

Milestone 8.1: Identification of potential synergistic activities with other ENVRIs

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1. About this document

This report proposes a set of possible activities to allow the full exploitation of the synergies from collaborations with other research infrastructures of the environmental domain (ENVRIs). It is prepared in the context of the activities of the ACTRIS IMP (Aerosols, Clouds and Trace Gases Research Infrastructure Implementation Phase Project) Work Package 8, capitalizing the work done by ACTRIS in the ACTRIS PPP (Preparatory Phase Project) and the ENVRIPIus project¹, and following developments of the ongoing ENVRI Fair project².

The ACTRIS IMP is meant to take ACTRIS into a new level of maturity supporting the implementation of the organizational, operational and strategic frameworks of the RI. In particular, Work Package 8 aims at ensuring that ACTRIS is strongly embedded, highly connected, and heavily collaborating in the European and international research and research infrastructure arenas, particularly related to climate and air quality topics.

Starting from an analysis of the importance and added value of interlinkages and cooperation for the Research Infrastructures (RIs), also underlined in the Landscape Analysis included in the ESFRI Roadmap³, this document contains an overview of past, successful experiences of synergies building on which a new group of actions to be carried out to is proposed.

2. The added value of synergy

Synergies are meaningful interactions built to exploit the benefit that results from combining the actions of two agents or organizations willing to achieve something that neither of them would be able to achieve on their own. For entities in most sectors and domains, bundling activities has proven to be more efficient and effective than engaging in each activity separately, as results produced are generally more and greater than the simple sum of those achieved by the single parties.

This applies to many fields of operations and knowledge, and it is perhaps even more valid for science. Not by chance, exploiting synergies is highly recommended to RIs by the European Strategy Forum on Research Infrastructures (ESFRI). The ESFRI Landscape Analysis describes the crucial role that the RIs in the

¹ ENVRIPlus - Environmental Research Infrastructures Providing Shared Solutions for Science and Society was supported by the European Commission under the H2020-INFRADEV-1-2014-1, Grant Agreement No 654182. http://www.envriplus.eu/

² ENVRI-FAIR connects the Environmental Research Infrastructure (ENVRI) community to the European Open Science Cloud (EOSC). It is supported by the European Commission under the H2020-INFRAEOSC-2018-2, Grant Agreement No 824068. The main goal is for the participating RIs to build a set of FAIR data services. <u>https://envri.eu/home-envri-fair/</u>

³ See ESFRI Strategy Report and Roadmap 2018, Part 2, Landscape Analysis, Section 2 http://roadmap2018.esfri.eu/landscape-analysis/

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Roadmap can play in all scientific domains and highlights, in particular, the interconnections and crosscutting aspects of the whole European RIs ecosystem. Section 2 of the Analysis identifies some relevant connections that already exist among different thematic areas by means of the ESFRI RIs, making evident the critical needs and opportunities for new links and new research practices.



Figure 1 Interconnections between ESFRI RIs and scientific domains

ACTRIS IMP (www.actris.eu) is supported by the European Commission under the Horizon 2020 – Research and Innovation Framework Programme, H2020-INFRADEV-2019-2, Grant Agreement number: 871115 Exploiting synergies involves integrating actors, creating a common base of knowledge and developing shared practices, tools and instruments in a systemic approach which is very much needed to tackling current societal challenges. This is the main reason why environmental RIs are frequently encouraged to evaluating organisational coordination and joining efforts and resources to offer a broader spectrum of data and services for research on the natural environment, capable of fostering innovation and informed policymaking⁴. Global environmental challenges such as climate change, health, food and environment security can only be achieved through the establishment and implementation of linkages, partnerships and collaborations across institutes and scientific fields. The possibility to pool and share different data, equipment and expertise to conduct studies and scientific experiments has a decisive role in advancing the frontiers of science in the various domains, with the creation of knowledge critical to address challenges that require innovative approaches and methods as never before.

Synergies based on a multidisciplinary, interdisciplinary and transdisciplinary approach are particularly strategic for research in the environment domain, where efforts towards limiting the most damaging impacts of climate change, modelling a pathway to healthier, more sustainable communities in sustainable environments, and improving health and human security require a collective effort by different disciplines working in joint, common groups.

3. Past experience and best practices

In developing and exploiting synergies during its implementation phase, ACTRIS will learn from and capitalize the efforts and results reached by the ENVRIPlus project, which aimed at promoting cross-fertilization between Environmental and Earth System research infrastructures, improving the Earth observation monitoring systems and strategies by enhancing the transdisciplinary use of data and data-products. In the ESFRI Landscape Analysis ENVRIPlus was reported as a best practice of networking among Research Infrastructures that fosters synergies based on cross-disciplinarity:

"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 ENVRIPLUS (Environmental Research Infrastructures Providing Shared Solutions for Science and Society) project, the cluster of ENV RIs, built around ESFRI roadmap and

⁴ European Commission, Directorate-General for Research and Innovation, Supporting the Transformative Impact of Research Infrastructures on European Research. Report of the High-Level Expert Group to Assess the Progress of ESFRI and Other World Class Research Infrastructures Towards Implementation and Long-Term Sustainability, June 2020.

https://ec.europa.eu/info/sites/info/files/research and innovation/strategy on research and innovation/docum ents/ec rtd transformative-impact-ris-on-euro-research.pdf

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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."⁵

ENVRIPlus reached important results in the following areas:

- Joint development of observational capabilities → working to improving the Research Infrastructure's abilities to observe the Earth System, particularly in developing and testing new sensor technologies, harmonising observation methodologies and developing methods to overcome common problems;
- Joint development of data management, processing and publication for establishing functional and interoperable data systems,
- Development of access mechanisms for Research Infrastructures → with recommendations to be used as a reference for the Environmental Research Infrastructures when defining data and access policies. The project also created a pilot programme for multidisciplinary access
- Joint efforts to enhancing skills of RI operators and knowledge → with common training for RIs operators, managers and directors and common training material for the users on the usage of Research Infrastructure products and services.

ENVRIPlus also worked to establish and deepen relations with other RIs in the ESFRI Roadmap to promote, coordinate and cultivate new, stronger interaction and cooperation across disciplines that is needed to understand the complex problems facing the world today and to achieve the research goals.

4. Set of potential synergistic activities

The results of the synergies exploited by environmental RIs in the framework of the ENVRIPlus project, as well as those created during the ACTRIS PPP, demonstrated the need for further collaboration and coordination, especially on aspects such as interoperability of services, access provision to the facilities, possibilities of co-location, RI-to-RI services and many other features.

These are the key areas where to direct most of the efforts to establish more systematic and stable synergies. An initial set of potential synergist activities includes:

Collaboration to ensure the interoperability of digital services in the environmental, particularly
atmospheric domain. Interoperability is at the heart of the new EU digital strategy. It will be a key
action to ensure coordination and common standards among environmental RIs for securing
environmental data flows and services and for making maximum use of data. The application of

⁵ See ESFRI Public Roadmap 2018, Part 2, Landscape Analysis, p. 75

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compatible formats and protocols for gathering and processing data in a coherent and interoperable manner will be actively pursued.

- Pooling as much as possible resources, facilities and services to provide open, coordinated, multidisciplinary open physical, remote and virtual access and encourage the development of interdisciplinary and transdisciplinary teams performing complementary experiments for a better understanding of the underlying environmental problems. This can be done, for instance, also by contributing to establishing/maintaining multi-instrumented observation platforms covering at least two or more environmental domains (atmosphere, bio-ecosphere, marine, and solid earth domain);
- Harmonization of the access procedures, through the joint development of sustainable solutions, guidelines and recommendations for governance, management and funding for efficient and effective access provision to a larger user community, also exploring and testing new modalities of access that build on the complementarity and synergies among atmospheric RIs;
- Encouraging the joint design, test and implementation of complementary products and more advanced services, including digital services, developed as part of cross-RI efforts to improve the offer and capabilities of the parties and ensure wider accessibility for a great variety of users, including the private sector;
- Joint design and implementation of research projects, collaborative initiatives and plans to improve efficiency and effectiveness in pursuing the common goals of generating knowledge to tackling societal challenges and producing significant socioeconomic impacts;
- Joint organization of Workshops and Science Events to bring together close but separated research groups and scientific communities with a view to share knowledge and experiences, thoughts and views on common scientific challenges, this way overcoming the boundaries of the individual disciplines to allow multiple points of view on topics of common interest;
- Carrying out appropriate networking activities also with RIs outside the environment domain, to develop the relevant links that already exist among different thematic areas, fostering cooperation with other RIs and other scientific communities in different domains establishing and deepening relations with other RIs in the ESFRI Roadmap, so as to explore chances for new, interdisciplinary cooperation and research.

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