



D17.2

Updated version of the ENVRI strategy

WORK PACKAGE 17 – Coordination of RI communication, development and implementation of the ENVRI strategy

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ABSTRACT

This document summarizes the development of the ENVRI strategy within the lifetime of the ENVRIplus project. The strategy process is ongoing and the aim of this document is to bring together the available strategy related material and outcomes that are based on common discussions and decisions held in and between the regular BEERi (Board of the European Environmental Research Infrastructures) meetings. Special attention in this document is paid to the outcomes of a separate ENVRI strategy and sustainability workshop that was organized for the BEERi members in November 2018. Based on the discussions and agreed actions points during the lifetime of ENVRIplus, the elements to realize the new ENVRI strategy including the reformulated ENVRI vision statement for the ENVRI community are presented here. In addition, the options and decisions related to the organizational structure to support the implementation of the new strategy are described here.

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TERMINOLOGY

A complete project glossary is provided online here:

<https://envriplus.manageprojects.com/s/text-documents/LFCMXHHCwS5hh>

PROJECT SUMMARY

ENVRIplus is a Horizon 2020 project bringing together Environmental and Earth System Research Infrastructures, projects and networks together with technical specialist partners to create a more coherent, interdisciplinary and interoperable cluster of Environmental Research Infrastructures across Europe. It is driven by three overarching goals: 1) promoting cross-fertilization between infrastructures, 2) implementing innovative concepts and devices across RIs, and 3) facilitating research and innovation in the field of environment for an increasing number of users outside the RIs.

ENVRIplus aligns its activities to a core strategic plan where sharing multi-disciplinary expertise will be most effective. The project aims to improve Earth observation monitoring systems and strategies, including actions to improve harmonization and innovation, and generate common solutions to many shared information technology and data related challenges. It also seeks to harmonize policies for access and provide strategies for knowledge transfer amongst RIs. ENVRIplus develops guidelines to enhance transdisciplinary use of data and data-products supported by applied use-cases involving RIs from different domains. The project coordinates actions to improve communication and cooperation,



addressing Environmental RIs at all levels, from management to end-users, implementing RI-staff exchange programs, generating material for RI personnel, and proposing common strategic developments and actions for enhancing services to users and evaluating the socio-economic impacts.

ENVRIplus is expected to facilitate structuration and improve quality of services offered both within single RIs and at the pan-RI level. It promotes efficient and multi-disciplinary research offering new opportunities to users, new tools to RI managers and new communication strategies for environmental RI communities. The resulting solutions, services and other project outcomes are made available to all environmental RI initiatives, thus contributing to the development of a coherent European RI ecosystem.



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UPDATED VERSION OF THE ENVRI STRATEGY

1. Introduction

1.1 The strategy in the ENVRI

In 2014, the ENVRI community agreed on a strategy for 2030 which was one of the final deliverables of the ENVRI FP7 project. This strategy document was based on a holistic understanding of our planet and its behaviour, processes, feedbacks, and fluxes; developing an environmental system model, a framework of all interactions within the Earth System, from solid earth to near space. It was stated that many of the urgent challenges we are facing (such as climate change, energy use, water availability, food security, land degradation, hazards and risks, life in mega cities, and human health) are closely related to complex interactions with and in the environment. Whilst each RI is separately concerned with its own domain of interest, it was thought imperative to find robust yet lightweight means to integrate various operations across RIs to serve an increasingly multidisciplinary scientific community and to help addressing the urgent societal challenges (see Fig. 1).

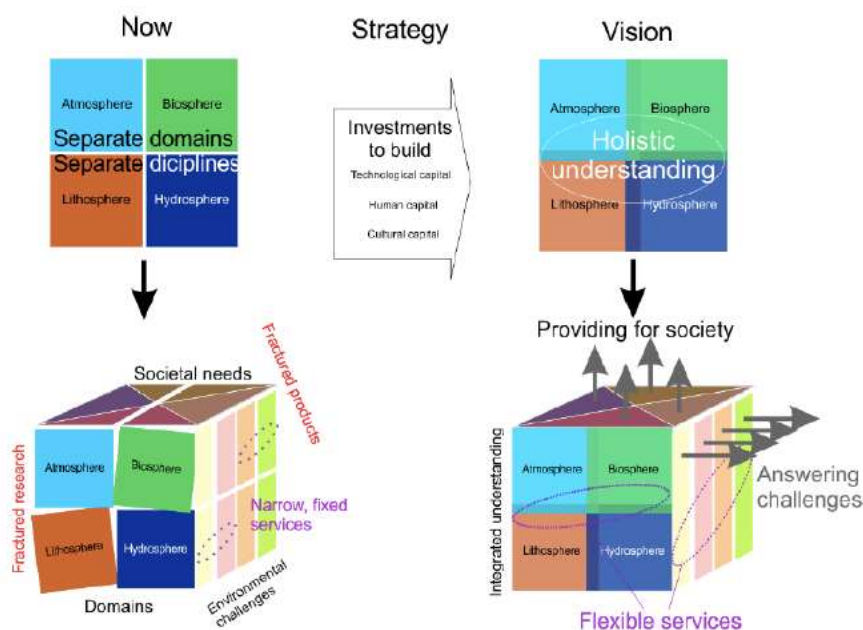


Figure 1. Overview of the vision for the European Environmental in-situ Research Infrastructures from the original ENVRI strategy (2014).

1.2 Setting ENVRI strategy in action in ENVRIplus

The ENVRI strategy agreed in 2014 served as a guidance for drafting the ENVRIplus proposal. The figure above from the original ENVRI strategy shows the ENVRIplus approach to move from separated domains, RIs and disciplines with fragmented research products, to investment in community integration allowing for a system science approach with multidisciplinary services to answer environmental challenges and provide key products for

societal needs. As a conceptual model, three resource capitals to be improved were identified.

- Technological Capital: Capacity to measure, observe, compute, and store, with technologies, software, and analytical and modeling capabilities.
- Cultural Capital: Open access to data, services in between RIs, requiring rules, licenses, citation agreements, IPR agreements, machine-machine interactions, workflows, metadata, data annotations, etc.
- Human Capital: The specialists to make it all work, with also generalists overseeing more than only their own discipline.

The ENVRIplus project started in 2015 and formed around six different Themes presented in Fig. 2. This Theme structure reflects the above mentioned three capitals and much progress has been made to improve cooperation in technology, culture and human capital. ENVRIplus has gathered all domains of Earth system science to work together around the themes to bring into practice the overarching ENVRIplus goals: 1) favoring cross-fertilization between infrastructures, 2) implementing innovative concepts and devices across RIs, and 3) facilitating research and innovation in the field of environment to an increasing number of users outside the RIs.

During the four years in ENVRIplus, work has been done simultaneously at three different levels: at cluster, domain and single RI level (see Fig. 3). Focus has been to address issues that are more efficiently addressed as a cluster of infrastructures rather than within the single RIs, and avoid duplication of efforts. Based on the results of ENVRIplus, the question must be faced how to continue cooperation and regardless of any new funded common project.



Figure 2. Themes identified to work together in ENVRIplus project.

approach is already at work in domains like environmental sciences and life sciences, and that there is a high potential to address complex phenomena like grand societal and scientific challenges – e.g. climate change, population increase and differential ageing, food and energy sustainability – by using synergistically RIs from all fields”.

Moreover, the landscape analysis in the ESFRI 2018 Roadmap is encouraging to continue a strong ENVRI cooperation (p. 75):

“A federated approach should help to reduce overlaps, to maximize synergies and benefits, and to coordinate Research Infrastructures in order to optimize observing systems ranging from in situ and remote sensing data measurement and collection, to data analysis in the laboratory. Concrete actions towards this direction have started already within the ENVRI PLUS (Environmental Research Infrastructures Providing Shared Solutions for Science and Society) project, the cluster of ENV RIs, built around ESFRI roadmap and associated leading e-infrastructures and Integrating Activities, and RIs from other domains as Health & Food for fostering cross-disciplinarity. ENVRI has proven to be an excellent tool to coordinate Environmental RIs regarding everything from Management, Access policy, Data handling etc. It is of imperative importance that this initiative is continuing”.

1.3.3 European Open Science Cloud

In addition to ESFRI perspectives, European Commission driven European Open Science Cloud (EOSC) initiative has been one of the external drivers affecting the ENVRI community. The aim of the EOSC is to give the European Union a global lead in research data management and ensure that European scientists reap the full benefits of data-driven science. This change in the landscape requires also the ENVRI cluster to revise their plans and timelines to match the requirements of these new initiatives.

For two years now, ENVRI community has been participating to the EOSC projects, such as EOSC PILOT and EOSC HUB (incl. involvement in meetings, panels, deliverables, etc.), which have been funded by the European Commission to support them in defining and implementing both the initial phases and longer-term vision of the European Open Science Cloud. These projects are the key elements on building the EOSC framework.

From the beginning of 2019 launched H2020 project ENVRI-FAIR (Environmental Research Infrastructures building FAIR services accessible for society, innovation and research; see: www.envri.eu/envri-fair) connects the ENVRI cluster to the European Open Science Cloud. The overarching goal of the ENVRI-FAIR is that at the end of the project, all participating RIs have built a set of FAIR data services which enhances the efficiency and productivity of researchers, supports innovation, enables data- and knowledge-based decisions and connects the ENVRI cluster to the EOSC. The direction of this project is in general towards the overall ENVRI cluster goals, but will also require some additional considerations for the strategy.



2. Process to the new ENVRI strategy

2.1 ENVRI strategy discussions in the BEERi

In the beginning of the ENVRIplus, the ENVRIplus research infrastructures formed a Board of European Environmental Research Infrastructures (BEERi) that has followed the work of the ENVRIplus, validated the deliverables of the ENVRIplus and discussed on regular basis on further development of common environmental ENVRI strategy and its implementation actions. During the lifetime of the ENVRIplus, BEERi meetings have been held at least a twice a year and as Table 1 shows, ENVRI strategy related topics have been in the agenda in almost all of the BEERi meetings.

Table 1. ENVRI strategy related discussions held in the BEERi meetings during the ENVRIplus project in 2015-2019.

BEERi meeting	Agenda item(s) related to the ENVRI strategy	Meeting place and time
1 st BEERi meeting	ENVRI heritage: ENVRI strategy and landscape analysis	Prague, November 2015
2 nd BEERi meeting	-	Zandvoort, May 2016
3 rd BEERi meeting	-	Prague, November 2016
4 th BEERi meeting	ENVRIplus: Sustainability plan, ENVRI strategy update	Grenoble, May 2017
5 th BEERi meeting	ENVRI strategy	Frankfurt, September 2017
6 th BEERi meeting	ENVRI sustainability and vision: ENVRI strategy update	Malaga, November 2017
7 th BEERi meeting	ENVRI strategy and sustainability of the ENVRI community	Zandvoort, May 2018
Facilitated workshop for the BEERi members (8 th BEERi meeting)	The whole workshop was dedicated to the ENVRI strategy and sustainability issues (see workshop agenda in Annex A).	Riga, November 2018
9 th BEERi meeting	Follow-up and hands-on working on action items on ENVRI sustainability and strategy agreed in Riga workshop: <ul style="list-style-type: none"> • Summary of main outcomes of the Riga meeting • Expected outcomes of this session • Revised ENVRI vision (new strategy statement) • Outcomes and analysis of the updated ENVRI survey • Discussion on the ENVRI organisational structure after the end of ENVRIplus and on the perspective for 2025 and beyond • Report of the working group for drafting a Letter of Intent (LoI) • Plan for widening of the funding structure 	Prague, January 2019



	• Proposed decisions and next steps	
10 th BEERi meeting	<p>1. Visibility and communication</p> <ul style="list-style-type: none"> • Update of ENVRI strategy (D17.2) + Finalization of ENVRI vision • Update of ENVRI-FAIR WP2 Task for developing a joint communication strategy with the RI communication officers • ENVRI landscape illustration <p>2. Fragmented funding landscape</p> <ul style="list-style-type: none"> • Long-term sustainability of distributed RIs — fragmented funding landscape, their effects and the possible solutions <p>3. Positioning of RIs</p> <p>Status of the ENVRI landscape analysis (D17.6)</p> <ul style="list-style-type: none"> • Single domain reports (atmosphere & hydrosphere domains) • Sketch of the white paper integrating all domains • Discussion on Solid Earth domain's landscape analysis <p>4. Collaboration of RIs</p> <ul style="list-style-type: none"> • ENVRI participation in EC calls <p>5. Organisational structure</p> <ul style="list-style-type: none"> • The way forward with ENVRI organisational structure • The route to Federated structure with a consortium agreement: Status of Letter of Intent (LoI) and ENVRI Consortium Agreement (CA) 	Helsinki, March 2019
11 th BEERi meeting	<p><u>Organisational structure</u></p> <ul style="list-style-type: none"> • Letters of Intent (LoI) and draft of Consortium Agreement (CA) • Updating the BEERi Terms of Reference (ToR) and Criteria for the BEERi membership • Nomination and selection process for a new BEERi chair • Work progress and outline of ENVRI Business plan <p><u>Visibility and communication</u></p> <p>Update of ENVRI strategy</p> <ul style="list-style-type: none"> • ENVRIplus Deliverable D17.2 • Work after deliverable submission (iteration of ENVRI strategy) <p><u>Positioning of RIs</u></p> <p>Status of the ENVRI landscape analysis and integrated white paper (ENVRIplus D17.6)</p> <p>FIERI proposal for an International committee</p> <ul style="list-style-type: none"> • Update of the progress after Prague BEERi meeting (Jan 2019) 	Brussels, June 2019



2.2 ENVRI strategy update and its relation to ENVRIplus Sustainability plan

The ENVRI strategy is closely related to the ENVRIplus Sustainability plan, which is one of the ENVRIplus project deliverables (D17.5) and was worked particularly in the end of project (2018-2019) when most of the ENVRIplus results were already available. The objective of the Sustainability plan was to:

- Analyse the most suitable, long-term operational and organisational model for sustaining the cluster level common operations, services and collaborative bodies, boards and community platform after ENVRIplus.
- Include means how to maintain the common operations and services provides during the project.
- Also address the future development needs and actions for pilot and test cases, and how to sustain the technological, data, management related outcomes in a feasible organisational framework.
- The organisational framework should also ensure the continuation of the dissemination, training, and communication actions of the cluster.

The Sustainability plan was framed by the views of stakeholders, more specifically the views of the involved research infrastructures, and also of relevant scientific bodies, policy bodies. The plan utilized two different approaches (see Fig. 4). First, a **'bottom-up'** approach to identify and analyse vital common services, products and other results developed in the ENVRIplus project to be sustained after the end of the project, and by which organisations. Focus of the bottom-up path was on the results that have relevance for all cooperating research infrastructures. Second, a **'top-down'** approach - that is closely connected to the ENVRI strategy - to consider the future ENVRI structure at the level of joint cooperation, regardless of any funded collaborative project.



Figure 4. The ENVRI strategy is closely related to the ENVRIplus Sustainability plan (D17.5) that was formed utilizing two different approaches: 1) the bottom-up and 2) the top-down approach.

3. ENVRI strategy and sustainability workshop

A facilitated two-day workshop titled “ENVRI strategy and sustainability workshop” was organized for the BEERI members in November 2018 in Riga, Latvia, right after the 7th ENVRI week. The aim of the workshop was to discuss on the future of the cooperation of European environmental research infrastructures from various perspectives. Two professionals from Deloitte Company moderated the workshop, and topics were tackled in plenaries and working in small groups. Both workshop days gathered around 25 participants and altogether 19 RIs were represented.

In general the workshop was seen valuable and received good feedback from the participants. The workshop resulted in clearer views about the expectations of RI representatives in regard to the future role and organization of the ENVRI cooperation and it was promising that the workshop participants agreed on some conclusions by comparing the suggestions emerging from the discussions.

3.1 Workshop topics and discussions

The workshop agenda (see Annex A) was constructed around five main topics:

- Common understanding on key stakeholders, benefits and impact.
- Purpose and vision of the ENVRI cooperation.
- Critical obstacles and their solutions.
- Organisation and structure.
- Roadmap for the next years.

The next sections summarize the discussions and outcomes of these topics.

3.1.1 Common understanding on key stakeholders, benefits and impact

In the beginning of the workshop, participants viewed at different perspectives to ENVRI community and identified the most important stakeholders, benefits from cooperation and impacts on society. Participants’ perspectives are summarized in Table 2.

In general, there was quite a high consensus among the participants on the need for and usefulness of ENVRI community and on its position in the society. The line between external and internal stakeholders was seen as unclear, as many of the RI members and scientists benefit both from the internal efficiencies within the ENVRI community as well as the impact ENVRI has on the society. In the discussion on the societal value creation by the ENVRI community, it was raised that ENVRI is perhaps not so strong in creating value for private industry but can instead be seen as more useful for preserving and conserving value.



Table 2. Most important 1) stakeholders, 2) benefits from cooperation and 3) impact on society, identified in the ENVRI strategy and sustainability workshop (Nov 2018).

<p>Most important stakeholders:</p> <ul style="list-style-type: none"> • Policymakers & lobbies; policymakers (high and low level); policy (through science); decision makers; • Scientific communities; researchers (multidisciplinary); working scientists and students; science and educators; • Private sector / industry; business: test beds, product/service development; insurance companies; • General public; citizens • Funding agencies – national & international • IPCC, UNFCC, UNEP <p>Most important benefits from cooperation:</p> <ul style="list-style-type: none"> • Common voice & legitimacy; Common contact point; Visibility; • Multidisciplinary approach to grand challenges; Cross domain knowledge, cross boundaries Understanding complexity of Earth systems, • Common access (data interoperability); improved efficiency for data users and providers • Sharing of experience, effective management, methods, harmonization, cost effective • Lobbying • Common strategy <p>Most important impacts on society:</p> <ul style="list-style-type: none"> • Breakthroughs in science; New solutions increasing our knowledge; Near real time information on environmental process • Educated public; Provide efficient answer to grand challenges; Improved awareness & decision-making; • Sustainability; Targeted solutions, e. g. Mitigation and adaptation • Common authority of voice • Research & Innovation, PPP

3.1.2 Purpose and vision of the ENVRI cooperation

The second part of the workshop focused on participants' views on a common longer-term vision for the ENVRI community. Note: Vision discussion part of the workshop is described in more detail in chapter 4, which presents the overall process of renewing the ENVRI vision.

As an outcome of discussions and group work in the workshop, following vision statements were suggested by the RI leaders (in the order of support, votes indicated in parenthesis):

- *We provide multidisciplinary fair data and data-related services enabling societies to respond to grand challenges in an informed way and mitigate risks. (22)*
- *By 2030, We will have contributed in making Europe the most attractive place to perform environmental research by providing a unique multidisciplinary network & cooperation of RIs and related expertise (18)*

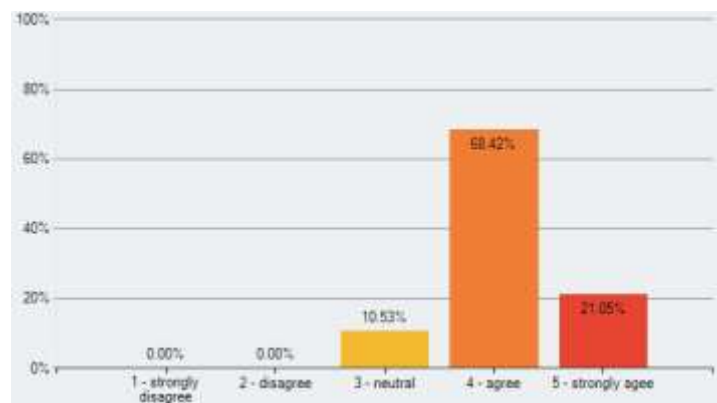


- *ENVRI community vision for 2025: We will establish a one-stop shop for information & data – access to strengthen the role and visibility of environmental RI delivering services for science and society (14).*
- *Deliver FAIR data and coordinated services for users to consume in support of environmental sciences by 2030. (13)*
- *Provide qualified interoperable data for a good system approach that allows the modeling of dynamics of life on Earth (9)*

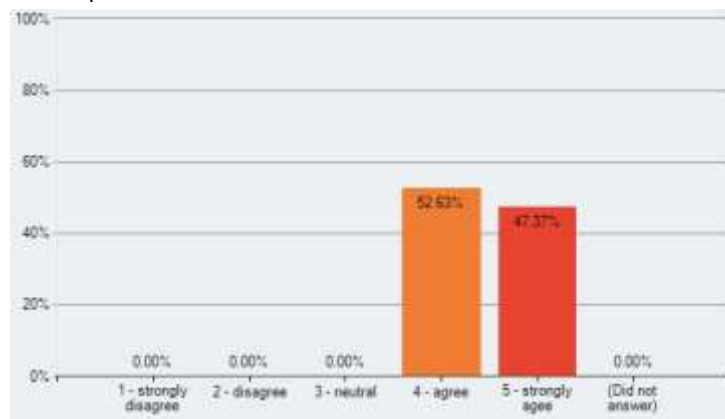
These results were used to open a survey to map ENVRI RIs views in a more systematic way on A) Purpose of the ENVRI cooperation i.e. where can ENVRI create best value for society and on B) Operational efficiency to identify how the ENVRI cooperation can benefit the RIs. The survey was circulated among BEERi members who were encouraged to have internal discussions within their RIs before filling the survey as the survey could be filled once for each RI. The respondents were asked to consider their opinions for a future situation from 2025 onwards. The response on the survey was 85% and resulted in outcomes presented below.

A. Purpose of the ENVRI cooperation (where can ENVRI create best value for society?)

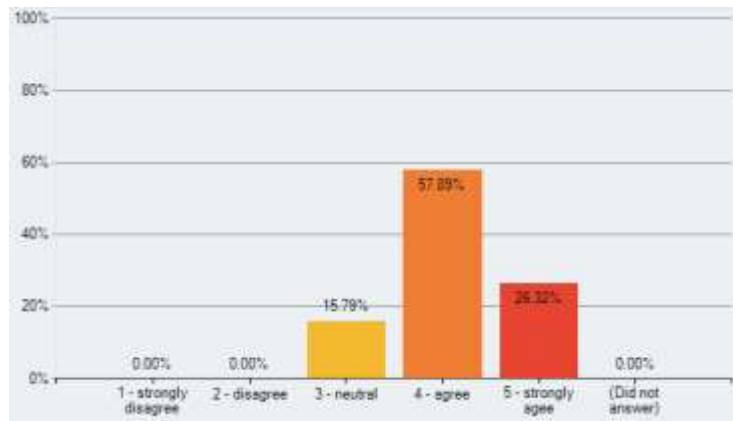
Advertise the significance of Earth sciences by promoting an informed and educated civilian and policy interest.



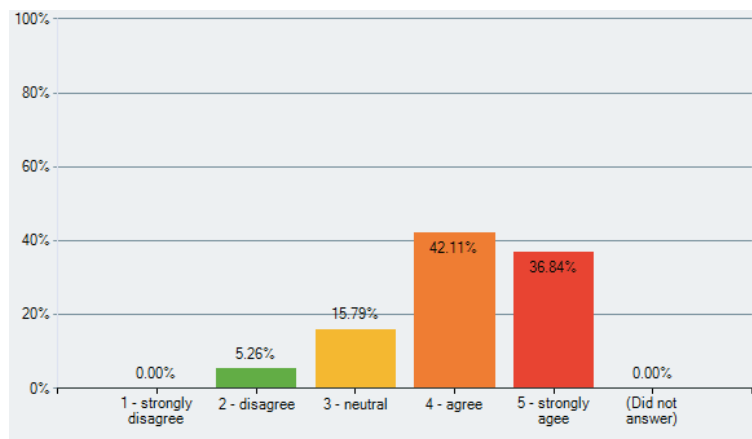
Present a common ENVRI voice and legitimacy by increasing the visibility of the cooperating RIs with advocacy, and provide a platform for discussion.



Provide combined infrastructure services from different RIs to address pressing and complex environmental issues (grand challenges), to support breakthroughs, or to offer near real-time information about environmental processes in support of decision-making.



Work together to make Europe the most attractive place to engage in environmental research.

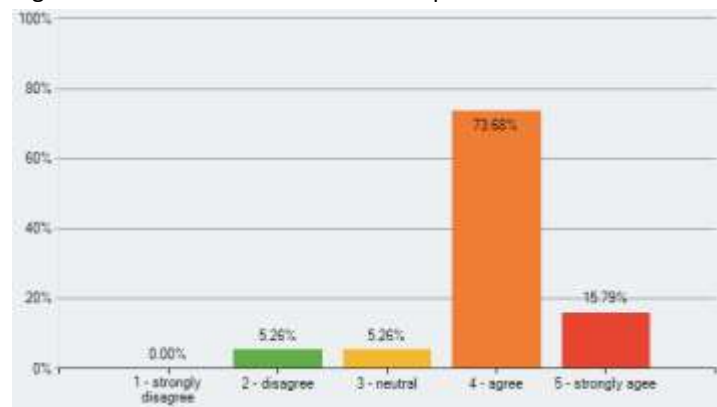


Comments

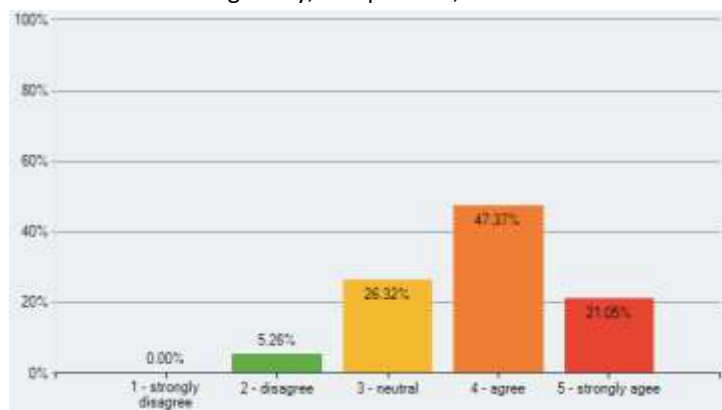
The strongest support is for advertising Earth sciences and promoting the visibility of the cooperating research infrastructures. The BEERi concluded in addition that ENVRI should not function as an exclusive monopoly by excluding new members and keeping the old ones. ENVRI can only keep legitimacy if it is based on scientific merits, not on science political power.

B. Operational efficiency (how can the ENVRI cooperation benefit the RIs?)

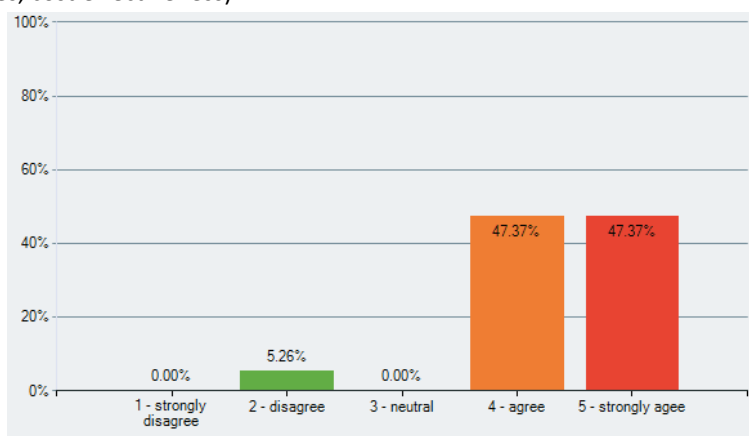
Establish a more recognizable ENVRI brand and credible reputation.



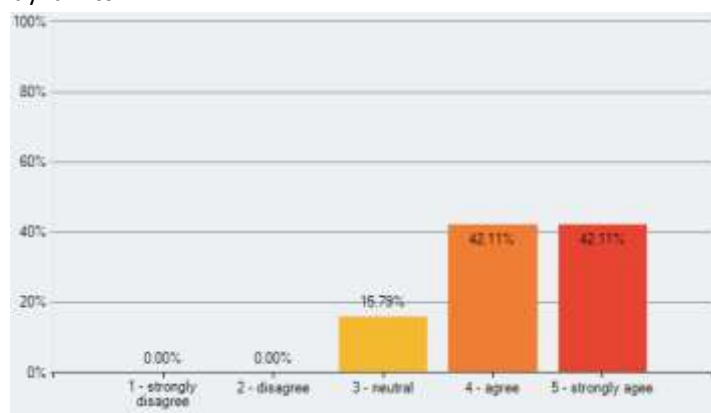
Overcome fragmentation from RI heterogeneity, competition, and cultural differences.



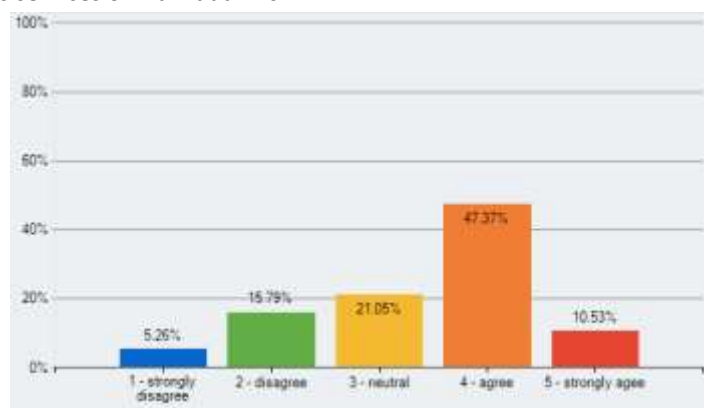
Share expertise on construction and operational approaches (including effective management, architecture, Reference Model, data processing capabilities and other methods, harmonization, ethical guidelines, cost effectiveness).



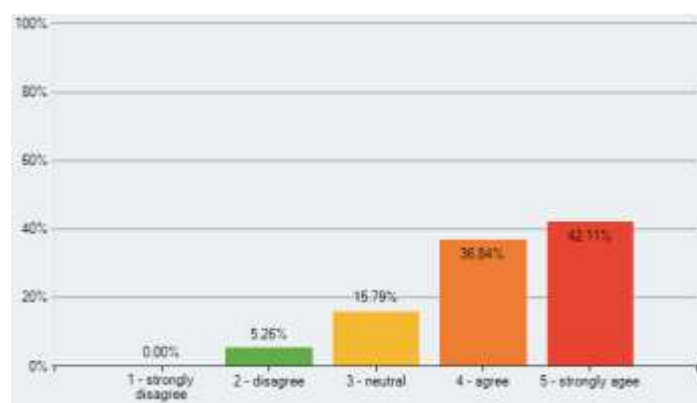
Provide multidisciplinary and fair data with data-related services, to support for example the modeling of Earth dynamics.



Offer integrated ENVRI user's access (one-stop shop) for interdisciplinary researchers, in addition to the existing access services of individual RIs.



Joint efforts for human capacity building (training, staff exchange, career planning, etc).



Comments

- All questions about the benefits of internal efficiency in ENVRI cooperation receive strong support.
- Although multidisciplinary and fair data with data-related services receive sufficient support, the suggested action of offering integrated ENVRI user's access (one-stop shop) for interdisciplinary researchers (in addition to the existing access services of individual RIs) received slightly less support.
- Access for interdisciplinary projects is a process still to be validated at the level of individual RIs.
- The survey answers are indicating that all actions should be taken up by ENVRI with due attention on what are required practical operational approaches for individual RIs.

3.1.3 Critical obstacles and their solutions

After identifying the building blocks of the future for ENVRI community cooperation (key stakeholders etc.) and brainstorming new vision statement, the RI leaders were asked to identify the most probable critical obstacles that could complicate reaching the vision of the ENVRI community. Defining these obstacles inspired lively debate, where the ENVRI community was contrasted with other RI clusters on e.g. funding and structure. The obstacles were tackled in groups and the results of the discussions are presented in Table 3.

Table 3. Obstacles that could complicate reaching the vision of the ENVRI community (votes in parenthesis, indicating topics that were regarded most important), identified in the ENVRI strategy and sustainability workshop (Nov 2018).

- | |
|--|
| <p>A. Absence of continuation of the coordinating framework (2)</p> <p>B. Lack of visibility/communication (18)</p> <p>C. Challenge of data interoperability across multiple RIs (2)</p> <p>D. Engaging funding of institutions to get the European scale (5)</p> <p>E. Multidisciplinary does not equal culture, methodology (4)</p> <p>F. Competition between members/entities of the consortium (9)</p> <p>G. Lack of knowledge & interest (3)</p> <p>H. Cultural differences (4)</p> <p>I. Internal competition</p> <p>J. Heterogeneity across RI driven by different maturity (8)</p> <p>K. Reluctance in giving away autonomy and control (15)</p> <p>L. Incompatibility between collaborative vision and competitive reality (9)</p> <p>M. Complex, slow, & fragmented (inefficient) funding structures promotes competition within cluster (not collaboration) (12)</p> <p>N. Traditional distance or even competition between disciplines & lack of a unified model (5)</p> <p>O. Diversity of maturity amongst RIs (3)</p> |
|--|

There were multiple perspectives to each obstacle, and definitions and thoughts on root causes to each were widely varied. Many of the obstacles were seen challenging but looking for solutions for each of them were clearly considered critical to a workable and good continuation of the ENVRI community work. As a summary, three recurring themes within the obstacles were identified:

- Funding
- Internal competition instead of collaboration
- Culture and traditions in each RI.

After identifying the obstacles, the next step was to brainstorm solutions for the most important problems and deciding on concrete action items to take the first steps towards each goal. The resulted solutions for the four main obstacles are presented in Table 4.



Table 4. Solutions to the main obstacles that could complicate reaching the vision of the ENVRI community, identified in the ENVRI strategy and sustainability workshop (Nov 2018).

Problem: Visibility and communication (related to obstacle B)

The problem focused on lack of coordination between RIs in external communication and related internal efforts, which was seen to be a cause for lack of external visibility and voice for ENVRI community.

Proposed solution:

- Internal: cooperation of RI communication offices
- External: communication agenda, demonstrating added

Action point:

- An ENVRI representative will coordinate communication with each RI about future cooperation in external visibility and communication and related internal efforts, taking into account national restrictions that the RIs may have.

Problem: Complex, slow, and fragmented funding structures (related to obstacle M)

The problem focused on the rigidity of funding structures and the competition between RIs that it causes. It addressed the root cause, i.e. the funding and how it could be tackled. Two separate solutions were suggested.

Proposed solutions:

- Widen the funding structure by attracting private sector investments and service use
- Timely and efficient funding by setting up European coordination mechanism for public RI funding (JPI, EIB, ERDF, national sources)

Action points:

- The topic will be prepared and presented as an agenda point in BEERi meeting on creating a plan for widening the funding structure.
- The topic will be presented to DG research and commissioners.
- The solution will be developed into an action plan, including contacts to the right people, a proposal description of the mechanism for a cocktail of funding that supports the development of research infrastructures in Europe, and a plan for implementing.

Problem: Competition for funding between RIs (related to obstacle F)

The problem addressed the other side of the competition between RIs, focusing mainly on funding, although other resources were recognized as targets for competition.

Proposed solution:

- Develop a coordinated funding strategy

Action point:

- A document on coordinated funding will be drafted, creating a risk analysis presentation. The preparation of the document will take into consideration existing/available documents on the topic.

Problem: Reluctance to give away autonomy and control (related to obstacle K)

The problem related to possible future structures for cooperation, as well as competition between different RIs. The tendency of RIs to strictly hold on to autonomy and independence was seen as a hindering element to all cooperation.

Proposed solution:

- Subsidiarity: have a common statement on the FP9 infrastructure program

Action point:

- The topic will be prioritized on the agenda of the next BEERi meeting.



3.1.4 Organisation and structure

This part of the workshop is included in the chapter 5, which describes the process related to defining the organizational structure supporting the implementation of the new strategy.

3.1.5 Roadmap for the near future

In the end of the workshop, based on the exercises and discussions during the two days, a Roadmap including agreed action points for the near future was constructed and agreed among the participants (see Table 5).

Table 5. The Roadmap agreed in the ENVRI strategy and sustainability workshop (Nov 2018).

<p><u>November 2018:</u></p> <ul style="list-style-type: none">• Distribute memo to BEERi members. Timing: November 26.• Reformulate and redistribute the sustainability survey. Timing: December.• Request a letter of Intent from all RIs. Timing: December.• Presentation to DG research & commissioners. Timing: November 28. <p><u>December 2018:</u></p> <ul style="list-style-type: none">• Comments from each RI to the vision before its finalization. Timing: December.• Draft an updated and concise vision for further comments. Timing: December.• Second round of comments from Each RI. Timing: December.• Establishing of working group(s) for business plan and consortium agreement. Timing: December. <p><u>January 2019:</u></p> <ul style="list-style-type: none">• Finalise and present the finalized vision. Timing: by January BEERi meeting.• Agenda point for January BEERi meeting: reluctance to give up autonomy.• Related to the above, drafting of a common statement on FP9 infrastructure program for discussion purposes. Timing: by January BEERi meeting.• Agenda point for January BEERi meeting: “widen the funding structure” plan.• Conduct initial legal consultation on Consortium agreement and draft the first discussion version of consortium agreement. Timing: by January BEERi meeting.• Draft a process for formulating ENVRI landscape analysis and business plan. Timing: by January BEERi meeting. <p><u>February 2019:</u></p> <ul style="list-style-type: none">• Draft a plan for European coordination mechanism. Timing: February.• Draft document on coordinated funding presentation map. Timing: February. <p><u>March 2019:</u></p> <ul style="list-style-type: none">• Commenting on the first discussion version of the consortium agreement by each RI. Timing: by March BEERi meeting.• An ENVRI representative will coordinate communication with each RI about future cooperation in external visibility and communication and related internal efforts, taking into account national restrictions that the RIs may have. Timing: March 2019. <p>Later: The business plan will be developed later towards the summer</p>



4. ENVRI vision

4.1 Process of renewing the vision

ENVRI, as a cooperation of European environmental research infrastructures, started in the first half of the 2010 decade with a common strategic view serving as guidance for organising joint project activities. The strategy was based on the vision to provide scientific support for a holistic understanding of our planet and its behaviour, processes, feedbacks, and fluxes. Whilst each individual research infrastructure is concerned with its own domain of interest, it was thought imperative to find robust yet lightweight means to integrate various operations across research infrastructures to serve an increasingly multidisciplinary scientific community and to help addressing the urgent societal challenges.

The ENVRI vision formulated in the ENVRI strategy in 2014 stated as follows:

The vision for environmental research infrastructures for 2030 is aiming towards universal understanding of our planet and it's behaviour. This should result in the evolution of a seamless holistic understanding of the Earth System, an environmental system meta-model¹, a framework of all interactions processes within the Earth System, from solid earth to near space. Scientists that within their own science contribute with data, models, instruments, algorithms and discoveries should feel that this serves a greater good, namely a contribution to this understanding.

During the ENVRIplus, the community of the European environmental Research Infrastructures has widened and evolved and external drivers and societal needs have changed – all this setting a natural need for a re-evaluation of the community's shared vision as an essential part of the new ENVRI strategy. To this end, regular discussions on the vision statement took place during the last years of the project (2018-2019). Members of the BEERi started to discuss and hands-on work on the vision in the ENVRI strategy and sustainability workshop in Riga (Nov 2018). After the workshop the work continued by feedback round via email exchange and by hands-on iteration in the 9th BEERi meeting in Prague (Jan 2019) until the statement was finalized in the 10th BEERi meeting in Helsinki (March 2019).

Most effort on reformulation of the vision took place in the ENVRI strategy and sustainability workshop (Nov 2018). In the workshop, the discussion focused on what the ENVRI community wants to be and achieve in the mid-term future (in the next 5-15 years) taking into account the community's purpose, values, and ambition level. The workshop participants were divided into groups and each group formulated a new vision statement, which was followed by a voting of the best suggestion. Following vision statements were suggested (in the order of support, votes indicated in parenthesis):

- *We provide multidisciplinary fair data and data-related services enabling societies to respond to grand challenges in an informed way and mitigate risks. (22)*
- *By 2030, We will have contributed in making Europe the most attractive place to perform environmental research by providing a unique multidisciplinary network & cooperation of RIs and related expertise (18)*

¹ A term model here is not to mean a *computational model*, even though that can be one realization. Here the term is meant to describe a self-contained and consistent contextual model, which describes our understanding of the system, its linkages and feedbacks.



- *ENVRI community vision for 2025: We will establish a one-stop shop for information & data – access to strengthen the role and visibility of environmental RI delivering services for science and society (14).*
- *Deliver FAIR data and coordinated services for users to consume in support of environmental sciences by 2030. (13)*
- *Provide qualified interoperable data for a good system approach that allows the modeling of dynamics of life on Earth (9)*

The group discussions in the workshop reaffirmed the development of a comprehensive Earth-systems model as a key part of the vision. Some key arguments included the importance of common quality standards for data among the env RIs and the practical distinction between the user-interface (front-end) and data-structuring (back-end) of data federation. The significance and definition as well as the complexities and challenges in ENVRI community being or becoming a one-stop shop were also considered.

It was agreed in the ENVRI workshop that the next draft of the vision statement will be put together as a combination of the top two results (presented above), with an additional perspective of a system approach. It was decided that the ENVRIplus WP17 will draft the next version and send it for comments to RIs during December 2018. This version for the last comment round during 2018 is presented below.

We provide multidisciplinary FAIR-data and other RI related services, enabling societies to respond to grand challenges in a systemic way to mitigate risks. By 2030, Europe will be the most attractive place to perform environmental research by providing a unique multidisciplinary expertise offered by the cluster of environmental RIs.

The above vision draft was presented and iterated in the Prague BEERi meeting (Jan 2019) and BEERi members were asked once more to give feedback if they have goals and elements that they consider that are important to be added to the vision text. Based on the feedback and comments during and after the Prague BEERi meeting, the revised strategy statement grew to its final form (see chapter 4.2). This version was introduced in the Helsinki BEERi meeting (March 2019) and no more comments on it were received from the BEERi members.

4.2 Renewed vision statement

During the iteration process among BEERi members during 2018-2019, the ENVRI vision statement grew to a formulation presented below.

ENVRI – the large-scale cluster of collaborating European environmental research infrastructures – contributes to the grand societal challenges by providing in a systemic way high-quality multidisciplinary research data, services and expertise for scientific breakthroughs supporting the mitigation of societal risks. With these resources, it is the ambition that by 2030 ENVRI is internationally strongly positioned with its attractive service portfolio and access opportunities for researchers, private sector and policy-makers.

4.3 Proposed mechanisms to realize the updated ENVRI vision

This paragraph presents a number of actions and mechanisms to consider for next steps in the ENVRI strategy, while building upon the developed three “Capitals”. In reference to the



ESFRI 2018 Roadmap (p. 26) the steps may contribute to the new ESFRI strategy on “the contribution of RIs towards a novel, open-integrated research environment capable of mobilizing the necessary disciplinary resources at the proper level, and of combining the new data to formulate answers to complex issues”.

Discussion on the three different potential mechanisms (A, B, C) presented below has started among RI representatives in the BEERi meetings. The suggestions below are presented as examples and are not meant to intervene in the policies and operations of individual research infrastructures. It should be noted that some of these suggested actions are partly incorporated in the new ENVRI-FAIR project, and related to implement an ENVRI data commons. However, most of the actions below deserve attention for a wider strategy.

A. Challenge the scientific community (to address the grand societal challenges with RI support)

1. Establish an (independent) ENVRI scientific advisory body to define interdisciplinary research challenges, based on provided integrated RI services and support.
2. Advertise the interdisciplinary research challenges, showing how RI can assist.
3. Open a joint financial fund for inviting innovative users with original research plans requiring integrated RI access.
4. Provide centres of frontier research with at least a single access service to benefit from multiple RI capabilities, also serving as focal points for education and advanced training of researchers.

B. Showcase the strengths and significance of ENVRI

1. Demonstrate ENVRI’s strengths through an integrated data and analysis portal with easy-to-use interfaces for e-science use, and also linking to individual RIs.
2. Combine sites and laboratory facilities, and/or cross-use of experimental research platforms and vessels.
3. Present common ENVRI views to policy, and organise advocacy similarly. Communicate to the general public on emerging and/or catastrophic changes.
4. Optimize collaboration between industry, policy-makers and RIs to ensure greater impact of our research and innovation system (ESFRI 2018 Roadmap, p. 24).
5. Define joint ethical guidelines and related expert support.
6. Organise joint procurement activities where appropriate.

C. Be prepared in ENVRI (to support interdisciplinary research)

1. Implement the ENVRIplus results in each RI (currently tackled by ENVRI-FAIR).
2. Consider a common minimal set of measurements/observations relevant for environmental variables regarding the Earth system, and a mutual strategy to fill geographical gaps.
3. Have capacity in place to guide and support interdisciplinary researchers requiring support from more than a single RI.
4. Promote an engaged ENVRI community by expanding joint training and staff exchange programmes.
5. Consider improved consultation, decision and management mechanisms at the ENVRI level.



5. Organisational structure supporting the implementation of the new strategy

5.1 Process

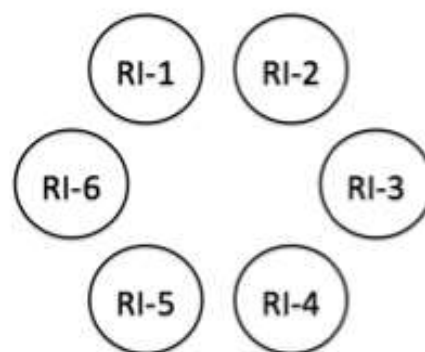
Two consecutive anonymous surveys were organized in 2018-2019 to map RIs views on the preferences in regard to the future role and organization of the ENVRI cooperation. Between the surveys a BEERi workshop discussed the pros and cons of alternative options to organise the future ENVRI, while taking into account the consensus of a common ENVRI strategy.

5.2 Organisational options

The survey included following different options to consider for a future ENVRI structure: finishing the ENVRI cooperation, proceeding with a network, or a federated cooperation, a modest or more extensive common legal entity, or even merging to a joint ENVRI research infrastructure. These options are described in more detail below.

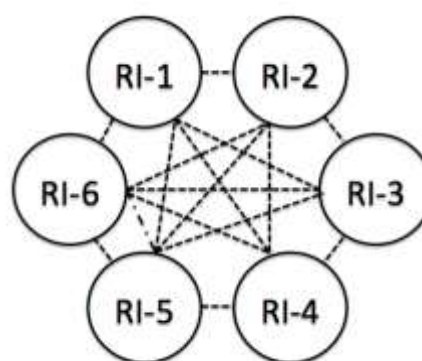
a. *Finishing the ENVRI cooperation*

This option would imply that each research infrastructure goes separately. Or, that some may conclude to proceed in a cooperative way, while others are leaving the ENVRI community. Of course, there may be irregular joint meetings, but bringing an end to the ENVRI cooperation will most likely reduce the voice and impact of the environmental cluster.



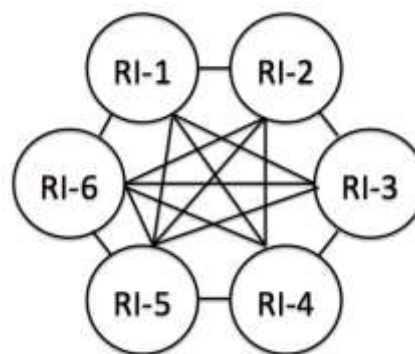
b. *ENVRI network, without required commitments*

An ENVRI network could be considered when enough research infrastructures prefer to meet regularly and consider joint activities, either at management level or at operational levels. A simple network can be organized on the basis of a Memorandum of Understanding (MoU) with some agreements on how to run the network. The MoU may have provisions on for example a rotating chair and secretariat, on the subjects to be discussed or initiated, and on how each infrastructure offers in-kind contributions for the benefit for all. The latter may include the preparation of joint project proposals.



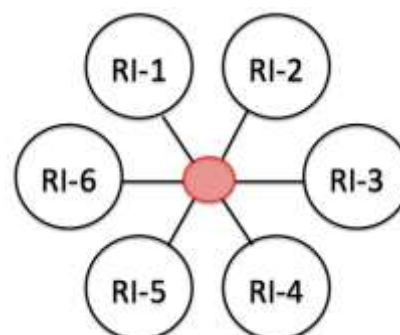
c. Federated structure with a joint consortium agreement

Similar to collaborative projects, the research infrastructures agree to work together within a Consortium Agreement on specific topics. It will state in which areas will be cooperated, how this will be governed and managed, and how any financial contributions from partners for joint activities will be arranged. Depending on the agreement, one or more individual infrastructures may be assigned with the task of chair, secretary and treasurer.



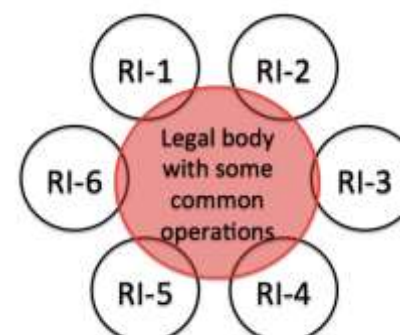
d. Establish an ENVRI legal body with limited roles

This would be a legal body with limited tasks and powers, mainly for organizing meetings and for organizing publicity. It is a cheap option, and has the advantage of a united “place”, both physically and on the Internet with a clear signal of the presence of ENVRI. Such a ‘small’ legal body should at least facilitate a secretariat and repository of joint undertakings. It may be considered to have in the legal body an independent director in charge, overseen by a board drawn from the cooperating research infrastructures.



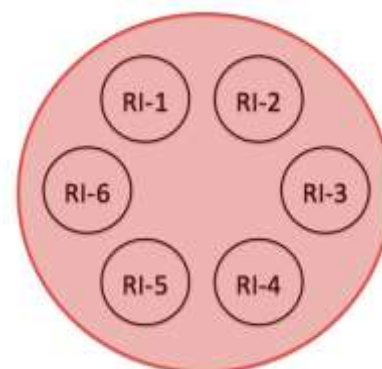
e. An ENVRI legal body taking up common tasks for the research infrastructures

The common tasks are the ones that can more efficiently and/or less costly be operated from the legal entity. As a consequence, the legal body will employ its own staff, and costs are to be covered by fees of the involved RIs. The Board of the legal entity (with representatives of the cooperating RIs) decides on the tasks that can better be operated by the legal entity.



f. Merge the individual infrastructures in a joint research infrastructure

This would be a united legal ENVRI acting as an umbrella organization of federated research infrastructures as working units. Each individual infrastructure will continue its normal operations, while an overarching board takes care of the common interests. This board may appoint supervisory committees from the relevant communities for each RI. This is a similar set-up as for CERN and EMBL where different research facilities are operated within a common legal body.



5.3 Opinions emerging from the ENVRI workshop and Survey

A survey to map RIs views on the preferences in regard to the future role and organization of the ENVRI cooperation was organized. All the options presented in chapter 5.2 were included in the survey. First survey took place before the ENVRI workshop but due to a low response rate, it was agreed in the workshop that the survey will be re-opened to get wider participation and at the same improved to include more details and explanations of the options. The results of the second survey are presented later in this section.

In the ENVRI workshop, to facilitate the discussion on the different options, the workshop participants voted on the organizational structures. The results were only meant to help in the discussion and were not used as a basis for decision-making. The workshop opinions are presented in Table 6.

Table 6. Preferred future ENVRI structure (votes indicated in parenthesis), identified in the ENVRI strategy and sustainability workshop (Nov 2018).

- A. Finish the ENVRI cooperation (0)
- B. Loose ENVRI network (2)
- C. Consortium agreement (17)
- D. Small ENVRI legal body (16)
- E. Larger ENVRI legal body (19)
- F. Merge all ENVRI into common ERIC (0)
- X. Multi-speed mixed model (15)

In the discussion, there was a call for clarification of terminology, for example on the differences between “Loose ENVRI network” (option B) and “Multi-speed mixed model” (option X that was added during the workshop). Several participants also pointed out that options C, D, and X are compatible, making it wise to start with C (i.e. with the Consortium Agreement), and there was a strong suggestion to get C in place during the last few months of ENVRIplus. Further discussion on which specific form of organization was therefore started during the workshop, but it was agreed that decision-making on the topic will take more deliberation.

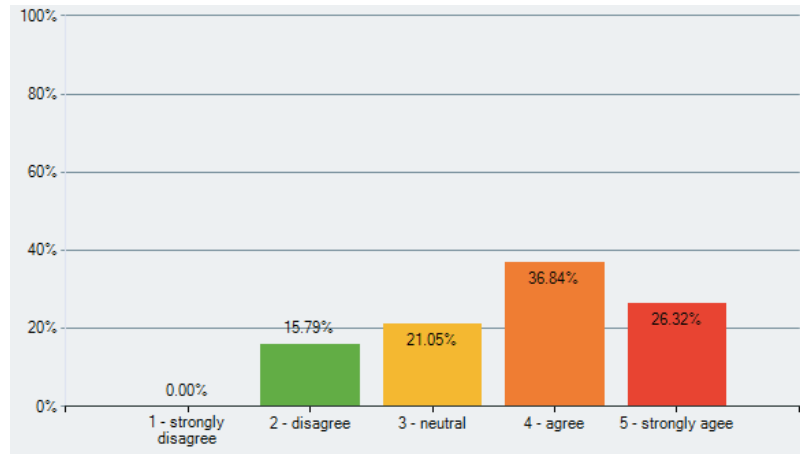
To help in the future discussions on the structure, the participants drafted action points to move forward and develop while looking for the suitable format. The most important items discussed were the drafting of a Business Plan and a Consortium Agreement. Both were agreed to be critical for the future, requiring a lot of background work and discussions, and taking time to build to suit the community members well. Therefore, it was agreed that neither the Business Plan nor the Consortium Agreement will be done quickly, but it was also agreed that getting started on the first steps of both immediately was critical. It was also reflected that RI discussion about legal paragraphs can begin already in parallel to work on a future Business Plan. Various steps towards both were presented and further discussed and processed, until action points were agreed on. All action points from the discussion on determining the organizational structure can be found from the Roadmap (see chapter 3.1.5).

After the workshop, the survey was re-opened to collect the opinions of the research infrastructures about the organizational options, focusing on preferred ENVRI structure in 2025. Each RI was asked to answer the survey once and every RI was encouraged to discuss internally on the topics before filling the survey. Altogether 19 responses were received

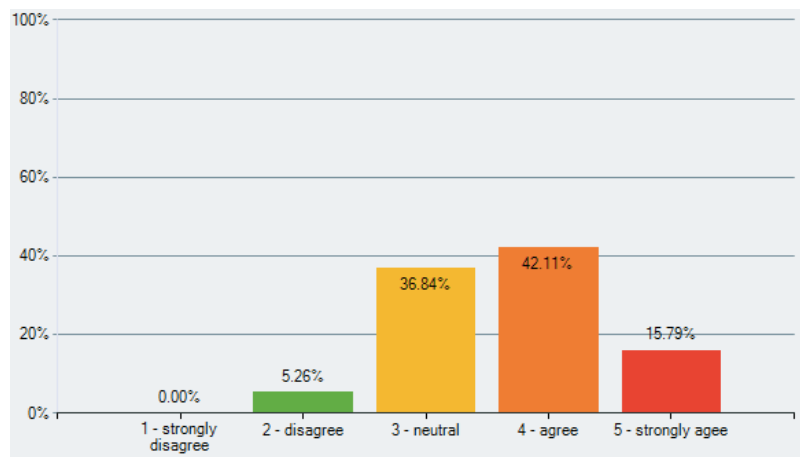


within the second round of the survey. The survey only focused on the options c-f since in earlier discussions revealed that all research infrastructures prefer to agree on a formalized cooperative model. The outcomes of the second survey are presented below.

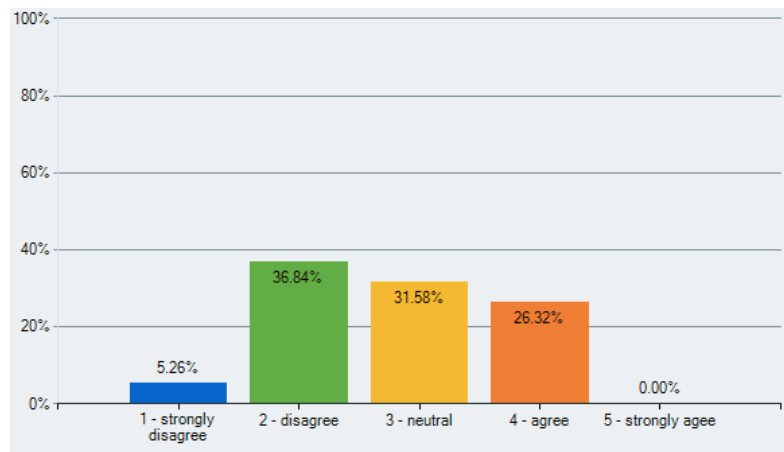
Option c: Federated structure with a consortium agreement



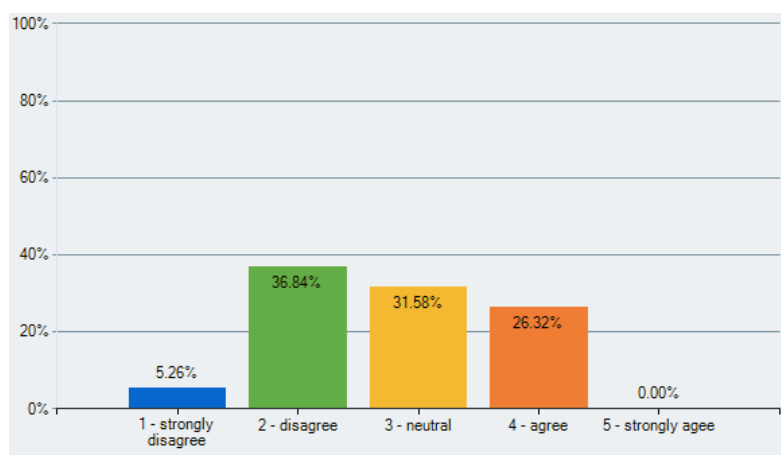
Option d: An ENVRI legal body with limited roles



Option e: An ENVRI legal body with agreed common tasks for the RIs



Option f: Merge RIs in a joint RI



The survey results were reviewed and discussed in the Prague BEERi meeting (Jan 2019) and following remarks were summarized:

- The survey answers are clearly reconfirming the outcomes of the discussions and conclusions in Riga workshop.
- The perspective is to aim at a common legal body, but start by organizing the European RI community in the framework of a Consortium Agreement.
- This allows for joint commitment to study and prepare a possible legal body with roles and tasks yet to be defined in more detail.

5.4 A stepwise approach towards consolidation of the ENVRI cooperation

The ENVRI workshop in Riga (Nov 2018) and the following BEERi meetings in January, March and June 2019 tackled intensively ENVRI strategic issues, partly supported by a new survey on the purpose, operational efficiency, and organisational structure of the ENVRI cooperation.

The discussions in the meetings and outcomes of the survey showed that nobody in the ENVRI community is in favour of ending the ENVRI cooperation, nor are they willing to merge all infrastructures into a single research infrastructure. Instead, the intermediate options were supported, with a joint commitment to study and prepare a possible legal body through a step-by-step process. This process towards the next phase of ENVRI is described in Figure 5 including steps that take place partly simultaneously:

- Vision statement
- Letters of Intent
- Updated strategy
- Business plan
- Potential Consortium Agreement

To facilitate the process, BEERi members agreed in the ENVRI workshop to set up a group of volunteers (working group) to gather the Letter of Intents from RIs and prepare proposals for a Consortium Agreement and associated Business Plan.



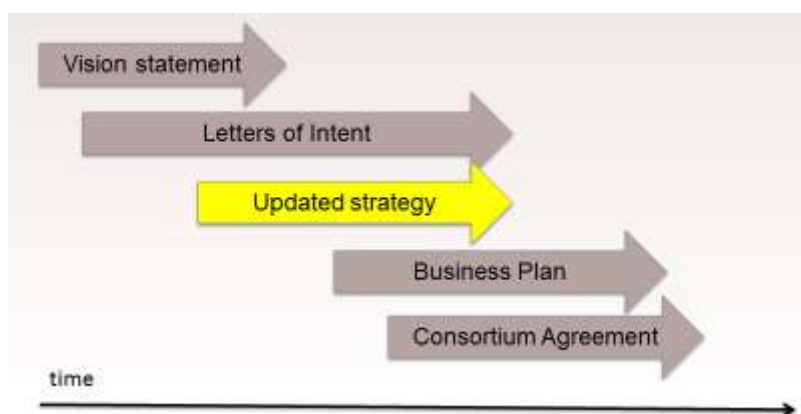


Figure 5. Building blocks of the step-wise approach to the next phase of ENVRI.

As described earlier in this document, the new vision statement for the ENVRI community was finalized in March 2019, describing community's ambition by 2030. In addition to the updated vision, the Letter of Intent (LoI) has been established and signatures to the LoIs from RIs are currently gathered. The Letter of Intent is not legally binding but it indicates RIs willingness to collaborate together with the other European environmental Research infrastructures in order to create more sustainable forms of collaboration for the ENVRI community. The elements that help in building and implementing the new ENVRI strategy are constructed and they are summarized in chapter 6.

At the same time when LoIs are collected, drafting of the potential Consortium Agreement is in progress to identify the priorities for common tasks and the related governance of the formalized cooperation. The working group together with the BEERi members are currently working on the bedrock of the Consortium Agreement by discussing on the following aspects:

1. Mission of the Consortium and the mandate
2. Membership criteria and types
3. Governance and management of the Consortium
4. Resources and fees

Along the Consortium Agreement, the ENVRI Business Plan is being drafted. The Business Plan will address topics that individual RIs will not tackle, and topics that RIs prefer to do collectively for reasons of efficiency or costs. These topics are presented shortly below, more detailed description of them can be found from the ENVRIplus Sustainability Plan (D17.5).

- 1) What is the focus of ENVRI? (Purpose and Vision; unique offering, ENVRI brand),
- 2) Who can you benefit? (Key stakeholders in which 'markets', which relations, benefits of cooperation, impact)
- 3) How to reach stakeholders? (Solutions, obstacles, required resources)
- 4) Commitments and constraints
- 5) How to structure it?

6. Elements of the updated ENVRI strategy

6.1 Common topics agreed in the ENVRI workshop and their further development

As presented earlier in this document, discussions and outcomes of the BEERi meetings and facilitated workshop on strategy and sustainability, as well as the opinions emerging from the different surveys have brought up several common topics that RIs regard vital and are willing to work further in the future.

After the strategic workshop (Nov 2018), BEERi members gathered together next time in the Prague BEERi meeting (Jan 2019), where the obstacles and solutions identified in the workshop were re-visited. The action points in the roadmap were presented and BEERi members' willingness to work on the common topics was reaffirmed to have a common understanding of the joint path forward. As a conclusion of the Prague BEERi meeting, the main topics to work together were agreed and identified content wise as follows:

1. Visibility and communication
 - ENVRI strategy (incl. vision)
 - ENVRI communication strategy
 - Network of communication officers
 - Outreach events (EGU, Brussels,...)
2. Fragmented funding landscape
 - National level
 - EC level (different DGs and units)
 - Regional, inter-regional level
 - ENVRI-FAIR Task3.1 (national stakeholder activity)
3. Competition between RIs
 - Landscape analysis
4. Autonomy and control
 - Defining the "boarders" of activities (RI level or cluster level activity) by BEERi discussions (e.g. participation in EC calls as ENVRI)
5. Organisational structure
 - Survey
 - Lol revised now for signature round
 - WG ENVRI one page description to be attached the Lol
 - Possible business plan and Consortium Agreement outline in March

Work on these common topics continued in the BEERi meeting during the Final ENVRI week in Helsinki (March 2019) and some of the topics were slightly renamed towards more positive impression to correspond better the ENVRI perspective as follows:

1. Visibility and communication
 - Update of ENVRI strategy (D17.2) + Finalization of ENVRI vision
 - Update of ENVRI-FAIR WP2 Task for developing a joint communication strategy with the RI communication officers
 - ENVRI landscape illustration
2. Fragmented funding landscape
 - Long-term sustainability of distributed RIs — fragmented funding landscape, their effects and the possible solutions
3. Positioning of RIs



Status of the ENVRI landscape analysis (D17.6)

- Single domain reports (atmosphere & hydrosphere domains)
- Sketch of the white paper integrating all domains
- Discussion on Solid Earth domain's landscape analysis

4. Collaboration of RIs

- ENVRI participation in EC calls

5. Organisational structure

- The way forward with ENVRI organisational structure
- The route to Federated structure with a consortium agreement: Status of Letter of Intent (LoI) and ENVRI Consortium Agreement (CA)

In the Helsinki BEERi meeting, the final revised ENVRI vision statement was agreed (see chapter 4.2), and brainstorming of the three mechanisms to help to implement the new strategy (see chapter 4.3) were presented and BEERi members' feedback and additions to the suggested mechanisms were gathered. It was agreed that an updated version of the ENVRI strategy (D17.2, this document) will be put together by the end of the project including description of the process, ingredients and possible actions of the updated strategy, and highlighting that the process is ongoing.

Working on the common topics continued in Brussels (June 2019), where the last BEERi meeting during ENVRIplus was held. The process so far on ENVRI strategy and the revised ENVRI vision was repeated, and BEERi members views on how to implement the new vision in practice was discussed. The agenda around the common topics in the Brussels BEERi meeting was structured as follows:

Organisational structure

- Letters of Intent (LoI) and draft of Consortium Agreement (CA)
- Updating the BEERi Terms of Reference (ToR) and Criteria for the BEERi membership
- Nomination and selection process for a new BEERi chair
- Work progress and outline of ENVRI Business plan

Visibility and communication

Update of ENVRI strategy

- ENVRIplus Deliverable D17.2
- Work after deliverable submission (iteration of ENVRI strategy)

Positioning of RIs

Status of the ENVRI landscape analysis and integrated white paper (ENVRIplus D17.6)

FIERI proposal for an International committee

- Update of the progress after Prague BEERi meeting (Jan 2019)

In Brussels, it was agreed to carry on the work on the joint topics in the next BEERi meeting to be organized in autumn 2019.

6.2 Summary of the elements to update the ENVRI strategy

The ENVRI cluster has produced several elements during the ENVRIplus that help the ENVRI community to move towards a new strategy. First of all, the 6 Themes identified in ENVRIplus are still considered valid. Secondly, as a result of long-term process, the ENVRI vision has been updated and discussion on the mechanisms (A, B, C) to implement the vision has been started. Thirdly, RIs have shown their interest to work on five topics regarded important for the whole ENVRI community as identified initially in the ENVRI workshop.



Figure 6 summarizes all these elements that help in building and implementing the new strategy for the ENVRI community. The work on the strategy elements will continue nonstop in autumn 2019 and spring 2020.

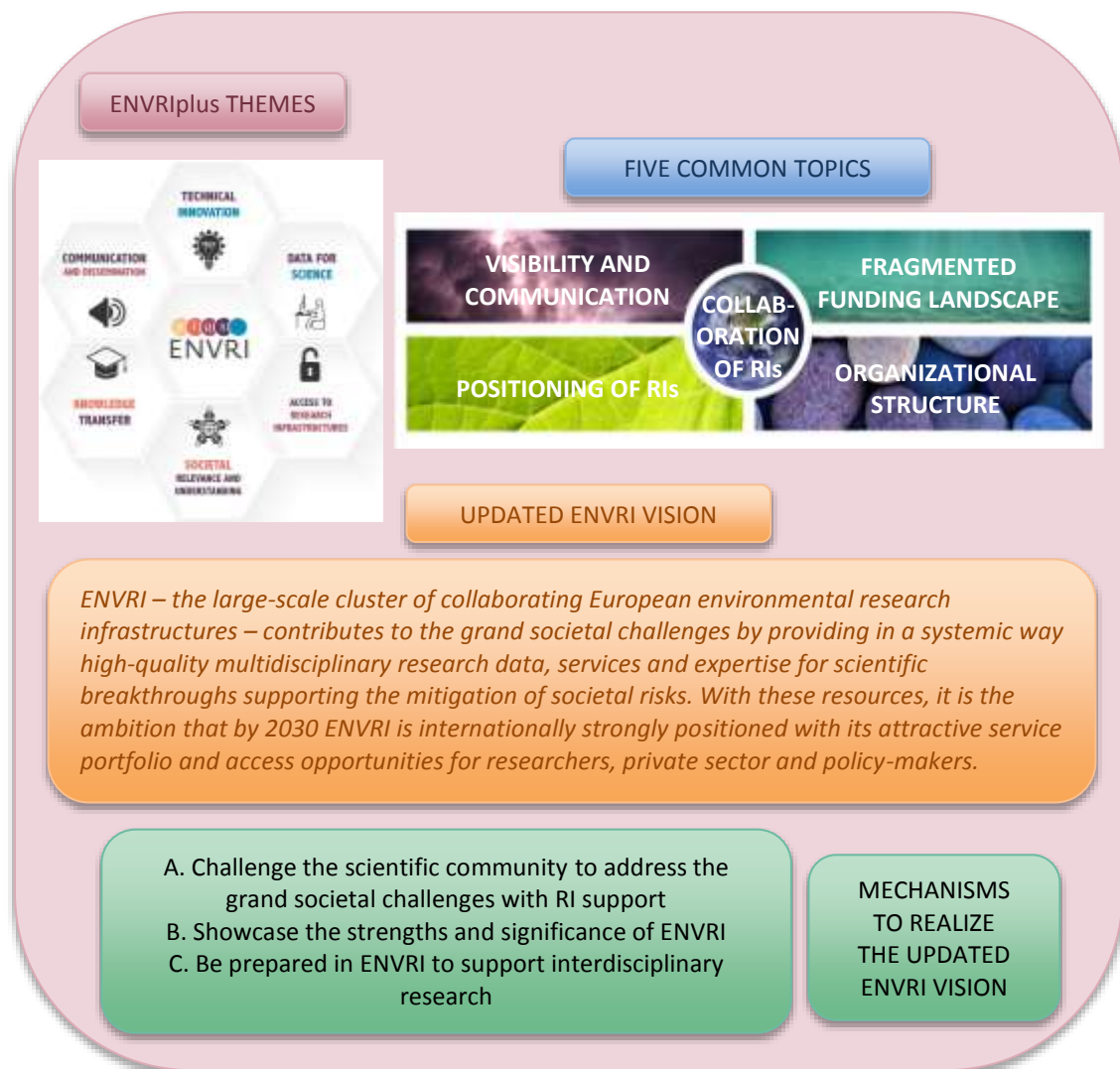


Figure 6. Summary of the elements that facilitate in building and implementing the new strategy for the ENVRI community.

7. Conclusions

This document summarizes the ENVRI strategy development during the ENVRIplus project and describes the potential elements to build and realize the new strategy for the ENVRI community. The strategy process is ongoing and the goal of this document is to bring together the available strategy related material and outcomes of the common discussions and decisions taken place in the BEERi meetings and dedicated workshop on ENVRI strategy and sustainability. In addition, the organizational structure to support the implementation of the new strategy is presented here.

A set of elements for shaping the new long-term strategy for the cluster of European environmental Research Infrastructures are in place and further to be developed and worked in the coming years (see Fig. 6). One of the main building blocks of the strategy is that the ENVRI community has agreed upon a new vision statement for the future that describes how European environmental RIs contribute to the society and what the community wants to be and achieve within the coming decade. In addition to the updated vision, the Themes identified in ENVRIplus are still valid and RIs have defined new common topics that they want to tackle and develop together.

In parallel to the common ENVRIplus themes and common topics, the ENVRI community has decided to proceed with a step-wise approach towards a federated structure (see Fig. 5). The Consortium Agreement and Business Plan are to help in this process and drafting of them has been started. In this process towards the next phase of ENVRI, the direction is more important than speed and allowing for investigation and experiencing is needed.

It should not be forgotten that building a strong ENVRI strategy requires good and healthy individual RIs on the bottom. As a summary, it can be concluded that a successful implementation of the ENVRI strategy requires at least following items:

- Individual RIs with catalogue of services, long-term sustainability (solid resources), capacity for interoperability
- Strong and motivated ENVRI community
- Strategy elements (common topics, themes, etc.) in place to work together
- Continuation of collaboration among RIs
 - Common activities, new development actions, knowledge transfer and sharing the best practices
- Revised framework for collaboration
 - Agreed organizational framework



References

Annex A ENVRI strategy and sustainability workshop public agenda



ENVRI strategy and sustainability workshop public agenda

ENVRI strategy and sustainability workshop

Agenda for the workshop

Day 1

- 9:00 Introduction
- 9:20 1. A common understanding
- 10:30 *Coffee*
- 11:00 2. Purpose and Vision
- 12:30 *Lunch*
- 13:15 3. Critical obstacles and solutions
- 15:30 *Coffee*
- 16:00 4. Setting objectives
- 17:00 Wrap-up of Day 1

Day 2

- 9:00 Recap from day 1
- 9:15 6. Commitment and constraints
- 10:00 7. Organisation and structure
- 10:30 *Coffee*
- 11:00 7. continued – determining the structure
- 12:00 *Lunch*
- 12:45 7. continued – practical considerations for iteration
- 8. Roadmap for next steps
- 14:15 *Coffee*
- 14:45 Workshop wrap-up