CoSAI
Commission on Sustainable Agriculture Intensification

Task Force on Principles and Metrics for Innovation in Sustainable Agri-food Systems: Final Report

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Other contributors

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Acronyms

CoSAI	Commission on Sustainable Agriculture Intensification
ESG	Environmental, social and governance
FAO	Food and Agriculture Organization of the United Nations
IWMI	International Water Management Institute
R4D	Research for development
SAI	Sustainable agricultural intensification
SAS	Sustainable agri-food systems
SDG	Sustainable Development Goal
UN	United Nations
WLE	CGIAR Research Program on Water, Land and Ecosystems

Abstract

A huge increase in investment for innovation in sustainable agri-food systems (SAS) will be critical for meeting the objectives of the UN Sustainable Development Goals and the Paris Climate Agreement. Currently only a small fraction of investment addresses environmental or social goals together with productivity increase. A major challenge for both innovators and innovation investors is determining whether an investment 'counts' as one likely to promote both environmental and/or social sustainability. A way forward is to establish a clear set of principles for determining which innovations and innovation processes count as promoting SAS, together with guidance for how to operationalize these principles. Currently though there is a gap in the intersecting area of principles for innovation in SAS, with various principles existing for sustainable agriculture (in general), and others for innovation and innovation systems. For this reason, the Commission on Sustainable Agriculture Intensification (CoSAI) set out to create principles that cover both the outcomes and processes of innovation in SAS. This report presents the Principles for Innovation in Sustainable Agri-Food Systems as developed by a multi-stakeholder group of research agencies, investors, private sector and NGO representatives, and watchdog organizations. It describes the process including task force composition, public consultation, pre-piloting and next steps. The report furthermore provides background for the selection of principles and describes the operationalization framework for the pilot version of the Principles as developed until December 2021.

1. Introduction

The Commission on Sustainable Agriculture Intensification (CoSAI) aims to influence public and private support for innovation to rapidly scale up sustainable agricultural intensification (SAI) in the Global South as well as promote sustainable agri-food systems (SAS). CoSAI promotes technical, policy, financial and social/institutional innovation in agricultural systems, to deliver the United Nations (UN) Sustainable Development Goal (SDG) objectives of food and nutrition security, social equity, resource use efficiency and an improved natural environment.

CoSAI brings together agricultural and food systems experts and decision makers from the Global South, and is collaborating with scientists, innovators and partner organizations from across the globe. CoSAI was initiated and is supported by the CGIAR Research Program on Water, Land and Ecosystems (WLE).

One of CoSAI's working areas covers principles and metrics to guide and track innovation in SAS. A huge increase in investment in such innovation will be critical for meeting the objectives of the SDGs and the Paris Climate Agreement. Most of this increase can come from reorienting existing funding for innovation. However, a major challenge for both implementers and investors in innovation is deciding whether or not an investment in innovation 'counts' as likely to promote SAS. A way forward is to establish a clear set of principles for innovations and innovation processes that promote SAS, together with guidance and a scoring system and metrics supporting those principles. These can be used to plan, guide and monitor progress against SAS objectives.

CoSAI established a voluntary Task Force on Principles and Metrics for Innovation in Sustainable Agri-food Systems – to develop and agree on a set of principles and a scoring system to guide and track innovation in SAS. The scoring system (for which metrics can be used in the evidence column) enables an assessment of how these principles are implemented and helps operationalizing them within an organization. This report describes the work of the task force, and the developed principles and scoring system. The report reflects the work of the task force up to December 2021.

2. The need for principles and metrics for innovation in sustainable agri-food systems

A huge increase in investment for innovation in sustainable agri-food systems will be critical for meeting the objectives of the Sustainable Development Goals and the Paris Climate Agreement. Innovations in policies, institutions, finance and technologies are needed to meet the challenge of feeding an estimated 10 billion people with healthy, accessible, safe and nutritious food, while protecting and regenerating the natural environment, meeting climate goals and sustaining equitable livelihoods.

Most of the increased investment can come from reorienting existing funding for innovation. Currently, although most large agribusinesses state good intentions around sustainability, their understanding is limited, and independent public information on the impact of programs, funding and technologies is lacking. A recent piece of evidence commissioned by CoSAI found that only 7% of the total USD 40 billion invested in agriculture contains environmental objectives, and only half of this 7% contains social objectives (CoSAI 2021; Dalberg Asia 2021) (**Figure 1**). This highlights both a huge gap and an opportunity to improve current investments in innovation in order to meet objectives for creating SAS.

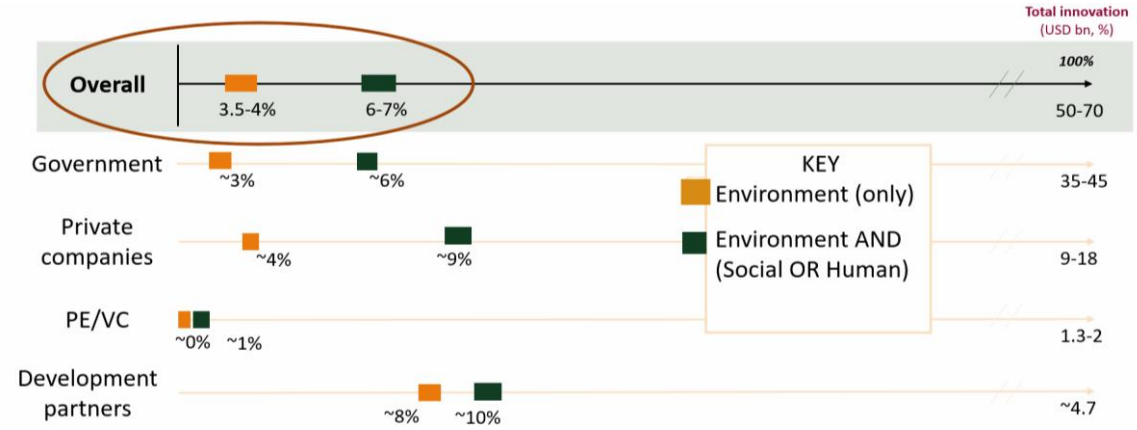

Figure 1. CoSAI analysis of current agricultural investments, showing percentage of innovation investments with environmental intentions (~7%), and percentage with social intentions also (~4%).

Source: Dalberg Asia, 2021.

Prior to focusing on impact, private companies and institutional funders should, at a minimum, be more intentional in their approach to innovation for SAS. Their sustainability goals need to rapidly expand, in order to move from 'corporate social responsibility' to environmental, social and governance (ESG) investments, and to cover core business activities including research and development as well as marketing. A major challenge for both implementers and investors in innovation is determining whether an investment 'counts' as one likely to promote sustainability. A

lack of clarity potentially leads to poor prioritization of investments in innovation and can open the door to ‘greenwashing’.

A way forward is to establish a clear set of principles for determining which innovations and innovation processes count as promoting SAS, together with guidance and metrics supporting those principles. These can then be used to plan, guide and monitor progress against sustainability objectives. Various sets of principles and metrics already exist for sustainable agriculture (in general), and others exist for innovation and innovation systems. However, there is a gap in the intersecting area of principles and metrics for innovation in SAS. For this reason, CoSAI set out to create principles that cover both the outcomes and processes of innovation in SAS.

3. The task force on principles and metrics for innovation in sustainable agri-food systems

To represent and utilize diverse perspectives in its work, the task force included different potential users of the new principles, scoring system and metrics. The key user groups incorporated into the task force were:

- Public and private funders of innovation in agri-food systems who need to ensure that their funds are used appropriately to support sustainability goals.
- Managers and implementers of research for development (R4D) and innovation programs, both public and private, who need to plan their work against SAS objectives.
- Certification and benchmarking organizations regulating the private sector, as well as civil society organizations, who are interested in holding public and private innovators to account and directing investment towards more sustainable and socially positive and equitable innovations.

Task force composition

The task force included 30 individuals from diverse professional backgrounds including research organizations, UN agencies, non-governmental organizations, development agencies, farmer organizations, private sector/private investor organizations, foundations and benchmarking organizations. All members were appointed in their own capacity and did not act on behalf of their institution or company. A list of all task force members can be found in Annex 1, and the task force terms of reference are in Annex 2.

The task force was chaired by Dr Preet Lidder, Technical Advisor to the Chief Scientist of the Food and Agriculture Organization of the United Nations (FAO), and Dr P.V. Vara Prasad, Professor of Crop Ecophysiology at Kansas State University, USA, and Director at the Feed the Future Innovation Lab on Sustainable Intensification. The task force was supported by members of the CoSAI Secretariat as well as a small expert group, consisting of Dr Monika Zurek, Senior Researcher at Environmental Change Institute at the University of Oxford, UK, and Dr Aniek Hebinck, Postdoctoral Researcher at the Dutch Research Institute for Transitions at Erasmus University Rotterdam, the Netherlands.

Representation in the task force according to regions, country income classification, gender and stakeholder classification can be found in **Figure 2**. In terms of geographic representation, almost all world regions were represented, with Europe and Central Asia slightly over-represented and the Middle East and North Africa, and East Asia and Pacific under-represented. There is a similar trend in the classification according to country income status, where about half of all members came from high-income countries (where most of the research donor organizations are located) while low-income countries were underrepresented, and middle-income countries had a balanced representation.

The task force also had a larger proportion of representatives from research organizations and development partners, which was to be expected based on the task the group was asked to perform

and the overall mission of CoSAI. The other stakeholder groups were nevertheless relatively equally represented. The gender balance of the group was quite skewed towards male participants (almost 70% were male). This mirrors the current picture in many research, development and private sector organizations working on agri-food systems and while the CoSAI Secretariat tried to include more women, participation was determined by expertise and personal availability.

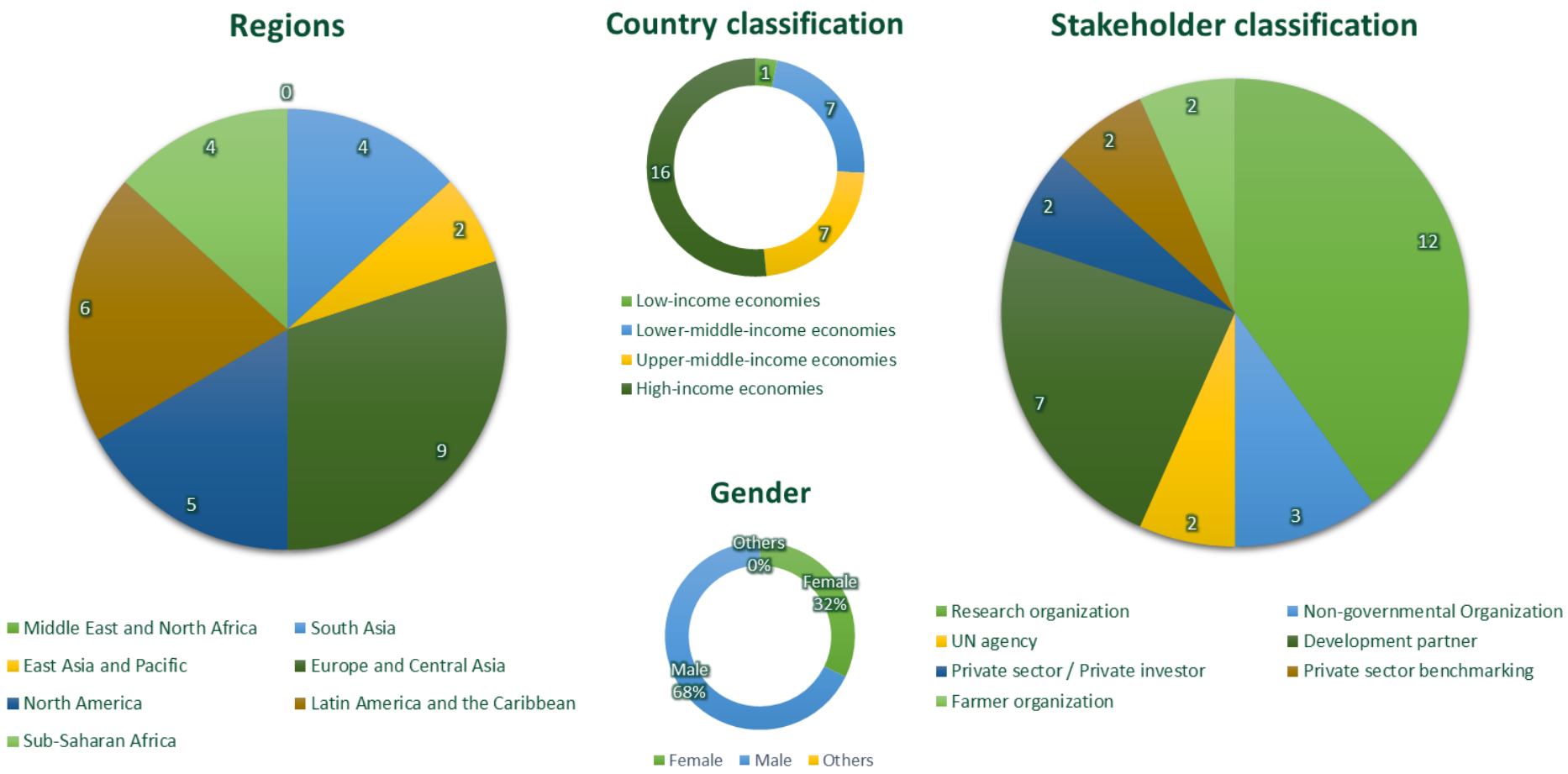

Figure 2. The composition of the CoSAI Task Force on Principles and Metrics for Innovation in Sustainable Agri-food Systems, according to region, type of economy, stakeholder classification and gender.

The work process of the task force

The task force met virtually for six interactive 90-minute meetings between June and December 2021 (see **Figure 3**), as COVID-19 travel restrictions made in-person meetings extremely difficult. Before each meeting, briefing materials capturing key results from the previous meetings, together with discussion points to be resolved, were sent out. In addition, a basic conceptual framework around innovation in food systems was developed to guide discussion of the principles and unify terminology and used concepts. Furthermore, a review of existing principles in the area of innovation systems, food and agriculture development and other associated areas was used to help establish a first set of principles; this was revised and further refined by the task force based on expert discussions and a public stakeholder consultation. Additional amendments were made based on feedback from a pre-pilot of the principles and an accompanying scoring framework.

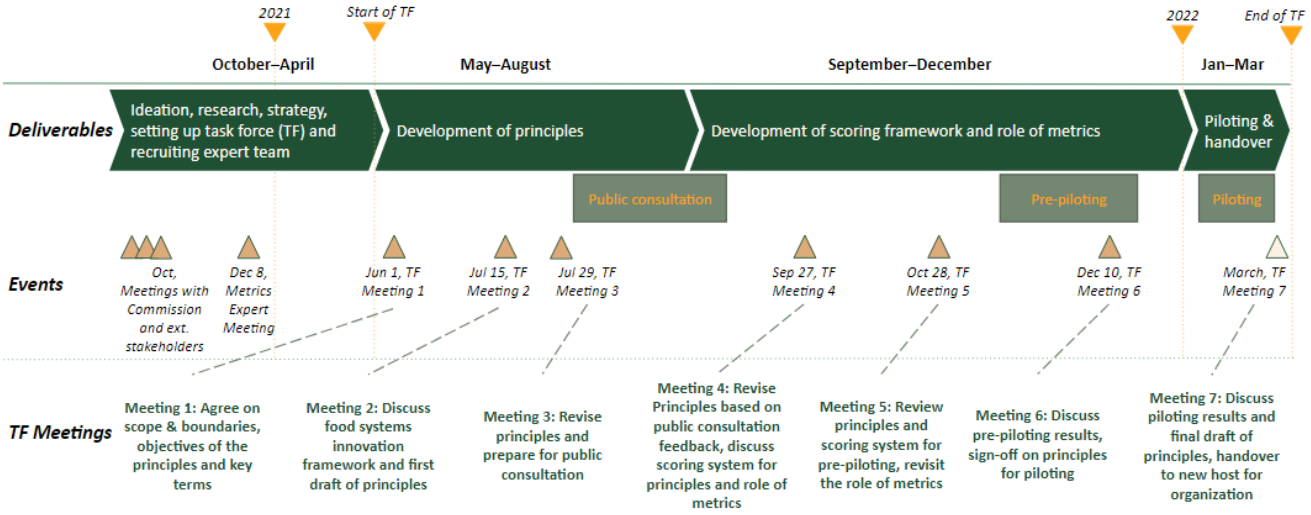

Figure 3. Work process of the CoSAI Task Force on Principles and Metrics for Innovation in Sustainable Agri-food Systems.

Public consultation on the draft principles

From August to early September 2021, the principles were refined, developed and contextualized based on a public consultation through a survey. The survey sought feedback on each principle and sub-principle using a Likert scale and open-ended questions. The survey was shared widely using social media, such as LinkedIn, and through distribution in agricultural, innovation and evaluation public newsletters. The survey garnered 57 responses. The majority of respondents (29%) were from international organizations, with non-governmental organizations, government and academia accounting for 18%, 18% and 14%, respectively. Other respondents identified themselves as private donors, public research managers, public donors and watchdogs, among others.

Regarding the survey responses from the Likert scale (response options were ‘relevant’, ‘somewhat relevant’, ‘neutral’, ‘somewhat irrelevant’ and ‘irrelevant’), most principles, and the majority of sub-principles were considered relevant. Some principles or sub-principles were considered ‘relevant’ by only half of the respondents, with the other half of respondents considering them ‘somewhat relevant’

or lower. Decisions regarding whether to keep these principles or sub-principles were made by the task force as a whole, considering the comments made.

Briefly, the feedback and resulting decisions are as follows:

1) The intended use of the principles has been made clearer through the development of a guidance document and a set of 'FAQs'. These documents will accompany the principles and address specific concerns including:
    a. The principles are too vague for practical use.
    b. There is a lack of definitions for the terms included in the principles. (To address this concern, numerous terms were defined and added to the glossary to clarify meaning and ease of application).
2) Some principles were merged and streamlined (e.g. Principles 8 and 9, to become Principle 1).
3) Antibiotic usage, protein diversification and sustainable protein production were raised as key topics by some respondents. The task force decided that, while these issues are important, they should not be included as sub-principles because they are too detailed. Also, antibiotic usage is covered by sub-principle 5.3 (OneHealth) and under 8.4 (animal welfare), and proteins are covered by both sub-principle 5.2 (adequate nutrition) and Principle 6 (sustainable management and use of natural resources). In addition, these issues are all solutions to particular problems in the food system and are not considered either processes or outcomes of innovation (i.e. they are 'outputs').

Pre-piloting the principles

After the fifth meeting, the task force members were asked to pre-pilot the principles and scoring system, applying them to one of their projects or programs to test how they would work in their own organizations. Several task force members generated scores for two CGIAR programs and four different projects, showing how the principles would fare across a range of topics and levels. One member also compared the principles and scoring system with their own existing system.

The pre-pilot resulted in a number of recommendations that were incorporated into the current version of the principles and scoring system:

- More specific hands-on instructions/guidance should be provided: the amount of information provided was perceived as overwhelming by outsiders.
- Better guidance should be provided to help users choose the processes and organizational level at which to apply the principles as well as to decide on an appropriate frequency.
- Although the principles and scoring system are easy to apply at program level, the most useful recommendations arise from the project level. For programs, a formula for aggregation should be conceived.
- More scoring levels per principle should be incorporated to make the assessment smoother.
- Scoring is difficult at the start of projects and should be made easier.
- Aggregating scores for sub-categories can be difficult and should be made easier.
- Outcome principles need to be worded better to directly link them to innovation processes (Change 'contribute' to 'consider').
- If a principle or sub-principle was not considered relevant by a project, that led to a 0 score. It should be able to omit these while providing a solid justification for doing so.

- Several terms should be defined that are not yet in the glossary.

The task force members also concluded that visualizing the scoring results for all principles jointly, as suggested in the operationalization framework (Section 5), can be helpful for gaining a quick overview of areas in need of improvement. The members also suggested possible alternative visualization options to accommodate specific needs within their own organizations.

4. Principles for innovation in agri-food systems

An agri-food system perspective

Sustainable agri-food innovations emerge within a food system context. To better understand the dynamics that influence agri-food innovation, the task force developed a basic agri-food system framework (**Figure 4**) building on the existing food system literature (Ericksen 2008; Ingram and Zurek 2018; van Berkum et al. 2018). This framework includes the main food system activities, with a specific focus on activities within the agreed scope of the task force – namely, pre-production, production and post-harvest activities – and their relation to other activities such as retail and consumption. Agri-food systems have a number of core goals that they should achieve through these activities (Hebinck et al. 2021). In fact, these activities should deliver on multiple agri-food system outcomes – food and nutrition security, economic opportunities and livelihoods for agri-food system actors – while minimizing environmental impacts and contributing to the sustainable management and utilization of natural resources, and social equity.

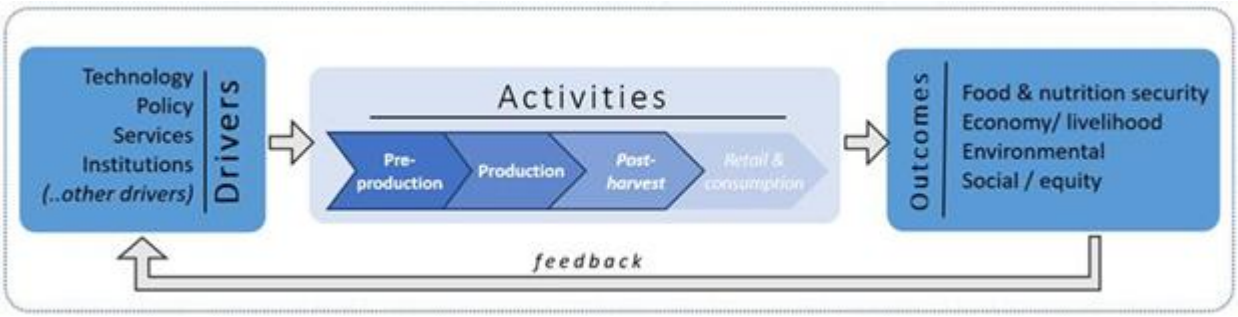

Figure 4. Basic agri-food system model used by CoSAI's Task Force on Principles and Metrics for Innovation in Sustainable Agri-food Systems.

But these activities and the delivery of outcomes do not play out in a vacuum. They are influenced by a wide variety of system drivers: environmental (e.g. climate change), political (e.g. geopolitics), economic (e.g. level of subsidies), demographic (e.g. age structure) and social (e.g. gender issues). Each of these drivers influence food system activities (positively or negatively) and their ability to deliver on the desired outcomes. In the proposed framework, the task force focuses on the drivers that are most important for innovation actions; namely, available and emerging technologies, the policy framework guiding innovation investments, the services available to agri-food system actors (such as extension and financial services) and the institutions shaping agri-food system activities (such as food safety regulations and trade regimes) (**Figure 4**).

The innovation process

The task force built on the FAO's definition of agricultural innovation, stating that "*Agricultural innovation is the process whereby individuals or organizations bring new or existing products, processes or ways of organization into use for the first time in a specific context*". Within the agri-food system, innovation can be understood as the process and set of measures or actions that change the

intensity and/or direction of the technology, policy, services or institutional drivers that then lead to changes in the design, production or recycling of goods and services and/or changes in the institutional environment (**Figure 5**, #1). These changes influence agri-food system actors' activities and their relationships within the system (#2) which can lead to different food system outcomes (#3). Thus, innovation can result in a change in drivers (e.g. a new drought-resistant variety becoming available for wide use) that will influence agri-food system activities (e.g. planting of the new variety) or the relationships between agri-food system actors (e.g. between farmers and processors if the new variety has different processing/milling/taste characteristics), leading to different food security levels or environmental impacts for example.

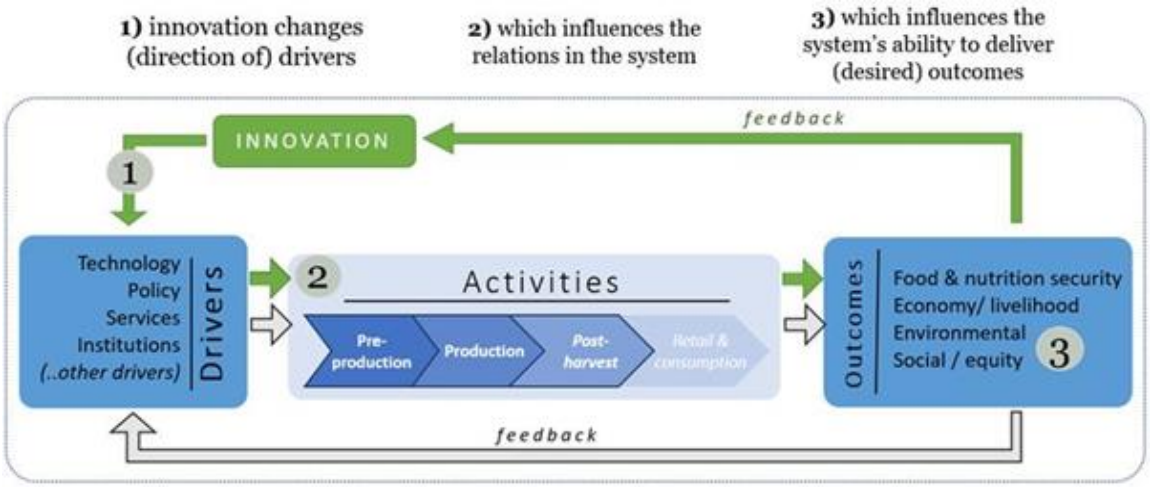

Figure 5. Innovation actions within an agri-food system framework.

Traditionally, people investing in or guiding innovation action have decided which innovations to prioritize using a narrow focus on achieving one outcome (e.g. improving food security) or on a combination of a few different outcomes (e.g. improving food security in an environmentally friendly manner). However, innovation processes play out in the entire system, therewith possibly influencing 'non-targeted' outcomes. Thus, if for example a new technology is brought into the agri-food system to enhance a targeted food system outcome (e.g. food security) it is likely that trade-offs or synergies occur with other food system non-targeted outcomes; for example, poorer farmers may find it difficult to grow a new variety due to a lack of the required additional inputs, and this can negatively influence livelihood outcomes and equitable access to technology.

The principles

Following best practices found in the academic literature, and based on task force discussions, the principles for innovation in sustainable agri-food systems address both the innovation process and agri-food system outcomes. Being overall process-oriented, the principles emphasize aspects that should guide innovators throughout the innovation process – from design all the way to implementation, and later evaluation. A simplified graphic of the innovation process, used for task force discussions, is shown in **Figure 6.**

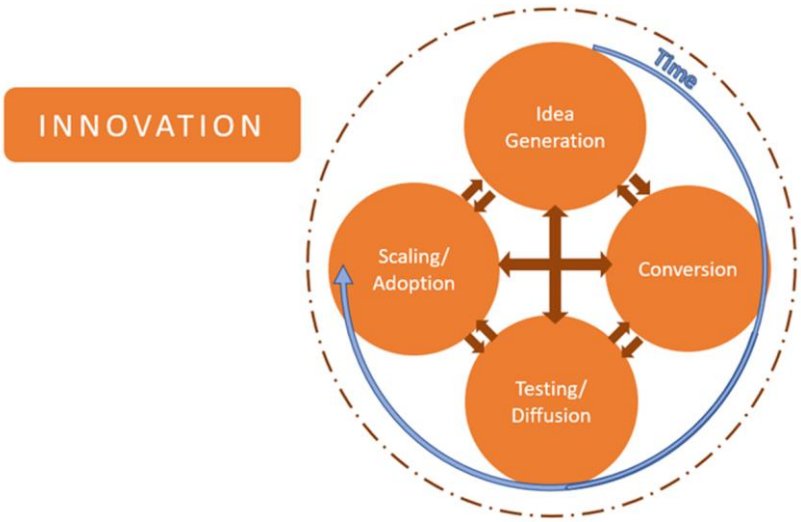

Figure 6. The simplified key stage in an innovation process.

Prior to developing its principles, the task force read through an analysis of existing principles developed by public and private actors in agri-food and innovation systems that was collected by the CoSAI Secretariat (see Annex 3). Several of these have inspired the proposed principles or their sub-principles.

There are three types of existing principles in agri-food and innovation systems, each of which is, on its own, insufficient for the purposes of the task force. First, principles on innovation outcomes (e.g. food security, biodiversity, livelihoods) are essential but cannot be measured at the beginning of innovation processes where it may only be possible to track intentions and processes. Second, principles on innovation processes (e.g. theories of change, participation) cannot directly address SAS objectives. Third, principles for innovation systems that ensure an enabling environment for an innovation process do not take account of the specific needs of direct investors in innovation who need to decide whether a process and product is on the right track. Consequently, the proposed principles are process-oriented but include both principles on innovation processes and principles on innovation outcomes, as shown in **Figure 7**. This combination is necessary for effectively guiding research and innovation processes in SAS.

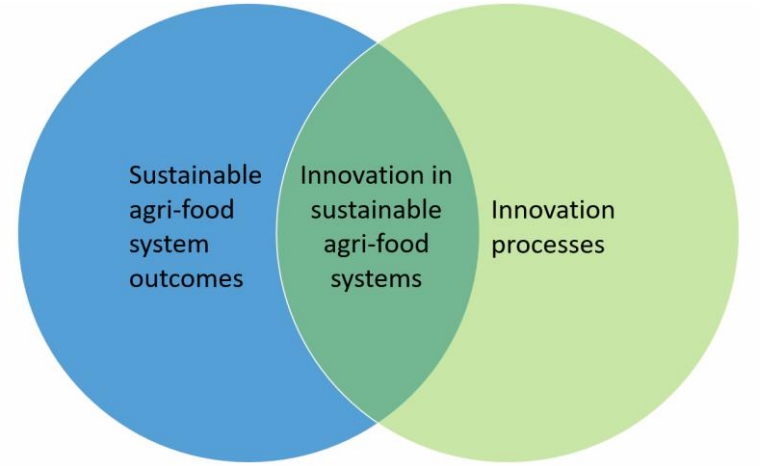

Figure 7. Venn diagram showing the conceptual position of the principles for innovation in sustainable agri-food systems.

While the task force principles are numbered, they are not hierarchical or chronological. They are, nevertheless, interlinked and build on each other. Throughout the innovation process, certain principles might be more prominent or more applicable than others; Section 5 will expand on how to apply these principles within the context of an organization. First, this section sets out the scientific relevance of the individual principles and how the task force and public consultations have contributed to their formulation. Each principle has several sub-principles, each of which describes components embodied in the main principle.

Principle 1: Set out a clear theory of change towards intended impact, based on a food systems perspective and reflexive learning

There is widespread recognition that innovation is key for a transition towards sustainable agri-food systems (Herrero et al. 2020), and that it has the potential to help overcome the multiple challenges agri-food systems face today. However, innovations can also have the potential to exacerbate existing challenges, or create new ones (de Boon et al. 2021). Ensuring that innovation contributes positively to SAS is difficult, as innovations emerge across different parts of the system, guided by diverse goals, aimed at distinct target groups, and building on various mechanisms of change. In order to achieve intended goals and impacts, it is key that innovators set out a clear theory of change identifying potential impact pathways and addressing constraints (Koerner et al. 2020; Zurek et al. 2021). The importance of this is unpacked in recent work on 'mission-oriented innovation', which emphasizes the need to be explicit about the rationale behind an innovation from the start, the intended direction of change, and the mechanisms of change the innovation builds on (Janssen et al. 2020; Klerkx and Begemann 2020; Mazzucato et al. 2020).

Principle 1 (see **Box 1**) builds on these theoretical insights and aims to set a standard for the *process* of innovation. It argues that innovators should keep a 'clear line of sight' towards the impacts they intend to achieve. However, discussions within the task force on the importance of clarifying the theory of change behind innovation processes yielded several insights and key adaptations. First, the task force stressed the importance and potential value of more open-ended innovation processes that are not guided by such a concrete 'mission', suggesting instead more flexible theories of change. Second, as food systems are complex and often non-linear, innovators should reflect on and assess intended pathways of change, applying systems thinking at different scales. Many impacts of innovations cannot be seen immediately or are difficult to measure, so a reflexive and adaptive approach is therefore key. Monitoring impacts and whether innovation processes follow the intended pathway of change can then help minimize the risk of unintended consequences, steer processes in the desired direction and support learning (Beers and van Mierlo 2017).

Box 1. Final principle and sub-principles

1. **Set out a clear theory of change towards intended impacts, based on a food systems perspective and reflexive learning**

    1.1. Clear and flexible theory of change towards intended impact of proposed innovation
    1.2. Applied systems thinking at different scales, including all impacted actors and activities
    1.3. Reflexive monitoring and evaluation to adapt route to impact to changing conditions

Principle 2: Design transparent and evidence-based innovation processes

The literature on accountability and governance of innovation stresses the importance of transparency about pathways of change, and any evidence of the impacts and outcomes of innovation processes. This transparency enhances learning across various actors in agri-food systems and has been embraced as key for socially responsible entrepreneurship (Piechocki 2004) and governance (Gupta et al. 2020). This is because transparency can enhance traceability and show what harm (or good) is being done. Second, transparency can support the sharing of knowledge and insights across diverse actors in the agri-food system. This is especially salient if innovations are pursued based on their profitability, as this might counter the call for scalable innovations accessible to people with low incomes (FOLU 2019; WRI 2018) or for innovations that are more for the public good.

Principle 2 (see **Box 2**) builds on these insights and argues for the design of transparent and evidence-based processes when innovating in agri-food systems applying appropriate and credible metrics. Discussions within the task force, and the public consultation process, highlighted the need for transparency and its role for accountability. Members also expressed the need for transparency around funding sources and how funding decisions are made. In addition, the task force stressed the need for knowledge sharing across diverse disciplines as well as a diverse range of knowledge generators/holders. As much as possible, this should include sharing of knowledge and new insights across public and private sector entities while accounting for issues relating to intellectual property rights.

Box 2. Final principle and sub-principles

2. Design transparent and evidence-based innovation processes

2.1. Information on innovation goals, key intended outcomes and budgets publicly available

2.2. Evidence-based processes including use of credible metrics

Principle 3: Conduct innovation processes in an inclusive and ethical manner, in compliance with human rights and other relevant international standards

Innovation can be understood as a process of change that involves 'new or modified knowledge, expertise, social arrangements, or technologies to address challenges' (Opola et al. 2021). However, processes of change have different impacts for different people in the food system (Klerkx and Rose 2020; Leach et al. 2012). The academic literature agrees overall that multi-stakeholder or participatory processes should be widely encouraged to minimize negative consequences for minorities and other marginalized groups pursuing more inclusive and effective innovation (Norström et al. 2020). In addition, innovation in agri-food systems needs to comply with human rights and other international standards that set out ethical requirements. However, these ethical considerations are often not taken into account, as an analysis of international development futures shows (Zurek et al. 2021): development either does not consider potential (unintended) consequences or cross-scale linkages, or it fails to prioritize innovations needed by the most vulnerable actors.

Principle 3 therefore stresses that innovation processes for sustainable agri-food systems should be conducted in an inclusive and ethical manner and comply with human rights and other relevant standards. The task force was unanimous in agreeing on the importance of inclusion and ethical

considerations in innovation, highlighting the need to ensure inclusion throughout every stage of the innovation process (see **Box 3**). However, task force members raised the concern that this should go beyond participation tokenism and mere box-checking and, instead, address power asymmetries directly. Transparency and accountability were seen as vital for monitoring whether innovation does actually address such power asymmetries.

Box 3. Final principle and sub-principles

3. Conduct innovation processes in an inclusive and ethical manner, in compliance with human rights and other relevant international standards

- 3.1. Inclusive, fair, and transparent decision making within innovation processes, ensuring all relevant stakeholders are included (for a specific innovation)
- 3.2. Fair and inclusive partnerships, including fair and ethical apportioning of benefits of innovation ownership
- 3.3. Considerations for all relevant types of knowledge
- 3.4. Ethically conducted innovation processes

Principle 4: Consider and make plans to address potential trade-offs and unintended effects across agri-food system outcomes

Innovation is instrumental for progress towards more sustainable food systems. While innovations are often designed to target a specific food system outcome (e.g. better environmental outcomes), they can have unintended consequences or side-effects – and might even be at odds with the SDGs (Herrero et al. 2021; Oliver et al. 2018). Managing or addressing such trade-offs has become a major challenge in furthering change towards sustainable agri-food systems – and sustainability in general (Grass 2020). Most overlooked are aspects of social justice and equity, with only a small portion of agri-food innovations focusing on addressing environmental or social goals (Dalberg Asia 2021).

Innovation processes for more sustainable agri-food systems should therefore intentionally address any trade-offs and unintended impacts they might have on food system actors and/or across key food system outcomes. While trade-offs cannot be overcome, development of clear transition pathways and monitoring of progress can ensure they are properly managed (Herrero et al. 2021; Zurek et al. 2021). When deciding which trade-offs are acceptable and which are not, the inclusivity principle is key (Mausch et al. 2020).

Discussions within the task force underscored the importance of considering trade-offs or unintended consequences, as these are unavoidable and somewhat inherent to innovation processes. Understanding and assessing these potential trade-offs requires innovators to take a full food system perspective. While there is a level of acceptance that processes of change can result in some harm, the task force recognized that it is the unpredictability of this harm that is the main problem: this makes it difficult to ensure trade-offs are distributed equally and managed across geographies, groups of people or landscapes. As such, the task force considers that deliberately addressing unintended impacts is paramount, and that transparency is vital to this process (see **Box 4**). Targets for sustainability are necessary for monitoring impacts and trade-offs, and these need to be dynamic so that they can match changing conditions over time.

Box 4. Final principle and sub-principles

4. Consider and make plans to address potential trade-offs and unintended effects across agri-food system outcomes

4.1. Transparent and systematic analysis of agri-food system outcomes (Principles 5 to 8)
4.2. Transparent monitoring of winners and losers in innovation pathways

Principle 5: Actively consider contributing to improved food and nutrition security and health

Many argue that the core objective of agri-food systems is to deliver food security and (nutritional) health for all (Hebinck et al. 2021; Willett et al. 2019). This entails ensuring access to sufficient, safe, and nutritious food, to meet the food preferences and dietary needs that are needed for a healthy life. Global assessments show that current agri-food systems are unable to fulfill this criterion in most places around the world and that diets of poor quality are the main cause of death and multiple forms of malnutrition (GBD 2020; Lindgren et al. 2018). While some of these themes have been driving R4D and the policy agenda since World War II (Clapp 2016), the need for innovations that are able to address the persistent challenges continues to be paramount (Herrero et al. 2020). For innovations to contribute to more sustainable agri-food systems, they must consider improved food and nutrition security and health outcomes.

The necessity of innovation to contribute to food and nutrition security and health was not questioned in task force discussions. Instead, discussions focused on how to assess progress in this area and how this could best be captured by the principles. For example, the task force raised the strong relationship between environment and nutrition, but for operational purposes these were kept separate. Secondly, the task force advocated for building on the concept of OneHealth, to capture health in a broad sense, and to include issues such as antimicrobial resistance and malaria (see **Box 5**). The FAO (2021) defines OneHealth as “an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent”.

Box 5. Final principle and sub-principles

5. Actively consider contributing to improved food and nutrition security and health

5.1. Food security
5.2. Adequate nutrition
5.3. OneHealth

Principle 6: Actively consider contributing to the sustainable management and utilization of natural resources

The role of agri-food systems in climate change and biodiversity loss is significant (Crippa et al. 2021; Newbold et al. 2015). Simultaneously, agri-food systems strongly depend on adequate climate and natural resources (Vermeulen et al. 2012). The call for more sustainable management and use of natural resources is widespread (Caron et al. 2018; Rockström et al. 2020; Springmann et al. 2018), emphasizing the positive impact it could have, not just on shaping more sustainable food systems, but

on climate change and biodiversity loss more generally. Innovation that contributes to more sustainable management and utilization of natural resources can cover several dimensions, including mitigating biodiversity loss and climate change, ensuring clean air and water, and maintaining soil health (Hebinck et al. 2021). Innovation processes should therefore be tailored towards such food system outcomes.

The task force and public consultation processes further underscored the importance of considering how innovation contributes to the sustainable management and utilization of natural resources. The group stressed how innovations in agriculture can contribute to climate adaptation and mitigation or even to regenerative processes. As for Principle 5 on food and nutrition security, the intimate link between environment and nutrition was raised, but the two were left as separate principles for operational purposes (see **Box 6**).

Box 6. Final principle and sub-principles

6. Actively consider contributing to the sustainable management and utilization of natural resources

6.1. Biodiversity and integrated habitats
6.2. Climate change mitigation
6.3. Clean water
6.4. Clean air
6.5. Soil health

Principle 7: Actively consider contributing to economic opportunities and livelihoods

The ultimate purpose of the economy is to support welfare in a broad sense – by striking a balance between the virtues of the market with the need to create and sustain common goods as well as a just society (Johansson 1991). Both in the Global South and in many countries of the Global North, the food sector is key to the economy; for example, in the UK, food and drink is the biggest manufacturing sector (Hasnain et al. 2020). Agri-food systems therefore provide livelihoods to many people around the globe, be they farmers or those involved in activities such as food processing, transport or catering.

At the core of any food system there needs to be vibrant and robust agri-food businesses able to innovate and adopt transformative practices (FOLU 2019; Herrero et al. 2020) in order to deal with economic, social and environmental change. However, the unequal distribution of economic benefits in the supply chain is a major concern as highlighted by the impacts of the COVID-19 pandemic across food systems around the world (e.g. Power et al. 2020).

During its discussions, the task force put strong emphasis on the need for inclusive economic development and opportunities, arguing that it is the poor and marginalized groups in particular who are disadvantaged in the food sector. The task force also discussed how innovation for sustainable agri-food systems can go beyond mere poverty reduction and contribute to shared prosperity (see **Box 7**).

Box 7. Final principle and sub-principles

7. Actively consider contributing to economic opportunities and livelihoods

7.1. Economic opportunities
7.2. Secure and stable income

Principle 8: Actively consider contributing to an ethical, equitable and adaptive agri-food system

The ethical and equitable dimension of agri-food systems has received little attention (Dalberg Asia 2021) and can be considered a blind spot of innovation processes (Hebinck et al. 2021; Herrero et al. 2021; Zurek et al. 2021). The aforementioned trade-offs in agri-food systems often include negative impacts with respect to these dimensions (Adams et al. 2014; Ellis et al. 2019; McShane et al. 2011). In addition, there is an urgent need for innovations that are accessible to vulnerable or low-income groups, to support more equitable distribution of the benefits of agri-food systems (WRI 2018).

The task force unanimously acknowledged the necessity to include dimensions of justice, equity and ethics in the principles for innovation in agri-food systems. Task force members emphasized the need for 'people-centered' innovation, fair distribution of the risks of innovation processes, and responsibility and accountability. The task force also highlighted the difficulty of accessing the data necessary for monitoring purposes, and that certain justice aspects are difficult to capture and measure. Much in line with Principle 3 on inclusivity within innovation processes, Principle 8 stresses that risks, benefits and decision-making power as outcomes must be distributed along the value chain (see **Box 8**).

Box 8. Final principle and sub-principles

8. Actively consider contributing to an ethical, equitable and adaptive agri-food system

8.1. Human rights and working conditions
8.2. Distribution of risks, benefits and decision-making power along the value chain
8.3. Inclusiveness
8.4. Animal welfare
8.5. Adaptation, including to climate and environmental change

5. Operationalization framework

In order to put the principles into operation and to facilitate their application for different types of users, the task force proposes a framework for assessing if and how the principles can be/have been applied. A scoring system indicating the degree of success achieved in applying the principles can help decision makers and innovators in assess progress, compare across possible innovation options, and also benchmark themselves against other organizations. The task force decided to target the following user groups, with potential to also make the metrics useful for farmers and farmers' groups:

- Public and private direct investors (funders) in innovation for sustainable agri-food systems.
- Managers and implementers of R4D and innovation programs, both public and private.
- Certification, benchmarking and watchdog organizations.

The operationalization framework ascertains whether an innovation project has taken action to address and implement activities in line with the principles. The framework therefore needs to:

- Include a simple scoring system to classify different types of actions on each principle.
- Allow for internal and external use.
- Provide guidance on how to deal with potential unintended consequences/trade-offs of actions aiming to address one principle but impacting on another.

Table 1 shows a scoring system that can be used to assess each principle individually. The scores reflect the degree of action that has been taken by an innovator or organization to implement the principles. The first step ranges from no action taken (0) to action taken to implement the principle (1). If an innovator/organization has systematically and regularly collected and analyzed information on the implementation of the principle, the score will be 2. If an innovator/organization can also show that needed changes have been implemented, the score is 3. The sub-principles can be scored individually providing the basic elements included in a principle and can help when considering actions to address the principle as a whole. All topics described in the sub-principles need to be considered. Thus, a score of 2 can only be reached if *all* sub-principles have been addressed within the actions, or clear information can be given as to why a sub-principle might not apply to the assessed innovation.

Table 1. Scoring system to assess the implementation of principles by an innovator/organization.

Score	Level of implementation
0	No evidence that action has been taken to implement the principle.
1	Some activities have been carried out in line with the principle, but these are insufficient to justify a score of 2.
2	There is evidence that activities have been carried out in line with the principle and its sub-principles. Information on the issues has been regularly and systematically collected and analyzed.
3	There is evidence that activities have been carried out in line with the principle and its sub-principles. Information on the issues has been regularly and systematically collected and analyzed and needed changes have been implemented.

Complementary to existing reporting processes in organizations, scoring should be carried out thoroughly at the beginning of each innovation process (idea generation) to see if the developing ideas address all the principles in a consistent manner. Scoring of the emerging innovation could be then carried out in a less intensive way in the middle of the innovation process and/or at the end again (but at least twice overall). This will allow for performance monitoring and the introduction of corrective measures. The scoring framework can thus serve as a learning tool at the beginning of an innovation process, and as a monitoring tool as the innovation progresses. At that point, credible, more quantitative metrics – for example, on food system outcomes (Principles 5 to 8) – could be used. An evolving selection of metrics for assessing food system outcomes can be found here.

A frequent demand that was discussed among task force members was the tracking of innovation progress through outcome metrics. This stands in contrast to the principles and their operationalization framework that focus on intentions. Box 9 explains why it is extremely difficult to measure progress on sustainability objectives through innovation outcomes, especially early on in the process.

Box 9. Why can't we use common outcome metrics to track innovation progress against the principles?

Results tracking distinguishes between 'outputs' (under the control of an intervention, such as the number of farmers trained) and 'outcomes' (desired results outside the direct control of the intervention, such as the number of farmers implementing their new knowledge, or improved farmer income).

Outcome metrics are important in the innovation process. However, the choice of metrics to use is specific to each innovation context and is influenced by:

- The question(s) of interest from the viewpoint of key actors (e.g. scientists, farmers).
- The type of innovation (e.g. technical, finance).
- The main object of innovation (e.g. crop, processing business, watershed).
- The scale or level (e.g. field, farm, landscape, value chain, food system).
- The resources and skills available for measurement (e.g. for biodiversity or farm income).
- The stage of the innovation process (e.g. lab or field experiment, pilot, or use at scale).

High-level outcome metrics at country/area level (e.g. poverty, nutrition, SDG indicators) are critical to track general trends in agri-food systems (Fanzo et al. 2021). As such, they are important background information for researchers and innovators. However, these metrics cannot be used to 'track progress' of research and innovations against outcome 'targets'. The main reasons are:

1. A lack of causal links between an innovation and the high-level outcome. For example, the district poverty rate may go down, but it would be dangerous to conclude that this is due to the innovation.
2. Most innovations take a long time to get to scale, and early results are often not predictive of outcomes at scale; for example, because small-scale programs having more resources and dedicated staff.

Carefully designed studies or evaluations at scale are therefore needed to tease out causal links between an innovation and its outcomes and ultimate impacts at scale. For this reason, tracking adherence to the principles focuses on intention and implementation to move towards outcomes, such as:

- Is there a theory of change that orients the innovation process towards outcomes?
- Have appropriate types of outcomes been considered?
- Have appropriate and credible metrics been used (e.g. for biodiversity)?
- Have outcome measurements been used appropriately to reorient the innovation process?

The scoring framework is designed so that it can be applied at different levels within an organization, i.e. at a program level as well as at the project or individual innovation scale. Ideally though, the scoring should be carried out at the lowest possible level at which strategic decisions are taken concerning the issues that the principles address.

Table 2 provides a draft scoring template for each principle. It allows for evidence on implementation to be documented and helps with monitoring progress. What remains to be decided is how to aggregate across different innovations in a whole innovation pipeline or organization. One option is to calculate aggregated scores as proportional to project budgets.

The implementation of actions to address each principle has the potential to create unintended consequences/trade-offs (i.e. an action for one principle could negatively affect another one). Therefore, part of an overall plan to mainstream the eight principles should include a space for

assessing trade-offs, discussing priorities and developing the necessary mitigation actions. This should be noted in the scoring template in order to ensure that actions to mitigate unintended consequences can be developed.

Scores should not be aggregated across different principles. Instead, they could be presented using a radar/spider diagram or similar that shows the scoring for each principle in a consistent manner; each innovator or organization needs to decide the level at which the spider diagram is constructed (i.e. the project, program or organizational level). In addition, comparing graphs over time allows one to assess progress towards the principles. See **Figure 8** for a hypothetical example and **Figure 9** for two alternative visualization options.

Table 2. Draft template for scoring an innovation

Principle	Score	Evidence
1		
2		
3		
4		
5		
6		
7		
8		

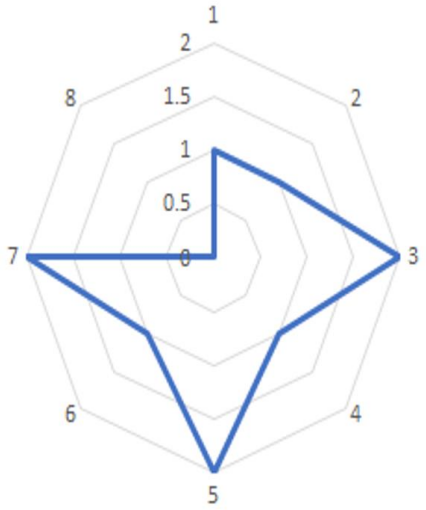

Figure 8. Visualization of hypothetical scoring on innovation X for the eight principles.

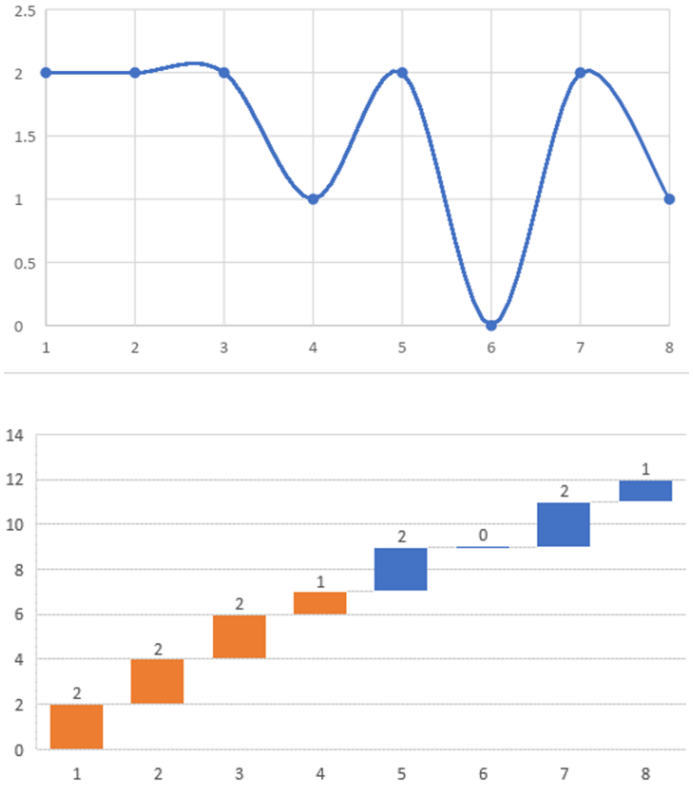

Figure 9. Alternative visualization options suggested by the task force.

6. Next steps

Following the development of Principles 1 to 8 by the Task Force on Principles and Metrics for Innovation in Sustainable Agri-food Systems, the first three months of 2022 will be used to conduct a pilot, involving stakeholders from the task force and beyond. Important objectives of this phase are to develop better guidance materials and identify obstacles to the integration of the principles in existing reporting processes. The pilot phase will run until the end of March 2022. Until then, CoSAI will seek a successor organization to which it can hand over the principles. Further technical development of the principles and a catalogue of metrics, as well as stronger advocacy and integration of the principles into existing reporting processes, are key tasks that should be taken on more strongly after March 2022. It is hoped that an organization with a strong international mandate in the agri-food sector will work on fine-tuning and disseminating the principles among public and private stakeholders, with a long-term vision to mainstream them into public reporting and benchmarking processes.

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Annex 1: Task Force Members List

List of Members of the CoSAI Task Force on Principles & Metrics for Innovation in Sustainable Agri-food Systems

The Commission on Sustainable Agriculture Intensification (CoSAI) is collaborating with FAO to convene a Task Force on Principles and Metrics for Innovation in Sustainable Agri-food Systems (SAS). The Task Force will establish a clear set of principles for innovations and innovation processes that promote SAS, together with guidance and metrics supporting those principles. These can be used to plan, guide and monitor progress against SAS objectives. [Updated: January 7, 2021]

Name	Position	Workplace
Co-chair: Dr Preet Lidder	Technical Advisor, Office of the Chief Scientist	Food and Agriculture Organization (FAO)
Co-chair: Prof Dr P. V. Vara Prasad	Distinguished Professor of Crop Ecophysiology // Director, Feed the Future (FtF) Innovation Lab on Sustainable Intensification (SIIL), CoSAI Commissioner, Chair of P&M Group	Kansas State University, CoSAI
Dr Aggrey Agumya	Director of Research and Innovation	Forum for Agricultural Research in Africa (FARA)
Mr Alessandro Meschinelli	Senior Advisor	Global Forum on Agricultural Research and Innovation (GFAR)
Dr Charlotte Pavageau	Program Manager, Policy and Advocacy	Biovision Foundation
Mr Christopher Ian Brett	Lead Agribusiness Specialist	The World Bank
Dr Daniel Walker	Chief Scientist	Australian Centre for International Agricultural Research (ACIAR)
Dr Dominik Klauser	R&D Lead	Syngenta Foundation for Sustainable Agriculture
Dr Eugenia Saini	Executive Secretary	Regional Fund for Agricultural Technology (FONTAGRO)
Dr Geraldo Martha Junior	Senior Researcher	EMBRAPA, Brazil
Prof Dr Giovanni Frajese	Coordinator, Scientific Council	World Farmers' Organization
Mr Hayden Montgomery	Special Representative	Global Research Alliance (GRA) on Agricultural Greenhouse Gases
Mr Ishmael Sunga	CEO	South African Federation of Agriculture Unions (SACAU)
Dr Jerry Glover	Deputy Director, Center for Agriculture	United States Agency for International Development (USAID)

Dr John McMurdy	Vice President for Innovation & Development	Croplife International
Dr José Joaquín Campos Arce	Executive Director	Sustainable Agriculture Network (SAN)
Dr Julia Compton	Head of Commission on Sustainable Agricultural Intensification	CGIAR Research Program on Water Land and Ecosystems (WLE)
Dr Ken Chomitz	Chief Analytics Officer	Global Innovation Fund
Dr Latha Nagarajan	Senior Economist	International Fertilizer Development Center (IFDC)
Ms Lissa Glasgo	Manager of IRIS+ and Impact Measurement & Management (IMM)	Global Impact Investing Network (GIIN)
Prof Dr Mario Herrero	Chief Scientist	Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia
Dr Maurice Lorka	CAADP-XP4 Manager	West and Central African Council for Agricultural Research and Development (CORAF)
Prof Dr Pablo Tittonell	CoSAI Commissioner | WWF Chair Professor Resilient Landscapes for Nature and People | Principal Research Scientist	CoSAI | Groningen University, The Netherlands | National Council for Science and Technology (CONICET), Argentina
Ms Patricia Flores	Senior Project Coordinator	Organics International (IFOAM)
Ms Rachel Lambert	Agriculture Research Team Leader	Foreign, Commonwealth, and Development Office (FCDO), UK
Dr Ravi Ketharpal	Executive Secretary	Asia-Pacific Association of Agricultural Research Institutions (APAARI)
Dr Sonja Vermeulen	Director of Programs	CGIAR System Organization
Dr Tania Eulalia Martínez-Cruz	Independent Researcher and Consultant	Food and Agriculture Organization (FAO)
Ms Viktoria de Bourbon de Parme	Food Transformation Lead	World Benchmarking Alliance (WBA)
Dr Walter Odhiambo	Chief Agriculture Economist	African Development Bank (AFDB)

Annex 2: CoSAI Taskforce on Principles and Metrics for Innovation in Sustainable Agri-food Systems: Terms of Reference

Summary

1. The Commission on Sustainable Agriculture Intensification (CoSAI)[1] is initiating and convening a Taskforce with the objective of developing and recommending a set of principles and metrics[2] for guiding and monitoring innovation[3] in Sustainable Agri-food Systems (SAS)[4] working with individuals from various stakeholder groups who – in their own capacity – bring in valuable experience on the issue. The Taskforce will steer the process, supported by a small Expert Group.

2. The proposed users of these principles and metrics are:
    - Public and private direct5 investors (funders) in innovation in agriculture and agricultural systems who need to ensure that their funds are appropriately used to support their sustainability goals
    - Managers and implementers of R4D and innovation programs, both public and private, who need to plan their work and track progress against SAS objectives
    - Certification, benchmarking and watchdog organizations promoting investment in innovation for environmentally sustainable and socially-positive outcomes

3. The main aim of the Taskforce is to build on existing work in this area[6] to recommend:
    - A focused set of principles for innovation for SAS
    - Guidance and metrics to support the implementation of the principles
    - Further work required, including major gaps in available metrics for further investment
    - A suitable institutional home and process to take this forward from 2022

[1] CoSAI is a time-limited international Commission, set up to promote more and better-targeted investment in innovation for Sustainable Agriculture Intensification (SAI) in the Global South, in support of the United Nations Sustainable Development Goals (SDGs) and the climate goals of the Paris Agreement. CoSAI takes a broad view of SAI, as defined here. For CoSAI, 'innovation' includes not only science and technology but also innovation in policies, finance and social institutions. SAI is interpreted broadly to mean the transformative changes needed in agricultural systems to meet the SDGs and climate goals of the Paris Agreement, including social and human objectives as well as environmental sustainability. CoSAI's main intended audiences are 'innovators' (e.g., research and development entities and the private sector) and 'investors in innovation' (e.g., Ministries of Agriculture, international funders), who directly fund and support agricultural innovation. CoSAI was initiated and is supported by the CGIAR Research Program on Water, Land and Ecosystems (WLE), with funding through the CGIAR Trust Fund

[2] For convenience, the term 'metrics' is used in this paper to cover both indicators and metrics.

[3] CoSAI defines innovation broadly to include innovation in policies, social institutions and finance as well as science and technology. It includes Research and Development (R&D) as well as other innovation processes.

[4] The scope and terminology of the Taskforce will be decided by the Taskforce itself, and may end up being something different than "SAS". However, for convenience, the acronym "SAS" is used throughout this paper.

[5] The term "direct investors" excludes those investing in the broader enabling environment for innovation in agricultural systems, such as physical infrastructure or digital connectivity.

[6] Annex 1 has examples of some existing principles, frameworks and metrics.

4. A further important aim is to promote, to the extent possible:
    - Agreement on the principles by key stakeholders
    - Agreement of a group of volunteer users to pilot, improve, and take forward the guidance and metrics (this piloting activity will continue beyond the end of the Taskforce)
5. The Taskforce will work from May – November 2021. It will be composed of volunteers representing potential users of the principles and metrics as well as a few benchmarking and watchdog organizations. It will be supported by a small Expert Group that will develop proposals for the Taskforce to discuss and make recommendations.

Background and rationale for Taskforce

1. It is widely agreed that **a huge boost for investment in innovation in agricultural systems will be a critical factor for meeting the Sustainable Development Goals and Paris Climate Agreement**. Innovations in policies, institutions, finance and technologies will be needed to meet the challenge of feeding an estimated 10 billion people with healthy, accessible, safe and nutritious food while protecting and regenerating the natural environment, meeting climate goals and sustaining equitable livelihoods.

2. According to a forthcoming study commissioned by CoSAI[7] (Dalberg Asia, 2021), over US$ 40 billion is invested every year in innovation for agricultural systems in the Global South[8]. However, only a small fraction of this funding (<10%) is squarely aimed at promoting the environmental and social objectives of SAI[9]. **This highlights a huge gap and opportunity to improve current investments in innovation to reach SAS objectives**.

3. A major challenge for both implementers and investors in innovation is deciding whether an investment in innovation is on the right track to promote SAS[10]. Lack of clarity potentially leads to poor prioritization of investments in innovation, as well as opening the door to 'greenwashing'[11]. **A way forward is to establish a clear set of principles for what innovations and innovation processes 'count' as promoting SAS, together with guidance and metrics supporting those principles.** These can be used to plan, guide and monitor progress against SAS objectives.

4. **CoSAI has identified this area of work as critically important to improve future innovation in agricultural systems and would like to help to bring experts together on this issue,** examining what has been done already[12] and promoting agreement on different principles, frameworks, guidance and metrics supporting the principles **for key groups (researchers, practitioners e.g. farmers, private sector and investors/policy makers)**. CoSAI will aim to align this work with that

[7] Dalberg Asia (2021) *Investment in innovation for agricultural systems in the Global South: how much promotes Sustainable Agriculture Intensification? (title tbc)*. Commission for Sustainable Agriculture Intensification (CoSAI)

[8] This figure covers investment by direct investors (see footnote 5) such as governments, international funders and private sector, but excludes farmers' own investments, which are considerable.

[9] Based on an analysis by Dalberg Asia of innovation project descriptions and other available information.

[10] This was among the early findings of the Dalberg Asia study.

[11] i.e., making claims of sustainability that are not justified.

[12] CoSAI started by collecting together an initial database of metrics from the literature, and recently has started collecting principles and metrics used by a selection of companies and organizations involved in innovation in agriculture. CoSAI also hosted an expert meeting on metrics for innovation in sustainable agriculture in December 2020, attended by experts from FAO, academia, thinktanks, and private sector, to exchange information on existing metrics and consider some challenges and opportunities in this area.

of other stakeholders, in particular FAO, which has a global normative function in agriculture and leads on many internationally-used principles, indicators and metrics. In 2021 there is an extraordinary international focus on sustainable agriculture and food systems, for example in the UN Food Systems Summit (UNFSS) and COP26, and this potentially provides some potential opportunities for leveraging broader agreement on principles and metrics.

5. As listed in Annex 1, various sets of principles and metrics already exist for sustainable agriculture (in general), and others exist for innovation and innovation systems. However, **there is a gap in the intersecting area of Principles and Metrics for Innovation in SAS**, as explained in the table below. The Taskforce will build on and where possible reconcile existing principles and metrics, and avoid reinventing the wheel.

Why aren't existing principles and metrics sufficient to use for innovation in SAS?

Existing principles and metrics[13] for…	Usually focus on….	These are insufficient for Innovation in SAS because…
Sustainable agri-food systems and related concepts	Outcomes of agri-food systems - such as soil carbon, biodiversity, gender equality, labor standards, productivity, loss and waste.	While outcomes are an important part of the picture, they are not sufficient, because innovation is usually a long undertaking. For the first few years, it may only be possible to track intentions, theories of change and processes, and checking to what degree these are being monitored and changes made in response to new information. This requires additional proxy and/or process metrics[14].
Innovation processes	Processes such as consultation of end users, ethics	While principles and metrics for processes are important, they do not address the specific objectives to be achieved (i.e., SAS)
Innovation systems	Enabling environment for innovation, e.g. education, infrastructure, connectivity, information	While an enabling environment for innovation is very important, these metrics do not address the specific needs of direct investors in innovation who need to decide whether their own process and product is on the right track.

6. At least two groups have already proposed practical frameworks and metrics for classifying the sustainability of *innovations* in agriculture:
    a) USAID Feed the Future – Sustainable Intensification Innovation Lab (Musumba et al., 2017). This framework defines 5 domains of sustainable intensification: productivity, economic, environmental, social (equity), and human (nutrition, capacity) and four spatial scales: field, farm, household-community and landscape. The framework

[13] For principles, see list in Annex 1.
[14] For one example, see (World Benchmarking Alliance (WBA), 2021) p. 27 draft scoring guidelines

provides a selection of indicators and metrics for each domain as well as a means to visualize trade-offs between objectives and domains (www.sitoolkit.com).

b) Biovision (Biovision and IPES-Food, 2019, 2020) based on the framework of (Gliessman, 2016). This distinguishes five levels of 'agroecological integration', moving from industrial agriculture (score 0) to incremental approaches (e.g. input efficiency and substitution) to transformational approaches.

While both frameworks have been tested, neither is yet widely accepted and both may need further development, for example to incorporate different types of innovation (such as financial) and outcomes (such as resilience). The Taskforce will consider and build on both these frameworks, as well as others identified.

Description, responsibilities and timeline of Taskforce

The Taskforce will be composed of around 20-25 volunteer individuals, representative of a range of potential users, monitoring organizations and others interested. It will work in close conjunction with a small Expert Group that will develop options and recommendations for the Taskforce's consideration. Annex 3 outlines the Terms of Reference for the Expert Group.

The Taskforce is expected to meet about five times between May and October 2021 to discuss and come to agreement on the following issues *(all dates approximate)*:

May	Introductions; agreement on the scope of the task, terms and definitions, and workplan
June	Consider a first draft set of principles and proposals
July	Agree on a set of principles for wide consultation
July-Aug	Consultation
Sept	Discuss results of consultation and agree on a set of principles to recommend. Consider first draft set of guidance and metrics
Oct-Nov 2021	Guidance and metrics recommended for wider consultation and piloting; proposal for institutional home and next steps in 2022

Taskforce members will also read and make written comments on draft proposals.

Annex 3: List of principles that were consulted and guided the development of the final principles list

Please contact wle-cosaisecretariat@cgiar.org for access to the larger database of principles with details.

Entity	Source	Principles
OUTCOME PRINCIPLES		
Alliance of Bioversity International and CIAT	Compendium of Indicators for Food System Assessment	Based on the HLPE (2017) framework. This framework has 5 high level domains, each with corresponding indicators: Domain 1: Diets Domain 2: Consumer behavior (choices on what foods to acquire and eat) Domain 3: Food environment (e.g. availability, affordability, physical access, quality and safety, advertising and information available) Domain 4: Food supply chains Domain 5: Drivers (biophysical and environmental drivers, technology and infrastructure, political and economic drivers, sociocultural drivers, demographic drivers)
Barilla	Fixing the Business of Food	P1: Beneficial products and strategies (i.e. bus. contr. to healthy and sust. dietary patterns) P2: Sustainable business operations and processes P3: Sustainable supply and value chains P4: Good corporate citizenship (including lobbying)
Bayer/Cropscience		P1: Product Stewardship: For us, product stewardship means that our products satisfy the highest quality standards and are safe for people, animals and the environment when properly used. Not only do the desired properties of substances and products need to be taken into consideration but also the possible risks for people and the environment. We respect legal requirements, and our voluntary commitment and internal standards go beyond these in a variety of areas. P2: Care for crops: Every farm is different, and every field within a successful farming operation is unique. As a result, every solution should be tailored to meet the needs of the individual farmer and their specific field—from the right seeds and traits to the correct type and amount of crop protection to the digital tools and services that inform good decision making. ForwardFarming demonstrates a holistic, tailored approach for healthy crops, harvests and ecosystems. P3: Care for human health and the environment: ForwardFarming promotes and demonstrates proactive stewardship to protect human health and preserve the environment. Examples include: addressing the safe and responsible use of crop protection products; soil health, biodiversity, and water conservation; and offering training in all of these areas. P4: Care for partnerships: Bayer FowardFarming partners with food and value chain participants, research centers and universities, and industry leaders to create space for dialogue and demonstration – connecting farmers with the communities around them and beyond. SET OF PRINCIPLES/GUIDING TERMS IN FORWARD FARMING BROCHURE ALSO LEADING TO SPECIFIC METRICS: P5: "Producing more with less: Smart farming helps farmers maximize their yields through agronomic best practices while reducing the amount of resources needed" [Precision Agriculture] P6: "Safety first: Regular training, applying products with caution and using adequate safety equipment is always the best approach"; Food safety; Operator Safety P7: "Biodiversity: Encouraging practices like crop rotation and cover cropping, creating flower strips, refuges, bird nesting aids and insect hotels helps build an agro-environment rich in biodiversity" P8: "Bee care and bee safety: Controlling the Varroa mite, planting flower strips and applying crop protection products in a way that minimizes exposure to bees are just a few

		measures to protect pollinators" P9: "Water preservation: Efficient water management, establishment of bufferstrips and on-farm wastewater management are good examples to follow."
Biovision and IPES-Food (2019)	Agroecology Criteria Tool.	Normative scale from worst (Level 0- agriculture with industrial inputs) to best (Level 5 - transformational agroecological global food system): Level 0 No agroecological integration Level 1 Increase efficiency of industrial inputs Level 2 Substitute alternative practices and inputs Level 3 Redesign the whole agroecosystem based on ecological processes Level 4 Re-establish connections between growers and eaters, develop alternative food networks Level 5 Rebuild the global food system so that it is sustainable and equitable for all
Blended Finance Taskforce	Better Finance, Better Food	Nine proposed principles for investing in the food and land use system: P1: Financing production of lower-carbon and more nutritious food P2: Promoting resource efficiency and regenerative farming methods P3: Conserving and restoring natural capital P4: Contributing to development and poverty reduction P5: Transforming sustainable and transparent food value chains P6: Providing improved risk scores to companies that have strong science-based targets – especially for biodiversity – and that integrate climate resilience, nutrition and health outcomes and inclusion into their corporate strategies P7: Zero deforestation supply chains P8: Zero tolerance for environmental crime P9: Zero tolerance for land grabbing or exploitation
Committee on World Food Security	Voluntary Guidelines on Food Systems and Nutrition	P1: Transparent, Democratic and Accountable Governance P2: Sustainable Food Supply Chains to through sustainable food systems to Achieve Healthy Diets in the Context of Economic, Social and Environmental Sustainability, and Climate Change P3: Equal and Equitable Access to Healthy Diets Through Sustainable Food Systems P4: Food Safety Across Sustainable Food Systems P5: People-Centered Nutrition Knowledge, Education and Information P6: Gender Equality and Women's Empowerment Across Food Systems P7: Resilient Food Systems in Humanitarian Contexts
Dangote Industries	7 Pillars of Sustainability	P1 Financial: For a diverse group like ours, it's essential we bolster the financial performance of our businesses using value driven techniques in keeping our strategies relevant. P2 Social: Create a learning environment and platform for our employees to grow and achieve their fullest potential, whilst adhering to the highest standards of health and safety. In our host communities, we strive to develop resilient and sustainable prosperity through direct and indirect employment... P3 Institutional: Build a world-class institution centered around corporate governance best practices and sustainability principles that promote legal and regulatory compliance, transparency and business continuity. P4 Economic: Promote inclusive, sustainable economic growth, self-reliance, self-sufficiency and industrialization across Africa, by establishing efficient production facilities and developing resilient local economies... P5 Environmental: Create sustainable environmental management practices, through a proactive approach to addressing the challenges and opportunities of climate change ... P6 Cultural: Embody our core values in the way we do business, including respect for cultural diversity and giving back to the societies in which we operate. To achieve this, we actively encourage teamwork, empowerment, inclusion, equity... P7 Operational: Serve and satisfy our markets by working together with partners to deliver the best products and services to our valued customers and stakeholders, through continuous product improvement, new business development.
FAIRR	Coller FAIRR Protein Producer Index	P1: GHG emissions; P2: Deforestation & Biodiversity Loss; P3: Water Use & Scarcity; P4: Waste & Pollution; P5: Antibiotics; P6: Working Conditions; P7: Animal Welfare; P8: Food Safety; P9: Governance; P10: Sustainable Proteins
FAO	Principles for Responsible Investment in	P1: Contribute to food security and nutrition P2: Contribute to sustainable and inclusive economic development and the erad. of poverty

	Agriculture and Food Systems	P3: Foster gender equality and women's empowerment P4: Engage and empower youth P5: Respect tenure of land, fisheries, and forests, and access to water P6: Conserve and sust. manage nat. resources, increase resilience, and reduce disaster risks P7: Respect cultural heritage and traditional knowledge, and support diversity and innovation P8: Promote safe and healthy agriculture and food systems P9: Incorporate inclusive and transparent governance structures, processes, and grievance mechanisms P10: Assess and address impacts and promote accountability
FAO (2019)	TAPE Tool for Agroecology Performance Evaluation (TAPE)	This framework has 5 strategic dimensions which overarch 10 core criteria against which the sustainability of agroecological performance is evaluated. The dimensions and corresponding core criteria are: (1) Governance: Secure land tenure (or mobility for pastoralists) (2) Health and nutrition: Exposure to pesticides, Dietary diversity (3) Society and culture: Women's empowerment, Youth employment (4) Economy: Productivity, Income, Added Value (5) Environment and CC: Agricultural biodiversity, Soil Health
GIIN	IRIS+	An impact measurement system with 18 impact categories, each with a large number of corresponding indicators. The impact categories are: (1) Agriculture; (2) Air; (3) Biodiversity & Ecosystems; (4) Climate; (5) Diversity & Inclusion; (6) Education; (7) Employment; (8) Energy; (9) Financial Services; (10) Real Estate; (11) Land; (12) Oceans & Coastal Zones; (13) Pollution; (14) Waste; (15) Water; (16) Cross Category (e.g. anti-discrimination policy, after-sale client support); (17) Infrastructure; (18) Health
Gliessman S (2016)	Gliessman S (2016)	A framework with 5 levels of food system changes which serve as a roadmap for transforming the global food system. Level 1: Increase the efficiency of industrial and conventional practices in order to reduce the use and consumption of costly, scarce, or environmentally damaging inputs Level 2: Substitute alternative practices for industrial/conventional inputs and practices Level 3: Redesign the agroecosystem so that it functions on the basis of a new set of ecological processes Level 4: Re-establish a more direct connection between those who grow our food and those who consume it Level 5: On the foundation created by the sustainable farm-scale agroecosystems achieved at Level 3, and the new relationships of sustainability of Level 4, build a new global food system, based on equity, participation, democracy, and justice, that is not only sustainable but helps restore and protects earth's life support systems upon which we all depend
Global Alliance for Improved Nutrition (GAIN) and Johns Hopkins University	Food Systems Dashboard	Over 150 indicators across 7 top level areas: (1) Drivers (e.g. Environment and CC, globalization & trade, urbanization, socio-cultural cont.) (2) Food supply chains (e.g. storage and distribution) (3) Food environments (e.g. food availability, affordability, food messaging) (4) Individual factors (e.g. economic, situational, cognitive, aspirational) (5) Consumer behavior (6) Diets and nutrition (e.g. dietary intake, food security, noncommunicable diseases) (7) Environment (environmental measured at production/consumption levels)
Global Alliance for the Future of Food	PRINCIPLES FOR FOOD SYSTEMS TRANSFORMATION: A FRAMEWORK FOR ACTION	P1 - RENEWABILITY: Address the integrity of natural and social resources that are the foundation of a healthy planet and future generations in the face of changing global and local demands P2 - RESILIENCE: Support regenerative, durable, and economically adaptive systems in the face of a changing planet P3 - HEALTHFULNESS: Advance the health and well-being of people, animals, the environment, and the societies that depend on all three. P4 - EQUITY: Promote sustainable livelihoods and access to nutritious and just food systems for all P5 - DIVERSITY: Value our rich and diverse agricultural, ecological, and cultural heritage P6 - INCLUSION: Ensure meaningful and authentic engagement of diverse people and organizations in transparent deliberations, shared power, democratic decisions, and

		collective actions affecting food systems for the public good P7 - INTERCONNECTEDNESS: Understand the implications of the interdependence of food, people, and the planet in a transition to more sustainable food systems
HLPE (2019)	Report: Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition	Report lists 14 agroecological principles for achieving sustainable food systems: (1) Regenerative production; (2) Recycling and efficiency; (3) Diversity; (4) Synergy (managing interactions): (5) Animal health and welfare; (6) Diversity; (7) Integration; (8) Climate change adaptation and mitigation; (9) Knowledge production and dissemination; (10) Cultural coherence; (11) Human and social values; (12) Connectivity; (13) Governance; (14) Empowerment; (15) Participation
International Union for Conservation of Nature (IUCN)	Core principles for successfully implementing and upscaling Nature-based Solutions	Principle 1: NbS embrace nature conservation norms (and principles) Principle 2: NbS can be implemented alone or in an integrated manner with other solutions to societal challenges (e.g., technological and engineering solutions) Principle 3: NbS are determined by site-specific natural and cultural contexts that include traditional, local and scientific knowledge Principle 4: NbS produce societal benefits in a fair and equitable way in a manner that promotes transparency and broad participation Principle 5: NbS maintain biological and cultural diversity and the ability of ecosystems to evolve over time Principle 6: NbS are applied at a landscape scale Principle 7: NbS recognize and address the trade-offs between the production of a few immediate economic benefits for development, and future options for the production of the full range of ecosystem services. Principle 8: NbS are an integral part of the overall design of policies, and measures or actions, to address a specific challenge
IUCN (2020)	Global Standard for Nature-based Solutions (NbS)	The Standard consists of 8 inter-connected criteria and 28 indicators: Criteria 1: Societal challenges (i.e. ident. societal challenge to which the NbS is a response) Criteria 2: Design at scale (i.e. responding to the scale of the issue) Criteria 3: Biodiversity net-gain (i.e. environmentally sustainable solution) Criteria 4: Economic feasibility (i.e. economically viable solution) Criteria 5: Inclusive governance (i.e. socially equitable solution) Criteria 6: Balance trade-offs Criteria 7: Adaptive management Criteria 8: Mainstreaming and sustainability
Mahon et al (2018)	Towards a broad-based and holistic framework of Sustainable Intensification indicators	A Social-Ecological Systems (SESs) framework that has 7 interacting subsystems, each with a set of indicators (1) "Resource System" subsystem (indicator e.g. farm size, ag productivity) (2) "Resource Unit" subsystem (indicator e.g. Soil organic matter, Farmland bird numbers) (3) "Governance" subsystem (indicator e.g. Presence of subsidies to encourage more environmentally sensitive farming) (4) "Resource Users" subsystem (indicator e.g. Number of people in agricultural employment, Educational level of famers) (5) "Interactions" subsystem (indicator e.g. Quantity of fertilizers used per hectare, Extent of farm mechanization) (6) "Outcomes" sub-system (e.g. yield, farmer income) (7) "Environment" subsystem (e.g. Trends in agricultural output prices)
Olam	2 out of 4 KEY TRENDS TO INFORM OLAM'S STRATEGIC CHOICES UP TO 2024 + AtSource	P01: Right-for-me (consumer): Healthy eating, Customization, Premiumization, Authenticity, Natural ingredients (flavor, color), Cool / niche brands. P02: Right-for-the-planet & Right-for-the-producer: Environmental concerns, (planetary boundaries), Social equity, Assurance (certification), Supply chain provenance & traceability, Direct link to producer. PROSPEROUS FARMERS & FARMING SYSTEMS P1: Economic Opportunity: Farmers and people engaged in the agri and food production system can earn a decent income and are resilient to external shocks. P2: Safe & Decent Work: Provide and support safe workplaces that respect the rights of everyone. THRIVING COMMUNITIES

		P3: Education & Skills: Farming communities and our workforce can improve their technical and vocational skills P4: Nutrition & Health: Improve farmer and employee wellness and longevity. P5: Diversity & Inclusion: All people are socially and economically empowered. REGENERATING THE LIVING WORLD P6: Climate Action: Reduce, mitigate and adapt to the impacts of changing weather patterns. P7: Healthy Ecosystems: Support and encourage biodiversity and effective land use. P8: Healthy Soils: Protect soil and help restore degraded land. P9: Water: Reduce water usage while improving yields. P10: Reduce Waste: Feed more people and increase farmer incomes by reducing food waste.
PROCISUR	Key variables for evaluating the sustainability of agricultural systems	1. Dependence on external inputs; 2. Ecological efficiency; 3. Social equity; 4. State of natural resources; 5. Environmental impact; 6. Social Inclusion; 7. Innovation; 8. Productivity; 9. Profitability Subdimensions were also considered, though they are not listed in this Annex.
Rabobank	Banking for Food	P1: Increasing the availability of food: To produce 60% more food sustainably, primary producers need to increase yields with less inputs: produce more food from stable amounts of arable land, with less water spilling and fewer fertilizers. At the same time, companies throughout the food supply chain need to significantly reduce food loss, food waste and emissions. So, productivity and efficiency need to improve. This can be achieved by better leveraging existing knowledge and technologies and stimulating innovations such as genomics, precision agriculture and bio-based approaches. P2: Improving access to food: Raising availability of food alone is not enough. People need to have economic and physical access to it. This is determined by factors such as the level of disposable income and food prices and the availability and quality of infrastructure. Major investments are needed to improve transport, logistics and distribution, particularly in developing economies, to make sure consumers have physical access to affordable food. P3: Promoting balanced, healthy nutrition: It's not even enough to increase agricultural output, affordability and distribution, food also has to be safe and nutritious. While food quality and food safety continue to improve, undernourishment and overnourishment occur alongside each other throughout the world. Diverse and balanced diets are vital to cover nutritional requirements. Education and information on healthy nutrition and the handling, preparing and storing of food are essential. P4: Increasing stability: Stability is key to realize sustainable access to nutritious and safe food. Price and supply volatility of agricultural products and food can have a major impact on food security. For consumers who spend a large portion of their income on food, high food prices can lead to increased poverty and hunger. On the supply side, price fluctuations result in significant changes in revenues for producers from year to year and deferred or suboptimal investment decisions. In effect, consumers, farmers, processing businesses and food retailers all benefit from predictable stable markets.
Sayer et al (2013)	Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses	P1: Continual learning and adaptive management P2: Common concern entry point (i.e. solutions to problems need to be built on shared negotiation processes based on trust) P3: Addressing multiple scale impacts (i.e. an awareness of higher and lower level processes like feedback loops and synergies can improve local interventions, inform higher-level policy and governance, and help coordinate administrative entities) P4: Multifunctionality (i.e. landscape provide a diverse range of values, goods, and services which must be addressed in a spatially explicit and ecosystem-driven manner that reconciles stakeholders' multiple needs, preferences, and aspirations) P5: Involvement of multiple stakeholders P6: Negotiated and transparent change logic P7: Clarification of rights and responsibilities P8: Participatory and user-friendly monitoring P9: Resilience (i.e. actions need to be promoted that address threats and that allow recovery after perturbation through improving capacity to resist and respond) P10: Strengthened stakeholder capacity
Society Inside	Principles for Responsible Innovation	P1: Deliver social, environmental & economic benefit; P2: Evaluate risks and wider impacts; P3: Involve people; P4: Demonstrate radical transparency; P5: Embrace good governance; P6: Welcome warnings (i.e. ??)

Standards Advisory Council (SAC)	B Impact Assessment	1. Governance; 2. Workers; 3. Community; 4. Environment
Sustainable Agriculture Network (SAN)	Sustainable Agriculture Framework (SAF)	Ten IMPACT AREAS with associated Sustainability Goals and Indicators that guide the transition to sustainable agriculture: (1) Sustainable management of agricultural and livestock operations (2) Biodiversity conservation and management (3) Conservation and management of natural resources (4) Crop protection and agrochemicals management (5) Protection of workers' rights (6) Occupational Health & Safety (7) Wellbeing of workers and their families (8) Wellbeing of rural communities (9) Sustainable livestock production (10) Climate change mitigation and adaptation
Tata Chemicals		P1 : Integrate sustainability considerations into business decisions and key work processes, with the aim of creating value, mitigating future risks and maximizing opportunities. P2: Follow highest standards of governance and transparency. P3: Embody principles of product stewardship by enhancing health, safety, environmental and social impacts of products and services across their lifecycles P4: Provide employees and business associates with working conditions that are clean, safe, healthy and fair. P5: Strive to be neighbor of choice in the communities in which we operate and contribute to their equitable and inclusive development.
UN	Principles for Responsible Investment	P1: Incorporate ESG issues into investment analysis and decision-making processes P2: Incorporate ESG issues into ownership policies and practices P3: Seek appropriate disclosure on ESG issues by the entities in which we invest P4: Promote acceptance and implementation of the Principles within the investment industry P5: Work to enhance our effectiveness in implementing the Principles P6: Report on activities and progress towards implementing the Principles
USAID Feed the Future	Sustainable Intensification Assessment Framework	Five high-level domains, each domain has its own indicators: Domain 1 Productivity - Indicators e.g. Crop productivity, animal productivity Domain 2 Economic - Indicators e.g. Profitability, Variability of profitability Domain 3 Environmental - Indicators e.g. Vegetation cover, Plant biodiversity Domain 4 Human - Indicators e.g. nutrition, food security, health Domain 5 Social - Indicators e.g. gender equity, social cohesion
World Benchmarking Alliance	Food and Agriculture Benchmark	The Benchmark has 4 measurement areas, each with its own set of indicators, against which a company's performance is scored. A scoring guideline is provided for each indicator - some are quantitative, some qualitative. Area 1: Governance & strategy (Sust dev strategy, Governance and accountability for sust dev, Stakeholder engagement) Area 2: Environment (GHG emissions, Protection of terrestrial natural ecosystems, Sustainable fishing and aquaculture, Protein diversification, Soil health and agrobiodiversity, Fertilizer and pesticide use, Water use, Food loss and waste, Plastic use and packaging waste, Animal welfare, Antibiotic use and growth-promoting substances) Area 3: Nutrition (e.g. Availability of healthy foods) Area 4: Social inclusion
World Wildlife Fund (WWF)	ESG Integration Indicators	INDICATORS to assess whether investor is focused on responsible/sustainable investments: (1) Sustainability strategy and stakeholder engagement (2) Participation in sustainable finance initiatives and policy advocacy with regulators (3) Public statements on specific ESG issues (4) Public statements on specific sectors (5) Assessing ESG risks in client & transaction approvals (6) Client monitoring and engagement (7) Responsibilities for ESG (8) Staff E&S training and performance evaluation (9) ESG integration in products and services

		(10) ESG risk assessment and mitigation at portfolio level (11) Disclosure of ESG risk exposure and targets
INNOVATION PROCESS PRINCIPLES *(some principles from above are repeated were applicable)*		
ACIAR	Planning for Innovation	The ACIAR project proposal template asks teams to summarize intended project outcomes—the changes to knowledge systems or practices that the project intends to contribute to during the project. Specifically, we ask proponents to tell us: If the project is successful, who is going to be able to do what differently? We then ask them to expand on this under three headings: • Scientific achievements: What will we know or be able to do that we don't know or can't do now? What future research and innovation will this enable? • Capacity built: Who will be able to do what differently? • Next users and innovation enabled: Who (excluding the project team) do you expect will do what differently and what value will this create?
Australian Council for International Development (ACFID)	Principles and guidelines for ethical research and evaluation in development	P1: Respect for human beings (people's right to exercise autonomy) P2: Beneficence (i.e. the expected benefit to participants justifies any risks of harm or discomfort to them) P3: Research merit and integrity P4: Justice (i.e. equitable participation and benefit from research)
Barilla	Fixing the Business of Food	P1: Beneficial products and strategies (i.e. business contributions to healthy and sustainable dietary patterns); P2: Sustainable business operations and processes; P3: Sustainable supply and value chains; P4: Good corporate citizenship (including lobbying)
Bayer/Cropscience		P1: Product Stewardship: For us, product stewardship means that our products satisfy the highest quality standards and are safe for people, animals and the environment when properly used. Not only do the desired properties of substances and products need to be taken into consideration but also the possible risks for people and the environment. We respect legal requirements, and our voluntary commitment and internal standards go beyond these in a variety of areas. P2: Care for crops: Every farm is different, and every field within a successful farming operation is unique. As a result, every solution should be tailored to meet the needs of the individual farmer and their specific field—from the right seeds and traits to the correct type and amount of crop protection to the digital tools and services that inform good decision making. ForwardFarming demonstrates a holistic, tailored approach for healthy crops, harvests and ecosystems. P3: Care for human health and the environment: ForwardFarming promotes and demonstrates proactive stewardship to protect human health and preserve the environment. Examples include: addressing the safe and responsible use of crop protection products; soil health, biodiversity, and water conservation; and offering training in all of these areas. P4: Care for partnerships: Bayer FowardFarming partners with food and value chain participants, research centers and universities, and industry leaders to create space for dialogue and demonstration – connecting farmers with the communities around and beyond. SET OF PRINCIPLES/GUIDING TERMS IN FORWARD FARMING BROCHURE ALSO LEADING TO SPECIFIC METRICS: P5: "Producing more with less: Smart farming helps farmers maximize their yields through agronomic best practices while reducing the amount of resources needed" [Precision Agriculture] P6: "Safety first: Regular training, applying products with caution and using adequate safety equipment is always the best approach"; Food safety; Operator Safety P7: "Biodiversity: Encouraging practices like crop rotation and cover cropping, creating flower strips, refuges, bird nesting aids and insect hotels helps build an agro-environment rich in biodiversity" P8: "Bee care and bee safety: Controlling the Varroa mite, planting flower strips and applying crop protection products in a way that minimizes exposure to bees are just a few measures to protect pollinators" P9: "Water preservation: Efficient water management, establishment of buffer strips and on-farm wastewater management are good examples to follow."
Blended Finance Taskforce	Better Finance, Better Food	Nine proposed principles for investing in the food and land use system: P1: Financing production of lower-carbon and more nutritious food P2: Promoting resource efficiency and regenerative farming methods

		P3: Conserving and restoring natural capital P4: Contributing to development and poverty reduction P5: Transforming sustainable and transparent food value chains P6: Providing improved risk scores to companies that have strong science-based targets – especially for biodiversity – and that integrate climate resilience, nutrition and health outcomes and inclusion into their corporate strategies P7: Zero deforestation supply chains P8: Zero tolerance for environmental crime P9: Zero tolerance for land grabbing or exploitation
CCAFS/FCDO (Akshay Duda)	Innovation Research - End-to-end evidence review presentation	Eight core principles that define success for E2EI (end-to-end innovation) (1) E2EI should follow an open innovation model incorporating both external and internal learning and sharing core insights to the broadest audience (2) E2EI should integrate across the innovation pipeline linking activities from foundational science to delivery within a single institutional framework (3) E2EI must be conducted with line of sight from research investments through to development impacts based on a clear theory of change (4) E2EI must put end-users in the research and development process and provide feedback between end users and the generators of new technology (5) E2EI must focus on rapid testing and attritional management (6) E2EI must use metrics of success and institutional incentives linked to downstream deployment at scale, not the generation of knowledge (7) E2EI must foster institutional capacity and capability focused on delivery, having the right people and partnerships (8) E2EI must be able to integrate into national innovation systems and operate with organizations linked to end or next users
Committee on World Food Security	Voluntary Guidelines on Food Systems and Nutrition	P1: Transparent, Democratic and Accountable Governance P2: Sustainable Food Supply Chains to through sustainable food systems to Achieve Healthy Diets in the Context of Economic, Social and Environmental Sustainability, and CC P3: Equal and Equitable Access to Healthy Diets Through Sustainable Food Systems P4: Food Safety Across Sustainable Food Systems P5: People-Centered Nutrition Knowledge, Education and Information P6: Gender Equality and Women's Empowerment Across Food Systems P7: Resilient Food Systems in Humanitarian Contexts
COP26 Transforming Agricultural Innovation Campaign Steering Group	COP26 Principles for Transforming Innovation	P1: Alignment - aligning innovation priorities with current needs and opportunities across key areas – including nature, adaptation and resilience, and mitigation – and working on a set of shared standards, investments and incentives will allow to shift the dial on agricultural innovation at global level; P2: Integration - developing integrated institutional frameworks across the innovation pipeline will better link foundational science to delivery and shift research objectives to concrete developments impacts and downstream deployment at scale; P3: Demand-driven, end-to-end - fostering demand-driven approaches working across the innovation system for agriculture, and putting end-users at the center of the research and development process will address concrete needs, and ensure societal outcomes at scale; P4: Partnership and collaboration - addressing fragmentation among research institutions and donors, fostering partnerships and collaboration across the innovation ecosystem and adopting an open innovation model will be key to breaking silos and rethinking innovation processes from the ground up; P5: Contribution to international commitments - future proof agricultural innovation will help achieve international commitments and agendas – including the SDGs, the Paris Agreement under the UNFCCC, and the Convention on Biological Diversity.
DFID	Ethical guidance for research, evaluation and monitoring activities	P1: Seek to maximize benefit and minimize harm P2: Respect people's rights and dignity P3: Act with honesty, competence and accountability P4: Deliver work of integrity and merit
Equator Principles Association	Equator Principles	P1: Review and categorization (i.e. place projects into Categories A/B/C depending on size of potential environmental or social impacts) P2: Environmental and social assessment P3: Applicable environmental and social standards (i.e. comply with host country's laws and regulations)

		P4: Develop and implement an Environmental and Social Management System and Equator Principles action plan . P5: Stakeholder engagement P6: Establish grievance mechanisms P7: Independent review of project (by an Independent Environmental and Social Consultant) P8: Incorporation of covenants (linked to compliance) P9: Independent monitoring and reporting (by ab external expert) P10: Reporting and transparency (as per EP reporting requirements)
FAIRR	Coller FAIRR Protein Producer Index	P1: GHG emissions; P2: Deforestation & Biodiversity Loss; P3: Water Use & Scarcity; P4: Waste & Pollution; P5: Antibiotics; P6: Working Conditions; P7: Animal Welfare; P8: Food Safety; P9: Governance; P10: Sustainable Proteins
FAO	Principles for Responsible Investment in Agriculture and Food Systems	P1: Contribute to food security and nutrition P2: Contribute to sustainable and inclusive economic development and the eradication of poverty P3: Foster gender equality and women's empowerment P4: Engage and empower youth P5: Respect tenure of land, fisheries, and forests, and access to water P6: Conserve and sustainably manage natural resources, increase resilience, and reduce disaster risks P7: Respect cultural heritage and traditional knowledge, and support diversity and innovation P8: Promote safe and healthy agriculture and food systems P9: Incorporate inclusive and transparent governance structures, processes, and grievance mechanisms P10: Assess and address impacts and promote accountability
Gliessman S (2016)	Gliessman S (2016)	A framework with 5 levels of food system changes which serve as a roadmap for transforming the global food system. Level 1: Increase the efficiency of industrial and conventional practices in order to reduce the use and consumption of costly, scarce, or environmentally damaging inputs Level 2: Substitute alternative practices for industrial/conventional inputs and practices Level 3: Redesign the agroecosystem so that it functions on the basis of a new set of ecological processes Level 4: Re-establish a more direct connection between those who grow our food and those who consume it Level 5: On the foundation created by the sustainable farm-scale agroecosystems achieved at Level 3, and the new relationships of sustainability of Level 4, build a new global food system, based on equity, participation, democracy, and justice, that is not only sustainable but helps restore and protects earth's life support systems upon which we all depend
Global Alliance for the Future of Food	PRINCIPLES FOR FOOD SYSTEMS TRANSFORMATION: A FRAMEWORK FOR ACTION	P1 - RENEWABILITY: Address the integrity of natural and social resources that are the foundation of a healthy planet and future generations in the face of changing global and local demands P2 - RESILIENCE: Support regenerative, durable, and economically adaptive systems in the face of a changing planet P3 - HEALTHFULNESS: Advance the health and well-being of people, animals, the environment, and the societies that depend on all three. P4 - EQUITY: Promote sustainable livelihoods and access to nutritious and just food systems for all P5 - DIVERSITY: Value our rich and diverse agricultural, ecological, and cultural heritage P6 - INCLUSION: Ensure meaningful and authentic engagement of diverse people and organizations in transparent deliberations, shared power, democratic decisions, and collective actions affecting food systems for the public good P7 - INTERCONNECTEDNESS: Understand the implications of the interdependence of food, people, and the planet in a transition to more sustainable food systems
Global Innovation Fund (GIF)	Practical Impact: GIF's approach to impact measurement	P1: Forecast the impact of prospective investments and use this information to guide investment decisions. P2: Track project performance and impact during implementation, using real time information to adapt and adjust as necessary. P3: Evaluate investments after their completion to better understand how investments

		fared (and why), using this evidence to guide future GIF decisions; and inform decisions made by other development partners.
HLPE (2019)	Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition	Report lists 14 agroecological principles for achieving sustainable food systems: (1) Regenerative production; (2) Recycling and efficiency; (3) Diversity; (4) Synergy (managing interactions); (5) Animal health and welfare; (6) Diversity; (7) Integration; (8) Climate change adaptation and mitigation; (9) Knowledge production and dissemination; (10) Cultural coherence; (11) Human and social values; (12) Connectivity; (13) Governance; (14) Empowerment; (15) Participation
International Development Innovation Alliance (IDIA)	IDIA's Principles for Development Innovation	P1: Promote inclusive innovation; P2: Invest in locally-driven solutions; P3: Take intelligent risks; P4: Use evidence to drive decision-making; P5: Learn quickly and iterate; P6: Facilitate collaboration and co-operation; P7: Identify scalable solutions; P8: Iterate proven innovations
International Union for Conservation of Nature (IUCN)	Core principles for successfully implementing and upscaling Nature-based Solutions	Principle 1: NbS embrace nature conservation norms (and principles) Principle 2: NbS can be implemented alone or in an integrated manner with other solutions to societal challenges (e.g., technological and engineering solutions) Principle 3: NbS are determined by site-specific natural and cultural contexts that include traditional, local and scientific knowledge Principle 4: NbS produce societal benefits in a fair and equitable way in a manner that promotes transparency and broad participation Principle 5: NbS maintain biological and cultural diversity and the ability of ecosystems to evolve over time Principle 6: NbS are applied at a landscape scale Principle 7: NbS recognize and address the trade-offs between the production of a few immediate economic benefits for development, and future options for the production of the full range of ecosystem services. Principle 8: NbS are an integral part of the overall design of policies, and measures or actions, to address a specific challenge
IUCN	Species Threat Abatement and Restoration (STAR) Metric	The STAR metric quantifies the potential contribution of specific threat abatement and habitat restoration actions, or the sum contribution of multiple actions, to reducing extinction risk. The higher the score, the higher the potential to reduce extinctions. E.g. of actions and scores: - annual and perennial non-timber crop production: 24.5% - logging and wood harvesting: 16.4%
IUCN (2020)	Global Standard for Nature-based Solutions (NbS)	The Standard consists of 8 inter-connected criteria and 28 indicators: Criteria 1: Societal challenges (i.e. ident. societal challenge to which the NbS is a response) Criteria 2: Design at scale (i.e. responding to the scale of the issue) Criteria 3: Biodiversity net-gain (i.e. environmentally sustainable solution) Criteria 4: Economic feasibility (i.e. economically viable solution) Criteria 5: Inclusive governance (i.e. socially equitable solution) Criteria 6: Balance trade-offs Criteria 7: Adaptive management Criteria 8: Mainstreaming and sustainability
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Principles for Digital Development Forum	Principles for Digital Development	P1: Design with the user (get to know and co-create with end user) P2: Understand the existing ecosystem (ecosystem here means geographic/social context) P3: Design for scale P4: Build for sustainability (sustainability here refers to uninterrupted funding/revenue generation) P5: Be data driven P6: Use Open Standards, Open Data, Open Source, and Open Innovation P7: Reuse and improve (i.e. build on the work or others instead of re-inventing the wheel) P8: Address privacy and security P9: Be collaborative (i.e. share info, insights, strategies and resources across projects, organizations and sectors)
Sayer et al (2013)	Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses	P1: Continual learning and adaptive management P2: Common concern entry point (i.e. solutions to problems need to be built on shared negotiation processes based on trust) P3: Addressing multiple scale impacts (i.e. an awareness of higher and lower level processes like feedback loops and synergies can improve local interventions, inform higher-level policy and governance, and help coordinate administrative entities) P4: Multifunctionality (i.e. landscape provide a diverse range of values, goods, and services which must be addressed in a spatially explicit and ecosystem driven manner that reconciles stakeholders' multiple needs, preferences, and aspirations) P5: Involvement of multiple stakeholders P6: Negotiated and transparent change logic P7: Clarification of rights and responsibilities P8: Participatory and user-friendly monitoring P9: Resilience (i.e. actions need to be promoted that address threats and that allow recovery after perturbation through improving capacity to resist and respond) P10: Strengthened stakeholder capacity
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CoSAI
Commission on Sustainable Agriculture Intensification

The Commission on Sustainable Agriculture Intensification (CoSAI) brings together 21 Commissioners to influence public and private support to innovation in order to rapidly scale up sustainable agricultural intensification (SAI) in the Global South.

For CoSAI, innovation means the development and uptake of new ways of doing things – in policy, social institutions and finance, as well as in science and technology.

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