Action Track 3 – ACAI 2 "Manage"
Solution Cluster 1 – Nature-positive innovation

1. What is the idea?

This solution cluster promotes innovation as a key way to create nature-positive innovation systems and value chains, to catalyze food systems transformation. The food system is defined as *"the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded"* (FAO, 2018). While the focus of the solution cluster is on production, its broader objective is to foster nature-positive innovation spanning all parts of diverse food systems.

The solution supports increased investment in innovation for nature-positive production and promotes the use of innovation in the following areas: (i) Technology and practices; (ii) Knowledge systems (incl. scientific, local); (iii) Policy and governance; and (iv) Data and digital. Through this focus, the solution closely aligns with the innovation lever of change and its four areas (knowledge and technology, societal and institutional, regional and national, data and digital). More specifically, this solution aims at:

- Scaling up innovation in technology and practices, through participatory scenario building and risk-based analysis with producers, businesses and consumers, policy actors, donors as well as other relevant stakeholders;
- Supporting scientific and local knowledge innovations as a possible way to tackle the challenges of biodiversity loss and climate change, while meeting production needs through land sharing and sparing as appropriate;
- Fostering policy and governance innovations (including regional, national and local innovations that connect decisionmakers with end-users) to enable investment in nature-positive production, to support farmers in adoption and provision of ecosystem services, and to ensure fairness and equity in access to critical resources, capacity building and technologies, irrespective of gender, age, and ethnicity;
- Promoting data and digital innovations to improve traceability and transparency, to enhance fairness and equity in both value and risk sharing along the chain, as well as to value the ecosystem services that farmers provide in the context of nature-positive value chains.

By catalyzing investment in such innovations, as well as efforts to address fragmentation among institutions and by fostering evidence-based dialogue, we seek to shift the dial on innovation to put it on a nature-positive pathway. The solution thus proposes investing in initiatives that have demonstrated the ability to scale inclusive, human-centered, end-to-end solutions working across the innovation system for food systems, providing tailored solutions to address local needs, while mobilizing relevant partners to ensure societal outcomes at scale.

2. Why is it needed?

Food systems have been a major driver of climate change. They are responsible for 34% of total GHG emissions (Crippa et al., 2021) – with the largest contribution coming from agriculture and land use/land-use change activities (71%). Food systems are also a principal driver of biodiversity loss through conversion of natural ecosystems to agricultural lands, excessive use of inputs such as fertilizers, pesticides, water, energy and land, hence accelerating species extinction (Benton et al., 2021). At the same time, farmers are at the frontline of catastrophic impacts of climate change and nature loss, suffer from deepening poverty levels and a widening inequality gap, and are bearing disproportionate costs compared to other food systems actors. It is therefore widely recognized that a major transformation of agri-food systems is urgently needed (Steiner et al., 2020, Pharo et al., 2019, Loboguerrero et al., 2020).

On the positive side, if sustainably managed, agriculture is capable of reducing emissions and sequestering carbon, as well as enhancing nature and biodiversity through integrated farming systems and input reductions, spurred by innovation. However, although the World Bank estimates that around USD 56 billion is spent every year on agricultural research and development (Fuglie et al., 2020), investment is not growing at the rate that is needed to address climate change, nature loss, hunger and other development objectives (CERES, 2020). Reorientation towards innovation and an overall growth in investment in agricultural research and development that delivers for both nature and people are critical to meeting the SDG agenda and improving food system level outcomes, particularly in vulnerable countries (Pardey et al., 2014). In addition to this, and

to sustain nature-positive production on the long-term, research and innovation needs to support farmers livelihoods and to address some of the most pressing challenges they face, such as the lack of basic infrastructure and access to services. Finally, while the changes needed vary across different scales and contexts, low- and middle-income countries with higher dependence on agriculture are a priority as innovations can enable them to leapfrog the agricultural development curve, delivering benefits for people, nature and climate.

3. Why will it work?

Climate-smart, nature-positive innovation can have transformational impact and help achieve the aspirational outcome of sustainably managing existing food production systems to the benefit of nature and people (SDG12), helping develop an innovation system (SDG 9) that provides context specific solutions to increase input efficiencies, minimize externalities, improve soil health and increase yields, reduce food loss and food waste, maximize biodiversity and ecosystem functions (SDG 15), improve livelihoods (SDGs 1 and 10) and enhance resilience to climate change (SDG 13).

Indeed, evidence shows that innovation is essential to initiate the needed transformation of food systems: 1) agricultural research and innovation is an essential element of climate change adaptation (Global Commission on Adaptation, 2019); 2) investment in agricultural innovation has consistently demonstrated high economic returns (SoAR Foundation, 2020 and Pardey et al., 2014) while lifting millions out of poverty; 3) increasing investment in climate-smart, nature-positive innovation is key to end hunger sustainably, with estimates suggesting an additional $33bn a year is required until 2030 (CERES2030) for technology, innovation and related areas to help poor countries to prioritize, properly target and scale up cost effective interventions. Building on this, the development and deployment at scale of next-generation, demand-driven agriculture technology, knowledge and evidence together with societal and institutional changes will provide concrete solutions to the fundamental issues that food system stakeholders – including farmers – face.

The initial theoretical background comes from the 'Action to Transform Food Systems Under Climate Change' report (Steiner et al., 2020), which has seen input from over 100 organizations. Going beyond 2030, this solution aims at initiating a new era of nature-positive innovation, tailored to the needs of farmers and focusing on 'end-to-end' approaches to innovation.

4. How will it work?

Our theory of change envisages four key inputs to make this solution successful:

- **Increase investment in R&D, innovation, technology and knowledge sharing**, which enable climate-positive, nature-positive and people-positive pathways for development. While in some instances this requires the development of new technologies and practices, fostering investment also means for food system stakeholders – including farmers, who actively invest in innovations – to take existing technologies and practices to scale and to deploy them in such a manner as to realize multiple objectives. Potential ideas include principles and metrics on agricultural innovation – serving as a reference but open to context-specific adjustments – as well as knowledge and data sharing platforms for resource mapping, progress monitoring, training, best practice sharing and collaboration/co-creation. In addition, increased investments to enable innovation entities, such as accelerators, incubators, funds and start-ups focusing on food systems innovations, will further progress the impact of nature-positive innovation.
- **Realign innovation systems to address climate change, nature and livelihoods**. National and international institutions responsible for innovation need to become fit for purpose to achieve multiple outcomes. This solution will focus on realigning institutions to address fragmentation and streamlining efforts for greater impact. This will involve changing incentive structures, management and governance for researchers and the public sector in agricultural research and innovation systems to focus on impact and societal outcomes (climate, biodiversity and nature, resilience, livelihoods, inclusivity), and to ensure greater uptake of research results by food systems stakeholders.
- **Identify and scale best practices of taking innovation to scale**. These best practices connect capital providers, researchers, and end-users to co-create and provide a research-for-development "ecosystem for innovation" or "innovation value chain", capable of catalyzing food systems transformation.
- **Inclusive dialogue to identify and prioritize evidence-based approaches that address farmers' critical needs**, to **provide the right support systems for farmers**, as well as to ensure addressing **gender**

and social inclusion explicitly as part of this transformation. Investment in innovation must strive to protect human rights and improve economic welfare and livelihoods, as well as to promote equity, justice, and social well-being particularly for women and vulnerable communities, including smallholders. This solution aims at ensuring farmers have improved and equal access to policy, technical, digital and financial support systems for accessing and adopting agricultural innovations.

5. What efforts are already underway?

This solution has been subject to stakeholder input and consultations since September 2020, and around 30 member states have so far been engaged in this idea. Launched by the Rt Hon Lord Goldsmith, UK Minister for Pacific and the Environment at FCDO and the Department for Environment, Food and Rural Affairs at the 2021 Climate Adaptation Summit, it benefits from strong support under the UK's COP26 Presidency and investment in nature-positive innovation will indeed be a key priority of the COP26 Presidency.

While keeping a focus on member states, who stand as key funders and beneficiaries of innovation, this solution will also mobilize private companies that invest in innovation, and regional and international innovation organizations to agree on a concrete set of research and development programs and initiatives to catalyze and scale innovation. Examples of successful existing initiatives include the Local Technical Agroclimatic Committees in Latin America, the use of big data to scale Climate-Smart Agriculture, the Climate-Smart Villages, the Global Lighthouse Farm, the World Food Programme Innovation Accelerator and the "100 Million Farmers" platform, to support the transition towards net-zero, nature-positive food systems. This solution also includes initiatives looking at particular aspects, such as CoSAI's new Taskforce focused on principles and metrics for innovation, as well of the Agriculture Innovation Mission for Climate, spearheaded by the United Arab Emirates, United States, Australia, Brazil, Denmark, Israel, Singapore, the UK's COP Presidency and Uruguay, which focuses on increasing public spending on agricultural research and innovation in the next five years.