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UNIVERSITY  
**UNU-FLORES**  
Institute for Integrated Management  
of Material Fluxes and of Resources



UNITED NATIONS  
FOOD SYSTEMS  
SUMMIT 2021



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# UN Environment Management Group

## Nexus Dialogues



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### The Background

The current world is afflicted with crises which affect the integrity of our food systems' sustainability, including its capability to provide nutritional and quality foods, decent livelihood opportunities, and the biological diversity's capacity to produce renewable, ecological yield. The crises are myriad and nuanced, with unclear triggers and trajectories – ranging from land-use agricultural production, to food processing, through waste management. However, its socioeconomic impacts are clear. Transforming global food systems has the potential to guarantee a just society that would address human health, reduce environmental pollution, and secure fundamental rights for communities. Investing in food systems' transformation has the notable advantage being *self-perpetuating*, further enhancing its resilience for intergenerational equity<sup>1</sup>.

Resilient food systems are embedded within the 2030 Agenda and the Sustainable Development Goals ("SDGs"), throughout the CBD Secretariat's Aichi Biodiversity Targets<sup>2</sup>, and Post-2020 Global Biodiversity Framework<sup>3</sup>, UNCCD's Land Degradation Neutrality Framework<sup>4</sup> and UNFCCC's Koronivia Joint Work on Agriculture<sup>5</sup>. As a result, they influence the successful achievement of poverty eradication (1), zero hunger (2), water and sanitation (6), energy (7), industry (9), reduced inequalities (10), sustainable cities (11), sustainable consumption and production (12), climate action (13), life below water (14), and life on land (15).

<sup>1</sup> Brundtland, G. (1987). Report of the World Commission on Environment and Development: Our Common Future. United Nations General Assembly document A/42/427.

<sup>2</sup> CBD Secretariat (2020). Aichi Biodiversity Targets, <https://www.cbd.int/sp/targets/>

<sup>3</sup> CBD Secretariat (2020). Post-2020 Biodiversity Framework, <https://www.cbd.int/conferences/post2020>

<sup>4</sup> UNCCD (2017). Scientific Conceptual Framework for Land Degradation Neutrality. A Report of the Science-Policy Interface. UNCCD, Bonn, Germany. [https://www.unccd.int/sites/default/files/documents/2019-06/LDN\\_CF\\_report\\_web-english.pdf](https://www.unccd.int/sites/default/files/documents/2019-06/LDN_CF_report_web-english.pdf)

<sup>5</sup> UNFCCC (2018). Koronivia joint work on agriculture. Subsidiary Body for Scientific and Technological Advice, 48<sup>th</sup> Session, FCCC/SB/2018/L.1 [https://unfccc.int/sites/default/files/resource/l01\\_2.pdf](https://unfccc.int/sites/default/files/resource/l01_2.pdf)



## Food System Resilience in the 2030 Agenda

**Resilient and Sustainable Food Systems** are connected to every facet of the 2030 Agenda, either through primary, secondary, or tertiary system connections – and are, therefore, a *Nexus* of economic, social, and environmental development. Because of the broad, multi-level impacts of food systems, we believe that focusing on **Integrated Natural Resource Management (“INRM”)**, as a high-impact leverage point can expedite and optimize the effect that food has on a variety of environmental and socioeconomic impacts, such as poverty, health, ecosystem integrity, industry, etc.

**A few exemplary connections are delineated.**

### Poor Food Systems → Poor Ecosystem Integrity

Currently, an estimated 821 million people are currently undernourished, representing the failings of the global food system<sup>6</sup>. Food systems are under the simultaneous pressure of environmental change (e.g., land degradation, biodiversity loss, and changes in climate/weather), and non-climate stressors (e.g., population/income growth, and demand for animal-sourced products<sup>7</sup>). On the causal side, food systems may negatively affect the environment by depleting natural resources, and polluting both surface and groundwater, with pesticides and chemical fertilizer<sup>8</sup>. **INRM can support the sustainable yield of food systems, in particular within the ecosystem and biosphere’s capacity for renewal.**

### Poor Food Systems → Poor WASH Management → Poor Health & Nutrition

Food systems are dependent on water resource management, with inadequate water supply and sanitation, being inextricably linked to poverty. For example, poor sanitation practices can produce untreated wastewater which cause water quality changes (e.g., in lakes, rivers, oceans), damaging aquatic food sources, exacerbating food insecurity and malnutrition<sup>9,10</sup>. Food security relies on water security, and the provision of water, sanitation, and hygiene (“WASH”) services particularly in impoverished communities. **INRM, with a focus on water resources management, can meet the needs of a global population<sup>11</sup> by ensuring the fundamental safety and integrity of life below water.**

<sup>6</sup> FAO, IFAD, UNICEF, WFP and WHO (2018). [The State of Food Security and Nutrition in the World 2018](#).

<sup>7</sup> Mbow et al (2019): Food Security. In: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems

<sup>8</sup> Mateo-Sagasta, J.; Marjani Zadeh, S.; Turrall, H. 2018. More people, more food, worse water? a global review of water pollution from agriculture. Rome, Italy: FAO. 225p.

<sup>9</sup> [https://www.who.int/water\\_sanitation\\_health/diseases-risks/diseases/malnutrition/en/](https://www.who.int/water_sanitation_health/diseases-risks/diseases/malnutrition/en/)

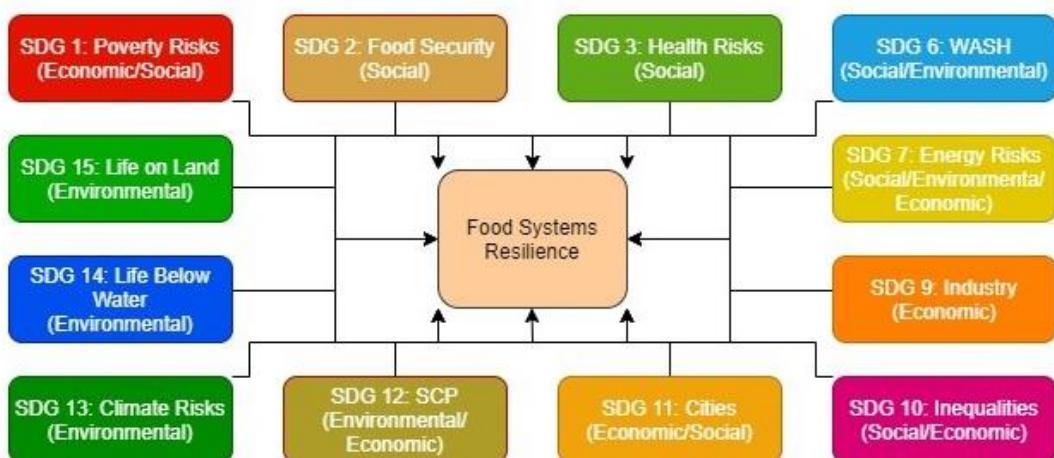
<sup>10</sup> Asian Development Bank (ADB), 2014. "Economic Costs of Inadequate Water and Sanitation: South Tarawa, Kiribati," ADB Reports RPT146428-2, Asian Development Bank (ADB), revised 15 Jul 2014.

<sup>11</sup> [Science for Environment Policy In-depth Report: Sustainable food](#). Report produced for the European Commission DG Environment, November 2013.



## Poor Food Systems → Poor Productivity → Poor Economy / Higher Poverty

Food insecurity leads to mal-/under-nutrition, which has adverse effects on the physiological and mental capacity of individuals<sup>12</sup>. Malnutrition and poverty are mutually-reinforcing, creating a vicious cycle that hampers productivity levels, exacerbating countries' poverty levels<sup>13</sup>. Failing to address undernutrition continue to yield significant losses in potential, in both humans and economies. Poverty, along with socio-economic and political marginalization, disenfranchises women, children and the elderly with regard to climate change and food insecurity<sup>7</sup>. INRM can reduce trade-offs, increase productivity, food security, and a better quality of life for all – in order to help achieve not short-term relief, but rather - long-term sustainability.



Therefore, Food System Resilience underpin the 2030 Agenda and the SDGs – committing to *leave no one behind*. In the long-term, and the knowledge and implementation of INRM will increase the ability of agri-food and forest systems to (i) ensure supply of goods (e.g., food, fodder, fibre, wood, and bio-energy) and ecosystem services (e.g., store, filter and transform nutrients, substance, and water, biodiversity and carbon pool) that human benefits from and significantly rely on, (ii) preserve natural resources that are non-renewable (soil and water), and (iii) enlarge social and economic benefits by reducing environmental costs and impacts.

## Rationale

In 2021, UN Secretary-General António Guterres will convene a Food Systems Summit as part of the Decade of Action to achieve the Sustainable Development Goals ("SDGs") by 2030 with the intention of inducing collaborative efforts to *Build Back Better*<sup>14</sup>, and transform the way society produces, consumes, and considers food, especially in light of the COVID-19 pandemic revealing the sharp inequalities within the agricultural food system, and the risks of zoonotic diseases deriving from unsafe

<sup>12</sup> Alemu, E. A. (2019). Malnutrition and its implications on food security. In W. Leal Filho, A. M. Azul, L. Brandli, P. G. Özuyar, & T. Wall (Eds.), Zero Hunger (pp. 1–10). Cham: Springer International Publishing.

<sup>13</sup> Siddiqui et al. (2020). The intertwined relationship between malnutrition and poverty.

<sup>14</sup> World Food Programme (2021). UN Food Systems Summit 2021,

<https://docs.wfp.org/api/documents/48fdf4ecae6d44a68f36f4c23a56c32d/download/>



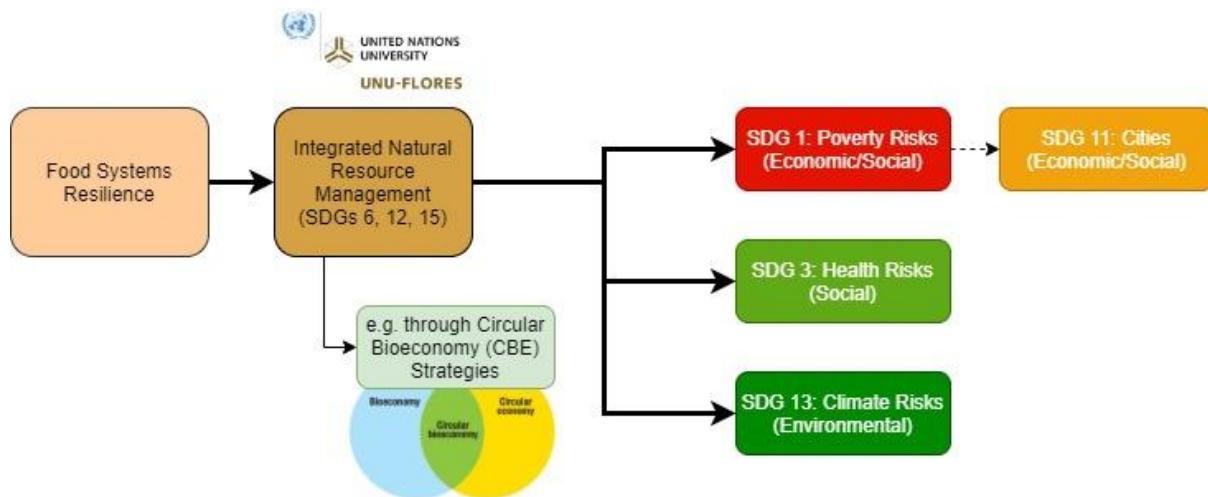
food practices. The Summit supports nutrient-rich Food Systems Dialogues, one of the five priority workstreams, which provides an opportunity to engage multi-level stakeholders (including governments, communities, academia, etc.) in discussing food systems and identifying ways to improve their resilience – especially against future pandemics and other crises.

Against this background, the UN Environment Management Group (“EMG”), in close collaboration with UNU Institute for Integrated Management of Material Fluxes and of Resources (“UNU-FLORES”) will organize a **Food System Resilience through Integrated Natural Resource Management** (7 June 2021) Nexus Dialogue as an independent dialogue of the Food System Summit, respecting the three key features<sup>15</sup>: respectful of the Summit’s three principles of engagement; featuring structured conversations among stakeholder groups with different perspectives; and contribute to the Summit.

In recognizing that food systems are simultaneously the cause- and effect of layered variables and interactions, the Nexus Dialogue seeks to investigate the accelerating effect of *Integrated Natural Resource Management* (“INRM”), underlined by Donella Meadows’ systems-thinking framework for leverage points<sup>16</sup>. A leverage point is a place in a system’s structure where a solution can be applied.

- *Low impact leverage point* is when a small change triggers a small change in system behaviour.
- *High impact leverage point* is when a small change triggers a large change in system behaviour.

Arguably, INRM is a high impact leverage point which expedites the beneficial effect of resilient food systems on socioeconomic and environmental wellbeing. With the aim of detangling complexity, the Dialogue will focus on INRM’s impact, enhanced through *Circular Bioeconomy* (“CBE”) strategies<sup>17</sup>, on reducing the risks of Poverty (including in sustainable cities), Health, and Climate.



<sup>15</sup> [https://www.un.org/sites/un2.un.org/files/unfss\\_independent\\_dialogues\\_guide\\_021621.pdf](https://www.un.org/sites/un2.un.org/files/unfss_independent_dialogues_guide_021621.pdf)

<sup>16</sup> Meadows, D. (1999). Leverage Points: Places to Intervene in a System, The Sustainability Institute.

[http://donellameadows.org/wp-content/userfiles/Leverage\\_Points.pdf](http://donellameadows.org/wp-content/userfiles/Leverage_Points.pdf)

<sup>17</sup> FAO. (2021) Aspirational principles and criteria for a sustainable bioeconomy. Rome

<http://www.fao.org/3/cb3706en/cb3706en.pdf>

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## INRM for SDG 1 (Poverty Risks) and SDG 11 (Sustainable Cities)

*Food Systems Resilience, when enhanced with INRM and Circular Bioeconomy, highly accelerates efforts to reduce Poverty Risks and Sustainable Cities.*

Food systems are increasingly pressured to produce sufficient food for the global population, buffer the environmental impacts of production, and adapt to climate change. The COVID-19 pandemic has aggravated the situation, exacerbating inequalities, particularly for the rural poor confronting acute challenges<sup>18</sup>. Food systems, when enhanced with INRM strategies that address the interconnections of water, energy, and food resources, could improve overall system resilience, e.g., through improving soil and land productivity, encouraging ecological renewability, and integrating equity/social justice into food security research and initiatives. INRM reprioritizes resource allocation which can induce a circular bioeconomy, stimulating economic competitiveness, stakeholder empowerment, and reduce the number of people living in extreme poverty and their vulnerabilities (SDG 1)<sup>19</sup>.

As cities expand – so does the food needs of their urban population, and increasing competition for access to natural resources. INRM and circular bioeconomy policies can promote shorter food supply chains, and increase the potential for agricultural/rural development via job creation. Resilience and inclusive food systems support resilient and inclusive human settlements (SDG 11)<sup>20</sup>. INRM consider the intersectoral nature of the urban food systems to reduce the impact of cities on climate, public health, and the environment<sup>21</sup>, and address urban resilience by introducing regenerative production techniques, more coherent food security/nutrition, and leverage investments in ecosystem health.

## INRM for SDG 3 (Health Risks)

*Food Systems Resilience, when enhanced with INRM and Circular Bioeconomy, highly accelerates efforts to reduce Health Risks.*

Sustainable and resilient food systems profoundly influence human and environmental health via food security and nutrition. Signs of unsustainability include the depletion of water/soil resources, changes in global nitrogen and phosphorous cycles, human health consequences relating to excessive pesticide use, and loss of habitats intended for agricultural productivity<sup>22</sup>. SDG 3 pledges to “ensure healthy lives and promote well-being for all”, yet food system resilience must reach beyond human health, and adopt a One Health Approach which includes the wellbeing of animals, plants, and the environment. When allied with One Health, INRM assesses the status quo of resources, dismantles silos, and

<sup>18</sup> [Transforming agrifood systems and fostering inclusive rural development in the context of COVID-19 to end rural poverty](#), DISD. (n.d.).

<sup>19</sup> Boon, E. K., & Anuga, S. W. (2020). Circular economy and its relevance for improving food and nutrition security in sub-saharan africa: The case of ghana. Materials Circular Economy, 2(1), 5.

<sup>20</sup> [SDG 11. Sustainable cities and communities](#)

<sup>21</sup> [Food and the circular economy](#).

<sup>22</sup> McLaughlin, D., & Kinzelbach, W. (2015). Food security and sustainable resource management. Water Resources Research, 51(7), 4966–4985.



balances the needs of humans with shared ecological systems. The circular bioeconomy addresses the current food system's ecological, environmental, energy, food supply, and natural resource challenges by establishing symbioses between healthy humans, soils, and animals<sup>19,23</sup>.

## INRM for SDG 13 (Climate Risks)

*Food Systems Resilience, when enhanced with INRM and Circular Bioeconomy, highly accelerates efforts to reduce Climate Risks.*

Efforts to rectify food insecurity has emphasized increasing agricultural production and yield. However, current food production practices rely extensively on fertilizer and water inputs, causing significant depletion of water/nutrients, and pollution of water/soil, which further degrade ecosystem integrity, and increasing its susceptibility to climate shocks. Climate change, e.g., extreme weather-related disasters, can affect food and nutrient availability by reducing agricultural productivity. Because farming is knowledge-intensive, food system resilience can be built through an accurate understanding of the soil's ability to bear productive crop, and by improving growing methods. For example, food waste and biomass can be composted and biochar, to be reused on farms, thereby closing the nutrient loops, and enhancing the soil's biodiversity and nutrition. Further, rainwater and treated residential wastewater (i.e., grey water) can be harvested for irrigation. As a result, valuable resources are recirculated into food production, enhancing the community's climate resilience.

## Objectives

**Food System Resilience through Integrated Natural Resource Management Nexus Dialogue** advances both the Economic (advance the sustainable recovery of food sectors) and Environmental (transforming our relationship with nature) building blocks of **Sustainable Recovery** under the auspices of **Stockholm+50**, and the [Task Group of the One Planet Network and International Resource Panel](#). Additionally, it will share from- and feed into- UNU-FLORES' projects<sup>24</sup>, including stimulating the Science-Policy Interface, and exchange inputs between the UN system and multi-level stakeholders:

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<sup>23</sup> World Health Organization Regional Office for Europe. Circular Economy and Health. Opportunities and Risks. 2018. <http://www.euro.who.int/en/publications/abstracts/circular-economy-and-health-opportunities-and-risks-2018>. Accessed 26 Oct 2018.

<sup>24</sup> A non-exhaustive list of UNU-FLORES' projects:

1. [Assessing and Synthesising Climate-Related Data for Integrated Water-Soil Management in East Africa](#)
2. [Cycle Management in African Smallholder Agriculture](#)
3. [Integrated Evaluation of Wastewater Irrigation for Sustainable Agriculture and Groundwater Development](#)
4. [Multifunctional Use of Agricultural Landscapes Under Climate Change Conditions](#)
5. [Nexus Thinking and Circular Economy](#)
6. [Resource Nexus Perspective on Climate Resilient Agri-Food System: Stakeholder Analysis, Land Management and Business Decisions \(KlimaKonform\)](#)
7. [Safe Use of Wastewater in Agriculture: Dissemination of Good Practice Examples and Setting the Research Agenda](#)



- **Address Resilient Food Systems through INRM**, at all spatial levels (local to global), and from an interdisciplinary- and systemic food systems-perspective, especially for the Global South.
- **Contribute to the Discourse of Resilient Food Systems**, via nexus understanding of integrated approaches for a sustainable relationship within the context of ongoing climate change.
- **Further an Integrated understanding of Food Security Drivers**, both current and future: Environmental, Demographic, Socio-economic, Technological and Institutional.
- **Discuss the Integrated Prioritization of Resources** across food, energy, and water sectors, and highlighting trade-offs and synergies for resilient food systems production.
- **Improve Capacity to Build Resilience for Food System and Nutrition**, through the One Health Approach – recognizing the interconnections between humans, animals, plants, as well as an understanding of the role of natural resource systems.

## Outcomes

In furthering the UNEP/EA.4/Res.2 on [Promoting Sustainable Practices and Innovative Solutions for Curbing Food Loss and Waste](#), UNEP/EA.3/Res.6 on [Managing Soil Pollution to Achieve sustainable Development](#), the Nexus Dialogue's strategic positioning before the Food System Summit provides momentum for stakeholders to reflect on the interconnectedness represented by INRM and the Circular Bioeconomy.

It is expected to contribute to the following outcomes:

- Contribute to the thought processes around the establishment of an EMG Issue Management Group (IMG) on Food System Resilience
- To develop a Policy brief that will strategically address Food System Resilience via a Science-Policy Interface (SPI) as a recommended tool kit for the United Nations
- Convening knowledge and implementation which could improve the Food System Resilience Nexus, and its integration into higher education at UNU-FLORES
- Feed into the UN Food Systems Summit 2021<sup>25</sup>, CBD SBI/SBSTTA<sup>26</sup> processes, the International Treaty on Plant Genetic Resources for Food and Agriculture<sup>27</sup>, UNCCD, UNFCD, and CBD, by providing input and showcasing best practices inducing steps towards Building Back Better, with special regard to food systems resilience, in the context of the COVID-19 pandemic.

## Structure and Content

For safety and logistical reasons, the Nexus Dialogue will be held virtually and hosted on Zoom Webinar. **Food System Resilience through Integrated Natural Resource Management (7 June 2021)** will be 120-minutes long. As an **Independent Dialogue of the Food System Summit**, it will respect the

<sup>25</sup> <https://www.un.org/en/food-systems-summit>

<sup>26</sup> <https://www.cbd.int/sbstta/>

<sup>27</sup> <http://www.fao.org/plant-treaty/overview/en/>



three key features: respectful of the Summit's three principles of engagement; featuring structured conversations among stakeholder groups with different perspectives; and contribute to the Summit.

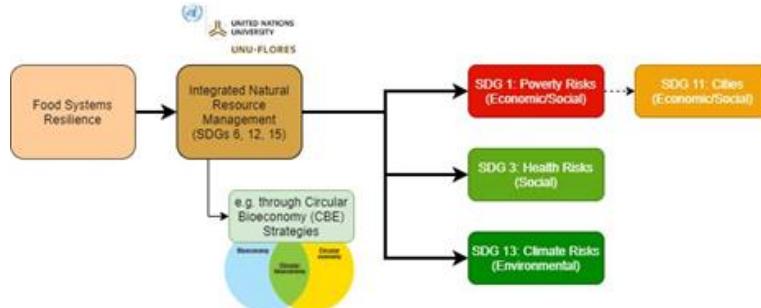
## Food System Resilience through Integrated Natural Resource Management

Time: 8:00-10:00 EDT, 7 June 2021

<u>Time Zones</u>	<b>Introduction and Welcome</b> by UNU-FLORES and EMG (and any other partners), outlining objectives and structure (10 minutes)  <ul style="list-style-type: none"><li>• Mr. Hossein Fadaei, Head of Office-Geneva, EMG Secretariat</li><li>• Dr. David M. Malone, Rector of the United Nations University, Under-Secretary-General of the United Nations</li><li>• Dr. Edeltraud Guenther, Director, UNU-FLORES</li></ul> <b>Food System Resilience through Integrated Natural Resource Management:</b> <i>An Independent Dialogue of the Food Systems Summit</i>  <i>Convenor: Ms. Nina Arden, Sr. Nexus Dialogue Consultant, EMG Secretariat</i> <i>Facilitator: Ms. Serena Caucci, Associate Programme Officer, UNU-FLORES</i> <i>Notetakers: Ms. Zeynep Oezkul &amp; Ms. Isabella Georgiou (UNU-FLORES)</i> <b>Curator &amp; Key Remarks:</b> <ul style="list-style-type: none"><li>• Mr. Joseph Alcamo, Director of Sussex Sustainability Research Programme (SSRP) (5 minutes)</li></ul> <b>Initial Expert Remarks (25 minutes)</b> <ul style="list-style-type: none"><li>• Mr. Jippe Hoogeveen, Senior Officer of the Land and Water Division, FAO (5 minutes)</li><li>• Mr. Stefan Uhlenbrook, Strategic Program Director: Water, Food &amp; Ecosystems, IWMI (5 minutes)</li><li>• Mr. Johan Bouma, 2017 Alexander Von Humboldt Medal, Professor Emeritus, Wageningen University &amp; Research (WUR) (5 minutes)</li><li>• Mr. James Lomax, Food Systems and Agriculture Adviser, Ecosystems Division, UNEP, Secondee to the UN Food Systems Summit Secretariat (5 minutes)</li><li>• Ms. Birguy Lamizana, Programme Officer, UNCCD-Bonn (5 minutes)</li></ul> <b>Panel Discussion</b> <b>Questions</b> <ol style="list-style-type: none"><li>1. Has your Agency experienced some success in adopting an <b>Integrated Natural Resource Management</b> approach in your programmes and mandates? What are some lessons you can share?</li><li>2. What opportunities to transform food systems for the benefit of poverty eradication, health and climate risk mitigation have been created by leveraging</li></ol>
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an **Integrated Natural Resource Management** approach? What are the capacity gaps – i.e., *what are we still missing?*

3. In pursuit of Building Back Better, what does an “enabling” environment look like to support **Integrated Natural Resource Management** and **Circular Bioeconomy Strategies** in policymaking for food systems?



Concluding Remarks and Next Steps: UNU-FLORES and EMG (10 minutes)