.a. Guiding ideas behind calls

Besides looking at the systems approach, whether explained or just mentioned, the guiding ideas behind the 21 calls analysed were also considered.

Due to the nature of the selected calls, enforcing transnational R&I projects, all of them contain the element of **innovation** and cross-border **collaboration**. Some calls lay a specific geographical focus on collaboration between regions (e.g. Interreg calls) or certain countries/areas (e.g. the Mediterranean, Baltic Sea, EU and China).

A strong guiding idea, present in almost all calls is **sustainability**, often coupled with **resilience** and **biodiversity**. In some cases, sustainability is targeted to a certain focus besides food, e.g. focus on water, cities or organic food and farming.

In several calls, **circularity** appears as a powerful driver for transformation or green transition on the way to sustainability/sustainable systems in general. This again goes along with specific attention to interconnections and synergies, also called nexus points, e.g. the Food-Water-Energy Nexus 2017 call or calls on mixed farming systems (ERA-NET Circularity Call 2021 and ERA-NET CO 2021).

Inter- and transdisciplinarity are underlying mechanisms in all of those cases, e.g. the ERA-NET HDHL Knowledge Hub 2019, ERA-NET SF-CO 2019, ERA-NET SF-FOSC 2021 and PS CBE JU 2023.

Interestingly but not surprisingly, the calls which have been launched under Horizon Europe show a clear **impact-driven focus** (in line with the Horizon Europe objectives) and so do the calls launched by philanthropic funders (NATIONAL Foody Zero Sprechi 2021 and NATIONAL Agropolis 2020). A characteristic of this focus is the high importance of the **multi-actor approach**, which is needed in order to reach societal impact. Another example for this is the PS SBEP 2023 call, which emphasises impact-driven transformation using **Theory-of-change** as methodology.

7.b. Aspects with regard to call types

In this section, a number of interesting comparative questions related to the systems approach in the call mechanism arising from already presented material are addressed. Are ERA-NET or Cofunded calls better for implementing SA? Do foundations or philanthropic institutions conduct their R&I calls differently compared to public funders? Do we see the progression over time where more 'system' aspects are included in newer calls with respect to those launched earlier? Are calls with a larger funding budget and a wider number of funding partners more likely to include a systems view than those with a limited budget and fewer funders included, or perhaps the other way around?

In the following, two examples are presented, however, these do not provide an exhausting overview but rather highlight some of the relevant comparative issues.

One of the interesting aspects that is related to the call types arises from the very nature of the funders that are included in the call. The calls, for instance, ERA-NET Cofunds, include public funding bodies, while the PS CBE JU 2023 calls are based on joint funding from the European Union and from the private sector where the public funders have only an advisory role. These two funding call realities, ensure distinct (im)possibilities when it comes to the involvement of the private sector and as a consequence limited impact of the call on the entire food system if not all partners can be involved. This means that in the cofund calls, national public funders

decide based on their national legislation which type of actors can be involved and often there is a limit for private sector inclusion, while in CBE JU calls public funders have only an advisory role and no budgetary committees, allowing the full integration of public partners, larger call budgets and also having a food systems aspect integrated differently into the call mechanism using for instance a different terminology. For example, the principle of ‘cascading’ was brought into the CBE JU programme when re-naming it and adding ‘Circular’ to Bio-based Europe Joint Undertaking (CBE JU) expanding the original programme scope named Bio-based Europe (BBI). This change, where circularity was added, offered a possibility to work on circularity and environmental aspects (e.g., cascading use of biomass, use of residues and by-products, ensuring no competition between food and land). The cascading principle is also directly mentioned in the call topics and there are individual evaluation sheets tailored to each of the calls. These aspects offer significantly different environments for working with R&I where the industry as a funder can promote applied research, more financial stability and perhaps more coherent decision-making not based on the national rules of each funder. The actual success and impact related to the SA integration would require additional research and interviews with stakeholders that are envisaged along the runtime of FOODPathS.

Another interesting aspect that is related to the call types arises again from the very nature of funders that are included in the call, but this time not their type but rather ‘geography’. There are programmes where the transnational calls are strongly shaped by the geography of the consortium, for example, calls with a regional character under the PRIMA Partnership Art.185 covering Mediterranean countries. Despite that under this cooperation model there are primarily national public funders, the regional nature and urgent agri-food challenges in Mediterranean basin has prompted PRIMA partners to develop particular approaches towards the food systems through a so-called ‘nexus’ thematic area in the calls. The nexus area has emerged due to two different reasons, on one side to address realities with the existing regional crises and conflicts in the Mediterranean basin, and on the other hand the need to work across sectors of water, energy, food, and ecosystems (WEFE) that ‘have historically been managed independently from each other in the Mediterranean region, with limited considerations of cross-sectoral interactions. Hence, the nexus approach has provided a funding platform for the public funders where they are able to address societal and agri-food issues in an unified manner on the regional level while also reaching higher-level of the R&I impact.

7.c. Aspects with regard to single calls

Theory of Change/Impact pathways

All analysed calls do indeed aim to fund impactful research which will be implemented in practice and create positive societal change. The PS SBEP 2023 call and the ERA-NET SINO-EUROPEAN CALL 2022 utilise a notable impact plan approach, which includes a Theory of Change, to increase the chance of impact generated from the R&I projects. The two calls use the same approach and applicants must consider and address various aspects in their project proposals.

In both cases, the Theory of Change consists of a problem analysis and an impact pathway. In the problem analysis, the applicants must consider which and whose problem the project will address as well as the knowledge gaps and desired impacts. Hereafter, the applicants must

develop an impact pathway, which outlines how research results will be disseminated and lead to the desired impact. Both calls highlight, that the theory of change will be largely based on a range of assumptions, meaning that the theory of change is not a static plan but rather a reflective tool that can be revisited and adjusted throughout the project duration.

In both calls, applications must plan productive interactions, meaning knowledge exchange between relevant actors (e.g. farmers, scientists, consumers etc) to ensure that knowledge is socially relevant and exploitable. Both calls highlight co-design and co-creation as approaches to create productive interactions.

Finally, and perhaps most significantly, the applicants must develop a strategic activity plan, which includes plans for stakeholder engagement, communication, monitoring, evaluation and learning, capacity strengthening and risk assessments. The purpose of the strategic activity plan is to develop a solid strategy for the trajectory from output through outcome to societal impact. The strategic activity allows the call offices to monitor that the project partners are putting in efforts to create impactful research.

The rationale behind the use of the Impact Pathway approach is, that asking projects to extensively plan for how research outputs will create impact will increase the chances of successfully realising societal impact. Therefore, the calls recognise, that impact will not happen without carefully planned strategic efforts on how the research outputs turn into outcomes and finally impact. The funding bodies of the two calls therefore expect that that by asking applicants to develop impact pathways and a theory of change, it increases the chances of actual impact.

Knowledge Hub

The ERA-NET HDHL Knowledge Hub 2019 call only funded one project, which is in contrast to the other analysed calls. However, the concept and approach outlined in the call were strongly positioned and included interesting aspects with regard to a food systems approach. The purpose of the call was to fund a cross-sectoral knowledge hub with a food system perspective. The overall purpose of the knowledge hub is described as:

- *“increase facilitation of transnational research activities between individual researchers, research groups and research organisations in order to build a productive network of complementary competences in the field of food and nutrition security.*
- *provide added value by bringing together complementary competences through knowledge flow from scientific research towards practice.*
- *support a more integrative and multidisciplinary approach and ensure the involvement of key stakeholders.”* (ERA-NET HDHL Knowledge Hub 2019, p. 2).

The funded knowledge hub must, amongst other things, facilitate knowledge transfer, capacity building, data access and sharing, and identify knowledge gaps. Additionally, the funded knowledge hub must target producers, agri- and food industry and consumers as the main stakeholder groups for creating impact, which creates a solid basis for transferring R&I knowledge, fostering capacity building across stakeholder groups and creating multidisciplinary collaboration within the food systems. Further, the knowledge platform must address at least two out of four outlined themes, which results in the knowledge hub covering various perspectives and thereby creating a holistic view of the food system.

The knowledge hub utilises a systems approach as it promotes cross-disciplinary and multi-actor approaches. Furthermore, the knowledge hub has the potential to strengthen synergies across initiatives (e.g. projects or programmes), networking activities and stakeholder engagements through knowledge transfer and capacity-building activities. The ERA-NET HDHL Knowledge Hub 2019 call does indeed have a very specific nature, which allows the call text to narrow its aims, purpose and expected impacts considerably. While this may not be possible for all calls the clear purpose of the knowledge hub can serve as inspiration to other calls.

8. Connection between programme, call, and project level

This systematic analysis considers 21 transnational calls representing a diversity of programmes to learn from. In order to include insights from multiple levels, the original idea was to analyse programs, calls and projects. However, the number of interesting calls increased notably compared to what was first anticipated and additionally the analysis of programmes and underlying strategies revealed to be very time-intensive and on a highly general level. Therefore, the call level was prioritised, specifically given the aim to develop recommendations for the design of future funding activities in the upcoming FutureFoodS partnership.

Nevertheless, a closer look into projects could give an indication of how systems approaches that were called for, were designed, and implemented in reality. Did the projects achieve their goal and perform impactful R&I? A collaboration with FOODPathS WP6 enabled a form of validation to receive the project perspective by performing focus groups with project coordinators stemming from several of the analysed calls. The guiding question was “What do leaders of food projects think about food research that is interdisciplinary and systems-oriented”? What are experiences, lessons learned, challenges and possible recommendations? A number of 17 participants (from 7 different calls) took part in 3 online focus groups. A sound description and report of this activity will be available by FOODPathS in due time.

9. Takeaways for future calls

Based on the present analysis, future calls take following recommendations into account when preparing calls for applications that use a food systems approach.

RECOMMENDATIONS:

1. Provide a definition of systems approach or a clear explanation of what is meant;
2. Be mindful and consistent with terminology, e.g. when using typical elements of a systems approach such as multi-/inter-/transdisciplinarity;
3. Cross-disciplinarity, stakeholder engagement, and multi-actor approach are highly demanded and also of great relevance for a systems approach call; think about where and how to ask for these aspects and consider the differences between the concepts;
4. When applying a systems approach it is important to consider both synergies and trade-offs;
5. Think about how impact shall be achieved by the projects, how the food systems approach contributes to impact and provides guidance and support towards applicants;
6. What additions to the proposals are sensible and what shall they contain (e.g. impact plan, DEC plan, stakeholder engagement plan, implementation/valorisation plan etc.); adapt to the systems approach and consider also follow-up and adjustments over time (revisiting the plan);
7. Networking activities facilitated at programme level can be valuable to align and/or collaborate with other projects or programmes but they need to be backed up with dedicated resources (they might even be a necessity for co-design and co-creation);
8. Be open to new funding instruments beyond classical projects (e.g. knowledge hubs) to create mechanisms for fostering connectivity, co-creation and inclusiveness.

10. Appendices

- Annex 1: Background information about calls
- Annex 2: Template for systematic analysis
- Annex 3: Filled in templates for all calls