Draft proposal for a

European Partnership under Horizon Europe

Accelerating farming systems transition: agroecology living labs and research infrastructures

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Summary

The partnership aims to **accelerate the transition towards sustainable**, climate- and ecosystem-friendly **farming practices**. To do so, it will 1) enable a better comprehension of agroecological processes from farm to landscape levels, 2) boost place-based innovation in co-creative environments and 3) improve the flow and uptake of knowledge and innovations on agroecology. It pursues the common vision to team-up and unlock the transition to agroecology so that farming systems are resilient, prosperous, place-sensitive, climate-, biodiversity- and people-friendly by 2050.

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Preamble

In spring 2019 the Commission services were asked to put forward first proposals for candidate European Partnerships to be funded under Horizon Europe. On that occasion, DG AGRI, in collaboration with DG ENV, DG RTD, DG CLIMA and the JRC, presented a first concept[1] of the partnership that received wide initial support from the Member States (MS) and Associated Countries (AC) represented in the Horizon Europe Shadow Programme Committee. Following requests from several countries, the present proposal has been developed by the Strategic Working Group on Agroecology (SCAR-AE)[2] set up under the Standing Committee on Agricultural Research (SCAR) in early 2021[3]. The proposal has been developed in close collaboration with the Commission and with FACCE-JPI[4] and Coordination and Support Actions (CSAs) funded under Horizon 2020 (work programme 2020) to prepare the ground for the implementation of this partnership[5].

During the process, SCAR-AE has gathered inputs from a wide range of stakeholders including national representatives, academics, researchers, EU-funded projects, ERA-Nets and Joint Programming Initiatives, farmer organisation, European Technology Platforms, EU research infrastructures, organised in thematic action groups. The proposal has been developed in accordance with the template, considering the initial concepts developed by the Commission along with feedback received from MS and AC, including Country Contact Points (appointed by MS/AC to follow the development of the partnership), as well as by a large community of stakeholders gathered around a series of six webinars organised by the Commission during May – October 2020[6]. The Commission has closely guided the drafting process to facilitate alignment with the overall EU political priorities and ambition and compliance with the criteria for Partnerships under Horizon Europe.

This document is a stable draft of the partnership proposal, released for the purpose of ensuring transparency of information on the current status of preparation (including on the process for developing the Strategic Research and Innovation Agenda). As such, it aims to contribute to further collaboration, synergies and alignment between partnership candidates and more broadly with related Research and Innovation (R&I) stakeholders in the EU, and beyond where relevant.

This document does not reflect the final views of the Commission, nor pre-empt the formal decision-making (comitology or legislative procedure) on the establishment of European Partnerships. During the next steps of preparation, the Commission Services will further assess these proposals against the selection criteria for European Partnerships. The final decision on launching a Partnership will depend on progress in their preparation (including compliance with selection criteria) and formal decisions on European Partnerships (linked with the adoption of work plans, and legislative procedures, depending on the form). A key precondition

[1] https://www.era-learn.eu/partnerships-in-a-nutshell/r-i-partnerships/european-partnerships-under-horizon-europe/partnerships-under-preparation/candidates-for-european-partnerships/27-towards-more-sustainable-farming
[2] Called hereafter SCAR-AE; membership of SCAR-AE is provided in Annex 10
[3] https://scar-europe.org/index.php/agroecology
[4] https://www.faccejpi.net/en/faccejpi.htm
[5] "European Agroecology Living Lab and Research Infrastructure Network" (ALL-Ready), "Agroecology for Europe" (AE4EU) with also the contribution of "Soil Mission Support" (SMS).
[6] https://ec.europa.eu/info/research-and-innovation/research-area/agriculture-forestry-and-rural-areas/partnership-agroecology-webinars_en

is the existence of an agreed draft Strategic Research and Innovation Agenda. The launch of a Partnership is also conditional to partners signing up to final, commonly agreed objectives and committing the resources and investments needed from their side to achieve them. The remaining issues will be addressed in the context of the development of the Strategic Research and Innovation Agendas/Roadmaps, and as part of the overall policy (notably, the respective legal frameworks).

All partnerships need to have a well-developed logical framework with concrete objectives and targets and with a set of Key Performance Indicators (KPI) to monitor achievement of objectives and the resources that are invested. Aspects related to implementation, programme design, monitoring and evaluation system will be streamlined and harmonised at a later stage across initiatives to ensure compliance with the implementation criteria, comparability across initiatives and to simplify the overall landscape.

It is important to indicate that the partnership belongs to a "partnership landscape" that will avoid overlaps and build synergies, including with the candidate partnerships on Food Systems, Agriculture of Data, Animal Health and Welfare, the Biodiversa+ partnership and the EU Mission "A Soil deal for Europe", for win-win collaboration and solutions.

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1 Context, objectives, expected impacts

1.1 Context and problem definition

1.1.1 Problems

The production of food, feed and biomass for other uses depends on farmers, who manage almost half EU land[7], making them central stewards of Europe's natural resources and key strategic actors in the bioeconomy. The COVID-19 pandemic and the increasingly frequent occurrence of extreme climate events have underlined the fragility of current production systems and the importance of moving towards robust and resilient food systems capable of ensuring access to sufficient affordable and healthy food for citizens. These events have also raised awareness on the relationships between health, ecosystems, supply chains, consumption patterns and planetary boundaries, and the importance of locally and regionally produced and sourced food that decreases the dependence on non-EU imports. In addition to food, feed, fibre and other types of biomass are of major importance to the EU economy and trade. Finally, farming is an important part of the rural economy and a major source of employment, despite farmers' ever-decreasing share of the EU [8] workforce and population.

The current agricultural production system benefits from several decades of scientific and technological innovation, which in the post-World War II period is associated with the Green Revolution. Through mechanisation, crop and livestock breeding, and the use of chemical inputs such as fertilisers and pesticides, productivity has increased, thereby compensating for the outflow of labour from farming to industry and services. Value chain structuring and technological development have favoured the specialisation of farmers and the production of a limited number of products, with supplies, processing and marketing being delegated to cooperatives, industry and retail.

These changes have successfully ensured food security in Europe but have come at the cost of a series of environmental, socio-economic and cultural degradations. IPCC[9] (2019) and IPBES[10] (2019) assessments have concluded that "many aspects of current food production systems drive degradation of land productivity, water resources and soil health, as well as biodiversity loss at multiple spatial scales, ultimately compromising the sustainability of food production systems"[11]. Indeed, the intensification of agricultural systems and land use have had adverse impacts on the environment and the preservation of natural resources, such as soil and water, and are among the causes of habitat fragmentation/loss and biodiversity loss. Intensification has also contributed to increased greenhouse gas emissions (GHG) from agriculture; the sector is responsible for 10.3% of the total EU's GHG emissions[12].

Animal-based food production is a significant contributor to GHG emissions. Additionally, the high proportion of land devoted to animal feed negatively affects crop diversity. In addition,

[7] https://ec.europa.eu/agriculture/cap-indicators/context_en
[8] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0381
[9] IPCC 2019 Summary for Policymakers. In: Climate Change and Land: an IPCC special report on cli-mate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems
[10] IPBES 2019 Summary for policymakers of the global assessment report on biodiversity and eco-system services of the Intergovernmental Science-Policy Platform on Biodiversity and Eco-system Services
[11] (Hodson et al. 2021 (UNFSS Science Group Track 3)
[12] EEA (2019), Annual European Union greenhouse gas inventory 1990-2017 and Inventory report 2019. These figures do not include CO2 emissions from land use and land use change, nor emissions from energy use and the production of chemical fertiliser.

the intensification of livestock farming on large farms with excessive use of antibiotics that increase the risk of resistance of some pathogens has negative impacts on animal health. In parallel, animal-based production has a potential to play a positive role in the transition, by providing services (e.g. well-managed manure on soil fertility and health). Moreover the decoupling of animal husbandry and crop production leads to imbalances between availability and need for nutrients locally and regionally.

Furthermore, farmers are increasingly confronted with the consequences of climate change and must adapt to its diverse effects. High temperatures, longer periods of drought and heat, increased late frost risks, increased heavy rainfall events and extreme weather events jeopardise entire agricultural production systems. Farmers also play a vital role in preserving biodiversity, since they are among the first to feel the consequences when biodiversity is lost but also among the first to reap the benefits when it is restored[13]. In conclusion, *European farmers are an essential part of the EU's future and must continue to be the social and economic hub of many communities across our Union*[14].

At the same time many farmers do not draw a sufficient income from their farming activity. In 2018, while 5 % of farms had a Farm Net Value Added (FNVA) per Annual Work Unit (AWU), a measure of a farmer's income per year, of more than EUR 70 000, 50 % had a FNVA per AWU below EUR 10 000[15]. Factors such as fragile incomes, volatile food prices, extreme weather events, increasing volatility and uncertainty, new pests and diseases, and imbalances in the food chain leave farmers in vulnerable positions compared to other actors in the value chain and constrain their long-term investments / projects, leading to lock-ins. This tends to lead to not only risk averse behaviour, but also challenges in terms of generation renewal (32% of European farmers were over 65 years old , and only 11% of EU farmers were under 40 years of age in 2016[16]), exacerbated in areas facing rural decline and limited access to land.

Finally, the environmental impact and carbon footprint of current farming practices are increasingly criticised by the public and the media. There is a growing expectation of a more resource-conserving agriculture based on more "natural" and integrated principles, which also contributes to environmental protection and to healthier and more sustainable diets. For example, in 2020, 9,1% of the total EU agricultural land was under organic production[17]. This poses challenges to the existing socio-technical system of currently practiced agriculture to transform through the implementation of a broad spectrum of innovations, to agricultural production systems which respond to the needs for affordable, sufficient, healthy and safe food and other high-quality raw materials, as well as conserving resources and the environment, promoting biodiversity and increasing the provision of ecosystem services from farming activities.

A description of the main problems encountered by the EU farming sector, the drivers and opportunities is provided in Annex 6.

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[13] EU Biodiversity Strategy 2030

[14] EU Biodiversity Strategy 2030

[15] EU Farm Economics Overview FADN 2018: https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/farming/documents/eu-farm-econ-overview-2018_en.pdf

[16] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2021%3A815%3AFIN

[17] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Organic_farming_statistics#:~:text=Organic%20farming%20covered%20around%2014.7,were%20Austria%2C%20Estonia%20and%20Sweden.

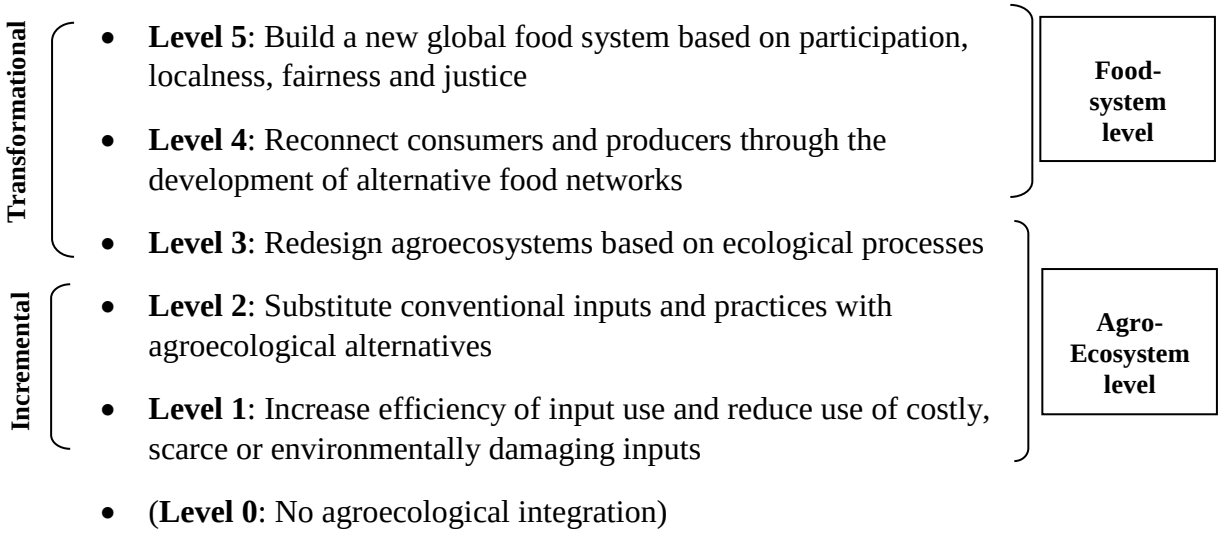
1.1.2 Strategic opportunities

The premise of this partnership is that we can address these challenges through agroecology (AE hereafter), which is an approach, that build on natural, biological interactions while using state-of-the-art science and technology as well as basing innovation on farmers' knowledge and tested best practices.

There is increasing recognition that a major change is needed that would make the agricultural sector more sustainable, resilient and responsive to societal and policy demands. This is highlighted in a large number of policy documents and initiatives, ranging from the UN Sustainable Development Goals (SDGs) to the ambitious European Green Deal and the underlying strategies - Farm to Fork and the EU Biodiversity Strategy 2030, and the Common Agricultural Policy (CAP), among others (see Annex 2).

This common understanding from a systemic, transformational approach allows for the definition and formation of approaches and steps for the transition to AE to be undertaken within the EU. This partnership offers the opportunity to address the ambitious challenge to redesign agricultural systems accordingly and feed positively into the redesign of the food system in cooperation with a landscape of Horizon Europe partnerships.

Five levels of agroecology transition have been widely adopted based on Gliessman (2016) [18]. These levels, modified from the FAO HLPE Report (2019) and the FAO TAPE Tool (2019) [19], are:



A full transition to AE entails arrival at levels 4 and 5 through transformative change of the entire food system. The proposed partnership has its main focus on transition through levels 1-3, i.e. on fostering AE transition at the primary production level. Nevertheless, to achieve the ambition of an in-depth transformation of the system, the links between primary production and the entire food system context described in the figure are acknowledged and therefore this

[18] Gliessman, S. (2016) Transforming food systems with agroecology. Agroecology and Sustainable Food Systems, 40(3), 187-189. https://doi.org/10.1080/21683565.2015.1130765

[19] FAO *TAPE Tool for Agroecology Performance Evaluation. Process of Development and Guidelines for Application. Test version*, 2019, 89 pp. (http://www.fao.org/3/ca7407en/CA7407EN.pdf).

partnership will also consider advances in level 4. With this perspective, synergies with the candidate European Partnership for Sustainable Food System for People, Planet & Climate will ensure coherence across the food chain and an increased demand at consumer level to support the transition.

1.1.3 R&I bottlenecks and lock-ins

The transition to more sustainable farming practices and systems such as AE that maximise the use of ecological processes and rely on increased diversity, as an alternative to systems that rely mostly on the use of external inputs (e.g. fertilisers and pesticides) with increasing costs, supply uncertainty and potential negative impacts on the three dimensions of sustainability, is hindered by factors that include:

R&I related:

i) Insufficient and scattered education, data and knowledge on agroecosystems, AE farming practices and the benefits and costs of AE transition measures, including: (a) insufficient knowledge on ecological processes and dynamics at the appropriate spatial level to address the relevant biophysical and socio-economic challenges; (b) lack of experimental and long-term data series on agro-ecosystems' functioning ; (c) lack of sound indicators, tools and methodologies to quantify ecosystem services at various spatial scales; (d) lack of robust data on the context-specific positive effects of combinations of AE management practices and systems on climate change mitigation and adaptation, and on biodiversity.

ii) Lock-ins in the research and innovation system: (a) lack of incentives for researchers involved in systems thinking approaches, lack of adapted funding opportunities (e.g. due to longer approval times because of the number of people that have to be consulted) and career opportunities; (b) the limited number of structures/mechanisms at the relevant level to facilitate the co-creation of innovative solutions to the local challenges of the farming sector and to ensure the involvement of end users along with other relevant stakeholders, including researchers, advisors, companies, consumers and public authorities; (c) the absence of a specific, harmonised mechanism that allows the sharing of experience and best practices and communication among different actors across Europe on the adoption of AE approaches.

iii) The diversity of local conditions, and of the local impact of climate change, which prevent the development of standard solutions to be rolled-out, leading to the need to design new knowledge management systems, allowing for both down- and upscaling of information and solutions, new tools to capture and aggregate place-specific data, and ways to address the trade-offs between specificity of place-based knowledge and innovation and genericity for knowledge exchange at EU level.

Related to policy:

i) The lack of common understanding and ownership of the concept of AE at relevant levels (policy, stakeholders, science community) and lack of recognition of its potential to deliver economic, social, climate and environmental sustainability, together with food

security and increased resilience, and hence be a credible alternative to more conventional farming approaches and productivist[20] paradigms.

ii) The lack/narrow focus of strategic and long-term thinking that impairs the planning and organisation of farming systems transition to AE, and the fragmentation of strategic policies that restricts a coherent policy framework to support this transition.

iii) The lack of adapted policy 'drivers' and regulatory aspects (for example land use-planning of green infrastructures without integrative criteria, lack of countries' and farmers' uptake of practices conducive to sustainable management of natural resources) which constrains the adoption of AE innovation and production practices with respect to nutrient inputs, agricultural emissions, multifunctional agriculture, agro-forestry, organic production, etc.

Linked to deployment, business models, systemic challenges:

i) Reluctance of farmers and advisors to embark on transitions to AE driven by: (a) higher knowledge intensity and complexity of AE compared with more conventional farming approaches and a subsequent need for skills on the practical implementation of AE practices in specific contexts, on their benefits on the environment and on their economic performance; (b) perceived risk of lower profitability in the first years (i.e. moving from annual considerations to longer-term) due to concerns on labour-intensity, potential lower productivity, yield instability, lack of market outlets and short-term risks related to outbreaks of pests and diseases; (c) low income, high debt, limited investment capacity, volatile market conditions and overall market orientations towards standardised products that limit farmers' capacity and willingness to take risks; (d) the relationship between generational issues, education and innovation, particularly the link between age and innovation, with younger and better educated farmers being considered particularly innovative, in combination with difficulties for young people to gain access to farming (White 2015[21]); (e) low attractiveness of farming and rural life. Nonetheless, there is a high degree of variation across European farms (see 1.1.4).

ii) Lock-ins in value chains and business models that are designed for large-scale global flows: (a) the overall orientation in processing, retail and logistics towards long value chains, adapted to standard products and industrial scale, and not including externalities (e.g. energy use); (b) lack of knowledge and innovation to optimise the costs and environmental impacts of shorter value chains or value chains adapted to smaller quantities of products or designed to aggregate these smaller quantities, and weak strategies aiming to provide added value from AE products through their processing; (c) challenges in processing of products from AE production systems (such as processing of variety mixes, pulses, less standardised quality features, etc.); (d) inadequate food standards in terms of quality or appearances of the fresh products; (e) reluctance of (some) companies to invest in new/changing systems.

[20] "Productivism" is defined as "a discourse of agricultural organisation in which the function of farming was singularly conceived as the production of food and fibre, and which prioritised increasing agricultural production over all other considerations" (Woods, 2011, p. 67). Woods, M. (2011). Rural. London, UK: Routledge

[21] White, B (2015) Generational dynamics in agriculture: Reflections on rural youth and farming futures. Cahiers Agricultures, Vol 24

iii) Lock-ins **restricting consumption and demand for products** coming from AE: (a) insufficient consumer awareness of the costs and added value of AE practices and insufficient incentives that could trigger increased demand for products produced under AE principles, in addition to products coming from organic farming; (b) issues around the affordability of AE products and, in some cases accessibility (absence of shops selling them/food deserts); (c) challenges around dietary change to adjust the composition of diets to what can sustainably be produced through AE; (d) economic system and cultural mindset oriented towards short-time and price-based competition. A close collaboration with the partnership on Food Systems can create strong win-win strategies.

1.1.4 Ways forward: combining AE, living labs and research infrastructures

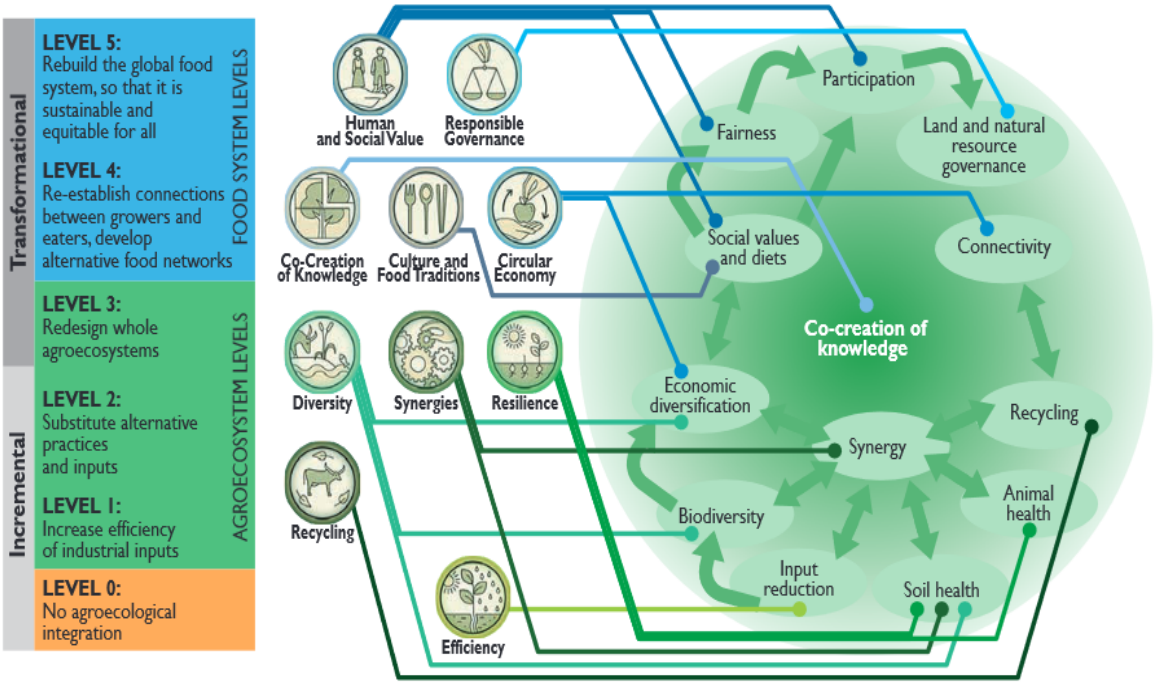
Agroecology (AE): is a dynamic and holistic approach to agriculture considered at the same time a science, a set of practices and a socio-political movement aimed at supporting the transition of agri-food systems towards more sustainable practices. It aims at connecting science, practice and society and to trigger the adoption of a set of policies aimed at sustainable agricultural practices.

As an outcome of SCAR-AE, AE will be considered in the context of this document as "the science of ecological processes *applied to agricultural*[22] *production systems* benefiting from the interplay of science, technology and traditional or indigenous knowledge by farmers and stakeholders in value chains". AE can contribute to mitigate climate change and strengthen the sustainability and resilience of farming and land use systems. AE practices are already emerging in many European countries and are recognised in the Green Deal[23]. AE could become a fundamental tool for the EU in its effort to respect planetary boundaries and in response to increasing consumer demand for healthy, affordable, pesticide-free and nutritious food.

At the international level, the Food and Agriculture Organisation of the United Nations (FAO) also promotes the potential of AE, stating that "*agroecology is based on applying ecological concepts and principles to optimise interactions between plants, animals, humans and the environment while taking into consideration the social aspects that need to be addressed for a sustainable and fair food system*"[24]. In this context, the FAO has developed ''The 10 Elements of Agroecology''[25].

More recently, a systemic approach has been synthesised and defined by the High-Level Panel of Experts[26] for the World Committee on Food Security in the 13 principles of agroecology (HLPE, 2019) (figure 1).

[22] Agriculture in the context of this document should be seen in the wider sense
[23] https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf
[24] http://www.fao.org/agroecology/home/en/
[25] http://www.fao.org/agroecology/knowledge/10-elements/en/
[26] HLPE 2019



▲ *Linking FAO's 10 elements, Gliesmann's 5 levels of food system transformation and the 13 HLPE principles*
Correspondence based on Wezel et al., *2020. Agroecological principles and elements and their implications for transitioning to sustainable food systems. A review.* Agronomy for Sustainable Development, *(2020) 40: 40.*

Figure 1: 13 principles of agroecology (26th dossier of AGROPOLIS International[27]).

More explicit than the ten elements, on which they are based, these provide indications and guidelines for concrete implementation.

BOX: Instead of a new definition, we hereby set common guidelines for AE. These guidelines are to be understood as the implementation of the current state of science and technology by farmers and stakeholders in value chains:

a. Reduction of greenhouse gas emissions from agriculture, active removal or carbon storage, as a contribution to climate protection with the goal of climate neutrality;

b. Preserving natural resources, minimising water and nutrients losses by reducing the use of pesticides and mineral fertilisers and optimising farm and regional nutrient cycles;

c. Improving water retention in the landscape;

d. Strengthening the resilience of agricultural systems to adapt to climate change by diversifying species and genetic resources in the agroecosystem at farm (including animal breeds), field (including site-adapted varieties and crop rotation), and landscape levels;

e. Adaptation of cropping patterns and field structures to landscape form, relief, and soil heterogeneity, within farms and also across farm boundaries at the regional level;

[27] https://www.agropolis.org/publications/thematic-files-agropolis.php

f. Enhancing ecosystem services, biodiversity and beneficial biological interactions (including promoting antagonists of diseases and pests) among different components in the agroecosystem and the local environment;

g. Promote soil health and quality through an appropriate management of organic matter and soil microorganisms, and tillage practices;

h. Minimise food competition between humans and livestock by transforming and upgrading biomass, residues, and co-products from the food industry that are not suitable for human consumption;

i. Improving animal welfare and prioritising dual-purpose livestock with meat as a co-product (dairy cattle, laying hens);

j. Define and adhere to social standards and build sustainable value chains - create and optimise further processing and marketing opportunities for products from diversified agro-ecosystems (including regional, national or global marketing), and

k. Improve communication between producers and consumers on sustainable value chains, change consumer behaviour.

It is important to note that there are approx. 14 mio. farms/holdings in the EU, with high variation, not only in terms of size and aspects related to pedo-climatic conditions and biogeographic regions across the EU MS and AC but also in terms of cultural backgrounds and traditions. This poses challenges in addressing the EU policy objectives and targets all over Europe in a coordinated way. Moreover, the approach and implementation of AE vary widely throughout Europe. AE is a knowledge-intensive, systemic approach that has implications for the whole span of agricultural practices, from breeds and varieties used to farming practices related to soil management and crop diversification strategies, integration in value chains, and business models that can economically and socially sustain these more locally adapted practices and provide greater market opportunities for farmers and citizens.

Therefore, coordinated large-scale initiatives are needed to attain tangible results at the farm level and beyond, to promote the development, uptake and upscaling of these practices at the adequate landscape and regional levels, while at the same time considering the specificities of the local context. A strong coordination with other partnerships enhances tangible results across the whole system. The rationale for this partnership is that strongly linking agriculture to ecological processes and biodiversity will render it more sustainable and resilient. To do this, a real-life approach, involving all actors, as exemplified by living labs, and/or in a science-based and open science context, as exemplified by research infrastructures, will ensure that this is not just an academic exercise. This will require overcoming the barriers cited above and specifically, for this partnership, addressing the knowledge gaps through research, the lack of long-term, coherent data sets through standardisation and long-term support for research infrastructures and the need for networking and exchange of knowledge and good practices through a Europe-wide network of living labs and research infrastructures (see below).

As indicated above, the adoption by farmers of AE practices largely depends on the availability of context-adapted, cost-effective solutions on the benefits of AE, for the environment, socio-economic and cultural conditions, the quality of their products, the income they generate and the overall sustainability of the farming activity as well as the acceptance of citizens. Accelerating AE transition means promoting the co-development of solutions, activities,

designing policies and developing skills and competences for the transformation of the overall agroecosystem, involving all the relevant actors. Advances will also depend on the capacity to monitor the changes and impacts at the whole agroecosystem level. Two main arrangements appear suited to shape, share, and renew the collective efforts and investments in this area:

Living Labs (LLs): Since their appearance in 2000 as real-life testing and experimentation environments for developing information and communication technologies[28], LLs have been implemented in many economic sectors. They place the user at the centre of innovation and operate as intermediaries among citizens, research organisations, companies, local and regional authorities for joint value co-creation, rapid prototyping or validation to scale up innovation and businesses. In LLs, three categories of outcomes are co-produced: business, social and knowledge[29]. LLs are increasingly central for implementing sustainable transition, e.g., in health infrastructure, rural development, etc. ENoLL, the European Network of Living Labs[30], founded in 2006, supports the evolution and the uptake of the Living Lab paradigm worldwide and has developed a labelling process. According to ENoLL, five key elements must be present in a living lab, regardless of their application domain: 1) active user involvement, 2) real-life setting, 3) multi-stakeholder, 4) multi-method approach, 5) co-creation (i.e. iterations of design cycles with different sets of stakeholders). These key elements are reinterpreted in each socio-economical sector to fit best the aim, the context, and the diversity of participants involved in each LL. A description of the main features foreseen for LLs and RIs to make the AE transition is provided in Annex 3.

In the context of the G20 Meetings of Agricultural Chief Scientists[31] (MACS), the European Commission has actively contributed to the discussion on the potential of "agroecosystem living labs" for improving the effectiveness and adoption of more sustainable agricultural practices[32]. Agroecosystem living labs (ALL) have been defined in this context as "*transdisciplinary approaches which involve farmers, scientists and other interested partners in the co-design, monitoring and evaluation of new and existing agricultural practices and technologies on working landscapes to improve their effectiveness and early adoption".* Furthermore, McPhee and colleagues[33] have specified the unique features of agroecosystems LL by analysing their commonalities and differences with other categorised LLs. ALLs were found to belong to the "place-based LLs", along with urban and rural living labs, and then the categories developed by Steen and van Bueren[34] for urban living labs (i. aims, ii. participants, iii. activities, iv. context) were used to identify commonalities and particularities.

Unique features of LLs for *AE transition* (hereafter AELLs) can then be inferred considering the expectations for AE transition. AELLs work towards improving sustainability and resilience at the agroecosystem and landscape levels. What makes AELLs unique are: i) their very strong local embeddedness, ii) the large diversity of their origins, from farms to networks or communities, and iii) the heterogeneity and intensity of knowledge and innovations needed

[28] Følstad, 2008
[29] Dubé et al., 2014
[30] https://enoll.org/about-us
[31] https://www.macs-g20.org/
[32] https://www.macs-g20.org/fileadmin/macs/Annual_Meetings/2019_Japan/ALL_Executive_Report.pdf
[33] McPhee et al. 2021 Sustainability
[34] Steen and van Bueren, 2017

and produced (from practice to policies). They require strong meta-governance[35] and a good orchestration of the activities. AELLs can have different scales: they can be built at the level of the farm and its immediate surroundings (although at such scale this may be a network of farms), at the landscape or at the regional level.

Research infrastructures (RIs): the following definition is given by DG RTD[36] "Research Infrastructures are facilities that provide resources and services for research communities to conduct research and foster innovation. They can be used beyond research e.g. for education or public services and they may be single-sited, distributed, or virtual. They include: major scientific equipment or sets of instruments; collections, archives or scientific data; computing systems and communication networks; any other research and innovation infrastructure of a unique nature which is open to external users". Europe's RIs boost the capacity to deliver scientific breakthroughs, that at the same time foster innovation. RIs can support research to rapidly address the societal challenges facing Europe and the world and can be key to lead and prepare the necessary economic, social and environmental transitions[37].

RIs can be defined as facilities, in a very broad sense, that provide services for research communities, whether or not they are managed by research institutions, working in a long-term perspective. The following main criteria can characterise RIs: (a) long-term and FAIR[38]. principles, (b) size of the research community that use facilities and services, (c) diversity of facilities, of data, of contexts that allow scientific production and (d) innovation, education, public services contribution. The long-term perspective is key in the area of work of the partnership since understanding the evolution of agro-ecosystems needs to take place over a long period of time. The partnership, with its network of LLs and RIs, will provide a unique opportunity to assemble harmonised data on key variables at the EU level.

RIs can be important facilities for AE transition. They are dedicated to research communities, and allow scientists to observe / experiment / predict agroecosystem and agri-food redesign. All together they contribute to bringing a body of scientific knowledge on AE available for the transition. They can contribute to (a) various degrees of agriculture and agri-food redesign (from incremental to strong redesign, biodiversity in agroecosystems), (b) sustainability assessment (impacts, ecosystem services, ecological, social and economic dimensions), (c) Vulnerability - Adaptability - Resilience assessment (emergent properties of agroecosystems) and (d) dynamics of the AE transition. Examples of EU level AE-relevant RIs include:

- AnaEE[39] provides a deeper understanding on the functioning of all types of agroecosystems, under all European climates, and their interactions with soils and the atmosphere, thanks to the scientific experimental approach (manipulation and modelling), by applying multiple drivers (such as drought, heat, elevated CO_2 levels, management methods) notably in the framework of current global change pressures.

[35] Metagovernance is understood as a "Governance of governance"; see Metagovernance for Sustainability, A Framework for Implementing the Sustainable Development Goals by Louis Meuleman
[36] https://ec.europa.eu/info/research-andinnovation/strategy/european-research-infrastructures_en
[37] ESFRI WHITE PAPER, 2020, www.ec.europa.eu/research/infrastructures
[38] Guiding Principles for scientific data management: Findability, Accessibility, Interoperability, and Reuse of digital assets
[39] Analysis and Experimentation on Ecosystems: https://www.anaee.eu/

- EMPHASIS[40] brings knowledge on plant phenotyping and plant-environment interactions, creating new, high yielding, varieties in plant breeding adapted to climate change and new management techniques.
- eLTER[41], based on a socio-ecosystem concept, is particularly relevant at landscape scale with real life observations and modelling approaches.
- Lifewatch ERIC[42] creates virtual labs with different tools for storage, exchange, consultation, analysis and model data on agroecosystems, and analyse their evolution under different management scenarios, providing decision-support systems for different management and global change scenarios.

Accordingly, a large and diverse set of RIs can contribute differently but complementary to AE transition. Interdisciplinary and transdisciplinary training and innovation are increasingly prominent activities of research infrastructures, developing various services, specific to various users. They are indispensable assets to understand socio-economic and ecological processes from an academic point of view. They are unique assets to follow the complex redesign of agroecosystems and of the agri-food systems that AE transition moves forward, because they are open to diverse users, for whom tools are developed to improve scientific knowledge appropriation. Recently a European call was dedicated to the development of services for AE[43].

Beside these RIs, some hybrid approaches, between research and society, useful for farmers and farmers' networks, for citizens and for research, can also be considered. Research can bring and collect knowledge in such hybrid settings. Some of them are not so far from LLs. Examples include networks of farms at regional or national level (even a few farms in a small territory), citizen science, platforms with innovation tools (e.g. serious games[44]) and co-creation platforms where innovation is more or less collectively in the making, and where scientists are involved. Even if academic contribution cannot be easily recognised in such networks because of difficulties in providing generic knowledge or sufficient data sets, they can be fully considered as open innovations for AE. Such hybrids can be mapped as RIs, sometimes included in them, if research is involved (to different extent) and knowledge produced.

LLs and RIs can be complementary in allowing ambitious experimentation between practice and science at different scales to provide science-based evidence about the effect of measures in agriculture. LLs and RIs, hand in hand, should form efficient instruments to accelerate the AE transition.

1.1.5 Overview of past EC support to AE and/or living labs

The EU has supported LLs for over fifteen years, notably under FP 6[45], with a limited uptake in the farming and rural community so far. The creation of the "European innovation

[40] European Infrastructure for Plant Phenotyping: https://emphasis.plant-phenotyping.eu/
[41] Integrated European Long-Term Ecosystem, critical zone and socio-ecological Research: https://elter-ri.eu/
[42] e-Science research facilities for scientists investigating biodiversity and ecosystem functions and services in order to support society in addressing key planetary challenges: https://www.lifewatch.eu/
[43] https://www.anaee.eu/news/horizon-europe-anaee-coordinates-proposal-infra-call-agroecological-transitions
[44] Djaouti, Damien; Alvarez, Julian; Jessel, Jean-Pierre; Rampnoux, Olivier (2011). "Origins of serious games". Serious Games and Edutainment Applications. Springer <https://en.wikipedia.org/wiki/Springer_Publishing>: 25-43. doi <https://en.wikipedia.org/wiki/Doi_(identifier)> :10.1007/978-1-4471-2161-9_3 <https://doi.org/10.1007%2F978-1-4471-2161-9_3>
[45] See collaboration@rural (https://cordis.europa.eu/project/id/034921) funded under the call IST-2005-2.5.9 - Collaborative Working Environments together with other projects

partnerships"[46] under the Innovation Union flagship initiative[47], and the consequent introduction of the multi-actor approach (MAA) under Horizon 2020, have triggered increased interest in open innovation methods and in the creation of LL-like approaches as part of several research projects[48]. These remain, however, time-bound and theme-specific, and are therefore not suited to sustain activities in the long-run, nor are they integrated in grassroots initiatives in specific territories since they normally lack focus on specific national and regional contexts, which is key for AE approaches.

The EU has also supported a stream of projects on integrated ecological approaches, including organic farming and agroforestry, under Horizon 2020's Societal Challenge 2[49]. These projects address aspects relevant to AE such as integrated weed management, crop diversification strategies or soil management practices that enhance soil biodiversity, mixed farming and agroforestry, breeding for diversified farming systems, legume crops for food and feed or socio-economic aspects of AE. The portfolio[50] also includes research projects, thematic networks and one ERA-NET (CORE Organic) that address specific needs of the organic sector. These projects provide a very important contribution to building the scientific knowledge base needed for the implementation of the activities under this proposed partnership. Nonetheless many research and innovation projects funded e.g. at national level or in Horizon 2020, while providing scientific facts that could trigger changes, typically have an average duration of three years, which is insufficient to sustain a transition in the long run. While much more knowledge, and thus research, is still needed to unlock the transition in the wide diversity of socio-economic, ecological and geographical contexts that can be found across the EU, past and ongoing EU-funded projects already provide a sound foundation to identify some of the needs to be tackled by research and to tailor solutions on the ground through hands-on co-creation and experimentation in LLs.

Furthermore, the Common Agricultural Policy (CAP) also supports innovation in the agricultural sector, in particular through the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP AGRI), and notably through Operational Groups (OGs). OGs are collaborative innovation projects that bring together farmers and researchers to find solutions to a specific problem in a specific context, with farmers and on-farm testing at the heart of this collaboration. OGs are therefore an important tool for boosting innovation, and bring research results closer to farm practices, including in the field of AE[51]. However, OGs are time-bound, subject to funding under the Rural Development Programmes, and hence not suited to deliver the long-term transition efforts and data management over a long period of time. The EIP-AGRI also supports knowledge exchange and pooling of resources on agricultural innovation in general and organisation of events at EU, national and –in some countries- regional levels; however, it does not have enough resources to sustain the intense interactions that are needed among all relevant stakeholders at different levels to support the large-scale uptake of AE practices by farmers.

[46] https://ec.europa.eu/info/research-and-innovation/strategy/past-research-and-innovation-policy-goals/open-innovation-resources/european-innovation-partnerships-eips_en
[47] https://ec.europa.eu/info/research-and-innovation/strategy/past-research-and-innovation-policy-goals/innovation-union_en
[48] ROBUST, COASTAL, LIVERUR, LIAISON, AGRILINK etc…
[49] https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/factsheet-agri-research-ecological-approaches_en.pdf
[50] https://cordis.europa.eu/article/id/430692-agroecology-transitioning-toward-sustainable-climate-and-ecosystem-friendly-farming-and-food
[51] See Agri-Innovation Summit in Lisieux (France, 2019): https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/2019_pei_carnet_projets_ais_web.pdf

The partnership will build on the results of previous, ongoing activities including R&I under Horizon 2020 and upcoming ones under Horizon Europe. In this sense, this partnership was and is being co-created with a broad range of relevant networks and actors. A mapping of relevant past projects has been performed by ALL-Ready and AE4EU, and over 300 FP7 and H2020 projects (deliverable of ALL-Ready, available upon request) have been identified. The results will be used for the preparation of the SRIA.

1.2 Common vision, objectives and expected impacts

1.2.1 Intervention Logic

The intervention logic of this partnership has been carefully co-created within SCAR-AE SWG with broad contributions of all relevant actors. It describes the logical steps towards a vision and identifies *in fine* the required activities.

The vision
This partnership relies on a common vision to ***"Team-up and unlock the transition to agroecology so that farming systems are resilient, productive and prosperous, place-sensitive, as well as climate, environment-ecosystem, biodiversity- and people-friendly by 2050***". In order to achieve impact on people, policies, planet, productivity and prosperity, we need a change in paradigm in science, policy and practice to support: i) New as well as improved **farming practices, products and services** that contribute to positive ecological, climate and environmental impacts of agri-food systems. ii) A **thriving agricultural sector**, which is economically viable, attractive to young generations and well connected to society. iii) The **strengthening** of social capital, values, networks, skills and awareness on AE. iv) Evidence-based, systems-oriented **governance & policy making** with governments and institutions and thereby policies that are more open, flexible, participatory, risk sharing and enable transformative changes.

By pursuing these objectives and related activities, the partnership will leverage efforts across countries, sectors and disciplines that will allow achieving the following key expected impacts:

A. Scientific (by 2030-2035)
Expected Impact 1: State-of-the-art science, research and innovation unlock the transition to agroecology.
Expected Impact 2: More evidence-based, open, flexible, participatory and risk sharing policies enable transformative changes in farming systems.
B. Societal including environmental (by 2040)
Expected Impact 3: Agricultural sector and rural areas are prosperous, attractive to young generations and connected to the rest of society.
Expected Impact 4: Stronger social capital, values, networks, skills and awareness of agroecology.

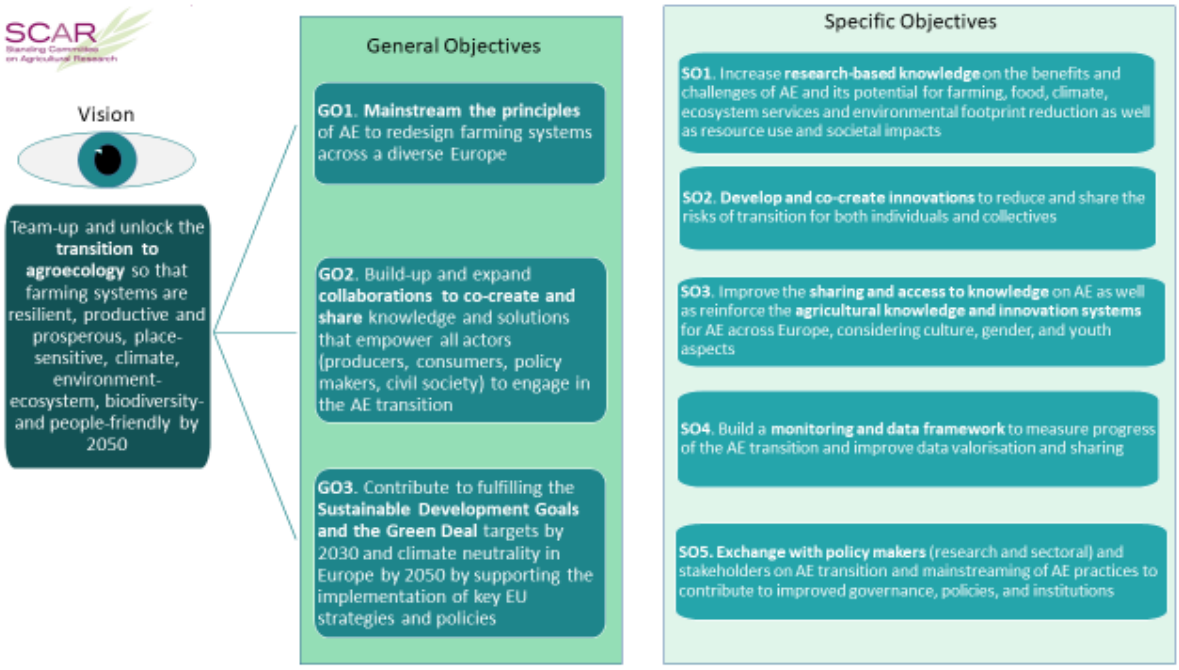
Expected Impact 5: Agroecological farming practices provide maximum positive contribution to biodiversity, climate and the environment, creating circular and sustainable farming systems.
C. Economic & technological (by 2040)
Expected Impact 6: Agricultural and livestock sectors are profitable
Expected Impact 7: Agroecological farming systems and related value chains are resilient, productive, place-sensitive and contribute to ensure European food security.
Expected Impact 8: Farmers are equipped with the necessary technological tools to drive the transition towards agroecology

General Objectives (GO, long-term goals): Three General Objectives will contribute to achieving the 2050 vision of the partnership:
GO1. Mainstream the principles of AE to redesign farming systems across a diverse Europe.
GO2. Build-up and expand **collaborations to co-create and share** knowledge and solutions that empower all actors (producers, consumers, policy makers, civil society) to engage in the AE transition.
GO3. Contribute to **fulfilling the Sustainable Development Goals and the Green Deal** targets by 2030 and climate neutrality in Europe by 2050 by supporting the implementation of key EU strategies and policies.

Specific Objectives (SO): To achieve these general objectives, this partnership will support research and related activities that contribute to achieving objectives of key strategies under the Green Deal, notably the Farm to Fork and the EU Biodiversity strategies and specific SDGs (see Annex 2), enabling transformative change in the agricultural sector towards AE. The Partnership will achieve this by focusing on five Specific Objectives (SO) to be delivered by the end of the Partnership, 2030-2035:
SO1. *Increase research-based knowledge on the benefits and challenges of AE and its potential for farming, food, climate, ecosystem services and environmental footprint reduction as well as resource use and societal impacts*; this implies research on e.g. AE benefits and trade-offs for climate change mitigation and adaptation, and on biodiversity or best practices for the sharing and use of AE knowledge and data, considering the European diversity.
SO2. *Develop and co-create innovations to reduce and share the risks of transition for both individuals and collectives*; LLs, by definition, bring together actors to co-create innovation in real life conditions while reducing the risk for both the individual farmer (or other actors) and the collective;
SO3. *Improve the sharing and access to knowledge on AE as well as reinforce the agricultural knowledge and innovation systems for AE across Europe, considering culture, gender, and youth aspects*; this will be achieved through a network of LLs and RIs, as well as targeted communication to different actors; this also includes removing the current barriers and lock-ins that prevent the engagement of scientists, advisors and farmers in the AE transition.
SO4. *Build a monitoring and data framework to measure progress of the AE transition and improve data valorisation and sharing*; harmonised methods and a set of common indicators will be developed to measure progress, integrating currently fragmented data repositories, including those of research infrastructures, and making them available;

***SO5**. Exchange with policy makers (research and sectoral) and stakeholders on AE transition and mainstreaming of AE practices to contribute to improved governance, policies, and institutions*, based on evidence and to provide supportive mechanisms; in order to achieve impact, the involvement of policy makers and stakeholders is needed and policies and governance adapted to support AE transition.

An overview of the Intervention Logic is provided here:



1.2.2 *Triggering transformational changes in the R&I ecosystem*

The partnership will trigger transformational changes in the broader R&I ecosystem and set the direction for knowledge creation, facilitating experiments that will improve understanding and uptake of AE processes, and ultimately the use of these results in policy making. Activities will be backed by a robust SRIA going from fundamental research on AE through to applied research, giving rise to ready-to-use solutions for the scaling up in real-life environments and demonstration of prospective implementation strategies. Ultimately, the partnership will contribute to filling existing knowledge gaps on AE, contribute to more open innovation and user-driven research on AE, addressing the wide geographical/territorial specificities in the EU through place-based approaches with long-term perspectives, and to improving the sharing of knowledge within and across EU countries and beyond.

Operational Objectives (OO): Delivering on the partnership's ambitions requires implementation of a portfolio of activities that correspond to the following eight Operational Objectives (OO), to be achieved during the Partnership's lifetime:

OO1. Support transnational research and innovation activities as defined in the SRIA on the challenges and potential of AE in addressing biophysical, environmental, climate, social and economic dimensions of sustainability, at farming, local environment and broader societal levels.
OO2. Support research in and on living labs across Europe to support AE transition.

OO3. Build and organise a European network of new and existing living labs and research infrastructures for knowledge sharing and co-creation on AE innovations at various scales.
OO4. Build capacities of various actors at the levels of networking, AE and LLs to foster collaboration for AE transition.
OO5. Improve access to and use of services provided by research infrastructures and other relevant initiatives for long-term measurement, observation and experimentation in support of AE.
OO6. Set up a framework, data management, indicators, and tools to monitor AE transition, its social, economic, environmental and climate performance and impacts, for different actors, contexts and scales.
OO7. Design and implement communication and dissemination activities to support AE transition through uptake by practitioners and to improve stakeholder engagement, including the wider public.
OO8. Put in place mechanisms for science-policy dialogue in support of the establishment and implementation of evidence-based policies (research and sectoral), that support AE transition, including long-term funding for AE R&I.

1.2.3 Other Partnerships and Missions

The partnership will ensure linkages with other relevant Horizon Europe (candidate) partnerships and missions (non-exhaustive list, e.g. other missions might be relevant as well):

- Partnership "Safe and Sustainable Food Systems": here a strong connection will be required to ensure an integrated approach to food systems from production to diet; complementarity will be sought on a very regular basis; coordination of activities, including calls, will be necessary; SCAR SWG Food Systems (in charge of preparing this partnership) is observer in SCAR-AE.
- Partnership "Rescuing biodiversity to safeguard life on Earth": e.g. cooperation on measuring biodiversity in agroecosystems, AE practices for the preservation of biodiversity, monitoring of pollinators; this partnership is an observer in SCAR-AE.
- Partnership "Agriculture of Data'': e.g. ICT and environment data as enabler of AE practices and as a tool to describe the status of agroecosystems; linkages already exist with the status of observer in SCAR-AE of the ERA-NET ICT-AGRI-FOOD.
- Partnership "Animal Health and Welfare'': e.g. AE as tool for reduced use of antimicrobials, increased animal welfare as a way to enhance health, safety of animal effluents used as fertilisers; SCAR CWG AHW is observer in SCAR-AE.
- Partnership "Water4All": e.g. links to demonstration sites and water-oriented living labs working on agriculture.
- Partnership "Circular Bio-based Europe": e.g. AE as a system that ensures circularity, resource efficiency and recycling in agriculture.
- Mission ''A Soil Deal for Europe: 100 living labs and lighthouses to lead the transition towards healthy soils by 2030'': e.g. AE as a tool to improve soil health and increase carbon sequestration in soils; living labs established under this mission could benefit of exchanges from the activities organised by the partnership where relevant and vice-versa. The Coordination and Support Action "Soil Mission Support" is a key advisor to SCAR-AE.
- Mission ''Adaptation to Climate Change: support at least 150 European regions and communities to become climate resilient by 2030'': e.g. AE as an approach to support adaptation to climate change in specific geo-climatic regions.

- Mission ‘’100 Climate-neutral and Smart Cities by 2030’’: the partnership could contribute to climate-neutrality of food supplies to cities, including by the use of urban agriculture.

Activities to ensure synergies could include coordination of programming (e.g. transnational calls), joint learning on transition processes and methodologies to steer such transitions, regular exchange of results/knowledge, common dissemination events, joint workshops with stakeholders, etc.

1.2.4 Exit strategy

The partnership will build a comprehensive framework to support the development of new (educational, production, science-based, etc.) policies in the field of AE and will lead the way by showing how AE transition can be organised in practice in a number of locations, all this going well beyond the duration of the partnership. By involving all relevant actors, including MS/AC authorities – national, and where relevant regional and local authorities, stakeholders and citizens in the transition to AE, this partnership will mainstream AE and facilitate ownership of the process, enabling AE to become embedded in the agricultural landscape and to keep being supported locally, regionally and nationally. The synergies that will be developed in the course of the partnership implementation will underpin authorities’ motivation to sustain them afterwards, both in the R&I, farming and other connected policy domains.

The ambition is that, as longer-term national/regional investments and transition enablers, RIs and many LLs identified and supported by the Partnership will continue their activities after 2030. Once proved efficient and enabled by the development of adequate methods and capacity building, the model of LLs will be sustained and further developed in the agricultural R&I landscape at local/regional levels. This needs to be secured financially, and therefore LLs and RIs, supported by networking and capacity building activities, will have to develop their self-sustainability models, especially when it comes to animation or orchestration[52] costs. In parallel, activities contributing to policy making (OO8) will ensure that the funding landscape (CAP, Horizon, Regional policy, Education, national and regional schemes, etc.) includes sufficient and better tailored funding opportunities to support R&I activities that are still needed to further progress on AE transition, including through LLs. The importance of RIs supporting AE will be highlighted by cooperating with the European Strategic Forum on Research Infrastructure (ESFRI)[53]. Finally, the partnership will explore ways and models through which EU-level networking and knowledge exchange activities between the various parts of the AE knowledge and innovation system, in particular LL and RI can be sustained (creation of an independent network – possibly in synergy with other missions and partnerships- or embedding in the EIP-AGRI or other new initiatives).

1.2.5 Amount of R&I investments needed to achieve impacts

As indicated throughout the present document, past regional, national and EU-wide R&I investments were only partly able to address the challenges faced by the agricultural sector.

[52] Orchestration provides automated configuration, coordination and management of complex computing networks, systems and services
[53] https://www.esfri.eu/

The ambitious vision of this partnership to redesign systems requires an approach bringing appropriate investments "under one roof".

Accordingly, a total budget of 500 million € is the ambition of this partnership. Being a 7-year project, this partnership would then require annual investments of approx. 70 million €. An annual contribution of approx. 50 million € is expected from the partners. Should e.g. 25 countries join this partnership, this would represent a mean annual investment of approx. 2 million € per country.

In the last years, ERA-NETs often launched calls with budgets of approx. 15-20 million €, however they were mostly dealing with specific sub-topics along the lines of those expected for the partnership (e.g. crop production, climate-smart agriculture, biomass production and transformation systems). The scope of the partnership is encompassing a much broader range of topics. In those ERA-NETs, numerous relevant research proposals, which were in addition highly ranked in the peer-review processes, were not funded due to lack of budget. The partnership will need new inputs (in terms of research outputs) throughout its duration, therefore calls for research are planned each year. Considering the degree of ambition of the partnership, the budget of each such calls should reach at least 32 million €.

As described in the present document, this partnership shall have a substantial focus on ensuring impact on people, planet and prosperity. This can only be reached by accompanying the research conducted within projects with efficient measures aiming at providing new practices, methodologies, technologies, and tools, assessing their performance, and identifying appropriate societal and policy instruments to support their implementation, such as the LLs. The ambition in this regard is to have an EU-wide impact on local/regional/national systems. Taking into consideration budgets invested in other instruments (e.g. EIP-AGRI), an annual investment of at least 39 million € in these activities should be aimed at.

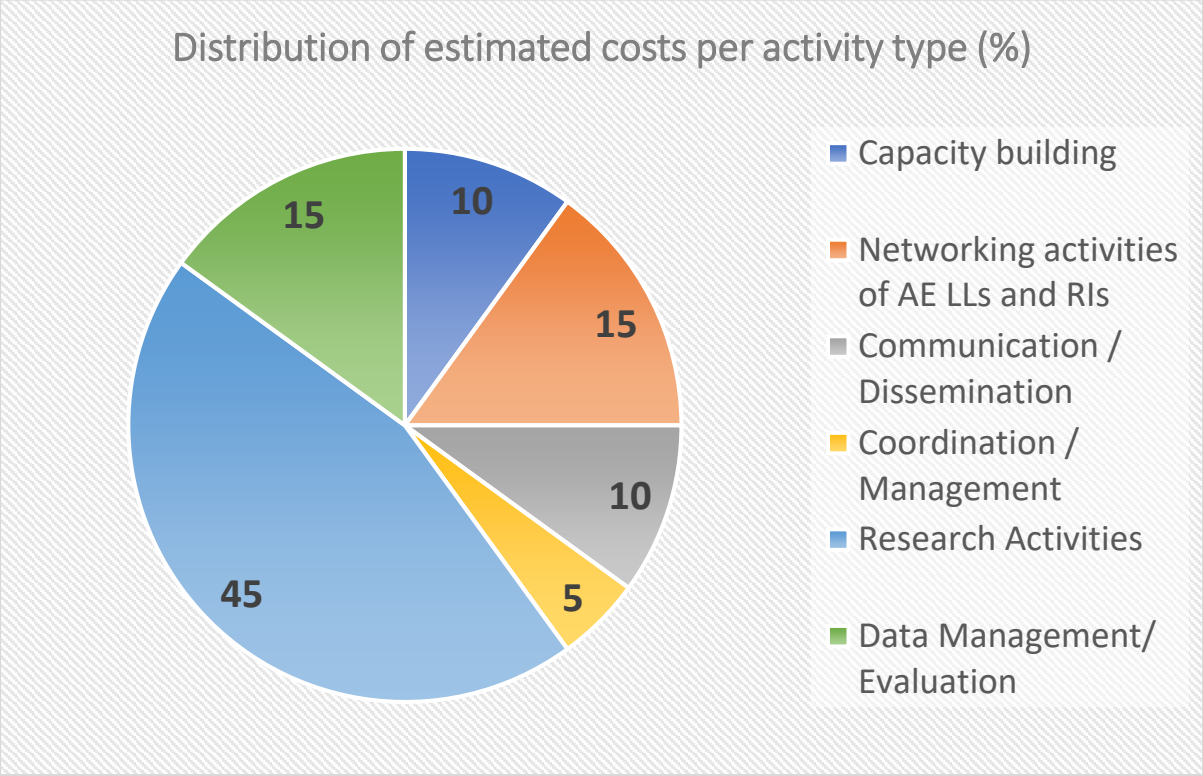
It should however be highlighted that these are rough estimates at the moment of writing the present document and that they need to be concretely refined during the partnership preparation and implementation and once the total financial and in-kind commitments available for this partnership will be known. As described in the table hereunder, the main types of costs expected in the partnership are (see also 2.1.1):

- Capacity building, e.g. specific training programs for farmers, advisors, etc.
- Networking activities of AE LLs and RIs, e.g. sharing best practices and knowledge.
- Communication / Dissemination, which are key to increasing uptake and acceptance.
- Coordination / Management; the successful implementation of such an ambitious and complex partnership will require a high degree of coordination, e.g. between the different bodies of the governance.
- Research activities such as competitive calls for R&I projects.
- Data management / Evaluation, in particular in order to monitor AE performance and transition.

Type of activity	Total amount	Annual Cost [54]
	m€	m€
Capacity building	50	7
Networking activities of AE LLs and RIs	75	11
Communication / Dissemination	50	7
Coordination / Management	25	4
Research activities	225	32
Data management/ Evaluation	75	11
Total	500	71

Main types of investments –estimated portions of budget

Distribution of these 6 types of costs:



1.2.6 Planned process for developing a SRIA

The associated SRIA will be developed in the following months, with the aim to finalise it by the end of 2022. The SRIA will be completely aligned with the objectives and expected pathways to the impacts of the partnership, which are stated in its intervention logic. Its development will follow an open, inclusive, and planned process by integrating from the very beginning a wide representation of R&I actors and the broader stakeholder community,

[54] Annual costs are approximate figures. During the 7-year duration of the partnership, it is e.g. expected to see annual variations of these figures. Most important figures are the total amounts as they give a better indicator of the total ambition of the partnership.

allowing sufficient time for consultation with policymakers, national and regional (sub-national) funding bodies, stakeholders, and the general public.

A core team under SCAR-AE in charge of the identification of research needs and instruments is already in place encompassing actors from relevant national administrations, key representatives of European R&I networks, infrastructures and Coordination and Support Actions (CSAs) within the scope of the partnership. This process is supported and advised by the EC to ensure alignment and contribution of the SRIA to EU policy priorities. This core team will be reinforced in order to develop the SRIA with input from additional experts and stakeholders. MS/AC who formally express their commitment to the partnership, following reception of the commitment letters in March 2022, will be invited to join the core team (if not yet represented).

Throughout the entire SRIA development, attention will be paid to ensure the exclusion of situations leading to potential Conflicts of Interest (CoI). This will in particular be the case for entities (e.g. Research Performing Organisations) which might apply for funding in the frame of calls launched under the umbrella of this partnership. It should be noted first that the SRIA will be a framework of agreed high-level ideas for thematic partnership priorities, on which the development of annual work plans will be based. As a reminder, SCAR-AE is a group of nationally appointed representatives; therefore, members of SCAR-AE represent their country, not the organisation to which they are affiliated. This process will substantially limit the risk of CoI. Finally, while collecting inputs, all contributors will be reminded about situations where CoI can occur.

In the process of developing this partnership proposal, a first identification of specific barriers and gaps related to the development and implementation of AE principles across Europe has been undertaken. These barriers are related to knowledge, methodology, production, overall-agrifood value chain, data, and policy. Accordingly, a preliminary list of more than 50 research needs associated to those categories has been established (See Annex 5). In the SRIA development process, a wide consultation of stakeholders will be implemented by circulating the identified research needs to receive feedback, revise and prioritise them. Activities such as workshops, dedicated meetings, surveys and interviews will be performed to this end. A six-month period for public consultation is also envisaged. In addition, other relevant actions to be performed by the partnership will be identified and discussed.

The SRIA will also provide an overview of horizontal activities (e.g. communication) and specific research activities requiring joint calls. This exercise will serve as an input for the definition of the partnership annual work plans and will also help to set up a monitoring framework, which uses key performance indicators (KPIs) to measure the progress towards the objectives.

The concrete actions that are needed in order to address the research needs will benefit from collaborating and finding synergies with other European partnerships, missions, and projects funded by Horizon Europe (some listed in annex), as well as with FACCE-JPI whose Strategic Research Agenda adopted by 23 MS/AC is relevant for this partnership. In particular, close collaborations are envisaged with identified missions and other partnerships (see 1.2.3). Additionally, contacts have been established with many R&I initiatives to understand their scope and ambitions and to avoid potential overlaps with their SRIAs.

In this regard, an analysis of relevant EC-funded topics and projects will be undertaken. A thorough review of the calls included in the Horizon Europe 2021-2022 work programme has been performed to identify potential synergies with the partnership's SRIA. This analysis also includes exchanges with relevant H2020 projects with the aim of learning from their findings and recommendations in terms of R&I needs and whether these could or should be addressed by the AE partnership. A similar exercise will be performed for calls selected under the HE work programmes. In this context, support for the preparation of portfolio analyses is available in the frame of a tender aiming at supporting the SCAR Working Groups which started in early 2022.

The implementation of the SRIA is perceived as an evolving process. Therefore, an open process to assess its development and a plan for updating the SRIA during the partnership lifetime will be implemented. The aims and approaches to perform this activity will be identical to those planned for the initial definition of the SRIA.

1.2.7 Expected timeframe to deliver the results and outside factors influencing the achievement of the objectives

The need to transition to more sustainable and resilient farming systems is urgent. The goal of mainstreaming AE practices across Europe through the activities set out in this partnership should be achieved by 2030. It should be noted though that, while the partnership will play the key role to that end, its Specific Objectives (SOs) also rely partly on factors which are not directly steered by the partnership and might sometimes represent hurdles. As an example, SO4 *Build a monitoring and data framework to measure progress of transitions and make data valued, shared and FAIR* requires access to already existing data repositories. Success will also depend on a strong enabling policy framework which can be achieved through close cooperation with the European Commission, on the one hand and on the other hand, an inclusive and broad involvement in the partnership of all MS/AC through the appropriate ministries and authorities as well as good national coordination to include all relevant actors (e.g. mirror groups; see 2.1.3).

1.3 Necessity for a European Partnership

1.3.1 Directionality & additionality

Directionality: Agricultural policies of the EU, Member states (MS) and Associated Countries (AC) converge towards similar goals and objectives that call for more sustainability in the agricultural sector, while ensuring a sufficient delivery of quality products, in particular in the food sector (but also feed, fibre, etc.), ensuring respect for the environment, contributing to combating climate change, delivering ecosystem services and providing a better life for people, including the farmers themselves. The EU and the MS/AC share the ambition of contributing actively to reaching the Sustainable Development Goals and agree that urgent action by all countries is needed. Numerous policies identify AE as a promising approach. These common ambitions call for working together towards a common effort to lift lock-ins, enable and steer the AE transition. In addition, as indicated previously, the challenges require action at different scales: European, national, regional or local. This calls for the different MS/AC and the EU to act jointly towards the same objectives, using the various policy tools at their disposal. Finally, the partnership, as a unique instrument at EU-level dealing specifically with AE, represents a

powerful instrument to support MS/AC in coordinating policies and working together on common methodologies to steer transitions and measure progress towards impacts.

Complexity: A partnership is needed to focalise the efforts of the EU, the MS and AC as well as regions, farmers, citizens, in a co-creative manner, in order to address the urgent need for concrete action. Moreover, agriculture as a common market is regulated by a common policy at EU level, which can solely be addressed jointly by MS/AC and the EC. As an example, products stemming from AE need EU-wide recognition of their benefits. The complexity of the challenges to address and the ambitious work to perform cannot be carried by any MS/AC alone, nor by the EU. A critical mass is required in order to achieve an in-depth redesign of the agricultural sector and systems. Such a critical mass can only be obtained by bringing together EU research funding bodies and national ministries related to the domains of agriculture and environment. On top of that, the targeted redesign requires a higher degree of integration in terms of bringing together all relevant actors, coordinating the activities and the policies and regulatory context. All countries and the EU need to share the effort and involve all important actors (regional, local, private...). In addition, as the partnership also intends to put the EU in a leading role at international level in the domain of AE, close collaboration within the EU is required in order to address the international community with a unified voice.

As stated earlier, AE processes are complex. In order to increase understanding and uptake, the availability of long-term data series that allow for an accurate analysis of the evolution of ecological processes in the long term is necessary. Assessing AE processes therefore requires long-term approaches along with landscape scale coverage that go beyond individual farms and across national borders and need to be embedded in the knowledge and innovation system of every country. Such long-term approaches are not possible with the usual EU or national R&I projects which have a limited duration, usually three-four years. Moreover, AE processes are knowledge-intensive and require that farmers are equipped with the necessary skills and knowledge for the effective adoption of AE practices. In addition to this, the agricultural landscapes differ among countries and their regions, and given that one single country or region will only be able to provide partial solutions to a common challenge, ensuring an exchange of good practices and experiences across MS/AC becomes crucial. Furthermore, there is wide scope for improving knowledge of agricultural transition processes, place-based innovations and how to steer, monitor and evaluate such transition and co-creation processes. Joint learning would not only be on the what (production practices, which might be applied between localities e.g. encountering similar challenges) but also on the how to accompany the evolution of actors: the methodology aspects can and therefore must be shared across Europe (if not beyond), in order to move iteratively to the optimal solutions.

1.3.2 In comparison to other instruments

Co-funding instruments (e.g. ERA-NET Cofund under Horizon 2020) have proven a limited capacity to mobilise financial resources to jointly fund research. Through this funding scheme, the EU resources had a “leverage effect” on the national resources put in common to address the agreed topics. Nevertheless, the (in particular financial) size of these instruments was restricted and became a barrier when it comes to addressing challenges of a broad nature.

In the last decades, the EU and the MS/AC have co-funded and/or worked together in numerous R&I initiatives in the broad field of agriculture and related bioeconomy. However, the landscape still remains fragmented between Joint Programming Initiatives (JPIs) in particular the JPI on Agriculture, Food Security and Climate Change (FACCE-JPI), plenty of ERA-NETs

(e.g. Core Organic, SusCrop, FACCE SURPLUS, ERA-GAS, SusAn), the European Joint Programme (EJP) on Soil, etc. In parallel, R&I was also funded directly via the work programmes under H2020 (RIAs and IAs). Excellent research was performed thanks to these instruments, nevertheless this was not sufficient to trigger a real change in paradigm, partially due to the dispersion of efforts among all initiatives and lack of a common strategy bringing together the outputs to make them available to the interested communities, and more specifically the farmers and the private sector.

Moreover, considering the specific orientation of the proposed partnership to work with LLs and RIs, an appropriately long-term instrument such as a partnership is required. Unlike other instruments (e.g. research projects with a three-year duration), the partnership will cover seven growing seasons, allowing for a longer time frame that is appropriate to initiate and sustain changes in the long-term.

While joint calls for transnational research projects planned under the umbrella of this partnership remain an important aspect in order to increase knowledge and develop innovation and solutions, the partnership demands a degree of cooperation which goes much beyond these approaches. Regular collaborative research projects can contribute to launching facilities or setting up networks, but are not suited to sustain them in the long run nor to integrate them in bottom-up grassroots initiatives in specific territories. They are also not suited to ensuring the long-term involvement of countries in the process and the coordination of their activities, all of which are essential factors to ensure the long-term approaches that AE processes require.

In the frame of the partnership, important efforts will be directed to transform the research results into "on-the-ground" solutions and questions coming from the actors "in the field", involving the various elements of the AKIS. This will be key to provide the whole range of knowledge and practices which are necessary for a transition towards AE of a substantial part of the EU farming sector. The adoption of AE practices requires the development of an ambitious and longer-term joint action at European level involving European, national and regional funders. It will trigger a dynamic adaptation of the research agenda towards greater and quicker impact. Impacting policies so as to provide an appropriate legal framework to the future agricultural systems is also an essential aspect. The partnership aims, in addition, to work specifically on communication and dissemination aspects that will ensure outreach to all concerned actors. Finally, monitoring the transition by assessing the performance of AE practices and of the LLs also calls for an instrument which goes much beyond former ones. The partnership instrument is suited to cover the full range of activities necessary to trigger the desired redesign of our farming systems.

1.3.3 Synergies with other programmes

The implementation of the partnership's activities should be facilitated by establishing synergies with other programmes, among which:

Synergies need to be built with the Common Agricultural Policy, in particular the funding of ecoschemes[55] under EAGF (in countries having chosen to implement ecoschemes on AE), Operational Groups (OGs) funded under the EIP-AGRI with the support of the EAFRD and various actions on demonstration farms, knowledge transfer, training and advice. Much of the

[55] https://ec.europa.eu/info/news/commission-publishes-list-potential-eco-schemes-2021-jan-14_en

OGs work could connect to the work of the LLs established under this partnership or even contribute to them by forming part of the innovation activities carried out under one LL. The OG measure could also be used to support the first years of the creation of a LL. Measures supporting demonstration farms could also be useful to showcase interesting practices. Finally, the partnership should also contribute to the development of agricultural knowledge and innovation systems as foreseen under the future CAP strategic plans, with a specific focus on improving the AKIS for AE. Examples of such support have been explored by DG AGRI and summarised in a note in July 2021 "Exploring potential synergies between Horizon Europe and the CAP on living labs and lighthouses applied to agriculture".

Support to innovation under the European Regional Development Fund (ERDF) is provided under the condition that authorities develop R&I smart specialisation strategies for sustainability (RIS4). In 2021-2027, ERDF shall enable investments to make Europe and its regions[56]:

- more competitive and smarter, through innovation and support to small and medium-sized businesses, as well as digitisation and digital connectivity,
- greener, low-carbon and resilient,
- more connected by enhancing mobility,
- more social, supporting effective and inclusive employment, education, skills, social inclusion and equal access to healthcare, as well as enhancing the role of culture and sustainable tourism and
- closer to citizens.

While the focus in this area has been mostly on digital technology aspects, in some cases, ERDF support goes to initiatives that are connected to either AE or LL-like approaches. The EU financial regulation foresees that ERDF can be used as co-funding for Horizon Europe actions. Synergies could be built between these two funding streams to support LLs that simultaneously contribute to a Smarter (PO1), Greener (PO2) and closer to citizens (PO5) Europe, benefitting farmers, consumers and the environment. The Commission will provide additional guidance on the use of other funding sources in the coming months.

Synergies will also be sought with other EU programmes like LIFE. These could take the form of joint actions around the LLs and eco-innovations around AE products in specific localities. Copernicus, while not a funding programme, will be considered as data could be valorised to assess the status of agroecosystems in the various localities in which the LLs would be established.

Moreover, given that the partnership will aim at building a network of LLs and RIs and existing RIs will be asked how they can contribute with service delivery to the research done in the LLs, synergies will also be sought with Pillar I of Horizon Europe (Research Infrastructures). In addition, since the LLs to be established are expected to contribute to strengthening the local/regional innovation ecosystem, activities will also be relevant for Pillar III (European innovation ecosystems).

[56] https://ec.europa.eu/regional_policy/en/funding/erdf/

1.4 Partner composition and target group

1.4.1 Building on existing collaboration

Although there are existing EU-wide initiatives and mechanisms that are related to the thematic area and, to some extent, the objectives of this partnership (FACCE-JPI, ERA-NETs SusCrop, SusAN, IPM, Core Organic, Biodiversa, the PRIMA initiative, the BIOEAST initiative on bioeconomy, the European Joint Programme EJP SOIL, as well as EIP-AGRI), there is currently no existing network of the kind that this partnership aims at developing and upon which it could build directly. Moreover, as indicated under 2.3, the ambition of this partnership could not be addressed by already existing initiatives alone as a real system change is needed.

Therefore, SCAR has established a Strategic Working Group on Agroecology (SCAR-AE), offering a platform for MS and AC to debate with the Commission in a co-creative manner, discuss strategic R&I issues on AE, and pave the way for a wide participation in the future partnership. SCAR-AE brings also views from former or running networks and initiatives together[57], among which FACCE-JPI, as well as the CSAs "European Agroecology Living Lab and Research Infrastructure Network" (ALL-Ready), “Agroecology for Europe” (AE4EU) and “Soil Mission Support” (SMS).

1.4.2 Type and composition of partners

At the stage of writing the present document, there are still uncertainties with regard to the involvement of certain entities in the partnerships. While the formal participation of RPOs/LLs/RIs is intended, strong attention will be paid to avoid any risk jeopardising the sound implementation of the partnership. Relevant EC services will be consulted in this regard. These aspects shall be clarified and specified during the partnership’s preparation.

The membership of many existing Partnerships focuses on research funders and ministries in charge of relevant policy, and do not foresee membership for Research Performing Organisations (RPOs), Living Labs (LLs) or Research Infrastructures (RIs). In consideration of the ambitious scale of this (and other) partnership and the number of new partnerships that will seek support from similar sources, it is important to facilitate a large number of potential contributors to the pool of co-funders. RPOs have great potential to mobilise MS/AC resources for investment in AE and contribute to the MS/AC co-funding which will be necessary for the success of this Partnership. Similarly, RIs and LLs that are established as legal entities have the potential to contribute to the costs of the Partnership through provision of their infrastructure and resources as an element of MS/AC co-funding. In order for the costs of RPOs/LLs/RIs to be considered eligible, those organisations must sign the Grant Agreement (GrAg) or have an established legal link with an organisation that signs the GrAg and be listed as an affiliated entity. On the other hand, involvement of RPOs/LLs/RIs raises issues regarding conflict of interest.

[57] Complete list in Annex 1

The EC considers that a Conflict of Interest (CoI) exists where the "impartial and objective exercise of the functions of a financial actor or other person involved in budget implementation is compromised for reasons involving family, emotional life, political or national affinity, economic interest or any other direct or indirect personal interest."

While best efforts will be made to be as inclusive as possible with regard to RPOs, LLs and RIs while building the future consortium and implementing the partnership, utmost attention will be paid to avoid any CoI. For RPOs, LLs and RIs, this will in particular be ensured as follows:

- ✓ They are, by default, not members of the GB. In an exceptional case, if a „regular" GB member (ministries/funders) expresses the wish to be represented in the GB by a person affiliated to a RPO/LL/RI, a formal declaration should be required stating that the new member (1) acts in the GB in the interest of her/his country, (2) will refrain from taking part in any decision/discussion where a CoI could arise and (3) ensures that s/he will keep the information provided in the GB entirely confidential. This declaration must be signed by both the "regular" GB member and the newly appointed GB member.
- ✓ RPO/LL/RI participation as a Grant Signatory has to be formally mandated by the "owner" of the programme, the national/regional authorities in charge.
- ✓ RPO/LL/RI are excluded from work package and tasks for activities in the Partnership where a CoI could arise (neither lead nor be contributors). This includes in particular the part on research activities (implementing calls for transnational research projects, e.g. defining scope, running the call, organising the evaluation…) as well as strategic orientation of the partnership (elaborating SRIA updates, annual work plans, etc.).
- ✓ In case of any doubts on CoI, the Ethics Advisory Board will be consulted.

The conditions stated above shall be further elaborated and complemented during the partnership preparation taking into account both national and EU requirements.

The full members (signatories of the GrAg) of the Partnership can include:

- National research funders (Ministries and Funding Agencies)
- Ministries in charge of relevant policy
- Regional (research) funders
- Research Performing Organisations (RPOs), defined as publicly funded research organisations that have their own funding which they can allocate as co-funding to the activities of the partnership. Their participation has to be formally mandated by the "owner" of the programme, the national/regional authorities in charge.
- Living Labs or Research Infrastructures when they are established as legal entities and their infrastructure or resources can be eligible as an element of co-funding for the partnership. Their participation has to be formally mandated by a national/regional authority in charge.

Partners are welcome from all Member States (MS) and Associated Countries (AC). In addition, it is also possible to involve partners from other countries as associated partners, when their involvement clearly adds value to the partnership. Consideration should be given to the overall composition of partners in terms of geographical balance, expertise in AE, the overall

size and manageability of the consortium and whether partner costs will be considered eligible for EC co-funding. Some LLs or RIs may not be able to join as "full members" due to their legal structure. Nonetheless, a strong collaboration is foreseen with them through a dedicated college of the enlarged stakeholder board (see section 2.3 Governance).

A strong and smooth collaboration with the European Commission services will be key in order to ease the implementation and administration of the partnership. (e.g. with regard to the preparation of the annual work plans). Moreover, it is essential to work hand in hand with the EC in order to ensure alignment of the partnership's activities with EU priorities and their impact on EU policy and at international level. The EC will therefore be co-creation partners of the partnership's strategic documents (including SRIA and annual work plans). DG AGRI, as the lead DG for this partnership, and DG RTD are the main two DGs and will participate in the Governing Board as observers. Further relevant DGs (e.g. JRC, ENV, CLIMA, INTPA…) will be involved through an EU Mirror Group (see section 2.3). The modalities of the EC's participation in the partnership's decision-making processes will be concretised during the partnership's preparations.

In addition to the beneficiaries that will sign the Grant Agreement, other actors (who will not sign the Grant Agreement) will be key to implementing this partnership:

- Entities successful in calls for transnational R&I research projects and funded to perform research activities. These could be, depending on the specificities of the call and the rules for funding, academic entities, research organisations, non-public entities (potentially running the LLs), private companies… Calls will be launched based on the topics identified in the Strategic Research and Innovation Agenda (SRIA).

- Entities related to the LLs: "cascading" funding (national/regional + EU co-funding if possible/appropriate) could be provided by e.g. the full members to entities implementing activities in the LLs (e.g., networking among LLs). National funding could also stem from regional funds such as EAFRD. Such entities could be farmers, advisory services, scientists, NGOs working in the LL, etc.

1.4.3 Target groups and stakeholder community

A broad range of stakeholders are considered:

- Farmers and the wider farming / rural community would be at the centre of the partnership. Involving farmers' representatives is required.
- Members of the Agricultural Knowledge and Innovation System (AKIS) at national and regional levels (including relevant research stations and experimental farms)
- Other food chain stakeholders: industry / SMEs (input providers / machinery / precision application systems / plant breeding, etc.), citizens, processors, wholesaler/ retailer etc. eventually foresters (for agroforestry-related activities)
- Local or regional public authorities (Territorial planning, landscape management, regional innovation management), social farming
- Financial sector (private and charitable) including carbon farming, e.g. banks, assurance providers, private investors.
- App/software developers/ ICT experts
- Civil society, citizen organisations / NGOs (including e.g. land owners)

Many relevant entities and initiatives have contributed to the work of the SCAR-AE and these are the first obvious stakeholder entities to consider while further developing the partnership. However, this list should not be considered as closed and exhaustive, as new entities emerge and could address the topic of AE in the future. A regular screening should be done in order to revise the list of stakeholders. It is envisaged to involve a broad range of stakeholders via (a) specific stakeholder or advisory board(s), in order to unlock implementation potential, facilitate knowledge and experience exchange and *in fine* enhance the efficiency of the partnership activities. Dedicated activities should be targeted at enhancing stakeholders' engagement and dissemination via stakeholders.

Inclusiveness:

- Theme: the partnership will cover issues related to the transition to AE in all agricultural production systems (e.g. conventional agriculture, organic farming, low-input farming, agroforestry, permaculture, regenerative agriculture, integrated farming, urban vertical farming).
- Geography: the partnership will cover a balanced and representative set of locations covering the diversity of farming systems / sectors in Europe, European bio-geographical regions, pedo-climatic conditions and socio-economic contexts.
- Public engagement: the partnership will seek the involvement of citizens / consumers as well as actors and end-users in LLs, to contribute from the perspective of product / value chain development and the coherence of the business model (socio-economic / behavioural sciences). The modalities of the involvement of those stakeholders will be further considered in the detailed governance of the partnership and in the SRIA (associate partners / consumer board, etc.). Public engagement will also be ensured through the communication and dissemination activities foreseen in the partnership. A close collaboration with the Food Systems Partnership is foreseen.

Moreover, there is a wide international community of practice around LLs, inside and outside the farming sector. Within the agricultural sector, relevant actors with whom the EU has already engaged in the context of the G20 MACS and with whom useful experiences could be exchanged in the context of this Partnership include Canada, the US, Japan and New Zealand. In addition, the work performed by the FAO on AE, including on specific tools to measure AE transitions, is also an important source of information and reference for the remit of the partnership. The EU-African Union Research Priority on Food and Nutrition Security and Sustainable Agriculture has been a tool to fund a number of AE related projects in the past and is expected to develop the approach further towards an International Research Consortium. Similarly, the partnership could benefit from liaising with the Transformative Partnership Platform on Agroecology[58], aiming at promoting AE within the international agriculture research for development system. An active dialogue at international level with above-mentioned entities, and also considering new, emerging ones, will be driven all along the partnership. In particular, at an early stage of the partnership (first year), a mapping of potential future international partners (African, Latin-American…) will be performed with a view to including partners providing an added-value to the partnership (in this case, on international outreach). Additionally, synergies will be explored with the Partnership on Food and Nutrition Security and Sustainable Agriculture (FNSSA) as part of the African Union -EU High Level

[58] https://glfx.globallandscapesforum.org/topics/21467/page/TPP-home

Policy Dialogue on Science Technology and Innovation. This will serve, on the one hand, to drive Europe to a leading position in the wide domain of AE and to have an impact on international policies. On the other hand, Europe can also learn from the experiences stemming from other continents. International participation in the partnership activities (e.g. in joint calls, even with partners not being full members of the partnership) will be encouraged.

2 Planned Implementation

2.1 Activities

2.1.1 Activities that will support the achievement of the objectives

Different types of activities are foreseen: on the one hand living labs and research infrastructures are key to this partnership and it is foreseen to create a Europe-wide network that would allow them to share experiences and knowledge, and build capacity, that will help foster up- and out-scaling of AE. On the other hand, this will be supported by more classic research calls providing the research foundation and/or responding to specific needs identified in the LLs and RIs. These activities will be complemented with other activities such as capacity building, dissemination and valorisation of research results and targeted science-policy interface activities. Here we provide a first, non-exhaustive, set of activities for each of the eight Operational Objectives (OO). In addition, a preliminary and provisional set of Key Performance Indicators are proposed (to be reworked and fine-tuned during the preparation of the partnership):

OO1. Support transnational research and innovation activities on the challenges and potential of AE in addressing biophysical, environmental, climate, social and economic dimensions of sustainability, at farming, local environment and broader societal levels.
This OO will be implemented by performing research, in particular through:
Activity 1 (Main): Competitive calls for R&I activities according to the scope defined in the future SRIA e.g. concerning AE, AE LL approach, digitalization, socioeconomic perspectives, etc. This should be complemented by the following activities under this objective:
Activity 2: Working in co-creation with multiple actors in living labs and other research infrastructure to (re-)define research priorities in response to needs for knowledge and AE solutions across Europe's biogeographical regions (providing input to calls).
Activity 3: Commissioning (foresight) studies on specific questions of relevance for AE transition to be defined in the SRIA.
Activity 4: Undertaking regular exchange activities with other relevant initiatives, in particular other Horizon Europe partnerships and missions, to ensure and maximise synergies on R&I activities and topics.
Activity 5: Further developing and updating the SRIA by collecting inputs according to the process to be refined by start of the partnership, e.g. by organizing exploratory workshops.

Proposed KPIs*: 1) Number of joint calls, 2) Number of projects, 3) Volume of funding spent in projects, 4) Number of researchers involved, 5) Number of regions/countries involved in the projects, 6) Number of research topics coming from the LLs and/or RIs, 7) Number of studies performed, 8) Number of exchange activities with other initiatives, 9) Number of exploratory workshops, 10) Achieving updates of the SRIA.*

OO2. Support research in and on LLs across Europe to support AE transition.

Activity 1: Organising calls targeted at living labs that stimulate co-creation between researchers, stakeholders and farmers and impact positively on climate, environment, soil health, biodiversity, improve value creation, the provision of ecosystem services from farming and resilience, including new circular and inclusive business models connecting various scales (farm, landscape, territory).

Activity 2: Creating transnational links and synergies between such programmes and other instruments supporting the multi-actor approach, such as Operational Groups under the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) with a view to accelerate uptake of AE.

Activity 3: Developing and introducing participatory tools for assessment, evaluation and monitoring of the co-creation process in the living labs, its generated know-how and its impact on AE transition for society, communities and rural development.

Activity 4: Organising calls to stimulate research on subjects arising from living labs acting for AE transition: development of meta-governance schemes, intellectual property sharing in the co-creation process, sharing of value between public-private-common goods.

Proposed KPIs*: 1) Number of calls for research involving LLs, 2) Number of LLs involved, 3) Number of projects funded, 4) Volume of funding, 5) Diversity of stakeholders involved in the projects, 6) Number of events organized bringing together LLs and other instruments (e.g. OGs) 7) Number of projects for research on the LL instrument.*

OO3. Build and organise a European network of new and existing LLs and RIs for knowledge sharing and co-creation on AE innovations at various scales.

Activity 1: Identifying existing LLs and RIs relevant for the network, present benefits in joining & structure the network (e.g. terms of reference).

Activity 2: Animating the network of LLs and RIs (including all actors, e.g. farmers, advisors, researchers, policy makers) to set the stage for a European-wide community contributing to AE transition. This includes organising their participation in the governance of the partnership (see 2.3).

Activity 3: Establishing a programme, creating and using tools for the sharing of best practice, cross-fertilisation and fostering knowledge exchange among living labs at various levels, by organizing and carrying out demonstration activities, cross visits, pilot tandem projects for mutual learning (e.g. for new LLs), exchanges, setting up of working groups on both thematic and horizontal issues, and establishing online platforms and networks both for scientists and practitioners.

Activity 4: Ensuring cooperation, synergies and knowledge sharing with other initiatives and living lab networks at international and European level, including the network of living labs and lighthouses set up under the Horizon Europe mission 'A soil deal for Europe'[59].

Activity 5: Identifying and sharing best practice indicators (e.g. practical cases) to assess the performance of living labs in regards to the enhancement of socio-technical innovation and adoption of AE schemes, in synergy with monitoring activities (see OO2 – activity 3 and OO6).

Activity 6: Promote the creation of new LLs by providing the necessary administrative support (e.g. organizing an EU-wide call for new LLs with national/regional funding).

[59] https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/missions-horizon-europe/soil-health-and-food_en#deals

Proposed KPIs*: 1) Number of identified relevant initiatives for the network, 2) Number of initiatives recruited to the network, 3) Number of activities organized within the network, 4) Number of research topics coming from LLs, 5) Number of tools for sharing knowledge, experience, best practices, etc., 6) Number of events aiming at demonstration and networking, 7) Number of meetings with other networks including LLs, 8) Report on indicators for assessing performance of LLs, 9) Development of guidelines for the creation of new LLs that support AE transition.*

OO4. Build capacities of various actors at the levels of networking, AE and LLs to foster AE transition.

Activity 1: Designing guidelines on key competencies and formulating didactical concepts to build-up innovation capacity to support AE transition, based on the needs/patterns of knowledge of all actors at various levels (e.g., via literature reviews, workshops with senior trainers and facilitators, being active in this field).

Activity 2: Developing training programs, training material and tools to enhance the networking, AE, LLs skills and methodological competencies of various actors and to support peer-to-peer learning between the living labs and other research infrastructures, specifically the following types of activities are foreseen:

- Organising specific training activities relevant for the AE transition, including transition management.
- Organising a summer school program on AE practices and transition management in farmers' schools (apprenticeship), universities, vocational trainings.
- Designing and providing transnational 'train-the-trainers' courses including for the facilitators of the living labs.

Activity 3: Developing (cross-national) green entrepreneurship/"agroeco-preneurship"[60] programs, promoting incubation and mentorship of agribusiness startups on AE and training on AE economics and finances.

Activity 4: Promoting AE curricula, career systems and impact-oriented research and develop guidelines and tools for decision makers (in synergy with OO8) and managing authorities to provide an enabling environment for AE capacity building.

Proposed KPIs*:1) Development of guidelines on key competencies, 2) Development of training programmes, material and tools, 3) Number of different target groups trained (e.g. farmers, students, entrepreneur, policy makers, etc.), 4) Number of people trained, 5) Number of trainers trained, 6) Development of summer school(s), 7) Number of participants to summer school(s), 8) Development of guidelines and tools promoting AE curricula and careers.*

OO5. Improve access to and use of services provided by RIs and other relevant initiatives for long-term measurement, observation and experimentation in support of AE.

Activity 1: Creating and updating a catalogue /guide for researchers and other stakeholders of research infrastructures and their services relevant to AE.

Activity 2: Collaborating with AE (e-)infrastructure entities to provide inputs (data, data management, long-term field experiments and research programmes) for the partnership activities.

[60] Meant here as the entrepreneurship oriented towards AE practices and products

Activity 3: Fostering networking and dialogue between RIs to optimize their contribution to the partnership's activities.
Activity 4: Facilitating access for individual researchers, LLs and other organisations to RI services that support AE transition, e.g. by brokerage events presenting services offered by RIs and conditions of access or specific calls.

Proposed KPIs*: 1) Development of catalogue, 2) Number of national and European RIs included in the catalogue and of services provided, 3) Number of RIs contributing (e.g. data) to partnership activities, 4) Number of networking activities between RIs, 5) Number of individual researchers using services of RIs, 6) Number of brokerage events to inform researchers about the panel of services available at RIs.*

OO6. Setup a framework, data management, indicators, and tools to monitor the AE transition, its impacts and social, economic, environmental and climate performance, for a variety of actors, contexts and scales.
Activity 1: Developing a data management and monitoring plan
Activity 2: Monitoring, assessing and evaluating the results of the research projects funded under the umbrella of the partnership.
Activity 3: Developing methods and indicators with relevant actors ("co-creation") to monitor the AE performance (e.g. economic, environmental, social) at various scales, contexts and pedo-climatic conditions, including by making use of Research Infrastructure capacities and digital technologies.
Activity 4: Designing methods for harmonized long-term data collection and compilation on socio-economic and environmental impact of AE schemes.
Activity 5: Developing decision-support systems targeted to different actors (farmers, advisors, etc.).
Activity 6: Establishing, in a participatory approach, indicators to monitor and evaluate transition/transformation towards AE at the European level, also considering monitoring processes of other partnerships and missions.
Activity 7: Developing narratives and success stories illustrating the impact of the partnership activities.

Proposed KPIs*: 1) Development of a data management plan, 2) Develop a monitoring and evaluation framework, 3) Number of indicators co-created with relevant actors to assess the AE performance, 4) Harmonisation of long-term data collection and compilation, 5) Developed tools for monitoring of AE and AE transition, 6) Number of actors making use of developed decision-support systems, 7) Narratives/success stories from the partnership.*

OO7. Design and implement communication and dissemination activities to support AE transition through increased uptake by practitioners and to improve stakeholder engagement, including the wider public.
Activity 1: Developing a communication and dissemination plan for targeted audiences. Accordingly, implementing e.g. following activities:
Activity 2: Developing specific and tailor-made support tools and events to raise awareness of various stakeholders, including farmers, about the benefits and challenges of AE and its potential for farming, food, the environment, climate, biodiversity and society.
Activity 3: Supporting targeted regional and supra-regional communication and participation platforms to facilitate the dissemination of information and to foster dialogue among actors on the benefits and challenges of AE.

Activity 4: Establishing a website and other digital supports for the partnership and developing information and communication material to disseminate results from the partnerships research and innovation activities and to illustrate how the partnership is contributing to achieve the targets of the Green Deal and its strategies, as well as other EU policies, including the Common Agricultural Policy.

Proposed KPIs*: 1) Development of communication and dissemination plans, 2) Number of annual visits to website, 3) Number of documents for awareness raising produced, 4) Number of translations to national languages of partnership documents, 5) Number of subscribers to newsletters, 6) Numbers of targets reached on social media, 7) Number of articles on website, 8) Number of newsletters produced per year, 9) Number of awareness raising events.*

OO8. Put in place mechanisms for science-policy dialogue in support of the establishment and implementation of evidence-based policies (research and sectoral), that supports AE transition, including long-term funding for AE R&I.
Activity 1: Improving and establishing linkages with policy and decision makers, through the organisation of dialogue, training and awareness raising activities, on the need of integrating and improving coherence of policies to facilitate the development of AE.
Activity 2: Developing appropriate relevant communication products (e.g. policy briefs) that present evidence-based recommendations for impact on national priority setting and uptake in policy-making processes.
Activity 3: Organising targeted events that promote the design and use of policy incentives to foster AE transition.
Activity 4: Conducting awareness-raising actions e.g. workshops for funding bodies and policy makers on how AE LLs and RIs contribute to knowledge and innovation generation and on the importance of long-term funding for transformative processes towards more sustainable farming systems.
Activity 5: Promoting the integration of existing frameworks and developing new ones to promote long-term investment in research and innovation infrastructures that support the AE transition.
Activity 6: Coordinating dialogues and liaising with other initiatives, in particular Horizon Europe partnerships and missions, to promote coherent EU and national policy-making and long-term funding for transition research.

Proposed KPIs*: 1) Number of communication products (e.g. policy briefs) targeted at policy makers, 2) Number of events promoting AE to policy makers, 3) Number of training events aimed at science-policy dialogue, 4) Number of ministries/authorities involved in national mirror groups (or similar), 5)Number of products under this OO created in cooperation with other initiatives, 6) Number of countries having put in place national structures for science-policy dialogue around the partnership, 7) Number of events with international initiatives.*

2.1.2 Mechanisms that will ensure the complementarity of activities

Partnership activities:

The activities implemented by the partnership will be described carefully in the annual work plans. While developing work plans, special attention will be paid in order to ensure that activities of the partnership have the highest degree of complementarity. As an example, interesting research results may be the object of further research or testing in subsequent work

plans. Similarly, needs identified during the co-creation process in the LL will inspire the scope of the research calls.

Work Package leaders will meet regularly (e.g. in the frame of the ET, see part on Governance; but also on ad-hoc basis) and report on performed activities and outputs, which could then be of interest for other activities, and also on planned activities. Such forward thinking will be key to coordinate activities in time and scope. This will allow early identification of opportunities for "horizontal" activities (not limited to a single Work Package).

With activities outside of the partnership:

Making best use of the available budget will require a very close monitoring. In this sense, it is essential to avoid any potential duplications of work with other initiatives and, on the contrary, to pool resources (financial but not only) whenever possible as common priorities appear. Regular contacts will be ensured with other relevant Horizon Europe partnerships and missions. These contacts will allow a smooth exchange of information, in particular on activities planned (and will also be the opportunity for this partnership to present its own plans, furthermore if possible to identify synergies, potential joint actions…). EC representatives (e.g. DG AGRI or DG RTD) will be asked to provide regular updates on the latest developments of Horizon Europe, in particular (but not only) Pillar II – Cluster 6. Moreover, numerous relevant EU and international initiatives are represented in SCAR-AE and will be consulted in the process of preparing work plans (either via SCAR-AE or directly into the partnership). It should also be noted that several relevant partnerships are tightly linked to SCAR Working Groups – accordingly linkages are also ensured via SCAR.

2.1.3 Coherence and synergies with national policies, programmes and activities

This partnership is being developed by SCAR-AE consisting of MS/AC representatives, relevant initiatives and a broad list of observers. SCAR-AE will follow up on the implementation of the partnership over its entire duration and create a link with the entire SCAR and affiliated Working Groups. SCAR is a major catalyst for the coordination of national research programmes and therefore a key actor to address.

In addition, the members of the partnership including national authorities responsible for funding R&I activities, for R&I policy and agricultural policy and activities will report on the partnership activities and outputs in their countries and therefore contribute to maximising the impact of the partnership at national level, including on national policies. Conversely, the members are asked to report to the partnership on important relevant developments in their countries (e.g. a new policy, programme or initative in preparation). The partnership will also be an opportunity for its members to benefit from the experience and best practices in other countries, in particular thanks to the establishment of national mirror groups. Mirror groups offer the opportunity to prepare and consolidate national positions taking own policies and programmes into account with regards to strategic decisions and therefore all MS/AC will be encouraged to establish such groups. In the frame of SCAR-AE, MS/AC have been encouraged to build such groups; several MS/AC have already established such mirror groups.

2.2 Resources

In agreement with what has been presented previously, the financial model of this partnership should be a mixed model with "in cash" and "in kind" financing.

The expected overall budget of the partnership rises to approx. 500 million €, broken down as 150 m€ EC contribution and 350 m€ from the signatories of the Grant Agreement. In terms of budget allocation, it is expected that research activities, mainly funded through competitive calls, will consume 200 to 250 m€ of the total budget. Management, coordination and administration- related activities costs are roughly estimated at max. 25 m€. Other activities, mainly related to innovation, dissemination, communication etc., will account for the remainder of the budget, i.e. 200 to 250m€. The principal resources required for delivering on the objectives of the Partnership will be in terms of 1) financial "in cash" contributions from countries and regions, 2) "in kind" contributions to carry out the tasks and actions undertaken (positions paid by partners and devoted to some activities of the Partnership; etc.;e.g. access to RIs and LLs).

Research activities carried out through joint external calls will mainly be funded "in cash" by the funding agencies and the ministries of the consortium. The overall ambition for funding research calls is estimated to the amount of 140 / 180 m€ (contribution from research funding organisations). Accordingly, this should be topped-up with approx. 70 m€ EU contribution. Over the 7 years duration of the partnership, this means an annual budget for funding transnational research projects in the range 32m€ to 37m€ (which seems reasonable regarding the amounts spent in the past in numerous initiatives, e.g. ERA-NETs and JPIs, while going much beyond individual calls of these initiatives). Besides, some extra cash could also be provided by "non-members of the consortium", entities wishing to contribute to the calls (e.g. from countries not eligible for EU funding).

To summarise and with respect to indications on main types of costs indicated under 1.2.5, and while this should be further elaborated during the SRIA and partnership preparation, it is expected at this stage that:

- Research activities will be mainly/entirely funded "in cash" (as indicated above).
- Networking activities of AE LLs and RIs could be partly subject to calls (which would be an in cash approach), while Grant Signatories could also partly implement these.
- Capacity building could be driven by in-kind contributions from Grant Signatories.
- Communication / Dissemination will most probably be in majority subject to in kind contribution by Grant Signatories.
- Coordination / Management is clearly not an activity to be subject to an in cash contribution, as such activities cannot be conducted by entities outside of the consortium.
- Data management / Evaluation should be completed by in-kind contributions from Grant Signatories.

Considering the figures given in 1.2.5 and the considerations above, it is estimated that contributions from MS/AC should be balanced between the in-cash (50%) and the in-kind (50%) scheme. As approximately 350 m€ are expected from the MS/AC over the 7-year lifetime of the partnership, 175 m€ in-cash and 175 m€ in-kind seem necessary, which means an annual investment of 25 m€ in-cash and 25 m€ in-kind.

Prior experience has proven that the "black box" model can allow using the EC contribution in a flexible manner. As an example, many ERA-NETs under Horizon 2020 (EU funding rate of 33%) were able to have a higher share in the funding by MS/AC of transnational research projects than the contractually binding 67%. Accordingly, the share of EU funding in these projects was, *in fine*, lower than 33%. This permitted the financing of other activities of the

ERA-NETs with the help of EU funding (e.g. coordination, monitoring, etc.) at a higher level than the contractually 33%.

At national level, it is also expected that resources will come from different funding entities (public, national, regional, etc... and non-public, e.g. association, LL, etc.). Partner countries should explore the possibilities to use other EU funding programmes, beyond Horizon Europe, such as structural and CAP funds (EFRD and EAFRD) for the co-funding and the development of their structural or human capacities.

At this stage, some countries have expressed their intent to contribute financially to the partnership. The wide involvement of countries in SCAR-AE SWG indicates a strong interest in participating in this partnership.

2.3 Governance

The Governance of the Partnership will be further refined in 2022/2023 and must be considered as a suggestion. The Governance will be a central aspect of the future Consortium Agreement. It should also consider that contributions from the partners are diverse and it will have to facilitate an efficient uptake of the results of the Partnership. For this, the partnership will base its governance on previously successful models for partnerships and EJPs with following main functions:

1. General Assembly (GA): This board will include one representative from each partner (signatory of the GrAg). It will meet only for Extraordinary General Meetings (EGM) to take decisions on amendments to the GrAg (e.g., addition of new members, termination of existing partners and amendments to the Description of Action). Each member will have one vote. As all signatories are legally bound by the GrAg (and by any amendments to the GrAg), they must have the right to vote on any amendments.
2. Governing Board (GB): This is the decision-making body of the partnership. In particular, the GB adopts the annual work plans of the Partnership, reports to the EC and fosters the political commitment. Membership consists of 1 (or 2 – tbd) members per country plus 1 (or 2 – tbd) members representing the Regions Mirror Group (RMG). The voting power of the representative(s) from the RMG should be equal to that of one country. The GB elects one Chair and 2 Vice-Chairs for a period of X years. In addition to full members, the following will be invited to GB meetings as observers (without a vote): 2 representatives of EC (1 each from DG AGRI and DG RTD); Chair of the Stakeholder and Science Advisory Board; and the Chairs of each of the colleges of the Enlarged Stakeholder Board. External guests may be invited as speakers for particular agenda items by the Chairs of the GB, including representatives of countries willing to join the Partnership in the future. The role of observers is diverse (e.g. provide advice to the GB, candidate for membership and therefore presenting opportunities of/for the country, presenting new developments beyond Europe, etc..). Conflict of Interest and/or confidentiality will be managed by making relevant parts of the GB meeting open for voting members only. One or more representatives of the OT will be responsible for note-taking, logistics etc.
3. Executive Team (ET): The ET includes the Partnership Coordinator, Chair and Vice Chairs of the GB; Operational Team members; and Work Package leaders. The role of the ET is to ensure that the GB decisions are implemented throughout the activities of the Partnership.

4. Operational Team (OT): The OT will ensure the implementation of activities in the partnership and support to all boards, in particular on administrative matters (protocols, preparing meeting agendas, administrative matters related to the Grant Agreement…). The OT is led by a Head of OT and includes other support staff.
5. External Call Board (ECB): An ECB will be constituted for each external funding call, and membership will consist of the parties that commit funding to the call. The ECB will gather inputs from stakeholders for potential topics for the call. This should be an open process, which gathers input from a variety of stakeholders. Those stakeholders can include organisations that will later apply to the call, but the consultation must be an open process that does not give advantage to any specific group of future applicants. After this initial information gathering stage, all work on framing the topics for the call, final decisions on the scope of the call, call documentation, evaluation and selection will be conducted solely by the ECB.
6. Science and Stakeholder Advisory Board (SSAB): Membership consists of high-level scientists in the remit of the Partnership (elected by the GB) and non-academic stakeholders (elected by enlarged stakeholder board). Membership renewed by one-third every two years. The role of the SSAB is to provide advice and suggestions on the strategy and main activities of the Partnership; be consulted on the main documents produced by the Partnership; review the outputs and impacts of the Partnership, and suggest possibilities for improvement. The SSAB will also contribute to the dissemination of information related to the Partnership towards relevant scientific bodies and stakeholders.
7. Enlarged Stakeholder Board (ESB): The ESB will be organised into 4-6 thematic colleges, representing the broad stakeholder types. An open call for interest will be published, and all relevant organisations free to apply. The ESB will be renewed regularly through open call. One representative and one deputy representative will be elected by each college and these will be stakeholder members of the Advisory Board. The ESB should include one college for Living Labs; one for Research Infrastructures and one for other major initiatives (e.g., JPIs, other partnerships). The role of the ESB is to inform the stakeholders about the main activities and outputs of the Partnership. The members can contribute to the identification and co-building of research needs to be addressed by the Partnership. Members of this board also bring their own field expertise to contribute to bridging the gaps between research and innovation, and to improve science-based knowledge transfer. The ESB will provide advice and suggestions on the strategy and main activities of the Partnership.
8. Ethics Advisory Board (EAB) This board will include external experts and will address issues related to ethics and the use and protection of personal data. The GB may ask the EAB for advice on conflict of interest issues.
9. Mirror Groups:
    a. National Mirror Groups (NMGs): Participating countries are strongly advised to constitute an NMG, bringing together the national GB member(s) and other relevant stakeholders. The role of the NMGs is to ensure national coordination, contribute to the objectives of the Partnership and benefit from it. The composition of an NMG is at the discretion of each participating country. NMGs could include representatives of Living Labs and Research Infrastructures; relevant national and regional authorities and research institutions (whether participating in the Partnership or not), as well as the national and regional members of the Partnership and the GB member that reports NMG views and positions during GB meetings. The establishment of National Mirror Groups ensures that the activities, strategies and needs of that country are considered

when taking decisions at the Partnership level and when designing the annual work plans.

b. European Mirror Group (EMG): This group should bring together a wider network of EC bodies that have an interest in the activities of the Partnership. This would include DG AGRI and DG RTD who act as observers at the GB, as well as other relevant DGs (DG CLIMA; DG ENV; DG REGIO; DG INTPA; JRC etc.). This should facilitate a two-way flow of information, from the GB to the relevant DGs/JRC and from the DGs/JRC to the GB.
c. Regions Mirror Group (RMG): This group should bring together the regional representatives of the Partnership, allowing them to discuss issues specifically of relevance to regions. They should elect two members who will act as observers at the GB, facilitating a two-way flow of information.

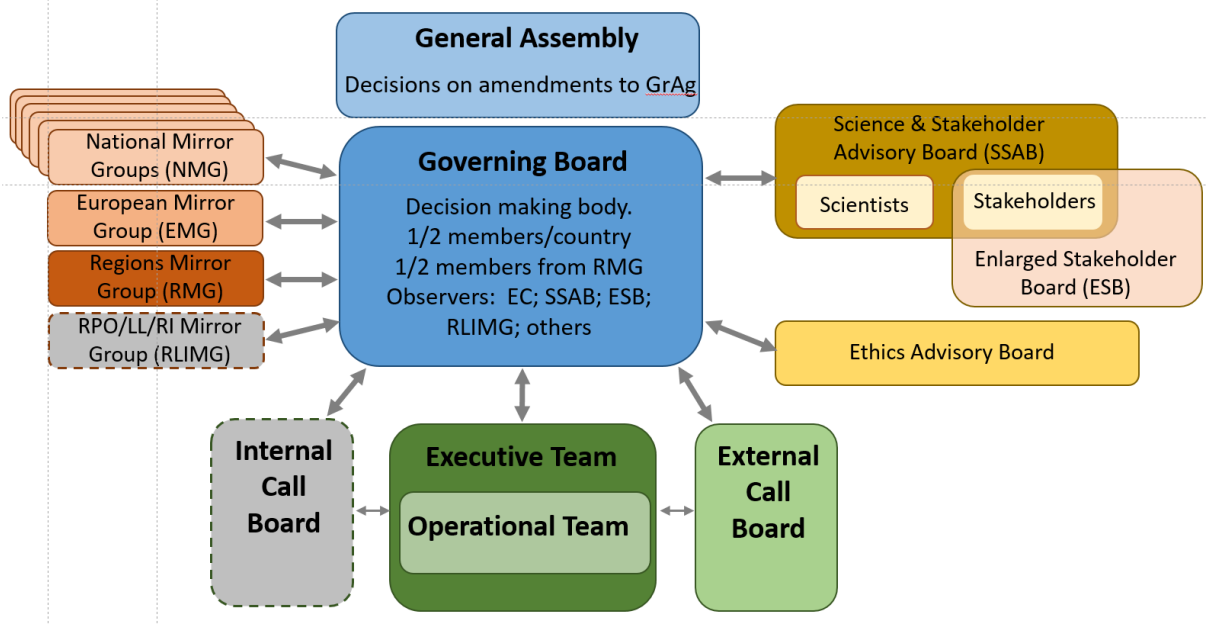
With regards to the participation of RPOs, LLs and RIs as full members (signatories of the GrAg) of the Partnership, the following will apply:

ECB: For the avoidance of doubt, the RPO/LL/RI members of the Partnership will not have any input to the work of the ECB, apart from when input is invited from all relevant stakeholders, and will not receive any information, apart from that which is publicly available.

RPO/LL/RI Mirror Group (RLIMG): This group should bring together the RPO, LL and RI members of the Partnership allowing them to discuss issues specifically of relevance to their members. They should elect two members who will act as observers at the GB, facilitating a two-way flow of information. The RPO/LL/RI Mirror Group will send two representatives, as observers to the GB. Normal procedures, as described, for management of conflict of interest/confidentiality will apply (i.e., GB may choose to meet without observers for specific agenda items).

Cofunding from the RPOs/LLs/RIs can be provided in either or both of the following ways:

1. Internal Funding Call: A portion of the EC cofunding for the Partnership will be allocated to internal calls. These calls will only be open to members of the Partnership (as only their costs will be eligible as MS/AC cofunding). An Internal Call Board (ICB) will be constituted for each internal funding call, and membership will consist of the parties that commit funding to the call. The ICB will gather input from stakeholders for potential topics for the call. The ICB will prepare a draft call scope for RPO/LL/RI-conducted and cofunded activities. Call scope/topics, call procedures and the final list of selected projects requires co-decision from ICB and Governing Board (i.e., a majority of both must agree). The secretariat for the call, which will run the call office and manage the evaluation process will be staffed by non-RPO/LL/RI partners in the Partnership, in order to avoid a conflict of interest.
2. The RPO/LL/RI partners agree a two-year plan of work with the GB, which is then submitted to the EC for approval. These activities are to be conducted by RPOs/LLs/RIs, with a mix of their own funds/resources and cofunding from the EC. This process could be synchronized with 2-year GrAgs.



Possible governance structure. Bodies in grey with dashed outline will only be included where RPOs/LLs/RIs join as full partners.

Interaction with other Partnerships will be vital in order to ensure synergies and avoid redundancy between different Partnerships. One of the colleges in the enlarged stakeholder board will represent other major initiatives. In addition, it may be useful to establish a group with representatives of each of the Partnerships, that will meet on a regular basis to exchange information and identify how best to optimize the interaction between the Partnerships.

2.4 Openness and transparency

2.4.1 Open and transparent approach for different sectors and geographical areas

Ensuring participation of all relevant stakeholders is at the core of the partnership, from the concept inception phase, which includes consultations with country authorities, network of European regions, ERA-NETs, technological platforms, etc., and through the organisation of participatory discussions (workshops, webinars, etc.) to officially kick-start dialogue with researchers, funders, public authorities, scientists, farmers, industry and civil society representatives. Ensuring stakeholder and end-user involvement is also at the core of the activities that the partnership aims to implement, which are based on the living lab approach.

The proposed governance aims at this: the membership of the partnership remains open to all MS and AC. Efforts will be made in order to attract MS/AC who do not join the partnership at the earliest stage. This can be on an ad-hoc opportunity, via links with other initiatives (e.g. FACCE-JPI, BIOEAST, PRIMA, etc…) or via events aiming especially at enlarging the membership of the partnership. In addition, further countries might be targeted as well for membership, if a clear added value is identified. It is important to have both authorities responsible for research funding and also for agriculture/environmental/climate policies in the partnership, in order to ease filling the gap between research and policy as one of the aims of this partnership is impacting relevant policies. New membership will be subject to a decision by the GB.

Besides, keeping in mind that this partnership also aims at learning from other parts of the world and at having an impact on the international scene, cooperation will be sought with non-EU and non-European countries. While some countries already have experience with AE and LLs (e.g. Argentina, Brazil, Canada, Colombia, Cuba, Japan, New Zealand, etc.), further countries could follow the same path if the EU shows the way. Cooperation with non-member countries could be achieved via joint calls, dissemination activities (e.g. events). The possibility to export the EU expertise (e.g. staff exchange) should also be investigated.

The governance is aiming at a broad engagement of all types of stakeholders. The final structure of the stakeholder boards still needs to be fine-tuned, but should strive to ensure that each important type of stakeholder has a word to say. In order to maintain a manageable internal structure, there will be limited representatives of stakeholders in the boards, nonetheless, to the extent possible, they should speak on behalf of a wider community. Last but not least, LLs and RIs already include certain key stakeholders.

2.4.2 Access to information about the initiative and dissemination

A dedicated website would be set up where results of the R&I activities would be published. Moreover, regular workshops, conferences, meetings, etc. would be organised during the lifespan of the partnership for wider dissemination of activities and results with relevant stakeholders. One of the main dissemination channels will obviously consist in using the stakeholder networks established around the partnership and with the help of stakeholders' representatives in the partnership. Finally, the LL-scheme represents a powerful dissemination asset, in particular at more local/regional level, which shall be exploited optimally. At LL-level, specific attention is paid to the needs of end-users and local actors and to the best way to address them (language, local challenges e.g. extreme weather events…).

The website will also provide information on the governance of the partnership, the bodies, the activities, past and upcoming events, and appropriate contacts for different queries (e.g. willing to join the discussions as a farmer…). In this regard, contact persons will be appointed accordingly.

2.4.3 Proactive recruitment policy

Throughout the entire duration of the partnership, best efforts will be made in order to widen the partnership with additional partners providing added value to the already existing consortium.

The geographical coverage is one essential aspect in order to address the pan-European ambition of this partnership while considering e.g. pedo-climatic differences; therefore, countries not yet represented will be addressed proactively (in particular but not only MS and AC; see above 1.4.2). The benefit for a country to join the partnership shall be well described (while also being transparent in terms e.g. of expected/necessary contributions) in order to attract countries in an efficient manner. If possible/desired, countries might join the partnership as full members (beneficiaries of the Grant Agreement). Another option, in particular for non-European countries not eligible for funding under Horizon Europe, will be to perform joint activities, e.g. associate such countries to calls for research proposals (with their own funding), exchange knowledge (e.g. with Canada and other relevant countries on best practices to implement AE LLs).

Within a single country, different entities can be relevant for the partnership. In the first place, authorities responsible for research funding and /or for relevant sectoral (agriculture/environment/climate) policies are obviously the entities required for a good functioning and impact of the partnership. Having policy makers at the table is necessary in order to aim at having an impact on policies. While the partnership should strive to include these entities from the very beginning, should some of them be missing, best efforts will be made to attract them. In addition, as circumstances (e.g. mandates of ministers) can evolve during the lifetime of the partnership, the membership should evolve in order to ensure further that authorities responsible for research and policy are included. Finally, further entities might be identified on an ad-hoc basis as appropriate partners or relevant collaborators.

Past experience has shown that some MS/AC (e.g. Central and Eastern European Countries) encounter more difficulties in joining partnerships (e.g. ERA-NETs). This can be due to limited personnel or financial capacities. These countries nevertheless represent a high potential in terms of improving the European joint programming/reinforcing the ERA and, with relation to AE, still possess high nature value agricultural areas, natural habitats and biodiversity that would need to be preserved by a successful AE transition. Particular attention will be paid to facilitate the successful integration of these countries into the partnership, e.g. by organising specific events in these countries (BIOEAST and PRIMA initiatives could be supportive actors), supporting the research community in networking in order to ease their inclusion in research consortia…

It should be noted that the planned consecutive 2-years Grant Agreements will represent an opportunity for the partnership to smoothly evolve (without amendments) according to the needs identified during the 7-year programme.

In terms of the consortium, and beyond of all type of actors contributing to the partnership activities (e.g. LLs, RIs, farming sector, wider range of stakeholders) best efforts will be made to ensure gender balance. Specific actions could include: coaching for female farmers, best practice workshops and awareness training on gender equality, inclusivity and unconscious biases.

2.4.4 Process for establishing annual work plans

The preparation of each annual work plan shall be started much in advance (at least 6 months) of their planned adoption, while considering that a work plan should consider the most recent outputs and outcomes of the partnership activities (therefore it will partly be a moving target during the preparation). Since work plans must be agreed with the EC, regular consultation of EC services will be carried out.

Work plans should be based on the SRIA, inputs from the partnership members, the advisory boards and any ad-hoc input e.g. emerging from the partnership activities. The GB should decide on potential further inputs. The list of submitted topics for e.g. calls, activities, will be processed by the OT (in order e.g. to identify possible overlaps and suggest merges) and sent to the GB for their prioritisation. Where relevant, e.g. for a call, only the organisation providing funding shall be involved for this decision-making process.

Annexes:

Annex 1: Membership of the SCAR-AE

Strategic Working Group on Agroecology (SCAR-AE)

Countries member of SCAR-AE (27 countries):

SCAR-AE is composed of representatives of EU-Member States and Horizon Europe Associated Countries, nominated by the SCAR representative of the country. The current membership of SCAR-AE is as follows: Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Georgia, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Moldova, The Netherlands, Norway, Poland, Portugal, Serbia, Slovakia, Spain, Sweden and Turkey.

Key Advisors (involved in the core work of SCAR-AE):

Key Advisors are involved intensively in the work of SCAR-AE. In this regard they contribute to all meetings of the "Coordination Group" (together with the co-chairs of SCAR-AE and the DG AGRI) and report regularly on the performed work and main outcomes of their projects. They are also involved in the work performed in the different "Task Forces" under SCAR-AE (Task Forces deal with specific aspects e.g. research needs, governance…). The 4 Key Advisors of SCAR-AE are: the Joint Programming Initiative on Agriculture, Food Security and Climate Change (FACCE-JPI), the CSA "European Agroecology Living Lab and Research Infrastructure Network" (ALL-Ready), the CSA "Agroecology for Europe" (AE4EU) and the CSA "Soil Mission Support" (SMS).

Observers (involved in process at plenary level, further observers join on regular basis):

Observers are organisations/initiatives active in themes that are of direct relevance to SCAR-AE and the partnership. They were proactively addressed by SCAR-AE and/or requested such status which was then considered on an ad-hoc basis by SCAR-AE. SCAR-AE paid attention to a have a proper balance of interests represented amongst the authorized observers. Observers are invited to participate in the meetings of SCAR-AE and its Task Forces when relevant, receive the information that is needed to participate in the meetings and have the opportunity to comment on the documents prepared by SCAR-AE.
Currently, observers in SCAR-AE are (this list is regularly updated/broadened): SCAR SG Task Force, SCAR SWG AKIS, SCAR SWG Food Systems, SCAR SWG Fish, SCAR SWG Bioeconomy, SCAR SWG ARCH, SCAR SWG Forest, SCAR CWG AHW, SCAR CWG SAP, Horizon Europe Partnership Biodiversa+, Agroecology Europe, TP Organics, ERA-NET Core Organic, ERA-NET SusAn, ERA-NET FACCE SURPLUS, ERA-NET ICT-AGRI-FOOD, COPA-COGECA, La Via Campesina, ERIAFF, ERRIN, EnoLL, ETP Plants for the Future, EEB (European Environmental Bureau), EuroCoop (European association of consumer cooperatives), IBMA (International Biocontrol Manufacturers Association), IFOAM - Organics International, BIOEAST Initiative, Animal Task Force, Birdlife, LifeWatch ERIC and AnaEE.

Annex 2. Contribution of AE and the Partnership to EU and international policy context

Policy	Objectives/Goals	Contribution of AE/this partnership
European Green Deal (December 2019)	Climate-neutrality by 2050 and reduction of GHG emissions to 55 % of 1990 levels by 2030.	AE farming enhances the transference, and the retention, of atmospheric CO_2 to the agroecosystems, contributing to the climate mitigation and neutrality objectives.
Farm to Fork Strategy (May 2020)	Promote sustainable farming approaches such as AE, and by 20230: i) reduce the use and risk of chemical pesticides by 50%, ii) reach at least 25% of EU's agricultural land under organic farming, iii) reduce the use of fertilisers by at least 20%, iii) reduce overall EU sales of antimicrobials for farmed animals (and in aquaculture) by 50%.	AE farming is based on organics, input reduction and recycling and on boosting natural and ecological processes. AE farming strategies include diversification of agroecosystems and combination of practices such as conservation tillage, biodiverse mixing crops in space (e.g., intercropping and poly-cultures) and/or time (e.g., crop rotations), cover crops and mulching, crop-livestock integration, use of on farm or locally available organic sources of nutrients, prevention and biological control of pest and diseases and agroforestry, among others, boosting ecological processes and ecosystem service and increasing primary production CO_2 uptake and carbon retention. Partnership will boost AE farming and scaling-up through new knowledge and innovations, overall contributing to F2F, EU biodiversity, zero pollution action plan, EU forest and 2030 Climate target Pact objectives.
EU Biodiversity Strategy 2030 (May 2020)	i) Bring out full potential of AE to supply healthy food, maintain productivity, while reducing food footprint, and GHG emissions, and contributing to soil fertility and biodiversity, ii) Achieve the potential of organic farming as a sector that creates jobs and attracts young farmers, providing 10-20 % more jobs per hectare than conventional farms, and create added value for agricultural products, and iii) Support the uptake of agroforestry for its great potential to provide multiple benefits for biodiversity, people and climate.	
Zero Pollution Action Plan (May 2021)	50 % of reduction of pollution from pesticides in air, water and soil in 2030, by the promotion of agro-ecological practices, including organic farming.	
EU Forest strategy (July 2021)	Explore the potential of agroforestry as a carbon farming approach that should be rolled-out in order to achieve environment- and climate-related objectives.	
2030 Climate Target Pact	Cut GHG emissions by at least 55% by 2030. By 2035, the EU should aim to reach climate neutrality in the land use, forestry and agriculture sectors.	
EU Soil Strategy for 2030 (November 2021)	Sets out a framework and concrete measures for the protection, restoration and sustainable use of soils: • Make Sustainable Soil Management the new normal	Soil management is at the core of AE. The partnership will contribute to achieve the strategy's measures in relation to the protection, restoration and sustainable use of agricultural soils.

	• Boost circular economy • Restore degraded soils and remediate contaminated sites • Act to prevent desertification • Increase research, data and monitoring on soil • Mitigate and adapt to climate change • Mobilise the necessary societal engagement and financial resources	
New Common Agricultural Policy (CAP), 2023-2027 (June 2021)	Managing the transition towards a sustainable food system and strengthening the efforts of European farmers to contribute to the EU's climate objectives and to protect the environment. Eco-schemes are a new instrument in the CAP to support this transition	AE farming practices (conservation tillage, poly-culture, crop rotations, cover crops, mulching, agroforestry and crop-livestock integration) are among those that can be supported under the eco-schemes. Moreover, AKIS and co-creation will be reinforced under the new CAP. These aspects lay at the core of AE approaches and of this partnership.
Action Plan for the development of organic production (March 2021)	Sets the path to achieve the farm to fork target on organics. R&I will continue to be instrumental to boost the organic sector. At least 30% of the budget for research and innovation actions in agriculture, forestry and rural areas to topics specific will be devoted to the organic sector.	Research and innovation activities under this partnership will contribute to reach the farm to fork target on organics.
Circular Economy Action Plan (March 2020)	Develop the circular economy in order to significantly reduce the negative impacts of resource extraction and use on the environment and contribute to restoring biodiversity and natural capital in Europe.	AE is a systemic approach to food systems based on the principles of circular economy that can make food value chains shorter and more resource-efficient.
Long-term vision for rural areas (COM(2021)345)	i) engaged in multi-level and place-based governance and integrated strategies using collaborative and participatory approaches, ii) providers of food security, economic opportunities, goods and services for wider society (e.g. bio-based materials and energy) and local, community-based high-quality products, retaining a fair share of the value generated, iii) flourishing sources of nature contributing to the objectives of the Green deal, and iv) places of diversity, making the most out of their unique assets, talents and potential.	The partnership will be particularly relevant for the area of work "resilient", that puts the focus on the restoration of landscapes, including cultural ones, the greening of farming activities and the shortening of supply chains, and "prosperous" that stresses the importance of entrepreneurship, synergies between tourism, farm marketing and processing, and increasing values by recognising the link between products and where and how they are produced. AE and this partnership will contribute in the developing of strategies that make the most of rural areas intrinsic strengths, while preserving self-sufficiency and sustainability of food production.

Sustainable Carbon Cycles (SWD(2021) 451 final)	Sustainable land management will be critical in achieving the EU's 2050 climate neutrality objective as it will increase the amount of carbon captured and stored in plants and soils. To establish sustainable and climate-resilient carbon cycles and start a reflection towards the further integration of carbon removals into the EU regulatory and compliance frameworks, post-2030, taking into account scientifically validated methodologies. Explore the potential competitive advantage for land managers implementing carbon farming practices.	Some of the land management practices that result in the increase of carbon sequestration and in most cases in co-benefits for ecosystems and biodiversity, will be in the scope of this partnership and include: - Agroforestry and other forms of mixed farming combining woody vegetation (trees or shrubs) with crop and/or animal production systems on the same land; - Use of catch crops, cover crops, conservation tillage and increasing landscape features.
Sustainable Development Goals SDG 2 No hunger SDG 3 Good health and well-being SDG6 clean water and sanitation SDG12 Responsible consumption and production SDG 13 Climate Action SDG 15 Life on land	End hunger, achieve food security and improved nutrition and promote sustainable agriculture. Ensure healthy lives and promote well-being for all at all ages Ensure availability and sustainable management of water and sanitation for all. Ensure sustainable consumption and production patterns Take urgent action to combat climate change and its impacts. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	AE contributes directly to multiple SDGs through integrated practices that cut across many areas. From tackling hunger, poverty and inequality to responding to climate change to safeguarding biodiversity and expanding nutritional choice, agroecology echoes the goals of the 2030 SDG Agenda. Some examples of activities of AE which contributes to SDGs include: i) achieving food security and sovereignty (SDG2 and 12) is one of the principles of AE, ii) by diversification, external input reduction (SDG6) and alternative marketing channels (SDG 2 and 12), iii) by supporting of market models that emphasize local and regional production which foster local economies (SDG 3 and 12), iv) by boosting AE training for women (SDG 12), and v) the diverse and heterogeneous AE approaches which take advantages of wild and domesticated biodiversity (SDG15), and of locally sourced practices designed to restores and improve soil organic matter (SDG 13), fertility and health (SDG 15).

Paris Agreement (COP 21)	Substantially reduce global GHG emissions to limit the global temperature increase in this century to 2ºC while pursuing efforts to limit the increase even further to 1.5 ºC.	AE practices/methods at farm, landscape and food chain levels are based on external input reduction, recycling, and efficiency, contributing to climate change mitigation, and thus on main goals of Paris Agreement.
Glasgow Agreement (COP 26)	Phase-out fossil fuels starting with coal and limit the global temperature increase in this century to 1.5 ºC.	AE practices/methods at farm, landscape and food chain levels can deliver the phase-out of fossil fuels in diverse inputs such as fertilisers, pesticides.

Annex 3: Features for LLs and RIs for AE transition

General features distinguishing LLs and RIs

	Living labs	Research infrastructures
Aims	Business, knowledge and social transformations.	Diversity of facilities, of data, of contexts that allow more systemic scientific production
Activities	Co-creation, demonstration and iteration (experimentation-evaluation-improvement; experimentation-evaluation…)	Innovation, education, public services contribution
Participants	Mix of private and public organisations, academics and "users", citizens	Research and R&D communities
Context	Real-Life	Research, long term perspective

Specific features expected for LLs and RIs for AE transition

	Living labs for AE transition	Research infrastructures for AE transition
Aims	- Improve sustainability and resilience at the landscape level and all over the value chain - Constant consideration of biodiversity on site and in the surroundings - Build a community around common goods.	- Allow research to observe / experiment / design / predict agroecosystem and agri-food redesign. - Bring a corpus of references on AE transition.

	Which means a : • Strong anchorage locally • Large diversity of their origins (from new field practices to experimental policy frames) and of the communities involved (farmers, policy makers, consumers, citizens…), • Large heterogeneity and quantity of knowledge produced (from practice to policies).	- Compile useful information and provide multiple services to a large community of actors in an open science vision.
Activities	Co-creation associated with: - Outcomes at the system level (value chain, landscape, territory). - Knowledge intensiveness (academic, tacit, implicit…) - Subtle governance schemes (meta-governance) to i) avoid the burden of information, ii) manage conflicts of interest, iii) orchestrate the co-creation, iv) ensure the democratic control of the direction taken. Demonstration and iterations: - demand a strong and dedicated effort, multi-actor innovation processes is an asset. - real time evaluation of the targets and the means, evolving with the collective learning and the empowering effect of the living lab. - dependent on the quantity and diversity of data to monitor the changes at the system level - Dependent on seasonal cycles LL l have to be long lasting and to be able to absorb unpredictable variations.	- Redesign at different ranges (from incremental innovation to strong redesign) - Multi- performance assessment (impacts, ecosystem services, social and economic dimension) - Vulnerability - Adaptability - Resilience assessment (emergent performance) - Dynamics of the AE transition - Stakeholder involvement (innovation - various knowledge) - Research management or non-research management

Participants	- The "users" are so diverse (adviser, farmer, consumer, citizen…) and with such evolutive roles, that the LLs have to constantly re-analyse who are the users and administer a constant re-opening to citizens and consumers. - The governmental investment is determinant of the long lasting of the LL. - Academics are strongly present with diverse roles beside the provision of scholarly knowledge and methods, such as the design of the "metagovernance" scheme, the facilitation of knowledge exchange between the partners…. - Participants go from being coordinated to cooperation	- Scientists of various research and research and development organisations - Teachers, students, agricultural and environmental managers. - Innovators (testing new sensors, technologies…). - Stakeholder are more or less involved - There are hybrid approaches, between research and society (networks of farms at regional or national level, platforms with innovation tools and experience (serious games…), where innovation in the making, with scientists
Context	- Boundaries of the agroecosystem and of the territory - Strong implication of the academics and of the 'agriculture innovation knowledge system" - Can originate on existing networks and has a trajectory for the transition at the systems level.	- Research and controlled systems

Annex 4: Potential connections of the partnership with Horizon Europe topics

TOPICS	YR	Keywords	Budget (m€)	EU contr. (m€)	SCHEME
HORIZON-CL6-2022-BIODIV-02-02-two-stage: Boosting breeding for a sustainable, resilient and competitive European legume sector	2022	Agroecological systems, Organic Farming, sustainable agriculture, food	14	7	IA
HORIZON-CL6-2021-FARM2FORK-01-02: Developing sustainable and competitive land-based protein crop systems and value chains	2021	Agroecological systems, organic farming, food	9	9	IA
HORIZON-CL6-2021-FARM2FORK-01-03: Digitalisation as an enabler of agroecological farming systems	2021	Agroecology, Agroecological systems, organic farming	2	2	CSA
HORIZON-CL6-2021-FARM2FORK-01-08: Uncovering lock-ins and levers to encourage farmers to move to and stay in climate-neutral and sustainable food production systems: from experiments to systemic mechanisms	2021	Agroecological systems, organic farming, food	12	**4**	RIA
HORIZON-CL6-2021-FARM2FORK-01-09: Towards an EU approach to assess and internalise positive and negative externalities of food for incentivising sustainable choices	2021	Agroecology, organic farming, food	8	8	RIA
HORIZON-CL6-2022-FARM2FORK-01-08: Research and innovation for food losses and waste prevention and reduction through harmonised measurement and monitoring	2022	Agroecological systems, organic farming, food	14	7	RIA
HORIZON-CL6-2022-FARM2FORK-02-01-two-stage: Agroecological approaches for sustainable weed management	2022	Agroecology, Agroecological approaches, organic farming, food	14,5	5	RIA
HORIZON-CL6-2021-CLIMATE-01-05: Agroecological approaches for climate change mitigation, resilient agricultural production and enhanced biodiversity	2021	Agroecology, Agroecological approaches, organic farming, food	7	7	RIA
HORIZON-CL6-2021-CLIMATE-01-08: Agroforestry to meet climate, biodiversity and farming sustainability goals	2021	Agroecological sector, organic farming, agroforestry, food	8.00	**4**	RIA
HORIZON-CL6-2022-GOVERNANCE-01-14: Improving preparation of multi-actor projects to enable the relevant actors to work in a co-creative way	2022	Agroecology	5	5	CSA
HORIZON-CL6-2022-FARM2FORK-01-12: Agro-ecological approaches in African agriculture systems	2022	Agroecological systems, Sustainable agriculture, food	28	7	RIA
HORIZON-INFRA-2021-SERV-01-02: Research Infrastructures services for a sustainable and resilient agriculture and agro-ecological transitions	2021	Agroecological transitions, Sustainable agriculture	7	15	RIA
HORIZON-CL6-2022-BIODIV-01-06: Monitoring and effective measures for agrobiodiversity	2022	Agro-ecology, Agrobiodiversity, Agroforestry, agrobiodiversity, Agro-ecological practices, food	8	8	RIA
HORIZON-CL6-2022-CIRCBIO-01-04: Maximising economic, environmental and social synergies in the provision of feedstock for bio-based sectors through diversification and increased sustainability of agricultural production systems	2022	Agro-ecological practices, food	8	8	IA

HORIZON-CL6-2021-ZEROPOLLUTION-01-01: Regional nitrogen and phosphorus load reduction approach within safe ecological boundaries	2021	Agro-ecological practices, food	6	2	CSA
HORIZON-CL6-2021-ZEROPOLLUTION-01-02: Optimisation of nutrient budget in agriculture	2021	Agro-ecological practices, organic farming, food	7	7	RIA
HORIZON-CL6-2021-ZEROPOLLUTION-01-09: Environmental impacts and trade-offs of alternative fertilising products at global/local scale.	2021	Agroecological approach	4	2	CSA
HORIZON-CL6-2022-ZEROPOLLUTION-01-03: EU-China international cooperation on nature-based solutions for nutrient management in agriculture	2021	Agroecological approach, organic farming, food systems	12	6	IA
HORIZON-CL6-2021-GOVERNANCE-01-26: Deepening the functioning of innovation support	2021	Agro-ecology	5	5	CSA
HORIZON-CL6-2021-FARM2FORK-01-04: Tackling outbreaks of plant pests	2021	Sustainable agriculture, organic farming	14	7	RIA
HORIZON-CL6-2021-FARM2FORK-01-05: Animal welfare 2.0	2021	Sustainable agriculture, food	8	8	RIA
HORIZON-CL6-2021-FARM2FORK-01-18: One health approach for Food Nutrition Security and Sustainable Agriculture (FNSSA)	2021	Sustainable agriculture, Food systems	18	**6**	RIA
HORIZON-CL6-2022-FARM2FORK-01-01: Risk assessment of new low risk pesticides	2022	Sustainable agriculture	7	7	RIA
HORIZON-CL6-2022-FARM2FORK-01-02: Socio-economics of pesticide use in agriculture	2022	Sustainable agriculture, organic farming	6	6	RIA
HORIZON-CL6-2022-FARM2FORK-01-03: Enhancing biosecurity in terrestrial livestock production	2022	Sustainable agriculture	10	5	RIA
HORIZON-CL6-2022-FARM2FORK-01-13: AU-EU Combatting all forms of malnutrition	2022	Sustainable agriculture, food	11	11	RIA
HORIZON-CL6-2022-FARM2FORK-01-14: African food cities	2022	Sustainable agriculture, organic farming, food	12	6	RIA
HORIZON-CL6-2022-FARM2FORK-01-15: Support for international research on infectious animal diseases	2022	Sustainable agriculture, food	3	3	CSA
HORIZON-CL6-2022-FARM2FORK-02-02-two-stage: Emerging and future risks to plant health	2022	Sustainable agriculture, organic farming	7	7	RIA
HORIZON-CL6-2022-FARM2FORK-02-03-two-stage: Ecology of infectious animal diseases	2022	Sustainable agriculture	12	6	RIA
HORIZON-CL6-2021-GOVERNANCE-01-12: EU agriculture within a safe and just operating space and planetary boundaries	2021	Sustainable agriculture	10	10	RIA
HORIZON-CL6-2021-GOVERNANCE-01-23: Broaden EIP Operational Group outcomes across borders by means of thematic networks, compiling and sharing knowledge ready for practice	2021	Sustainable agriculture, Food	4	2	CSA

HORIZON-CL6-2021-GOVERNANCE-01-25: Improving national AKIS organisation in a co-creative process across the EU	2021	Sustainable agriculture	10	10	CSA
HORIZON-CL6-2021-GOVERNANCE-01-28: Thematic networks to compile and share knowledge ready for practice	2021	Sustainable agriculture, food	8,5	3	CSA
HORIZON-CL6-2022-GOVERNANCE-01-12: Thematic networks to compile and share knowledge ready for practice	2022	Sustainable agriculture, food systems	8,5	3	CSA
HORIZON-CL6-2022-GOVERNANCE-01-13: Broaden EIP Operational Group outcomes across borders by means of thematic networks, compiling and sharing knowledge ready for practice	2022	Sustainable agriculture	4	2	CSA
HORIZON-CL6-2022-GOVERNANCE-01-15: Developing EU advisory networks on water use	2022	Sustainable agriculture	8	4	CSA
HORIZON-CL6-2022-FARM2FORK-01-09: Microbiomes in food production system	2022	Sustainable agriculture, food	10	5	RIA
HORIZON-CL6-2021-BIODIV-01-14: Fostering organic crop breeding	2021	Organic farming, food systems	10	**5**	IA
HORIZON-CL6-2022-BIODIV-01-05: Intercropping – understanding and using the benefits of complexity in farming and value chains	2022	Organic farming, food	16	8	RIA
HORIZON-CL6-2022-BIODIV-02-01-two-stage: Maintaining and restoring pollinators and pollination services in European agricultural landscapes	2022	Organic Farming, agroforestry, food	20	6-10	
HORIZON-CL6-2021-FARM2FORK-01-01: Reaching the farm to fork target: R&I scenarios for boosting organic farming and organic aquaculture in Europe	2021	Organic farming, food	4	4	RIA
HORIZON-CL6-2021-FARM2FORK-01-07: Research & innovation roadmap for blockchain technologies in the agri-food sector	2021	Organic farming, sustainable agriculture, food	3	3	CSA
HORIZON-CL6-2022-FARM2FORK-01-04: Innovative solutions to prevent adulteration of food bearing quality labels: focus on organic food and geographical indications	2021	Organic farming, food systems	8	4	IA
HORIZON-CL6-2021-CLIMATE-01-06: Resilient livestock farming systems under climate change	2021	Organic farming	12	12	RIA
HORIZON-CL5-2021-D1-01-05: Better understanding of the interactions between climate change impacts and risks, mitigation and adaptation options	2021	Organic farming	20	6-7	RIA
HORIZON-CL5-2022-D1-01-03-two-stage: Social science for land-use strategies in the context of climate change and biodiversity challenges	2021	Agroforestry	20	6-7	RIA

Annex 5: R&I Bottlenecks and needs

SCAR-AE TF2: R&I BOTTLENECKS AND NEEDS

Types of R&I bottlenecks and needs considered by SCAR AE TF2:

1.- CONCEPTUAL R&I BARRIERS

BARRIERS		**Further input needed from**
1.1.- Lack of consolidated concepts for:	Agroecological Territory	TF1
	Agroecology Concept	TF1
	AE Living Labs	TF 1&3 Dialogue on AE (TF3)
1.2.- Definition of how Research Infrastructures could support AE and AE LLS	Education, training, demonstration and promotion events of Living labs and Lighthouses; Specialised training courses in the HEI, research institutes, farming/business/research ecosystems; Training courses on environmental communication techniques to make agroecology attractive for farmers and consumers (TF3)	TF3
1.3.- The prevailing productivist paradigm locks the system in certain production models		
1.4.- Better definition of AE-related public goods and ecosystem services		

2.- KNOWLEDGE-RELATED BARRIERS & RESEARCH NEEDS

BARRIERS	**Identified barriers for each subclass**	**RESEARCH NEEDS**
2.1.-Knowledge gaps weakening agroecological transitions	Insufficient knowledge on ecological processes at the appropriate spatial level to address relevant biophysical (biodiversity, soil, water use and quality, reduction/avoidance of synthetic chemical pesticide use, and participatory breeding), and socioeconomic challenges related to agroecological transitions.	Research devoted to increase knowledge on ecological and socioeconomic processes at the agro-ecosystem level considering both relevant spatial scales and long-term changes
2.2- Gaps related to the valorisation of agroecology-related ecosystem services, including climate change	Lack of systematized knowledge supporting the valorisation of ecosystem services associated with agroecological nature-based solutions for climate change adaptation and mitigation, enhancing agroecological transitions (AET).	Research on the contribution of agroecological management to combating climate emergencies and making agriculture more resilient, while positively impacting biodiversity. Research on AE benefits and trade-offs for climate change mitigation (C sequestration and reduced GHG emissions) and adaptation to adverse climatic conditions at both farm and landscape level. Develop tools aiming to better quantify (e.g., through indicators, methodologies, modelling exercises, etc.) the co-benefits that agroecological farming can provide to ecosphere, under the framework of the “One Health" global approach
	Difficulties in setting a unified and optimized agroecosystem management model for scientific and educational purposes that could capture the great diversity of local conditions.	Stock-take research to compile and analyse existing information on AE transitions, and provide appropriate guidelines for different biogeographical regions, combining information from both meta-studies and detailed studies performed in specific locations.

2.3- Knowledge management and sharing-related barriers	Absence of mechanisms to ensure the sharing of experience and best practices across different scales (especially local and regional) on the adoption of agroecological approaches.	Research to identify best practices for the sharing and use of agroecological knowledge and data. Research on local and traditional knowledge adapted to specific contexts and its potential usage in current initiatives aiming to advance in the AET.
	A general lack of knowledge from farmers and advisors on the practical implementation of agroecological practices in their specific contexts, including local and traditional knowledge and their benefits to the environment and on their economic performance.	Investigate how to support facilitators and advisors with specific training and education material. Explore and deepen existing knowledge on digital technologies' barriers, drivers, risks and usability aspects for farmers as means to support the dissemination and application of agroecology principles for AE transition.

3.- METHODOLOGICAL R&I BOTTLENECKS AND NEEDS

R&I BARRIERS	**Identified barriers for each sub-class**	**R&I NEEDS**
3.1.- Co-creation & multi-actor involvement-related barriers	Absence of structures/mechanisms at the relevant level to facilitate the co-creation of innovative solutions to local challenges in the farming sector and to ensure the involvement of end-users along with other relevant stakeholders, including researchers, advisors, companies, consumers, public authorities, and civil society.	Research to improve existing methodologies for both: - Facilitating the co-creation of innovative solutions appropriate to the different biogeographic regions and local and regional socioeconomic (i.e., mostly rural, rural areas influenced by large cities, etc.) and environmental challenges of the farming sectors. - Ensuring the involvement of end users and other relevant stakeholders, including researchers, advisors, companies, consumers, banking and financial entities, and public authorities.
	Scarce number of trained facilitators with the appropriate soft skills demanded by agroecological approaches	
3.2.- Tools and approaches to evaluate Living Lab Performance	Need for tools and approaches to address and evaluate territorial sustainability (an evolving process), considering agroecological farming at the appropriate terriotorial scale and its interactions with landscape food-systems.	Research focused on defining and testing suitable indicators for the integrated evaluation and monitoring of the AET advancement. Research devoted to designing a realistic and efficient Tool for Agroecology Performance Evaluation (TAPE).
	Need for instruments to evaluate AE Living Labs performance	Assessment, further research, and identification of AE Living Labs best practice indicators for enhancing and implementing socio-technological innovations and adaptation to AE technologies.

3.3.- Overarching methodological barriers	Need for wider use of digital tools by the AE-related community	Co-design, develop, test and implement digital tools and technologies addressing the needs identified by farmers to increase knowledge and its understanding and uptake, facilitate the monitoring of AE impacts and the decision-making process, while improving links in communication among actors along the agri-food chain, to accelerate and achieve a just AET

4.- PRODUCTION LEVEL-RELATED (AE TERRITORIES) R&I BOTTLENECKS AND NEEDS

BARRIERS	**Identified barriers for each sub-class**	**R&I NEEDS**
4.1.- Social perceptions and responsibility	Simplified concept of productivity and yield, not including externalities.	Research on sustainable intensification according to AE principles, moving from the classical productivity just focused on yield performance to metrics reflecting externalities, nutrient intensity, and land equivalent ratios associated to both conventional and agroecological practices .
	Wide perception of the agri-food community on potential increased yield instability due to the implementation of agroecological farming practices in a changing climate.	Research on the beneficial and adverse (e.g. potentially increased yield instability) impacts of implementing agroecological farming practices in a changing climate.
	Redesign current farming and food systems based on agroecological principles including ecological processes, social equity and responsibility	Research on how to integrate system, agronomic and socio cultural aspects in designing “future proof” agroecological farming systems

4.2.- Technological limitations for AE transitions	Methodological and technological limitations to enhance the fast recovery of agrosystem conditions after their long-term exposure to conventional practices	Research on means of speeding up the recovery of soil functions after being exposed to conventional management practices for many years, including SOM restoration, soil biodiversity and functions, and to contribute to climate change adaptation and mitigation[1].
	Need for agroecological innovations aiming to enhance internal recirculation of biomass and resources at the landscape level.	Assessment, selection, and implementation of site-specific, bio-geographically best suited, nature-based set of practices, appropriate for specific soil and climate conditions and different socioeconomic contexts to: o Reach the closure of biophysical (SOM, N and P, water, etc) and energy flows within geographical areas, by taking advantage of synergies occurring through the interaction of different land-use practices in complex landscape mosaics, enhancing the efficient usage of by-products, land, and other resources. o Reduce and overcome agriculture's current dependence on off-system fossil-derived and polluting inputs using renewable energy and/or animal labour. Development of a "Landscape Agroecology". Research on new ways of functional integration of different land and livestock uses that increase territorial efficiency giving rise to landscape mosaics that are well-endowed with biodiversity and ecosystem services. Assessment, further research, and identification of living lab best practices for enhancing socio-technical innovation and adoption of agroecological practices
	Need to facilitate access, adapt and co-develop need-based technology, including digital technologies, to agroecological territories (diversity of territories, farm size) to reduce the low-quality employment.	Development and redesign of on-farm applications of renewable and alternative energy sources (solar energy, biofuels, hydrogen, animal labour, etc.) for agricultural traction, groundwater lifting and product storage. Research on the adaptation of redesign oriented digital technologies and tools to small-mid scale farming conditions.

		Identification of traditional agricultural knowledge (practical knowledge from agriculture) and its adaptation to present-day technological conditions is an essential complement to agroecological innovation.
4.3- Plant and animal genetic material	Difficulties in using locally-adapted, open access-genetic material related to legal burdens, and appropriate breeding programmes and business models.	Need for participatory breeding programs and research to understand nutrient quality of traditional varieties in a multidisciplinary way. Research on identification and creation of co-actions using banks/repositories of ancient/traditional and minor/forgotten seeds and varieties.
	Lack of adaptation of breeds and traditional agricultural knowledge to agroecological production systems and climate change.	Research on adapted genetic resources for each site-specific condition by rescuing, selecting and improving heterogeneous genetic materials (i.e. evolutionary populations, cross composite populations), local and traditional seeds, cultivars, and livestock breeds

4.4.- Acquisition of appropriate inputs for AE purposes	Market access to available appropriate inputs for AE: Economic burdens and lack of appropriate strategies to foster the substitution and minimization of synthetic off-system inputs.	Research that addresses adapted small-scale renewable resources, the functioning of short input chains, and the governance mechanisms in upstream supply chains for sustainable territories and areas.[61]
4.5.- Machinery	Lack of specific machinery or equipment to reduce low quality labour-intensive demands on AE territories	Investigate how the lack of specific machinery or equipment can help reduce low quality labor-intensive demands on AE territories
4.6.- General economic burdens	Lack of appropriate business models for agroecological farmers	Investigate applicability of existing business models (e.g., cooperatives) and explore opportunities for future business model innovation Training and dissemination events on agroecological economics and finances (TF3)

5.- OVERALL AGRIFOOD VALUE CHAIN-RELATED R&I BARRIERS AND NEEDS

BARRIERS	**Identified barriers for each sub-class**	**RESEARCH NEEDS**

[61] Check with Soil Mission

5.1.- Consumer awareness and perceptions	Average consumer is not aware of the benefits of AE-based products	Research devoted to identifying consumer-related reluctances to buy products from AE farming, and potential ways to promote the change from current unsustainable diets to healthier ones, coherent with the land and resource uses adopted in efficient, integrated agroecosystems, landscapes, or AET.
	Insufficient consumer awareness of the costs of conventional agronomic practices, and the added value of agroecological practices.	Research on appropriate means to promote consumer education (increasing dialogue, co-learning and ensuring active involvement of producers and consumers in research and decision-making) in order to exert a positive pressure on agri-food systems through purchasing decisions of consumers.
	Unrealistic consumers' expectations in terms of seasonality and types of products they may find in a given AE territory.	Research on consumer expectations for seasonality and local products and willingness to purchase these AE products
	Unaffordability of AE products for some consumer groups	Economic research to properly reflect real costs (including externalities in both conventional and AE-based products).
5.2.- Processing industry	Lack of extended landscape level strategies aiming at providing added value from agroecological products through their processing.	Design and development of efficient agro-industrial processing methods adapted/suited to the products and logistics related with agroecological farming both for large- and small-scale production, including collective public and private infrastructures. Development of sustainable food technologies, including health-friendly additives, preservatives, etc. Design and development of packaging methods based on circular economy, recycling, and waste minimisation.

5.3- Logistics	Lack of appropriate logistics, mostly based on short chains, enabling access and provision of upstream and down-stream relevant goods to AE territories.	Discover and implement the scope, shape and business-type opportunities (i.e., new circular and sustainable business models) offered by shorter, nearer, and fairer value-added chains of the innovative agri-food system. Development of localised production and distribution systems of organic matter (composting, urban waste, etc.) Research to develop and implement appropriate energy and environmental analysis of shorter food supply chains to improve inefficiencies and promote economies of scale and scope. Technical designs of agroecological logistics and assessment of their economic feasibility. Design and development of agro-ecological logistics infrastructures, which are essential to facilitate the leap in scale.
5.4.- Economic burdens	Lack of appropriate business models considering the overall value chain across a given AE territory, based on consumer expectations on AE products.	Research focused on the economic assessment of the impact of agroecological practices in each link of the food chain, and/or their potential when considering economies of scale and scope that can be achieved both at local and higher levels of organization (i.e., cost optimisation for joint manufacturing of inputs, food processing, logistics, industrial projects that make them viable, etc.)

6.- DATA-RELATED R&I BOTTLENECKS

6- DATA-RELATED BARRIERS	Identified barriers for each sub-class	Research needs
6.1- Scarce and scattered information	Scattered and limited data availability because of the specificity of AE information.	Stock-take action to collect, analyze and synthesize existing AE information using approaches such as meta-analyses.
	Lack of long-term data series on agroecological systems providing irrefutable evidence of their social and environmental benefits.	Design European-wide monitoring programmes for long-term data collection on social and environmental impact of agroecological schemes.
	Lack of agroecological data in existing EU data collection and surveys.	Research on methods and schemes facilitating the collection of global, integrated, harmonized and structured data to provide better access and circulation of existing knowledge
6.2. Data usage	Need for a better usage of existing agri-food statistics (i.e. natural capital accounting)	Research to make better use of existing agricultural and food statistics (e.g., natural capital accounting).
6.3.- Reluctance to share data	Reluctance of farmers and other potential data providers to share their data without incentives	Research on methodologies and instruments to increase the willingness to share data and the role of monetary and non-monetary incentive schemes.

7.- POLICY-RELATED R&I RESEARCH BARRIERS AND NEEDS (INCLUDING R&I POLICIES)

	Identified barriers for each sub-class	**Research Needs**
7.1.- R&I policies	Need for research and innovation policies aiming to enhance the wide participation of scientists and research centres from different disciplines in agroecology and AE-LL research.	Research on the design of R&I policies to foster AE research, such as incentives to encourage broad participation of researchers from different disciplines and incentives for research funders
	Need for process, market, organisational, social and knowledge based innovations in the European R&I system to promote and fund local experimentation and cooperation among stakeholders across the agro-food value chain, thus favoring agroecological transitions.	Research focused on new institutional designs and management approaches in the European R&I system to: o Facilitate collective action and networking, encourage local AE initiatives and sharing of best practices, and cope with uncertainty in the functioning of complex agro-ecological social systems; o Define methodologies and tools to test and identify the most effective and efficient policy actions to achieve sustainable food systems and the production of "public goods" that do not necessarily emanate from public administration o Develop stakeholder participation in governance and policy co-creation and decision-making at different levels (promoting polycentric and multi-level governance subsystem structures) and in different forms (bottom-up, bureaucratic, associative, informal, etc.).
7.2- Territorial Planning	Need for holistic, long-term and integrated territorial planning	Research on adequate landscape planning from local and regional (subnational) authorities to speed up the agroecological transition and maximize the provision of ecosystem services
7.3.- Valorisation of AE-related ecosystem services	The need for harmonized True Cost Accounting for the different AE systems vs. other systems (environmental outcomes, sustainability incorporating the associated externalities, and public goods) so that costs and benefits can be considered for the design of policy regulations, instruments and standards.	Research for setting appropriate indicators for the integrated evaluation, participative deliberation, and monitoring of the AET advancement. Identify instruments for the socio-economic valorisation of agroecosystem services.

		Validation and adoption of valorization tools (such as TAPE) for realistic and efficient AE evaluation
7.4.- Conceptual frameworks and design of appropriate policies and instruments to facilitate AET	Insufficient incentives and actions from both public and private sectors that could trigger increased demand for agroecological products, beyond products coming from organic farming Fragmentation of farming and food system governance (including land, water, and soil governance) and regulatory capture of narratives adopted by powerful interests to set the terms of debate (i.e., "feed the world" narrative directing the search for solutions towards productivity-enhancing technologies, greater economies of scale, and improved food safety through standardisation)	Research devoted to design public instruments and potential incentives to foster, drive and speed up the AET, and assess their potential benefits and trade-offs, considering among others: o Eco-schemes o Public payment for agro-ecosystem services o Public procurement o New labelling o Applications of the polluter pays principle o Regulations Research on adequate instruments to support private initiatives from agri-food or other sectors (i.e., touristic industry) promoting AET. Research for identifying adequate policies and innovative solutions for financing/credit and risk management insurance to facilitate AE transitions Research on prevailing narratives underpinning policies and governance and agenda setting to derive alternative strategies

7.5.- Data governance-related policies	Insufficient systemic efforts to centralise and harmonize all available data and knowledge on agroecology at the relevant spatial level, following FAIR principles aiming to share and exploit them.	Research on data harmonizing methods and associated barriers. Designing decentralised but hierarchical platforms at the European level (based on FAIR principles), aiming to facilitate the compilation of existing and future agroecology data, especially long-term series of data, through a "Farm & Territory Sustainable Data Network". Policies incentivizing the performance of long-term initiatives to implement agroecological approaches and associated data sharing Research on the effectiveness of policy instruments aiming to enhance the data sharing among stakeholders
7.6.- Communication policies	Common languages, strategies and adequate communication channels and skills are still insufficient to allow good communication between different actors (consumers, scientists, farmers, value chain operators etc.)	Research devoted to improving methods for disseminating the best agroecological practices among farmers suited for specific contexts and their environmental and economic performance benefits. Research focused on refining user-driven and open communication strategies and methods focused on citizens, agroindustry and other relevant sectors to promote AE territories and their social, economic, and environmental achievements Investigate how to organize effective communication for a specific context across large cities, neighbourhoods, rural areas and across-borders

Annex 6: Problems, drivers and opportunities

Problems	Drivers	Opportunities
Degradation of land productivity, water resources and soil health.	Unsustainable use of land and natural resources, increased agrochemical inputs, land use change. Increased yields, needed for ensuring food security to the growing global population. Value chain structuring; specialization of farmers in a few variety of products	Promote agroecological practices that can ensure sufficient yields in a sustainable agroecosystem while respecting the environment. Build and expand knowledge as well as share experiences on the benefits of the agroecological practices for a farmer business as well as for the environment.
Biodiversity loss and habitat fragmentation	Intensification of agricultural systems and land use as well as intensification of livestock farming and excessive use of antibiotics	Advance scientific and technological innovations to maximise the use of agroecological processes and uptake of good agricultural practices towards a more sustainable food production system. Co-create innovative solutions targeting the local challenges of the farming sector involving end users along with other relevant local stakeholders, including researchers, advisors, companies, consumers and public authorities.

Climate change	Demographic expansion and income growth of the global population, leading to increased food demand and GHG emmissions.	Re-diversify farming systems in order to become more resilient, better adapted to local conditions and less reliant on the use of external non-renewable inputs. Substitute the use of external inputs by the delivery of ecosystem services (e.g. include N-fixing crops in rotation schemes, avoid monoculture, etc) Promote the use of new digital tecnologies to incresase sustainability and resilience of farming along with yield stablity.
Economical pressure; poverty. Outflow of labour from farming to industry coupled with no generational renewal leading to rural population decline and limited access to land.	Fragile incomes for farmers, volatile food prices, extreme weather conditions, increasing market uncertainty for primary production, new pests and diseases difficult to control with traditional products and practices, imbalances in the food chain. Mechanisation at farm level for both crop and livestock production, including the increased use of efficacious synthetic plant protection products and fertilisers	Adopt agricultural practices that are inspired by ecological processes, which are knowledge-intensive rather than input-intensive and which can provide a sufficient income to farmers from their farming activities as well as attract local young farmers to develop the rural areas. Redesign farming system in order to improve farmers' autonomy, depending less on the upstream sectors for advice as well as on downstream sectors for commercialisation with very demanding standard prescriptions on certain product attributes.
Social pressure: deteriorating public health and growing expectations for healthier and more sustainable diets	Weakened relation between producers and consumers. Current farming practices increasingly criticised by people and the media	Improve the communication and awarness to the general public regarding the added value of agroecological practices and local consumption. Facilitate the assignation of incentives that would trigger an increased demand for products derived from agroecological farming. Enhance farmers community cohesion, by creating networks which would guide the transition towards agroecology.