



Food and Agriculture
Organization of the
United Nations



Transforming Food Systems: Pathways for Country-led Innovation

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“ **Innovation defined more widely and with people at the centre is a significant enabling factor for food systems transformation.**

Tjada McKenna, Chief Executive Officer, Mercy Corps, USA

“ **Ending chronic hunger and all forms of malnutrition by 2030 is very challenging. Packaging interventions and innovation are fundamental and will bring complementarities, and generate significant cost savings, for MORE efficient, inclusive, resilient and sustainable agrifood systems.**

Qu Dongyu, Director-General, Food and Agriculture Organization (FAO) of the United Nations, Rome

“ **There is significant space for all stakeholders to come together around the 2030 Agenda, and indeed we can only succeed in progress with the leadership of all actors in their own right, and with additional multistakeholder coalitions, at local, national and global levels.**

Agnes Kalibata, UN Secretary-General's Special Envoy to the 2021 Food Systems Summit

“ **Viet Nam is committed to working closely with partners around the world in the fight against COVID-19 and on the path towards sustainable and inclusive recovery, including green and sustainable agriculture.**

Pham Binh Minh, Permanent Deputy Prime Minister of Viet Nam



Foreword



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The Food and Agriculture Organization of the United Nations (FAO) and the World Economic Forum's Food Systems Initiative are pleased to present this white paper on the role of innovation to enable country pathways for food systems transformation.

After nearly two years, the world is still struggling to address a pandemic that has destroyed and disrupted so many lives and livelihoods, deepening global challenges such as hunger, malnutrition, poverty and climate change. In response to these risks, innovation offers a powerful opportunity to improve global food systems towards more efficient, inclusive, resilient and sustainable models for better production, better nutrition, a better environment and a better life, leaving no one behind.

On the occasion of the historic milestone represented by the first ever United Nations Food Systems Summit, in 2021, innovation was included as one of the four levers of change. In defining innovation, as this paper lays out, it is critical to adopt a wider, more holistic view – one that is inclusive of local and traditional knowledge, one that recognizes the importance of policy and institutional innovation, of multistakeholder partnership innovation, and of social innovation. The Innovation Lever, as part of the UN Food Systems Summit, brought together a diverse community of 75 organizational partners representing the public, private and social sectors in a commitment to make this wider view of innovation a significant enabling factor for food systems transformation and to support the objectives of the summit.

As part of the Food Systems Summit, more than 100 countries produced national pathways for food systems transformation, with more than one-third of those highlighting the role of innovation as an area of focus. This document aims to present an action-oriented roadmap to assist countries, defining common principles and identifying key implementation mechanisms to assist national and regional efforts in ensuring that innovations help meet the needs of all stakeholders within food systems. This roadmap offers multiple areas of focus to support national transformation pathways including national innovation ecosystems, societal and institutional innovation, knowledge and technological innovation and data and digital solutions.

The FAO and the World Economic Forum are committed to following through on the outcomes of the summit as outlined in this report. In that respect, the Innovation Lever Network will continue to serve as a platform for collaboration on food systems transformation by bringing together diverse stakeholders and promoting concrete opportunities and initiatives in support of the national transformation pathways.

As the world commits to achieving the UN Sustainable Development Goals (SDGs) by 2030, it is our hope that this innovation white paper will bring new perspectives and stimulate stakeholders to develop a collective leadership action agenda.

Executive summary

Transforming the world's food systems is an environmental, social and economic imperative. Global food systems are unsustainable in their current forms for both people and planet. Food systems emit up to one-third of global greenhouse gases (GHGs) and are a significant driver of biodiversity loss – in addition to the environmental cost. They also leave millions of people, disproportionately women in the low- and middle-income countries (LMICs), in poverty and suffering from hunger and malnutrition.¹ The impacts of COVID-19 highlighted the already urgent need for food systems that are inclusive and equitable, resilient to shocks, environmentally sustainable and efficient at delivering healthy and nutritious food to all.

A holistic and inclusive approach to innovation will be a vital enabler of food systems transformation. To achieve such an urgent transformation, innovation across and throughout food systems is required, including improving collaboration, involving vulnerable groups, creating partnerships and ecosystems, and making best use of data, as well as incorporating new and traditional knowledge and technologies.

The UN brought together member states and constituencies to commit to take action at the Food Systems Summit in September 2021.

As part of the official summit process, the World Economic Forum and Mercy Corps co-chaired with public-, private- and social-sector partners on the Innovation Lever of Change to support countries in implementing a people-centred approach to innovation. The objectives of this paper are to guide country stakeholders by: 1) setting out an inclusive and holistic approach to innovation that uses data, knowledge and technology to improve food systems at the national and regional levels; 2) providing an achievable roadmap and initial support mechanisms to innovative food systems.

To improve global food systems, countries will need to lead national multistakeholder transformations while cooperating at regional and global levels. The Innovation Lever, along with the summit's Scientific Group, will support robust and engaging commitment from countries, such as the target to invest 1% of their food system-related GDP in innovation. Investing in innovation could, over the next 10 years or more, end hunger, significantly cut global emissions and generate more than \$1 trillion in economic returns.²

To help countries to accelerate their food systems transformation, the Innovation Lever will continue to support country stakeholders to take advantage of innovation opportunities.

The Innovation Lever will act as a resource that countries can use to share knowledge and engage potential partners to take actions that implement the four innovation areas:

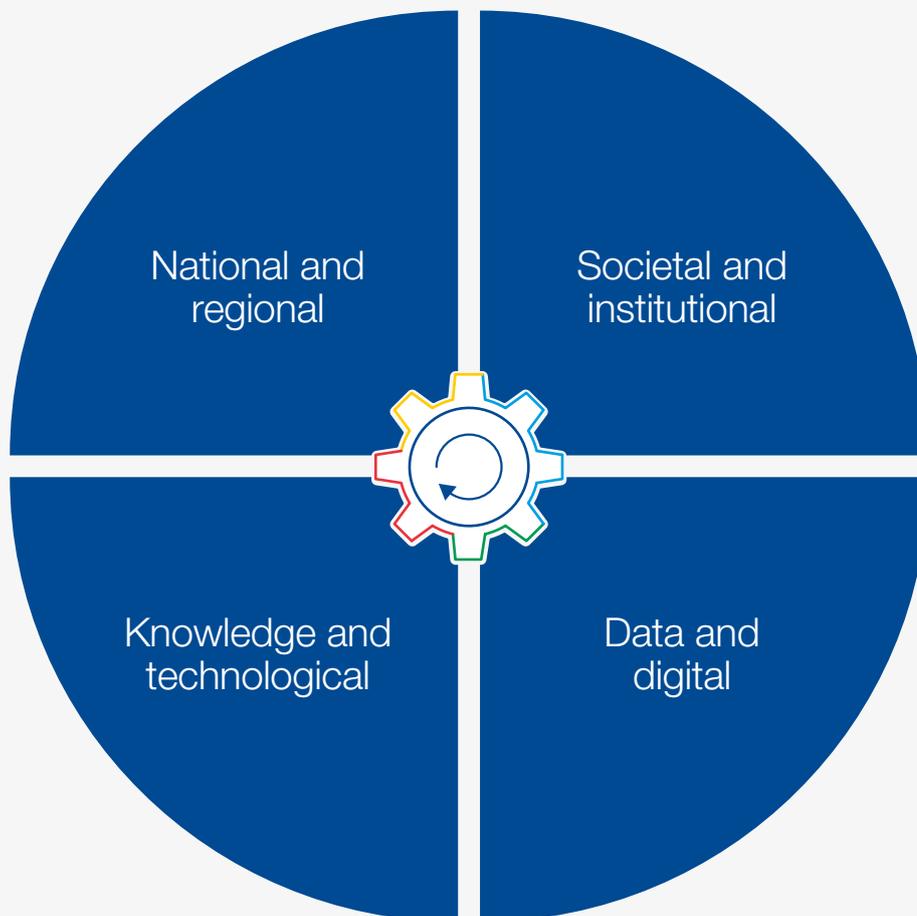
- 1. Promoting national and regional innovation ecosystems** by creating inclusive national innovation strategies that are adequately supported, committed to and resourced. The Innovation Lever identified the [Food Innovation Hubs](#) as a potential delivery mechanism for countries to stimulate innovation at national and regional levels through collaborative multistakeholder action using knowledge, technology, data and institutional capacity to develop locally driven innovation ecosystems.
- 2. Encouraging societal and institutional innovations** that improve existing models of collaboration and partnerships, and create new ones, to ensure and protect the right of all stakeholders – be they small-scale producers, women, Indigenous peoples, community-based organizations, entrepreneurs or others – to participate fairly in decision-making in relation to food systems. The Innovation Lever created principles for multistakeholder collaboration

that the UN Development Programme is taking forward as part of an initiative to realize greater participation in food system decision-making.

3. Employing and supporting new and existing knowledge and technology to create and implement net-zero nature-positive solutions that work for people. The Innovation Lever identified the 100 Million Farmers platform³ as a way to incentivize farmers and enable consumers to place climate, nature and resilience at the core of the food economy to boost nature-positive production, advance equitable livelihoods and build resilience to vulnerabilities, shock and stress.

4. Improving and integrating data and digital systems to ensure they are aligned, agile and interoperable and can support a climate-smart and inclusive food systems transformation. The Innovation Lever identified the Global Coalition for Digital Food Systems Innovation,⁴ made up of three delivery platforms (One Map, Data and Digital Marketplace Playbook and Digital Data Cornucopia), as a coalition with the capability to support countries to employ data in inclusive and responsible ways, thus creating new visibility of, and opportunities within, food systems.

FIGURE 1 Four people-centered innovation areas for food systems transformation



Note: Innovation should be understood in a broad-based, inclusive way on how we collaborate with different stakeholders, including the most vulnerable, and how we use existing and new knowledge and technologies – scientific, indigenous and of other kinds – to inform those evidence-based solutions through an ecosystem approach. The Innovation Lever identified four Innovation areas to support national food systems pathways to fast-track transformation by fostering holistic and inclusive innovation: 1. National and Regional Ecosystems, to improve how we innovate nationally and regionally – 2. Societal and Institutional Innovation, to improve how we collaborate – 3. Knowledge and Technological Innovation, to improve knowledge systems and technology solutions – 4. Data and Digital Innovation, to improve and integrate data and digital systems.

1

The need for innovation to create sustainable food systems

FIGURE 2 Key statistics

1	More than 3 billion people cannot afford a healthy diet, and more than 1.5 billion people cannot afford a diet with even the minimum level of essential nutrients. ⁵
2	World hunger increased after the onset of COVID-19; in 2020 between 720 and 811 million people went hungry globally. ⁶
3	Globally, women are 10% more likely than men to be moderately or severely food insecure. ⁷
4	About 600 million people fall ill each year due to the consumption of contaminated or unsafe foods. ⁸
5	Globally, food systems emit up to one-third of global greenhouse gases, contribute to 80% of tropical deforestation and are a main driver of soil degradation and desertification, water scarcity and biodiversity decline. ⁹
6	Only 7% of the annual funding for agricultural innovation for the Global South contains sustainability goals. If the figure were 50%, this could contribute an additional \$30 billion towards transforming food systems. ¹⁰
7	There is a \$15.2 billion funding gap for food system innovation that could support ending hunger, keeping emissions within 2°C and reducing water use by 10%. ¹¹
8	Improving soil management techniques could offset and sequester about 20% of total annual emissions. ¹²
9	By 2030, enhanced connectivity in agriculture could add more than \$500 billion to global gross domestic product. ¹³
10	Biological innovation in the fields of agriculture, aquaculture and food production could generate economic returns of up to \$1.2 trillion over the next 10–20 years. ¹⁴

Global food systems face an unprecedented challenge: how to sustainably feed 10 billion people by 2050? It is not possible to simply produce more food. Our food systems are already unsustainable for the planet; they use resources and land intensively and emit up to one-third of global greenhouse gases (GHGs).¹⁵ They also fail to deliver healthy and nutritious food to people equitably. One in 10 people is undernourished yet one in four is overweight.¹⁶ In 2019, 3 billion people could not afford a healthy diet, and that number has likely increased since COVID-19 shocked the world's food systems, triggering increases in global malnutrition, hunger and food insecurity that have disproportionately affected women and children in the Global South.¹⁷ Moreover, one of the most insecure groups of people in food systems is small-scale producers, who, despite being food producers, accounted for half of the 1 billion people going hungry in 2020.¹⁸

The world's food systems are unsustainable and in urgent need of change. The Global Sustainable Development Report 2019 identified food systems and nutrition patterns as an entry point to implementing transformative change across the SDGs. By some estimates, doing so could create \$5.7 trillion a year in new economic opportunities.¹⁹ However, with only eight years to go, how can such a transformation be achieved?

Innovation will be one of the key enablers that can spur food systems transformation and accelerate progress towards achieving the SDGs.²⁰ A recent study estimated that a \$4 billion investment in research and development could end hunger in East Asia, South Asia, Latin America and the Caribbean, and halve hunger in sub-Saharan Africa.²¹ While new and existing knowledge, technologies and data will need to be employed, creating environmentally, socially and economically sustainable food systems will also require social, regional and institutional innovations that are inclusive and encompass all of society.²²

Transforming food systems necessitates taking a broad view of innovation. To innovate is to improve, and improvement is necessary in terms of: 1) how we collaborate and work with different stakeholders, including the most vulnerable; 2) how businesses and governments operate and with whom they engage; 3) how data as well as knowledge and technology are used, whether current, new, scientific, indigenous or other.

Improvements will come from creating open processes that enable partnerships across the public and private sectors. These collaborations will create value that no single organization can create alone. Some solutions will be novel; others will come from scaling and adapting existing technology or knowledge solutions, business models or societal inclusion practices into different contexts. These

solutions should be linked to standards that can drive local, regional and global scaling. Innovation must be understood in this broad, inclusive way if countries and communities are to change food systems in ways that are effective and improve the scale, quality and equity of the systems.

In September 2021, António Guterres, the UN Secretary-General, hosted the UN Food Systems Summit, bringing together member states and constituencies to inspire food systems transformation. To recover from COVID-19 and achieve the SDGs by 2030, the Secretary-General called for stakeholders to rethink and take action to make food systems work “for people, for our planet and for prosperity”.²³ Recognizing that innovation is a leading enabler of food systems transformation, Guterres created an Innovation Lever of Change, co-chaired by the World Economic Forum and Mercy Corps, to bring together public-, private- and social-sector innovation partners.

The Innovation Lever, along with the summit's Scientific Group, called for countries to commit to innovation and set a target for countries to invest 1% of their food system-related GDP in innovation. Doing so will yield environmental, social and economic dividends to the tune of more than \$1 trillion over the next 10 years or more.²⁴

The Innovation Lever also assists country stakeholders (including local and national governments, the private sector, civil society and others) on how to implement country pathways successfully for accelerated food systems transformations. It identifies four innovation areas that countries need to address to implement a holistic approach to food systems transformation at the local, national and global levels, through inclusive and participatory multistakeholder approaches that leave no one behind. The four areas relate to societal and institutional, national and regional, data and digital, and knowledge and technological innovation.

At the summit, representatives from civil society, farmers, youth, Indigenous peoples and member states made nearly 300 commitments to take action, with innovation coming through as a top priority.²⁵ Thirty member states made explicit commitments to place innovation at the core of their approaches and many more committed to greater collaboration, to amplify their use of science and technology and to include marginalized people in the design process.

This paper guides country stakeholders to begin implementing this innovation agenda, helping them take action to put the four innovation areas into practice.

2

How to innovate for sustainability: principles and actions

Food system innovation needs to take place at the country and regional level. As part of the Food Systems Summit, more than 100 countries engaged in multistakeholder dialogues that produced more than 100 national pathways for food systems transformation. These pathways set out agendas for how local and national

governments, the private sector, civil society and other stakeholders will transform food systems. Many countries also committed to greater cooperation and collaboration at a regional level to share knowledge, use investments and funding, and pool resources.

2.1 A broad and inclusive innovation approach

The following principles were identified during the dialogues as being central to national and regional pathways to ensure that innovations help meet the needs of various stakeholders within the food system.

1. Innovate while protecting and respecting the right of all stakeholders, particularly the most vulnerable and those on the cusp, to participate fairly in decision-making about food systems.

Innovation must feature inclusive and participatory decision-making, involving a diverse set of stakeholders – be they small-scale producers, women, youth, Indigenous peoples, community-based organizations, consumers, entrepreneurs

or others – in partnerships, collaborations and coalitions. Stakeholders should be able to engage in an equitable manner that will enable greater success in creating a robust and sustainable food systems transformation.

BOX 1 | People-centred innovation at the UN Food Systems Summit

Inclusion and the right to participation were resounding themes at the UN Food Systems Summit. Recognized as “The People’s Summit”, it embedded these principles into its design through gender and human rights Levers of Change and was tasked with ensuring that gender equality and respect for human rights were at the heart of the summit’s agenda and national dialogues. During the 18 months prior to the summit, youth, food producers, Indigenous peoples and stakeholders from civil society, the private sector and government engaged in more than 1,500 dialogues, involving more than 100,000 people, on how to change

national food systems. Many of these highlighted the vital role innovation will play in bringing about the required changes.²⁶ During the summit, 45 member states committed to carry forward this inclusive, people-centred approach to innovation.²⁷ For example, Costa Rica pledged to make small-scale, particularly family-based, farmers the beneficiaries of innovations in public policy, finance and technology. In the case of Kenya, President Uhuru Kenyatta said the government was determined to fully re-engage young people in food production so as to ignite their passion for agriculture and teach them about healthy diets.

2. Innovate food systems to have positive social and environmental impacts by adopting nature-positive and sustainable approaches while ensuring equitable livelihoods.

Innovation in food systems needs to ensure that meeting increased demands for food does not compromise biodiversity and the environment. This requires identifying new business models and

opportunities that can strengthen farmers’ resilience to shocks, and lead to enhanced economic and social inclusion in food systems.

BOX 2 | Investing in climate-smart agriculture innovations

Climate-smart and regenerative agricultural and food system technologies have the potential to boost productivity, increase adaptation and resilience to climate change, and remove or reduce GHG emissions. To accelerate investment in technologies and innovations that have the potential to achieve this “triple win”, in November 2021 the United States and the United Arab Emirates launched the Agriculture Innovation Mission for Climate (AIM for Climate). They were joined by 30 additional governments making

this commitment at COP26. AIM for Climate brings together stakeholders from governments, academia, the private sector and other non-governmental sectors to research, develop and deploy new climate-smart solutions by drawing on diverse knowledge, experiences and cultures. AIM for Climate has already raised \$4 billion in investments, and other partners have committed to support the initiative by participating in “innovation sprints” to design solutions and by sharing knowledge.

3. Innovate to build a vibrant, agile, consumer-centric approach that supports the development of a more just and inclusive innovation ecosystem at scale.

Innovation should encourage open-access solutions, joined-up collective action and differentiated knowledge sharing. Vital innovations can be developed effectively at scale by reducing barriers, thus allowing new entrants to gain

access to financing and technical support, facilitating economies of scale, promoting open-source approaches, developing complementary infrastructure, and supporting learning-by-doing coalitions that enable the co-creation of solutions.

BOX 3 | Establishing a network to deliver food to vulnerable consumers

In Chile, Red de Alimentos established a network of companies and social partners, delivering food that would have been wasted to vulnerable consumers. In order to strengthen its impact and reach, a virtual network was launched in 2018, developed with support from a range of tech companies and major retailers, including Google, Walmart and others. Through this network, Red de Alimentos harnesses data and digital technologies

to identify food that would be wasted and deliver it and other essential products to schools, hospitals and vulnerable families. The network now spans 245 companies and 462 social organizations nationwide and, in 2020, reached 260,000 vulnerable consumers, saved 17,000 tonnes of CO₂, with 1,400 service hubs managing logistics nationwide.

4. Innovate ethically to develop digital tools, technologies and data platforms that include last-mile solutions for farmers and all consumers in food systems.

Digitalization, guided by ethical and inclusive standards, can create new interactions and networks to reconfigure value chains and marketplaces in ways that lead to more efficient, climate-smart food systems producing healthy and nutritious food for all. The aim is to collaboratively identify the most critical gaps that need to be filled by new, interoperable data collection, reduce

inherent biases, ensure equitable access, include protection for consumers and actively innovate to reduce unintended consequences. Clarity on the last-mile applicability of the intended use cases, the associated incentive models to support their roll-out and adoption, and the co-creation of proposed solutions, are all critical enablers of success.

BOX 4 | Employing data and digital technologies to increase the resiliency of food systems

In response to the impact of COVID-19 on Kenyan food systems, the Ministry of Agriculture, with other governmental and non-governmental partners, established a Food Security War Room. The war room combined digital tools and real-time and reliable data on food availability, accessibility and affordability across the entire country to create a knowledge centre. By centralizing technology and data in this way, the ministry and its partners created an evidence base to inform strategic responses by government, civil society and the private sector to alleviate risks to food systems.

Ethiopia's Agricultural Transformation Agency (ATA) has developed a digital strategy that has led to the consolidation of 17 digital datasets into one data hub. Correlating datasets provides significantly greater insights for policy-makers on food system pathways, enabling them to support precision agriculture services and improve farmers' decision-making, productivity and income across agricultural clusters; it also assists farmers to build, protect and employ economic identities while improving access to financing tools and solutions.

5. Innovate to reconfigure ecosystems to accelerate uptake of services prioritizing food systems transformation outcomes.

Ecosystems can be built that allow for the reconfiguration of: associated policy, incentives, financial and de-risking tools, innovation ecoservices and socioeconomic services to promote innovation uptake that is both accelerated and self-sustaining while supporting prioritized food systems transformation outcomes. Food systems have a unique set of context-specific needs that vary depending on markets and regions, which need to be accounted for and developed accordingly. The growing interconnectedness of the market across the globe also means that, while

providing for local needs, there is a requirement to ensure interconnected ecosystem development across regions. Likewise, aligning food system ecosystems with those of other sectors such as health, environment, consumer protection and education can be beneficial to all of those systems. Strengthening and developing ecosystems that use innovation as a key enabler of change is critical to address the unique needs of food systems. This is central of the vision for the locally driven, globally supported network of Food Innovation Hubs that are under development.

BOX 5 | **Creating national and regional ecosystems through Food Innovation Hubs**

In a movement to support greater multistakeholder collaboration at national and regional levels, the United Arab Emirates recently developed its

Food Tech Valley as a catalyst for investment in breakthrough innovation for agricultural production, alternative foods and proteins.

6. Innovate using different forms of knowledge.

Transforming food systems at the local and global levels to be inclusive, participatory and nature-positive will necessitate using and trusting

different forms of knowledge, from scientific and technological to indigenous and localized.

BOX 6 | **Innovating by employing new and traditional knowledge and technology**

To encourage food systems that are environmentally and socially sustainable, countries are increasingly employing new and traditional knowledge and technologies. Committing to blending both systems, the island state of Palau pledged at the Food Systems Summit to “recharge our customary food systems

and combine them with modern science, technology and serve market connections”. And the Government of Singapore has set a global precedent by granting regulatory approval to sell laboratory-grown chicken, part of the nation’s ambition to use alternative proteins to boost food production for greater national food security.

7. Innovate to build resilience in fragile settings.

This entails supporting the building of innovation ecosystems to identify and scale solutions that enable the functionality and resilience of food systems in areas particularly vulnerable to systemic

and compounded risks and stressors (e.g. climate extremes, disasters, conflict, instability, economic shocks, pandemics, consequences of migration).

BOX 7 | **The United Nations World Food Programme Innovation Accelerator**

The United Nations World Food Programme (WFP) Innovation Accelerator sources, supports and scales high-impact innovations to achieve zero hunger. Based in Munich, Germany, the Accelerator provides WFP employees, entrepreneurs and start-ups with funding,

hands-on support and access to WFP’s global operations. Through the Innovation Accelerator, WFP is leveraging new business models and digital innovation – new business models to deliver services that build resiliency in the most vulnerable communities across the world.

3

A Roadmap for Innovation: actions for a holistic transformation

As part of the Innovation Lever, an array of public, private and non-profit actors collaborated to define technical, organizational, institutional and political interventions that pave the way for country stakeholders to fast-track food systems transformation by encouraging innovation.



3.1 National and regional ecosystems innovation

To improve how to innovate nationally and regionally:

1. Develop food strategies at the national level that encourage collaboration and align initiatives among departments, including energy, health, trade, climate and agriculture.
2. Develop implementation pathways for food systems transformation at the national level and ensure innovation is a top priority in the government agenda, allocating to food research at least 1% of the proportion of their nations' gross domestic product that relates to food systems innovation and R&D.
3. Create, facilitate and fund Food Innovation Hubs that are precompetitive, multistakeholder and neutral and which can link universities, NGOs, (local) governments, start-ups, mid to large companies and venture capital. This will encourage public-private partnerships with coherent initiatives to bring innovation to scale, drive new breakthrough programmes and share the learnings and knowledge internationally.
4. Ensure adequate, long-term and responsible investment by both private and public actors at

all levels in food system innovation with three pillars: 1) knowledge development; 2) R&D and innovation; 3) physical infrastructure. This should include support for early-stage and scaled-up phase innovation solutions.

5. Review regulatory barriers that prevent the testing, adoption and scaling up of agricultural and food system innovation and encourage the use of new technologies through regulations and incentives, while paying careful attention to ensuring that innovation is meaningful and respects current consumer protections.
6. Recognize innovators with awards and support through targeted financing. Establish and reinforce SME/start-up financing facilities to transform food systems.
7. Communicate and adopt food system innovation by ensuring that any innovations are accessible to farmers and consumers. Educational institutions have a key role to play here.

Click [here](#) for more guidance on national and regional innovation.

3.2 Societal and institutional innovation

To improve how we collaborate to transform food systems:

1. Develop a shared understanding of the key issues to be addressed, taking into account the long-term outcomes. Ask yourself: Have you analysed the problem? Have you checked with other stakeholders?
2. Collaboration should be context-specific, locally owned and aligned with country and global goals, with an effort to keep food consumption as a driver. Ask yourself: Does the effort support national priorities? Are you working with local champions?
3. Establish multistakeholder structures that are accessible and inclusive from the beginning. Ask yourself: Are you involving affected people in decision-making? Are you reducing barriers for marginalized communities and supporting them to participate? Who is missing? Are there other groups working on the same issue?
4. Design for an inclusive and adaptable journey that addresses emerging trends, power imbalances and challenges from different perspectives. Ask yourself: Are you starting with

questions or answers? Have you addressed power imbalances between the group and/or others you work with? Will you review partnership strategies? Are you monitoring the situation to ensure you are helping those you intend to?

5. Proactively promote and reinforce the right to effective participation and to think differently about implementation. Ask yourself: Are all actors able to have a say and input into solutions?
6. Gauge and manage risk in multistakeholder dialogues. Ask yourself: Have you created a safe space? What are the risks? Are risks of misuse of power being addressed?
7. Develop common and agreed-upon food-related policies that balance different interests and goals. Ask yourself: Are public and private actors involved? How will this affect other areas of the food system? Are you promoting a common approach across the public sector?

Click [here](#) for more guidance on societal and institutional innovation.

3.3 Knowledge and technological innovation

To improve knowledge systems and technologies:

1. Accelerate tenfold the pace and scale of farmer-centred ecosystems for net-zero, nature-positive knowledge and technology access and adoption by 100 million farmers.
2. Develop a trusted collaboration framework for knowledge ecosystems to reach economies of scale and reduce fragmentation and reinvention, thus enabling scaling at speed.
3. Support farmer-led exchange platforms by directing research and support towards the networks, communities of practice and/or (social) media formats that are locally relevant and most conducive to encouraging the creation and exchange of context-specific knowledge and technology.
4. Empower 10,000 entrepreneurs in support of 100 million farmers, ensuring a pipeline of nature-positive innovation, aligned with strategic prioritization of national priorities.
5. Open the entrepreneur innovation funnel via strategic incubators. This will create a network of collaborators, including NGOs, farmer networks, established food companies and government entities, that will attract farmers as entrepreneurs, inspire youth engagement and bring in further innovators from beyond the food space.
6. Maintain the entrepreneur innovation funnel by ensuring proper financing, supporting precompetitive platforms and incentivizing entrepreneurs to come up with innovative business models.
7. Unleash 10 times more finance than is currently available to support 100 million farmers for net-zero and nature-positive food systems transitions, thereby supporting the “un-bankables” to become bankable by addressing finance data lock-ins, including simplification, interoperability, minimization of monitoring costs and risk-sharing.
8. Unlock investor confidence by defining KPIs that have delivered on proof of concept for net-zero, nature-positive financing to scale projects while minimizing the complexity of burden of proof for the producer.
9. Employ artificial intelligence (AI) in a manner that aspires to openness and independent assessment of low-cost monitoring, reporting and verification of practice changes and GHG reduction/mitigation.
10. Design systems to support the most vulnerable, least-connected farmers, and employ technology and data to create business models for new income streams, while ensuring that systems of redress and feedback exist for those in the system to highlight problems and find solutions.

Click [here](#) for more guidance on knowledge and technological innovation.

3.4 Data and digital innovation

To improve and integrate data and digital systems:

1. Innovate, iterate and invest in accessible digital services for food systems transformation. Concerted effort and investment is needed to support and scale up new business models for sustainable and equitable food production, value chains and informed, interactive consumer and farmer services that close the digital divide.
2. Support climate-smart digital solutions that promote data innovation and equitable access. Encouraging scalable and replicable digital solutions requires early ideation and prototyping, scaling, more patient capital and blended financing models to support food systems transitions.
3. Enable data agency, control and protection. The sector needs dynamic digital security and safety solutions to protect ownership and manage consent from data originators at all levels, while enabling the use of data to unlock analytics and services that can benefit people and nature by driving food systems transformation.
4. Mobilize data for food system enablement. Timely, accurate, ethically garnered and used data on food system flows, equitable access to services, nutrition outcomes, ecosystem health and environmental sustainability is fundamental for guiding joint efforts across highly varied environments.
5. Align data standards, policies and open infrastructures. Interoperable data and digital infrastructures built to open standards, which protect the rights of people and enable data

sharing, create the foundations for public, private and non-profit collaboration and investment, scaled innovation and equitable, sustainable and informed farm production and consumer participation.

6. Build agile governance for collective action. Agile data and digital coalitions, linked by guiding principles and a commitment to timely, responsible, open and inclusive action are needed to guide institutions and develop policies

7. Create foundational, public-good data so global connectivity can be strengthened to allow for the deployment of large-scale food system services able to reach even the most vulnerable populations.

Click [here](#) for more guidance on data and digital innovation.

3.5 Placing innovation at the core of national pathways

To accelerate food systems transformation, the Innovation Lever is supporting countries to address the four key innovation areas. The Innovation Lever also identified some initial partners who can support country-level stakeholders in implementation. The

three sections below outline a selection of inclusive multistakeholder partner groups that take a holistic approach to innovation, helping countries to deliver the agenda detailed above.

3.5.1 Promoting national and regional ecosystems

Food Innovation Hubs aim to create national and regional innovation ecosystems. They stimulate innovation through collaborative multistakeholder action by employing knowledge, technology, data and institutional capacity to develop locally driven innovation ecosystems. Thus, innovations improve the way in which food is produced and consumed sustainably while meeting local needs and addressing food system challenges. To achieve this, the hubs:

- Encourage and cultivate food system innovation for localized and global impact
- Support delivery and adoption of innovations at scale
- Develop a community of practice to share learnings and build capacity

The Food Innovation Hubs focus primarily on state, national or regional-level opportunities. Sister organizations are located in Europe ([Food Valley](#), [EIT Food](#)), East and Southern Africa, Asia and Latin America. Their principles are guided by the following requirements:

1. Multistakeholder and inclusive – engaging governments, the private sector, innovators, farmer organizations, civil society, international organizations and others

2. Locally driven and owned – aligned with national and regional goals, strategies and plans and in support of the SDGs
3. Market-based – focusing on spurring and expanding sustainable and inclusive investments and market-based activities
4. Neutrally facilitated – playing the role of catalyst and honest broker

To accelerate the creation of these national and regional innovation ecosystems, the UN Food Systems Summit Innovation Lever of Change and the Scientific Committee have proposed that countries pledge to commit 1% of their GDP to research and develop food system innovation.²⁸

Partners, at both the global and local levels, have the opportunity to get involved, driving and developing the Food Innovation Hubs to help scale and accelerate the innovations needed in our food systems.

The Vietnamese government has committed to transforming the country into a green agri-food powerhouse.

The government aims to use innovation to produce sustainably and create local value in food production through the establishment of a national food innovation hub. It is working with Grow Asia to bring in other partners by the end of 2022.

The Netherlands government will host the Food Innovation Hubs' Global Coordinating Secretariat. Prime Minister Mark Rutte declared that his country was "committed to forming partnerships that will catalyse the innovations that are needed to address the food system challenges".²⁹

Kenya's government has called for increasing access to nutritious foods and a need for greater diversification of diets by bringing back forgotten and neglected traditional foods and investing in aquaculture and fruit and vegetable farming. Farm to Market Alliance, together with Unilever, is joining forces to work with Kenya's Agricultural Transformation Office. They aim to find ways for local consumers to build nutritional diversity into their diets and access affordable, locally made food produced from indigenous, nutritious and climate-resilient crops, supplied by local smallholder farmers, as part of the establishment of a Kenyan food innovation hub.

3.5.2 Employing knowledge and technology

To embed sustainability throughout food systems, countries need to employ new and traditional knowledge and technologies to create and implement net-zero nature-positive solutions. The Innovation Lever identified the [100 Million Farmers](#) initiative, a multistakeholder platform inspiring the transformative potential of farmers to transition towards net-zero, nature-positive food systems by 2030.

The purpose of the platform is to incentivize farmers and enable consumers to place climate, nature and resilience at the core of the food economy. In doing so, the platform aims to boost nature-positive production, advance equitable livelihoods and build resilience to vulnerabilities, shock and stress. It sets out a shared global ambition to increase investment in innovation for nature-positive production and promotes innovation in technology, data, digital, knowledge systems and governance.

The 100 Million Farmers initiative has three objectives that place farmers at the centre of this transition and recognize the need to support consumer demand:

1. Amplify a shared narrative: demonstrate the ability of food systems to shift away from significant emissions and nature degradation towards climate mitigation, adaptation and nature restoration through cost-effective and practical solutions
2. Accelerate collaborative action: create multistakeholder partnerships that work with farmers to drive regional and national action, transform food systems and achieve net-zero, nature-positive targets and commitments

3. Unlock scale: activate a systems change to support 100 million farmers and 1 billion consumers in the shift towards sustainable agriculture by supporting the necessary enabling environment

Three critical enablers are central to the 100 Million Farmers initiative:

1. Data, tools and governance: calling for solutions such as low-cost and accessible measurement tools, a shared repository of soil and farm reference data, and clear governance systems to protect farmers' rights
2. Co-benefits valuation: recognizing the need to raise farmer, investor and consumer awareness of the suite of benefits delivered by climate-smart and regenerative practices, and to promote shared indicators and methodologies to value those benefits
3. Transformative finance: developing a set of market-based incentives that reward sustainable carbon-plus outcomes, and support and de-risk farmers' transition towards climate-smart and regenerative practices

By targeting approximately one-fifth of the world's farmer population, the initiative would reach a tipping point in farmer inclusion that could shape the future of food systems. Ultimately, employing lessons from country-specific catalytic demonstration examples, 100 Million Farmers feeds broader recommendations into formal markets, government policy-making and global frameworks through a multi-year agenda, towards 2030.

Europe is at the forefront of the 100 Million Farmers platform's development. Fourteen organizations, active throughout the food and agriculture value chain, joined forces and established the [European Carbon+ Farming Coalition](#) to accelerate farm-level transitions towards sustainable agriculture. The European coalition conducted a large-scale survey of farmers to identify the key barriers and pain points that they face in terms of implementing sustainable

practices. An insight report planned for release at the beginning of 2022 will build on this data to present key findings, policy recommendations, solution pathways and proof-of-concepts for the jointly designed solutions that start from the farm but also seek to engage the entire value chain and support the consumer. Building on the global momentum, the 100 Million Farmers platform will also spur national and regional engagements across continents.

3.5.3 Improving and integrating digital and data systems

To help countries improve how they use digital and data systems so that they harness the power within them, the Innovation Lever identified the Global Coalition for Digital Food Systems Innovation as a potential delivery mechanism. The coalition unites public, private and non-profit organizations committed to responsible digital innovation in food systems, and aims to create an open and inclusive data and digital ecosystem through three delivery platforms:

1. One Map, an initiative to unlock the power of food systems transformations through a global data map. The map develops data agency and consent management mechanisms linking small agri-food businesses, policy-makers and digital service providers. By doing so, it aims to facilitate the emergence of national data pipelines to map stakeholders, direct new investments, build appropriate policies and

regulations, and fast-track the benefits of data for food systems transformation.

2. The Data and Digital Marketplace Playbook, which is developing transparent, inclusive digital pathways and sustainable models enabling farmers and consumers to build more efficient, climate-smart markets for healthy and nutritious food.
3. Digital Data Cornucopia, a common resource-efficient data infrastructure to facilitate data use and sharing for food system analysis.

The coalition also engages with and supports the [Digital Village Initiative](#), to promote the digital transformation of villages and small towns across the world, enabling farmers to use digital technologies.

Countries are using data and digital systems to connect stakeholders throughout the food system to address imbalances, inefficiencies and failures.

Safaricom's DigiFarm platform has pioneered inclusive services for 1.4 million smallholders, 48% of whom are women, with finance, inputs, learning and market access. The platform, developed together with Mezzanine, is supported by Mercy Corps as an innovation partner. This has enabled the Ministry of Agriculture to employ private-sector and agri-tech innovators to better target government support to smallholders, lower the costs of subsidy distribution, offer access to inclusive financing and insurance, offer satellite-driven weather and agricultural advisory services

and provide e-subsidies to farmers to allow for more rapid and informed response to shocks including COVID-19 lockdowns, flooding and locust attacks.

IDEA – the India Digital Ecosystem of Agriculture – is currently being developed by the country's Ministry of Agriculture and farmers' welfare sources. This initiative seeks to better inform both producers and consumers, allowing for real-time price discovery while using digital technology to improve supply chain functionality. IDEA aims to enable the creation of secure, data-protected, interoperable and innovative solutions by the public and private sectors to build more inclusive, transparent digital agri-food markets.

Membership will further expand to deepen and diversify the coalition footprint and to harness synergies with aligned platforms and initiatives, ensuring data and digital technologies are used to their fullest potential to drive public good.

The coalition will commit to ethical action, agile governance and collaborative learning through a shared vision and guiding principles that will reflect the following:

1. Build an inclusive digital revolution
2. Encourage data agency and responsible sharing
3. Be force multipliers
4. Iterate and share learnings
5. Innovate responsibly through ethical action, agile governance and collaborative learning

The three delivery platforms are at different stages of their development. The Digital Data Cornucopia is planning to structure a consortium, including Google, the Global Alliance for Improved Nutrition (GAIN), the FAO and Johns Hopkins University, to further develop and implement the Food Systems Dashboard. The Data and Digital Marketplace Playbook, led by Consumers International, Mercy Corps and the World Economic Forum, is collaborating with organizations such as Bayer Foundation and country stakeholders, including the Kenyan government through the Agricultural Transformation Office, to further develop the playbook with a view to developing country-level roadmaps and inclusive innovation platforms. The One Map platform has brought together a group of partners such as the FAO, World Bank, CGIAR, GEOGLAM, Mineral (Google X), Hewlett Packard Enterprise, the World Economic Forum and 2030Vision to work with countries such as Kenya and Ethiopia to design the map and create a use case for national data pipelines that fast-track food systems transformation.

BOX 11

One Map – countries leveraging data maps for food systems

In Kenya, the One Map platform is working with the Agriculture Transformation Organization (ATO) to deliver proof of concepts in development advisory services for smallholder farmers, such as e-wallets. In Ethiopia, the platform is exploring a collaboration with the government's Agricultural Transformation

Agency (ATA) to advance the country's digital extension roadmap and start populating a data pipeline. In Indonesia, it is aligning with the Indonesian government to support the Program to Accelerate Agrarian Reform by building a use case for data on land rights to support smallholder farmers.

4

Towards a Food Systems Innovation Lever Network

The overall intention of the UN Food Systems Summit (FSS) 2021 is that national food systems should make the greatest possible contribution to the needs of people and the planet as set out in the 2030 Agenda for Sustainable Development. At the summit in New York, on 23 September 2021, civil society, farmers, young people, Indigenous peoples and member states made nearly 300 commitments to take action, with innovation declared a top priority. Thirty member states made explicit commitments to place innovation at the core of their approaches and many more committed to greater collaboration, to employ science and technology and to include marginalized people in the design process.

In support of the summit process, the mechanism of the FSS dialogues helped to identify different patterns and reflect on their significance within the context of national, regional and global needs and opportunities. Specifically, the member state dialogues, hosted at a country level, facilitated the definition of more than 100 national pathways for food systems transformation, moving towards more sustainable, equitable and resilient food systems by 2030. The overall ambition of these pathways is for widespread transformation of the whole of the food system to be backed up, in due course, by stakeholder commitments. Nations will build on their pathways as they advance their national transformation efforts, working together and linking with others in their region, also taking the opportunities to share with each other and learn from their collective experience.³⁰

To implement the outcomes of the Food Systems Summit and to support country stakeholders to implement a people-centred approach to innovation through the national pathways, the **Food Systems Innovation Lever Network** will continue and expand the convening of the wide group of cross-sector organizations, naturally taking over the role of the Innovation Lever Reference Group. The network will collaborate with the Food Systems Coordination Hub, established by the United Nation Secretary-General³¹ and acting as a coordinator and connector among diverse constituencies to support the follow-up to the Food Systems Summit, assisting national progress on the SDGs and being responsive to country priorities.

The Food Systems Innovation Lever Network will work towards:

- Advancing and continuously improving the guiding principles described above on how to innovate
- Addressing global challenges and opportunities, identifying specific initiatives and coalitions in support of people-centred innovation, in relation to broader themes, including finance and inclusion
- Coordinating and collaborating with the Future of Food Systems Collaboration (FFSC) – the post-summit initiative on how multistakeholder collaboration can accelerate food systems transformation

In support of the national transformation pathways for food systems improvement, three key opportunities arise as a starting point for the Food Innovation Network.

1 Enabling innovation platforms and design sprints

– supporting and facilitating cross-cutting platforms and targeted design sprints to enable a range of partners across the agri-food ecosystem. The aim is to maximize the scale and impact of innovations in support of the UN Food Systems Summit outcomes at a local, national and regional level. Initial examples include:

Supporting the [100 Million Farmers](#) innovation agenda to ensure that the farmer is at the centre of a sustainable and inclusive transformation

Support for [AIM for Climate](#) to address the climate crisis by uniting participants to significantly increase and accelerate investment in, and/or other support for, climate-smart agriculture and food system innovation over the next five years (2021–2025).

Support for initiatives such as [FAO Hand in Hand](#), [Food Action Alliance](#) and the [WFP Innovation Accelerator](#) to actively create innovation outcomes in support of national pathways

2 Global Coalition for Digital Food Systems Innovation

– where clear national strategies underpinned by agricultural data analysis and strong digital infrastructure for sustainable food systems can embed a culture of real-time data collection, integration and sharing, thus driving adoption of digital applications and services for sustainable food systems. The coalition aims to develop a data and digital ecosystem that is less fragmented, more open and inclusive, through:

- [One Map](#) – to develop data agency and consent management mechanisms linking small agri-food businesses, policy-makers and digital service providers to generate foundational data and analytic assets for digital food system innovation and interoperability from individual to global scales
- [Future Food Marketplace](#) – a transparent, inclusive, sustainable scale model enabling all actors, from smallholder farmers to consumers, to build more efficient, interactive, climate-smart markets for healthy and nutritious food
- [Digital Data Cornucopia](#) – a consortium established to achieve global food systems transformation at the intersection of digital technologies with natural and social sciences
- [Digital Village Initiative](#) – to promote the digital transformation of villages and small towns across the world, enabling farmers to use digital technologies

3 Food Innovation Hubs

– promotion on a regional and national scale with the aim of collectively stimulating innovation through collaborative multistakeholder action. Local knowledge, technology, data and institutional capacity are employed to develop country-specific innovation ecosystems to support national food systems transformation pathways. As part of the Food Systems Summit, a number of countries and regions have actively supported the need to strengthen national innovation ecosystems through the establishment of Food Innovation Hubs. These initially include:

- **Viet Nam**, which has set out its strategy to become a leading green growth food innovation hub in Asia
- **The United Arab Emirates**, which has announced its intention to become a world-leading hub in innovation-driven food security
- **Colombia, India and Kenya**, which have announced support to establish similar Food Innovation Hubs

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