The Scientific Group for the UN Food Systems Summit
https://sc-fss2021.org/

Evaluation, Peer Review, and Science Advisory Activities by the Scientific Group for the UN Food Systems Summit

April 2021

The Scientific Group for the UN Food Systems Summit is an independent group of leading researchers and scientists from around the world. Its members are responsible for ensuring the robustness, breadth and independence of the science that underpins the Summit and its outcomes.

Scientific Group https://sc-fss2021.org/ https://www.un.org/en/food-systems-summit/leadership

Joachim von Braun (Germany) Chair of the Scientific Group. Director of the Center for Development Research (ZEF), Bonn University, and Professor for economic and technological change. President of the Pontifical Academy of Sciences.

Kaosar Afsana (Bangladesh) Vice Chair of the Scientific Group. Professor Public Health, BRAC University.
Louise O. Fresco (Netherlands) Vice Chair of the Scientific Group. President of the Executive Board, Wageningen University & Research.
Mohamed Hassan (Sudan) Vice Chair of the Scientific Group. President of The World Academy of Sciences for the advancement of science in developing countries (TWAS).
Mario Herrero Acosta (Costa Rica) Chief Research Scientist of Agriculture and Food, The Commonwealth Scientific and Industrial Research Organisation (CSIRO).
Ousmane Badiane (Senegal) Chairperson of Akademiya2063, former Africa Director for the International Food Policy Research Institute (IFPRI).
Patrick Caron (France) Vice President of the University of Montpellier, President of Agropolis International and Director of the Montpellier Advanced Knowledge Institute on Transitions
Martin Cole (Australia) is Professor for Agriculture and Food within the Commonwealth Science and Industrial Research Organisation (CSIRO). Chairperson of the HLPE Steering Committee of CFS.
Ismahane Elouafi (Morocco) Chief Scientist, Food and Agriculture Organization of the United Nations (FAO).
Frank A. Ewert (Germany) Scientific Director, Leibniz Centre for Agricultural Landscape Research (ZALF).
Sheryl L. Hendriks (South Africa) Professor of Food Security & Director, Institute for Food, Nutrition and Well-being, University of Pretoria.
Thomas W. Hertel (USA) Professor of Agricultural Economics at Purdue University and Executive Director of the Global Trade Analysis Project (GTAP).
Jikun Huang (China) Professor at School of Advanced Agricultural Sciences and Director of China Center for Agricultural Policy (CCAP), Peking University.
Marta Hugas (Spain) Chief Scientist at European Food Safety Authority (EFSA).
Elizabeth Hodson de Jaramillo (Colombia) Professor Em. School of Sciences of the Pontificia Universidad Javeriana, and member of Inter American Network of Academies of Sciences (IANAS).
Andrew Kambugu (Uganda) Executive Director Infectious Diseases Institute (IDI), College of Health Sciences, Makerere University. Co-founder of the Researchers for Global Health (R4GH) initiative.
Kaoru Kitajima (Japan) Professor at Kyoto University Graduate School of Agriculture; a forest ecologist, especially in tropical America and Asia.
Rattan Lal (India) Professor of Soil Science, Director of the Carbon Management and Sequestration Center at Ohio State University. World Food Prize Laureate 2020.
Hoesung Lee (South Korea) Chair, Intergovernmental Panel on Climate Change (IPCC), Professor at Korea University Graduate School of Energy and Environment, Seoul.
Uma Lele (India) is President of the International Association of Agricultural Economists (IAAE).
Lynnette M. Neufeld (Canada) incoming President of the International Union of Nutrition Scientists (IUNS), Director Knowledge Leadership, Global Alliance for Improved Nutrition (GAIN).
Urs Niggli (Switzerland) Scientist focusing on sustainable farming systems, from 1990 to 2020 he led the Research Institute of Organic Agriculture (FiBL)
Claudia Sadoff (USA) Executive Management Team Convener and Managing Director, Research Delivery and Impact, of the Consultative Group on International Agricultural Research
Lisa Sennerby Forsse (Sweden) past President, Royal Swedish Academy of Agriculture and Forestry (KSLA) and was the vice-chancellor of the Swedish University of Agricultural Sciences 2006-2015.
Jean-François Soussana (France) is Vice-President of International Policy at the Institute national de la recherche agronomique (INRAE).
Morakot Tanticharoen (Thailand) Professor and Senior Advisor to the President of the National Science and Technology Development Agency (NSTDA), research in microbiology and biotechnology.
Maximo Torero (Peru) ex-officio Member Chief Economist, Food and Agriculture Organization of the United Nations (FAO).
Aman Wirakartakusumah (Indonesia) Professor Em. at Department of Food Science and Technology and Senior Scientist at SEAFAST Center, Bogor Agricultural University (IPB), President-Elect, International Union of Food Science and Technology.
David Zilberman (Israel, USA) Professor in the Department of Agricultural and Resource Economics, University of California at Berkeley. One of the Founders of the International Consortium of Applied Bio-economy Research (ICABR).

Table of Contents

1. Scientific Group Reports

The Scientific Group puts its own research reports (listed below) to external peer review.

- the Scientific Groups reports were put as early drafts on the website https://sc-fss2021.org/materials/scientific-group-reports-and-briefs/ and open for comments between October 2020 and February 2021.

- in February 2021, the papers were externally peer reviewed by leaders in the respective professions.

- in March – April 2021 the teams of authors revised their papers in response to comments and the anonymous peer reviewer reports. The revised papers are available on the website https://sc-fss2021.org/materials/scientific-group-reports-and-briefs/

Food Systems – Definition, Concept and Application for the UN Food Systems Summit
by Joachim von Braun, Kaosar Afsana, Louise O. Fresco, Mohamed Hassan, Maximo Torero (March 2021) [**Download**]

Healthy diet – A definition for the United Nations Food Systems Summit 2021
by Lynnette M Neufeld, Sheryl Hendriks, Marta Hugas (March 2021) [**Download**]

Action Track 1 – Ensuring Access to Safe and Nutritious Food for All Through Transformation of Food Systems
by Sheryl Hendriks, Jean-François Soussana, Martin Cole, Andrew Kambugu, David Zilberman (March 2021) [**Full report**]

Action Track 2 – Shift to Healthy and Sustainable Consumption Patterns
by Mario Herrero, Marta Hugas, Uma Lele, Aman Wira, Maximo Torero (April 2021)
[**Full report**]

Action Track 3 – Boost Nature Positive Production
by Elizabeth Hodson, Urs Niggli, Kaoru Kitajima, Rattan Lal, Claudia Sadoff (April 2021)
[**Full report**]

Action Track 4 – Advance Equitable Livelihoods
by Lynnette M. Neufeld, Jikun Huang, Ousmane Badiane, Patrick Caron, Lisa Sennerby Forsse (March 2021) [**Full report**]

Action Track 5 – Building Resilience to Vulnerabilities, Shocks and Stresses
Thomas W. Hertel, Ismahane Elouafi, Frank Ewert and Morakot Tanticharoen (March 2021)
[**Full report**]

2. FSS Briefs by Partners of Scientific Group

"Food Systems Summit Briefs" are invited papers by the Scientific Group in support of the Summit agenda setting.

These papers are typically contributed by researchers from partners of the Scientific Group after partnership has been agreed by Scientific Group Leadership (Chair and Vice Chairs). The papers are authored by researchers in the Partner organizations. Members of the Scientific Group may serve as co-authors.

Guidance for "Food System Summit Briefs" prepared by Science Partners of the Scientific Group for the Food Systems Summit

February 15th, 2021

Purpose

This memo provides a framework for the Scientific Group's cooperation with science and knowledge partners on important themes. The aims of the partnerships are

- Identifying key themes that need attention in the Food Systems Summit and beyond, drawing attention to key areas of action with promising contributions to solutions of food systems problems,
- Promoting inclusive science partnership, especially reaching out to science and knowledge communities, thereby giving voice to science communities from diverse backgrounds,
- Complementing Action Tracks' initiatives with scientific evidence, and facilitating bridge building between focus areas of the five Action Tracks with cross-cutting themes.

Approach

The themes for the Briefs in the tables below were identified mainly by two mechanisms:

1. Recommendations by science partners to the Scientific Group to put key themes on its agenda; and/or

2. Strategic priority setting by the Scientific Group itself, in particular following work on its set of Food Systems, Healthy Diet, and Action Track papers. Additional themes may still be considered.

Concept for the Briefs

- The "Food Systems Summit Briefs" are **invited papers** by the Scientific Group in support of the Summit agenda setting.
- These papers are typically **contributed by researchers from the partners** of the Scientific Group after partnership has been agreed by Scientific Group Leadership (Chair and Vice Chairs). The papers are **authored by researchers** in the Partner organizations. Members of the Scientific Group may serve as co-authors.
- After satisfactory **review** by the Scientific Group the Food Systems Summit logo and Scientific Group partnership will be placed on the paper together with logo(s) of partner organizations involved in that paper. The paper is **placed on the website** of the Scientific Group (and perhaps other websites of the UN Food Systems Summit) and communication activities are facilitated (twitter etc.).
- All these papers carry a **qualifying statement** on the cover page that they are under the responsibility of the authors and may not represent positions of the Scientific Group (see attached template for cover page).
- The Scientific Group is open to **fresh thinking**, and will not object to papers, as long as they have sound logic and present **evidence-based solutions**. We want to give the diversity of the science landscape an opportunity to articulate its thinking for the Food Systems Summit.

Structure and content of papers

While the papers are under the responsibility of the authors from partner organizations who have complete academic freedom to present their assessments and recommendations for the Food Systems Summit, we request that all papers adhere to a few general structural- and content-related features:

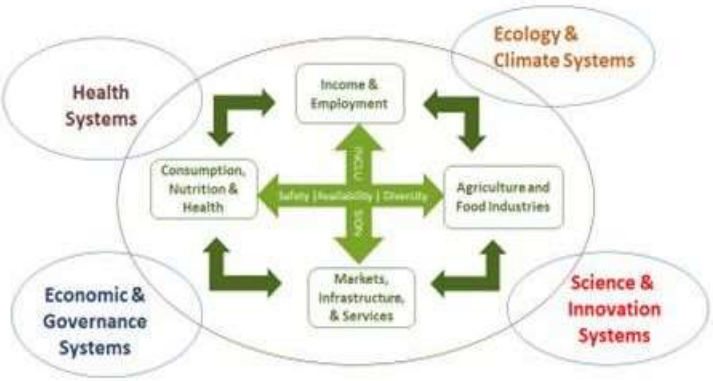
1. Clearly identify to which Food Systems aspect the paper relates, i.e., **take a food systems perspective**
2. Describe **the problem** that is being addressed by the paper, based on **state-of-the-art** thinking/knowledge. Authors are encouraged to seek comments from their peers and colleagues to assure that the brief is strong and reflects state of the art thinking in the respective field.
3. Focus on proposing **evidence-based actions and solutions** as well as identifying key actors to undertake these actions / solutions, referring to the problem(s) as defined under #2 above and making reference to the best science-based material from peer-reviewed materials where possible. Any proposed solution needs references to research evidence bases.
4. Write in the **style of a science-oriented commentary** in Nature or SCIENCE, and do **not exceed 8 to 10 pages** (max of 4500 words including references and graphics). Very short papers are welcome.
5. **Time lines:** Draft of paper submitted by March 20th, if possible. Final version (after considering Scientific Group's comments) submitted by April 15th.

3. Publications and Reports of relevance for Food Systems Summit

https://sc-fss2021.org/materials/publications-and-reports-of-relevance-for-food-systems-summit/

A) Food systems research

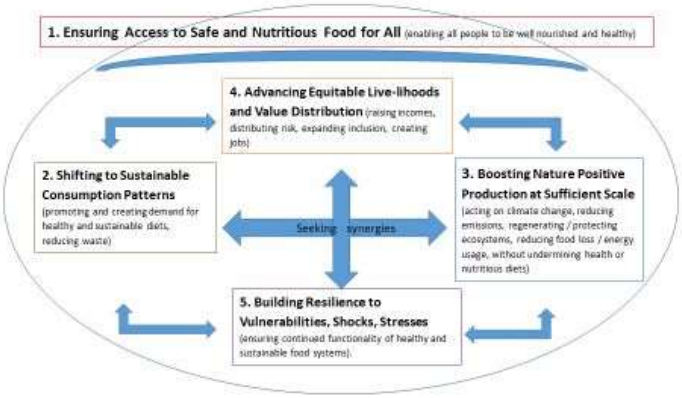
(broadly sorted by systems' components – only sources after 2016 considered)



1. Systems-wide research: Modelling Food Systems transformations- Synergies, Tradeoffs; Foresights – Policy Implications
2. Agriculture and Food Industries
3. Markets, Infrastructure and Services
4. Consumption, Nutrition and Health
5. Income and Employment

B) Action tracks related papers

(broadly sorted by Action Track Themes – only sources after 2016 considered)



1. Ensuring Access to Safe and Nutritious Food for All
2. Shifting to Sustainable Consumption Patterns
3. Boosting Nature Positive Production at Sufficient Scale
4. Advancing Equitable Livelihoods and Value Distribution
5. Building Resilience to Vulnerabilities, Shocks, Stresses

4. An early Suggestion for Integration of Action Track Propositions

DRAFT (submitted March 22, 2021) Toward Integrations

Dear Martin and Action Track Chairs, (bcc: Scientific Group members and FSS Secretariat)

In the Scientific Group we made an attempt to integrate Action Track's "Collective actions" propositions with propositions from the Scientific Group's Action Tracks related papers.

See our initial draft attached. This is to facilitate discussions.

Best wishes

Joachim

Chair of the Scientific Group

An attempt to integrate the Action Track's "Collective actions" propositions with various Propositions from the Scientific Group's Action Tracks related Papers

Actions for healthy, sustainable, and equitable food systems

In view of the various discussions in the FSS Advisory Committee meetings (i.e. the most recent one on March 19th, 2021 attention shall be given to
- how any propositions relate to and enhance SDGs and SDG 2 in particular
- concepts and terminologies of the Agenda 2030 shall be a basis
All the propositions below need further assessments related to agreed key criteria as well as assessments across the propositions for a enhancing synergies

Actions for end of Hunger and for an Equitable Food Systems

1. *Address inequalities and vulnerabilities in the farm system caused by rigid land, credit and labor market institutional arrangements, lack of market information, market segregation, and distorted government policies*.
2. *Focus on inclusion of and empowerment of women and youth (*transform land tenure in equitable ways, facilitate job training and education programs, provide affordable financial services, include women and youth in policymaking processes etc).
3. *Expand effective social protection programs*, including nutrition-sensitive programs and school feeding programs, and with a focus on jobs.
4. *Invest in food systems related "hard" and "soft" infrastructure* (e.g. roads, railroads, shipping, cold-chain facilities, digitalization and digital access) *as well in cleaner, greener energy sources.*
5. *Strengthen resilience and manage risks (with early warning systems and expand instruments;* eg. weather insurance).
6. *Explore opportunities for innovative financing mechanisms* and for i*ncreased government investments by both donor and developing countries to end hunger by 2030 (*e.g. social protection programs, crop protection, integrated soil fertility management, and child nutrition programs).

Actions for Healthy Food and Nutrition Systems

7. *Enhance nutrition and make healthy diets accessible and affordable for all* (rebalance agricultural policies to incentivize production of healthy and nutritious foods, repurpose subsidies to provide greater support to producing healthy foods, improve access to markets, reduce perishability of fresh fruits and vegetables, expand child nutrition programs, nutrition-sensitive social protection policies etc).
8. *Deal with hunger in conflict areas by expanded conditional food assistance and asset creation programs* (address immediate food needs with cash, voucher, or food transfers while improving long-term food security and resilience by creating assets such as rural roads).
9. *Foster behavioral change towards healthy diets*, and away from excessive consumption of meat, sugar, salt, trans-fats etc. (policies and regulations that enable healthy food environments, educational food labelling, etc).
10. *Improve food safety* (regulations, risk assessment and risk management tools, etc).

Actions for Sustainable Food Systems

11. *Invest in science* to develop new technologies and innovations and adapt them to local conditions (e.g. genomics, plant nutrition, animal production and health, biosciences, earth sciences, remote sensing, AI and robotics, digitization, big data, health and nutrition science, behavioral research etc).
12. *Reduce and prevent food loss and waste* (develop critical value chain infrastructure, redress incentive structures, develop product lines that are more sustainable, change behaviors etc.).
13. *Unlock the full potential contributions of the bioeconomy* (invest in disruptive scientific and technological developments, move from fossil to biobased value chains, biomass fractioning, promote new value chains associated with tropical biodiversity, use biomass to generate electricity etc).
14. *Harness oceans/blue economy more fully and sustainably.*
15. *Protect the agricultural genetic base and biodiversity*.
16. *Protect and keep productive soils and water* (support sustainable soil management, revisit large subsidies on agricultural water that promote unsustainable water usage, design incentives for adoption of sustainable agricultural practices including payments for ecosystem services etc.).
17. *Understand the true cost of food* and e*nsure that food prices reflect real costs,* including major externalities caused by climate change, land and water resources degradation and biodiversity loss; and identify trade policies that are supportive and non-tariff trade measure (policies to ensure true pricing leads to less pollution, less waste, and positive restructuring of food chains)
18. *Develop, disseminate, and utilize food, nutrition and agricultural big data* -- harnessing recent advances in remote sensing, machine learning and robotics -- to support agricultural research and innovation.

5. Review of Action Track Propositions – Methods, Concepts, Results (including a clustering)

Cover note– submitted March 29th, 2021

Dear Action Track Chairs, (bcc: Scientific Group members and FSS Secretariat)

In line with its TOR, the Scientific Group reviewed the current set of AT action propositions. We had received the complete list of the current 107 Action Tracks propositions by March 22nd. Each proposal was reviewed independently by two reviewers, without knowing from each other. We engaged 12 highly qualified external reviewers, because as you know, at the same time last week the Scientific Group members were busy with assessing the Action Areas.

The Vice Chairs of the Scientific Group and I congratulate the Actions Tracks' teams for an impressive set of innovative propositions, a number of which can actually become "game changers".

We recommend to use our evaluation information for reflecting not simply on high or low ratings of the individual propositions, but suggest Actions Track teams to consider clusters of propositions (we present some indicative clusters), because even propositions that are rated low may have elements that could have value in combination with one or the other proposition.

Attached are these files:
- The evaluation concept with the criteria (had been shared before);
- The review methodology is described in the attached memo;
- The tabulated results in the excel table, incl. an indicative cluster table.

Best regards,
Joachim

United Nations Food Systems Summit 2021
Chair of the Scientific Group, Prof. Joachim von Braun
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5.1 Explanation of the Review Methodology and suggestions for interpretation and utilization of the review findings

The Scientific Group received the complete list of the current Action Tracks propositions by March 22nd. The Scientific Group had discussed and shared review criteria with Action Tracks before. The actual review of the propositions was implemented as follows:

Step 1. Pre-screening of all the 107 proposals by two reviewers independently from each other. Each reviewer gave either 1 or 2 points for each proposal being 1 for not meeting minimum standards and 2 for meeting minimum standards. Those proposals which obtained more than 1 point after averaging were selected for detailed assessment. **62 proposals** were selected for more detailed assessment.

Step 2. Each of these 62 pre-selected proposals were then randomly assigned to reviewers. Each proposal was then reviewed in detail by two reviewers independently from each other. For convenience, the reviewers are called a and reviewer b in the table. The total number of reviewers was 12. In their review, they followed the review criteria developed by the Scientific Committee (with the 4 criteria, each maximum = 10, i.e. sum maximum = 40; memo see attached,).

Reviewers a provided an additional service by adding a note on the reasoning behind their grades and whenever possible, also citing the related evidence base in the peer-reviewed literature.

The results of the review are presented in the enclosed Excel file named “AssessmentFSS”. This file contains:

1) “Review, easy to read” --- presents the results of the review in easy to read format. Those proposals highlighted in red are those where there is significant difference between the reviewers in their assessment (when difference in total points exceeds 10).
2) “Cluster-based summary” ---all the 107 proposal were clustered based on their theme. This sheet provides the summary information of the review results by cluster (26 clusters).

We recommend to use this review information for a broad reflection about the propositions, and not just weather a proposition has a high or low rating.

Actions Tracks may like to revisit clusters of propositions (we present some indicative clusters), because even propositions that are rated low by the reviewers may have elements that could have value in combination with one or the other propositions. For example, action proposals 2 and 6 and similar ones might be grouped under an “enabling technologies” cluster or action proposals 20 and 25 and similar ones might be grouped under one cluster on “education and youth empowerment”.

We recommend for the way forward that Action Tracks further strengthens the science and evidence-based nature of proposals, for instance by referencing more peer reviewed sources as backup material where possible.

March 19, 2021

5.2 Scientific Group's Concept for Evaluating Propositions put forward by Action Tracks

Criteria and evaluation questions:

Clarity of description of proposed Action / Solution and Uniqueness: Is the description clearly presented? Is the Game Change clearly defined (across propositions)? Does any of the other proposed actions have a related or overlapping content? If there is strong overlap, the proposed action should be bundled with one or more other proposed actions and not evaluated individually? (if yes, the assessment of the proposed action **ends** here)

1. **Sustainability:** Is the Proposed Action / Solution environmentally, economically, and socially sustainable? Does it meet current needs, in particular the essential needs of the world's poorest, without compromising the ability to meet future needs? Does it minimize trade-offfs?

2. **Actionable:** Would it be feasible to implement the Proposed Action / Solution, and at what scale (local, national, regional, global)? Does the Proposed Action / Solution have potential for replication? [*provide the key scientific / research peer-reviewed resources regarding implementation feasibility if possible.]*

3. **Impactful:** What is the expected impact of the Proposed Action / Solution likely to be for key Food Systems Summit goals (a) Ending Hunger and Achieving Healthy Diets for All; (b) Eliminating Poverty and Increasing Incomes and Wealth? (c) Sustainable Use of Biodiversity and Natural Resources; and gender equity impact (will the Proposed Action/Solution benefit women)? Is there an evidence base of actual big impact or potential for big impact? What important science / knowledge gaps need to be addressed? [*provide the key scientific / research peer-reviewed resources describing the actual or expected impacts (impact assessments, trial results, modeling results etc).]*

4. **Costing, Financing, Efficiency**: Would the investment be efficient in terms of potential achievements? What would be the potential costs of the Proposed Action / Solution? How would it be financed? [*provide the key scientific / research peer-reviewed resources describing the estimated costs and financing modalities if possible.]*

Overall Recommendation whether to include in the UNFSS Action Agenda:

Important descriptive information:
Time Scale: When would results be expected / achieved of the Proposed Action / Solution? Short term (1-5 years), medium term (6-10 years), or longer term (after 2030)?

March 19, 2021

Scientific Group's Concept for Evaluating Propositions put forward by Action Tracks

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Overall Recommendation whether to include in the UNFSS Action Agenda:

Important descriptive information:
Time Scale: When would results be expected / achieved of the Proposed Action / Solution? Short term (1-5 years), medium term (6-10 years), or longer term (after 2030)?
What Food Systems targeted with the proposition: Given the great diversity of food systems, for which food systems would the Proposed Action / Solution be relevant or viable for implementation? Rural or Urban? A particular sub-region within a country / particular country / several countries or regions / global etc.?

A stylized tabulation

Evaluation: tabulation of aggregate findings (details on each proposition to be reported in an annex)						
		Sustainable	**Actionable**	**Impactful**	**Costing/Financing, Efficiency**	**Overall Recommen-dation**
NARRATIVE OF THE PROPOSITION and No. (Proposed Action / Solution and descriptive information (Targeted Food Systems; Time Scale for Results*)*	**FROM WHICH ACTION TRACK ? 1-5**	***Rank from Weak (=1) to Strong (=***10)				**Put the sum**

Cluster number	Cluster theme	Total proposals	Dropped by pre-screening	Assessed	Average points for assessed
1	Social protection	5	2	3	30.5
2	Child nutrition	4	1	3	29.0
3	Establishing food system funds	8	6	2	29.3
4	Agroecological approaches	8	2	6	29.1
5	Food waste and post-harvest loss	7	1	6	28.6
6	Public food procurement	4	2	2	26.3
7	Food systems alliances	6	6	0	-
8	National food system hubs	3	3	0	-
9	Equity and sustainability in supply cha	8	5	3	27.0
10	Indigenous people	2	1	1	33.5
11	Global soil alliances	1	1	0	26.5
12	Empowering women	4	0	4	28.9
13	Risk analysis	4	2	2	28
14	Setting environmental standards	2	2	0	-
15	Technological platforms	2	0	2	20.5
16	Labor market reforms	5	0	5	27.3
17	Fisheries	2	0	2	27.00
18	Livestock management	3	2	1	26.5
19	Genetic diversity and genebanks	4	0	4	27.3
20	Novel technologies in agriculture	4	1	3	27.7
22	Education systems	3	1	2	27.3
23	Civil society	3	1	2	25.0

24	Demand interventions	1	1	0	-
25	Food safety	2	0	2	31
v	Various, single	12	4	8	29

Action track	Nbr	Proposition	Review group	Sustainable	Actionable	Impactful	Costing	Sum	Average total score (max =40)	Evaluation explanation	Pre-screening Average	Assessed	Cluster
1	1	Establish a Zero Hunger Fund	a	2	5	10	10	27	29.5	The idea of a Zero Hunger Fund is appealing once key investment areas are known. However, the target funding level was not provided in the description. Given the current reluctance of food companies to commit to spending 1/500 of company profits, the feasibility is unkonwn. The financing appears to be unsustainble if contributions have to be collected annually. A global economic crisis would put zero hunger achievements at risks and is likely accompanied by reduced company profits. Therefore, resource needs and resources follow similar cyclical patterns. If money can be sourced, following CERES and PARI studies, the solution is impactful and sensitive to gender and equity concerns.	1.50	yes	3
			b	7	7	9	9	32					
			Difference (a-b)	-5	-2	1	1	-5					
1	2	Democratise precision agriculture technologies	a	9	7	9	7	32	32	Sustainable: there exist already an increasingly robust precision agriculture information ecosystem, and it is continuously being developed by the market on its own (AT 1, p. 10). Actionable: this proposition might receive high donors and governments support as precision agriculture has been recognised as a key anti-hunger tool (AT 1 p. 10), (Higgins et al. (2017).	2.00	yes	20
			b	8	8	8	8	32					
			Difference (a-b)	1	-1	1	-1	0					
1	3	Expand coverage of social protection systems	a	8	8	10	8	34	27	expansion not really a game changer, taken together with ACT 1, 11	1.50	yes	1
			b	5	4	5	6	20					
			Difference (a-b)	3	4	5	2	14					
1	4	Establish a catalytic SME financing facility to transform food systems	a						n.a		1.00	no	3
			b										
			Difference (a-b)										
1	5	Launch clean energy information and coordination platforms	a						n.a		1.00	no	7
			b										
			Difference (a-b)	0	0	0	0	0					
1	6	Scale up sustainable cold chain technology	a	7	7	7	7	28	27	Solution: Highly integrated, sustainable cold chain with an emphasis on the ‘Community Cool Hub’ (CCH) model. Targeted Food Systems: relevant/viable for a variety of food systems at local to regional and global scale. Time Scale: Short term (immediate). The proposal uses sound conceptual approach and prioritizes actions that would address SDG2. However, there is not much supporting literature on this proposed action(s) as the authors have alluded to. The pilot in India and Rwanda are at initial stage with no info on costing (though investment seems efficient). Priority policies could be identified and the proposed actions touch on variety of food systems. There is published work on impact , sustainability and cost-benefit analysis of cold chain.	2.00	yes	5
			b	6	6	8	6	26					
			Difference (a-b)	1	1	-1	1	2					
1	7	Create a partnership for investment in infrastructure for public procurement of nutritious foods	a	8	8	9	7	32	28.5	Solution: (i) Mechanism to provide investment and operational capacity needed to reduce costs and risks faced by small-scale producers and value chain entrepreneurs of perishable nutritious foods. (ii) Reducing risks by linking to public procurement for (guaranteed) institutional markets. Reducing the direct costs, transaction costs, and risks and creating incentives for investment in infrastructure to improve the connectivity of smallholders/entrepreneurs to markets and procurement systems. Targeted Food Systems: relevant for variety of food systems especially in low-income countries where infrastructure is weak and in areas with potential to produce nutritious foods. Time Scale: Medium to Long term (immediate). There exist evidence that gains in small-scale producers’ productivity and poverty reduction are far greater when complemented by infrastructure, education, and market access interventions. Investments in infrastructure and markets can also lower food prices and key to optimizing the benefits of the diverse production systems. More work is needed to establish nutrition linkages and political support for these programs	1.50	yes	6
			b	6	6	7	6	25					
			Difference (a-b)	2	2	2	1	7					

1	8	Incentivise food systems change towards equitable food marketing	a						n.a		1.00	no	9
			b										
			Difference (a-b)	0	0	0	0	0					
1	9	Launch a Workforce Nutrition Alliance to reach food system workers	a						n.a		1.00	no	7
			b										
			Difference (a-b)	0	0	0	0	0					
1	10	Promote women-led enterprises to grow and sell nutritious but neglected crops	a	10	10	10	8	38	32	The solution is clear and identifies synergies with other solutions and action tracks. It is a women-centered and bottom-up initiative. The proposed action is sustainable in the way that it maintains genetic diversity and agricultural production with environmental sound techniques, empower vulnerable groups, such as women and indigenous peoples, and contribute to higher income and resilience to shocks (Li and Siddique 2018; Reneri et al. 2019; Padulosi, Roy, and Rosado-May 2019). Feasible to up-scale. It is implemented at local levels, and there are existing frameworks to design policies at national levels (Padulosi, Roy, and Rosado-May 2019). It aims at improving food security and nutrition in rural contexts but could potentially bring positive spillovers in urban settings (Reneri et al. 2019; Gido et al. 2017). The solution includes successful case studies about the impacts on women empowerment and nutrition, supported by scientific evidence. Promoting neglected crops or underutilized species (NUS) could achieve Zero Hunger (Li and Siddique 2020). NUS are nutritious, climate-resilient, economically viable, and act as an entry point to tackle malnutrition. Women (and indigenous people) could benefit from enhanced production, marketing, and consumption (Reneri et al. 2019). Various examples come from Africa (Kenya, South Africa), Asia (India), and Central America (Guatemala) (Reneri et al. 2019; King and Padulosi 2017; Mabhaudhi, Chimonyo, and Modi 2017; FAO 2017; Conti et al. 2019). However, there is limited evidence of large-scale impact evaluations on the quantitative effects of such an initiative. The solution is missing to include a cost-benefit analysis or an indication of how it would be financed. While this is a difficult assessment, the costs are associated with staffing (e.g., organizing workshops, training, field visits, research, consultations etc.), and would largely depend on the type of intervention involved (Reneri et al. 2019). This type of intervention could be financed with investments from the G7 governments (von Braun et al. 2021). The solution also does not specify a time scale. In general, the solution contributes to SGD 2, SGD 5 & SGD 13 Braun, Joachim Von von, Bezawit Beyene Chichaibelu, Maximo Torero Cullen, David Laborde, and Carin Smaller. 2021. “Ending Hunger by 2030 – Policy Actions and Costs.” https://sc-fss2021.org/wp-content/uploads/2021/03/FSS_Brief_End_Hunger_SDG2_Actions_Costs.pdf. Conti, Maria Vittoria, Ausilia Campanaro, Paola Coccetti, Rachele De Giuseppe, Andrea Galimberti, Massimo Labra, and Hellas Cena. 2019. "Potential Role of Neglected and Underutilized Plant Species in Improving Women' s Empowerment and Nutrition in Areas of Sub-Saharan Africa." Nutrition Reviews 77 (11): 817–28. https://doi.org/https://doi.org/10.1093/nutrit/nuz038. FAO. 2017. "Promoting Neglected and Underutilized Crop Species." 2017. http://www.fao.org/news/story/en/item/1032516/icode/. Gido, Eric Obedy, Oscar Ingasia Ayuya, George Owuor, and Wolfgang Bokelmann. 2017. "Consumption Intensity of Leafy African Indigenous Vegetables: Towards Enhancing Nutritional Security in Rural and Urban Dwellers in Kenya." Agricultural and Food Economics 5 (14). https://doi.org/10.1186/s40100-017-0082-0. King, Oliver I., and Stefano Padulosi. 2017. "Agricultural Biodiversity and Women's Empowerent: A Sucessful Story from Kolli Hills, India." Li, Xuan, and Kadambot H.M. Siddique. 2018. Future Smart Food - Rediscovering Hidden Treasures of Neglected and Underutilized Species for Zero Hunger in Asia. Bangkok: FAO. http://www.fao.org/3/I8907EN/i8907en.pdf. ———. 2020. "Future Smart Food: Harnessing the Potential of Neglected and Underutilized Species for Zero Hunger." Maternal & Child Nutrition 16 (September 2019): 1–22. https://doi.org/10.1111/mcn.13008. Mabhaudhi, Tafadzwanashe, Vimbayi G. P. Chimonyo, and Albert T. Modi. 2017. "Status of Underutilised Crops in South Africa: Opportunities for Developing Research Capacity." Sustainability. https://doi.org/10.3390/su9091569. Padulosi, Stefano, Phrang Roy, and Francisco J. Rosado-May. 2019. Supporting Nutrition-Sensitive Agriculture through Neglected and Underutilized Species Operational Framework. Bioversity International/IFAD. Reneri, Jessica E., Stefano Padulosi, Gennifer Meldrum, and Oliver I. King. 2019. "Promoting Neglected and Underutilized Species to Boost Nutrition in LMICs." In Food Environments: Where People Meet the Food System. UNSCN. https://www.unscn.org/uploads/web/news/UNSCN-Nutrition44-WEB-21aug.pdf. Additional reading: Siddique, K.H.M., Li, X. & Gruber, K. Rediscovering Asia's forgotten crops to fight chronic and hidden hunger. Nat. Plants 7, 116–122 (2021). https://doi.org/10.1038/s41477-021-00850-z	1.50	yes	12
			b	7	7	6	6	26					
			Difference (a-b)	3	3	4	2	12					
1	11	Make social protection programmes more nutrition sensitive	a	8	8	10	8	34	33	Social protection programs have been proven to be very effective in the short-run to mitigate the consequences of food system disruptions. However, so far, they have concentrated on increasing food accessibility and availability of staple foods. Within recent years, research has strongly contributed to understanding the cost of affordable diets and its determinants (Bai et al. 2020). Building on this research, it could be possible to adjust and expand existing social protection programs (particularly cash transfers). Combining this idea with new advances in targeting and digital delivery solutions, the solution is very actionable and impactful. In addition, including nutritious foods, such as fruits, vegetable, and meat products, in the calculation of cash transfers will also boost local value chains and benefits the food system in the medium to long-run. Generally, sustainability is given but the fiscal costs are large and cannot be lifted by governments in LMICs alone. A risk associated with the impact of the solution is the (un)-conditionality of the transfer. Preferences of individuals are unknown and many households may decide not to purchase nutritious foods with the increased cash transfer income. Therefore, the solution needs to identify nudges to generate demand for nutritious foods.	2.00	yes	1
			b	8	8	8	8	32					
			Difference (a-b)	0	0	2	0	2					
1	12	Implement comprehensive	a						n.a		1.00	no	2
			b										

		school food programmes in every country	Difference (a-b)	0	0	0	0	0				
1	13	Create a global virtual nutritious food innovation hub for SMEs	a						n.a		1.00	no	9
			b										
			Difference (a-b)	0	0	0	0	0				
1	14	Foster a global conversation around coherence for food environment policies for healthier children	a	7	10	10	7	34	21	The solution is an urgent call to improve children's food environments and presents a road-map on how to address this need. It is supported by scientific evidence and highlights implementation challenges (e.g., power relations in food supply chains or food environments). It encourages dialogue between stakeholders on policies already in place (taxes, labeling, and marketing policies) and has proven successful in some countries at different levels (national or local). Some additional examples of implementation are from Mexico on food labeling, Seoul, Korea on establishing green food zones around schools to ban vending of unhealthy food, Baltimore, US on incentivizing grocery shops in food desserts to make food accessible, or London, UK on banning unhealthy food advertising on transportation (Acharya et al. 2021; Halliday, Platenkamp, and Nicolarea 2019). Hawkes et al. (2020) propose a theoretical approach to operationalize child-centered food environments that could support this solution's implementation. This framework is based on mixed-methods and focuses on coherent actions to steer food systems toward healthier diets in children. The impacts should enforce healthier diets and competitive food markets (from food business). It could also benefit children in slums, who face high malnutrition risks and stunting, with few interventions targeting this group (Acharya et al. 2021). While the solution could be economically beneficial, particularly for poor households, making nutritious food affordable and influencing food choices (Jensen et al. 2011; Downs and Demmler 2020), do not specify what environmental benefits are. The solution recognizes that "there has been no targeted funding or timebound partnership model to make them work in practice." Based on existing cases, such processes could take several years to implement, for example, ten years in Mexico's case (Morris et al. 2020). The solution highlights synergies with other solutions (solution 13). Also, improving nutrition and dietary diversity among children would substantially contribute to SGD 2. Acharya, Gayatri, Emilie Cassou, Steven Jafee, and Elyssa Kaur Ludher. 2021. Rich Food Smart City. How Building Reliable, Includsive, Competitive, and Healthy Food Systems Is Smart Policy for Urban Asia. Washington, DC.: World Bank. https://openknowledge.worldbank.org/handle/10986/35137. Downs, Shauna, and Kathrin M. Demmler. 2020. "Food Environment Interventions Targeting Children and Adolescents: A Scoping Review." Global Food Security 27 (November): 100403. https://doi.org/10.1016/j.gfs.2020.100403. Halliday, Jessica Jo, Laura Platenkamp, and Yota Nicolarea. 2019. "A Menu of Actions to Shape Urban Food Environments for Improved Nutrition." Hawkes, Corinna, Elizabeth Fox, Shauna M Downs, Jessica Fanzo, and Kimberley Neve. 2020. "Child-Centered Food Systems : Reorienting Food Systems towards Healthy Diets for Children." Global Food Security 27 (February): 100414. https://doi.org/10.1016/j.gfs.2020.100414. Jensen, Jørgen Dejgård, Helene Hartmann, Anika De Mul, Albertine Schuit, and Johannes Brug. 2011. "Economic Incentives and Nutritional Behavior of Children in the School Setting : A Systematic Review." Nutrition Reviews 69 (11): 660–74. https://doi.org/10.1111/j.1753-4887.2011.00422.x. Morris, Saul S, Simón Barquera, Aang Sutrisna, Doddy Izwardy, and Roland Kupka. 2020. "Perspective: Interventions to Improve the Diets of Children and Adolescents." Global Food Security 27 (May): 100379. https://doi.org/10.1016/j.gfs.2020.100379.	1.50	yes	2
			b	2	2	2	2	8					
			Difference (a-b)	5	8	8	5	26					
1	15	Launch a new alliance to end anaemia	a						n.a		1.00	no	7
			b										
			Difference (a-b)	0	0	0	0	0					
1	16		a	10	9	9	9	37	30		2.00	yes	20
			b	5	5	7	6	23					

		Scale up biofortified crops	Difference (a-b)	5	4	2	3	14		Solution: Stable supply of quality-assured bio-fortified staple crops (from farmers to aggregators and to institutions that supply bio-fortified foods to low-income consumers). The three-pronged approach involves piloting in Verified Sourcing Areas (VSAs), Volume guarantee scheme (contract between farmers in VSAs and aggregators) and publicly available standards (policies). Targeted Food Systems: Grains, Producers of staple food grains global scale. India and Tanzania are cited as examples of government commitment to procure bio-fortified foods. Time Scale: Medium to Longer term. The efficacy of bio-fortified staple crops in reducing micro-nutrient deficiencies is well documented . There are also several varieties of staple crops that have been formally released for production in many countries across Africa, Asia and Latin America. Complementary demand-side interventions (e.g. marketing, new product development) are needed in areas where demand would is less predictable. The impact of biofortification are well documented . The cost effectiveness is also documented for a number of crops (GAIN and HarvestPlus, studies and programs) .			
1	17	Develop a new global food safety index	a	8	10	10	8	36	33.5	It is a novel solution but needs clarity on how the index would collect information in informal settings and on which stage of the food supply chain is applicable. The prevalence of toxins and pathogen-borne contamination in food could occur at any production stage, processing, marketing, handling, or consumption (FAO 2016). The Global Panel on Agriculture and Food Systems for Nutrition (2016) provides examples of food safety risks along the food supply chain (p.90). Food safety is also a concern for food net-importing countries (for example, Maldives has a low capacity for inspections and facilities to quarantine), and for those countries which paperwork checks and labels are in a foreign language than the importing country (FAO 2018). The solution claims to be sustainable since it relies on existing data and low-cost technical maintenance. However, it does not indicate what environmental benefits bring about. Also, the solution provides clear guidance on the implementation of the Global Food Safety Index (GFSI) and indicates who could potentially lead such an initiative. Although it is emphasized that the cost for assembling all the data into an index is low-cost, it misses who would finance it. Regarding the impacts, it is expected to annually release a report on indicators relevant to food safety, which would lead to greater attention to food safety issues and actions to tackle them. The ultimate impact would be a global reduction in sickness and death from foodborne disease (which has a health burden equivalent to malaria, HIV/AIDS, or tuberculosis). While the impact is clear and concise, an index is a construct of variables, if well correlated, indicates one direction, in this case, the direction on what needs to be done and who would need to do it. Such impacts might take time and a strong willingness to change. The solution provides scientific evidence on the positive impacts that indices could bring into policymaking, but it lacks a time scale. FAO. 2016. "Influencing Food Environments for Healthy Diets." https://doi.org/10.1006/nimg.2001.1006. ———. 2018. Integrating Food into Urban Planning. Rome: Cabannes, Y.; Marocchino, C. https://doi.org/10.14324/111. 9781787353763. Global Panel on Agriculture and Food Systems for Nutrition. 2016. Food Systems and Diets : Food Systems and Diets: Facing the Challenges of the 21st Century. London, UK.	2.00	yes	25
			b	8	8	7	8	31					
			Difference (a-b)	0	2	3	0	5					
1	18	Develop a Global Alliance on Safe Food for All	a						n.a		1.00	no	7
			b										
			Difference (a-b)	0	0	0	0	0					

1	19	Assemble and launch a Food Safety Toolkit	a	7	8	10	8	33	28.5	The solution addresses food safety in informal markets. This is of primary importance for ensuring nutrition and reducing foodborne diseases since informal markets are the primary food outlets or venues for low-income households to access fresh food (Wertheim-Heck and Raneri 2019; IFPRI 2017). In particular, fruits and vegetables are associated with high food safety risks during production or distribution, and labels or information approaches are not well suited to ensuring food safety (Hoffmann et al. 2017). The toolkit would include a variety of tools and materials that can be adapted to different contexts and different countries (e.g., be available in local languages). It would be piloted to ensure validity, and its simplicity would make it feasible to implement at all levels (local or national). The solution misses clarifying who would be responsible for implementing, disseminating, or monitoring the toolkit. Since the solution aims to lead to better national food safety policies, appropriate standards, and better compliance, more details on how it would work in practice are helpful. By reaching these goals, the solution expects to reduce foodborne diseases and improve nutritional outcomes. The solution complements the proposed solution 17 and combined would leverage consumer demands for safer food, encouraging investments by the private sector. The sustainability of the solution lies on economic and social pillars, but there is limited information about its environmental benefits. It indicates that the costs will vary from moderate to high depending on the level of effort—no information on an estimated cost of implementation or time scale. Hoffmann, Sandra, Brecht Devleesschauwer, Willy Aspinall, Roger Cooke, Tim Corrigan, Arie Havelaar, Frederick Angulo, et al. 2017. "Attribution of Global Foodborne Disease to Specific Foods: Findings from a World Health Organization Structured Expert Elicitation." PLoS ONE 12 (9): 1–26. https://doi.org/10.1371/journal.pone.0183641. IFPRI. 2017. Global Food Policy Report. Vol. 91. Wertheim-Heck, Sigrid, and JE E Raneri. 2019. "Retail Diversity for Dietary Diversity," no. February: 1–6. https://www.wur.nl/en/project/Retail-Diversity-for-Dietary-Diversity-RD4DD.htm.	2.00	yes	25
			b	6	5	7	6	24					
			Difference (a-b)	1	3	3	2	9					
1	20	Foster shared learning on Food System Transformation Pathways	a	10	10	8	8	36	33.5	This solution proposes to develop a food system framework perspective to agri-food policy planning and implementation at the national level, based on participatory processes that engage different stakeholder groups. This could result e.g. in a National Food System Development Plan. Actual impacts of this solution are difficult to estimate and the description does not provide scientific research to predict possible outcomes. I would nevertheless support this as a game changing solution because I think that such a jointly developed strategy needs to form the basis for any future action to strengthen the food system. In addition to national level strategies, this could also be applied at other levels, from global all the way to local. The title is a little misleading though because it puts emphasis on the process rather than the outcome. An alternative title could be e.g. "Mapping food system transformation pathways through participatory appraoches". No. 25 and 37 could be integrated here.	2.00	yes	21
			b	7	8	9	7	31					
			Difference (a-b)	3	2	-1	1	5					
1	21	Develop new standards and legal frameworks to drive private-sector change	a	8	7	7	8	30	33	Solutions: (i) social and environmental food standards to drive private sector behavior change, and (ii) promotion of corporate legal framework that holds companies accountable for their impact on society and the environment. In essence the solution proposed here is a platform that can be used by companies to assess their impact on all stakeholders (consumers, workers, community, environment, and governance). Targeted Food Systems: relevant/viable for a variety of food systems from local to global scale. So far utilized in 8 countries. Time Scale: Medium term. So far a platform has been developed and is freely accessible online: 135,000 companies have utilized it so far. The proof of concept of global certification using free, broadly available, simple tools has gained ground for 15 years reaching tens of thousands of companies across the globe. The policy solutions have been passed in over 50 jurisdictions and have been vetted/recommended by many institutions, including the G7.	2.00	yes	9
			b	9	9	9	9	36					
			Difference (a-b)	-1	-2	-2	-1	-6					
2	22	Food Systems Framework. Facilitating Cross Sector Assessments and National Action Plans up to 2030	a						n.a		1.00	no	8
			b										
			Difference (a-b)	0	0	0	0	0					
2	23	City region food strategies. Local Food Markets	a						n.a		1.00	no	6
			b										

			Difference (a-b)	0	0	0	0	0					
2	24	Fiscal policy. Fiscal Policy Measures to improve food environments	a	9	7	8	9	33	32.5	The attractiveness of this solution is that it can be integrated into already existing government fiscal policies and enforcement capabilities. For this reason, it can be sustainable. Many countries are already introducing such taxes on unhealthy food, in most cases, providing evidence of reduced consumption of unhealthy foods (Caro et al., 2017; Mytton et al., 2012; Thow et al., 2014), especially for the poor(POWELL and CHALOUPKA, 2009). Maximum success achieved when food taxes/subsidies are at least 10–15% and used together(Niebylski et al., 2015). For increased success, taxes on unhealthy food and subsidies on health food need to be combined(Dodd et al., 2020; Niebylski et al., 2015). Potentially being revenue neutral, i.e. taxes on unhealthy food could support the subsidies on healthy food(Wright et al., 2017), this is also very attractive financially. Especially considering that unhealthy food generates substantial human health related costs, while cheaper healthy food would generate positive externalities. Although this proposal can be relatively easily put into action, it is likely to be strongly opposed by food industry producing sugar drinks and other unhealthy food to be taxed. Caro, J.C., Ng, S.W., Bonilla, R., Tovar, J., Popkin, B.M., 2017. Sugary drinks taxation, projected consumption and fiscal revenues in Colombia: Evidence from a QUAIDS model. PLoS One 12, e0189026. https://doi.org/10.1371/journal.pone.0189026 Dodd, R., Santos, J.A., Tan, M., Campbell, N.R.C., Ni Mhurchu, C., Cobb, L., Jacobson, M.F., He, F.J., Trieu, K., Osornprasop, S., Webster, J., 2020. Effectiveness and Feasibility of Taxing Salt and Foods High in Sodium: A Systematic Review of the Evidence. Adv. Nutr. https://doi.org/10.1093/advances/nmaa067 Mytton, O.T., Clarke, D., Rayner, M., 2012. Taxing unhealthy food and drinks to improve health. BMJ. https://doi.org/10.1136/bmj.e2931 Niebylski, M.L., Redburn, K.A., Duhaney, T., Campbell, N.R., 2015. Healthy food subsidies and unhealthy food taxation: A systematic review of the evidence. Nutrition. https://doi.org/10.1016/j.nut.2014.12.010 POWELL, L.M., CHALOUPKA, F.J., 2009. Food Prices and Obesity: Evidence and Policy Implications for Taxes and Subsidies. Milbank Q. 87, 229–257. https://doi.org/10.1111/j.1468-0009.2009.00554.x Thow, A.M., Downs, S., Jan, S., 2014. A systematic review of the effectiveness of food taxes and subsidies to improve diets: Understanding the recent evidence. Nutr. Rev. 72, 551–565. https://doi.org/10.1111/nure.12123 Wright, A., Smith, K.E., Hellowell, M., 2017. Policy lessons from health taxes: A systematic review of empirical studies. BMC Public Health. https://doi.org/10.1186/s12889-017-4497-z	1.50	yes	26
			b	8	9	8	7	32					
			Difference (a-b)	1	-2	0	2	1					
2	25	Formal and informal education strategies	a	4	4	4	4	16	21	This solution proposed to develop curriculum packages to mainstream food system-related topics in all levels of education. No evidence is provided. While I support the idea of integrating food system-related issues in education programmes, I find the proposed solution too top-down. Curricula would need to be adapted to widely differing contexts (e.g. in terms of social norms or food availability) and should be developed together with local stakeholders to increase buy-in and local adaptation. The need to develop such curricula could be mentioned in proposition Nr. 20.	2.00	yes	22
			b	7	8	5	6	26					
			Difference (a-b)	-3	-4	-1	-2	-10					
2	26	National Food System Action Hubs	a						n.a		1.00	no	8
			b										
			Difference (a-b)	0	0	0	0	0					
2	27	Mobilizing civil society and lifting up youth-led initiatives	a	5	6	6	5	22	21.5	Have similarities with solution 13 – “Activate the Activists: Ending Food Waste through a Global Activist Network” Solutions: The “Bloomberg Approach” is purposeful funding of civil society organizations to bring about policy change and measure its impact. The proposal aims at galvanizing action (advocacy and policy) to defeat hunger, improve health and heal the planet in local and global contexts. Targeted Food Systems: relevant for many food systems. Suitable for high-income countries through national philanthropy and low-and middle-income countries where civil society organizations are active and legitimate. Time Scale: Medium to Longer term. There few anecdotal evidence on the significant influence of civil society (Bloomberg Approach) in achieving SDG2 and related SDGs – some of these studies are on reduction of sugar-sweetened beverages, “junk” foods, and unhealthy snacks marketed to children. The link to youth-led initiatives is poorly constructed and does not seem to be well thought out.	1.50	yes	23
			b	6	5	4	6	21					
			Difference (a-b)	-1	1	2	-1	1					
2	28	Transforming power dynamics that shape food demand	a	6	6		9	21	19	Related to proposition in AT 5 on agroecology as well as other propositions in AT 2 (e.g. on food loss and waste). To achieve the goals of Agenda 2030, the global community must promote collaboration between multi-stakeholders while ensuring that their actions converge (Matzembacher, et al. 2021)	1.50	yes	9
			b	5	5	3	4	17					

			Difference (a-b)	1	1	-3	5	4		while ensuring that their actions converge (Hatzenbuehler, et al. 2021).			
2	29	Front of pack nutrition and eco labelling for promoting healthy and sustainable diets in points-of-sale and out-of-home	a						n.a		1.00	no	14
			b										
			Difference (a-b)	0	0	0	0	0					
2	30	Ensure a breastfeeding-friendly environment	a	10	10	8	10	38	30	This solution proposes a series of measure to support breast-feeding. The nutritional benefits of breast-feeding are backed up with research evidence. Breastfeeding and supportive measures to not carry high costs, but have high and long-term benefits, direclty on people but also on the society e.g. in terms of higher labour productivity and lower healthcare costs. The solution provides a system-perspective by considering different elements of the system that need to be changed to achieve this goal e.g. better nutrition of mothers, adapted work places, revisions to/enforcement of labour regulations related to maternity/paternity leave, social norms, rules governing advertising of formula milk etc.	2.00	yes	2
			b	6	5	5	6	22					
			Difference (a-b)	4	5	3	4	16					
2	31	Package of Demand Interventions	a						n.a		1.00	no	24
			b										
			Difference (a-b)	0	0	0	0	0					
2	32	Food is never waste - Interventions to deliver more circular food systems	a	8	9	10	9	36	32	Sustainable: Involvement of key stakeholders (policymakers, private sector and individual consumers in this type of intervention is significant in ensuring sustainability Actionable: the involvement of international bodies, such as the UN in the sensitization and dissemination of information about food waste and loss will facilitate scaling up of this proposed intervention. Impactful: Cutting down food waste and loss will imply saving lives and the entire ecosystem. It will also have tremendous impact on global GHG emissions (von Braun et al. 2020). Cost effectiveness: Redirecting the loss/waste food into inputs for conversion into feed and fertilizers will create opportunities for employment, increase in food/feed diversity and recovery of investments in technologies that reduce food loss and waste.	2.00	yes	5
			b	7	8	8	5	28					
			Difference (a-b)	1	1	2	4	8					
2	33	150x50x30: 150 countries launch national public-private partnerships and campaigns to reduce their food loss and waste by 50% by 2030	a	8	8	9	7	32	27	Solutions: Addressing food losses between the farm and fork through national public-private partnership Food Loss and Waste (FLW) costs about $940 billion in economic losses annually (1/3 of food produced). 150x50x30 – get 150 countries to establish national PPP to reduce their FLW by 50% by 2030. Targeted Food Systems: relevant for all food systems. Applicable at Global (high- and low-income countries), private sector, multilateral development institutions and civil society. Time Scale: Short to Medium term. There exists some evidence of the impact and cost-effectiveness of PPP on other sectors and not on this area. However, using the expected returns to investments in PPPs I suppose that the PPPs to address FLW would be worthwhile and meaningful. Some publications on impact of PPPs in reducing food losses and reducing food wastage .	2.00	yes	5
			b	5	6	4	7	22					
			Difference (a-b)	3	2	5	0	10					
2	34	Activate the Activists: Ending Food Waste Through a Global	a	6	6	6	5	23	25	Have similarities with solution 6 – “mobilizing civil society and lifting up youth-led initiatives” Solutions: Reducing household food waste – by establishing a global network of activists to drive culturally relevant behavior change among citizens Targeted Food Systems: relevant for all food systems. Global level approach but with a target of a few organization taking the lead – Unilever, WWF, Wageningen University, UNEP, WRAP and WRI. Time Scale: Short to Medium term. This game changing solution is not backed by evidence though the proposal mentions there might be “early mover”	2.00	yes	5
			b	6	8	6	7	27					

		Activist Network	Difference (a-b)	0	-2	0	-2	-4		countries and activists. A search in the web does not provide credible or anecdotal evidence of the impact of such initiative(s). Therefore, it is difficult to project cost-efficiency though the impact might be easier to grasp – 29% and 31% annual reduction in household per capita food losses in The Netherlands, and UK respectively. The consortium (Unilever, WWF, Wageningen University, UNEP, WRAP and WRI) is seeking to identify and secure funding for the pilot. Cost estimations are not yet available.			
2	35	Investing $1 trillion to reduce global food loss of high-impact commodities by 2025	a						n.a		1.00	no	5
			b										
			Difference (a-b)	0	0	0	0	0					
2	36	Enable a Just Transition of livestock production to mitigate climate change, improve health and create jobs	a						n.a		1.00	no	18
			b										
			Difference (a-b)	0	0	0	0	0					
2	37	Leveraging Food-Based Dietary Guidelines through Public Procurement	a	4	6	5	5	20	24	This solution proposes to develop food-based dietary guidelines at the national level and align all public policy to leverage the FBDGs. The solution seems too generic and is not supported by evidence. While such guidelines and related public policies would be valuabe, they could equally be covered in proposition nr. 20 and could be explicitly mentioned there as one of the outcomes of the participatory process.	2.00	yes	6
			b	8	8	6	6	28					
			Difference (a-b)	-4	-2	-1	-1	-8					
2	38	Women's Economic Empowerment for Sustainable and Healthy Consumption Patterns:	a	8	7	8	5	28	27.5	The solution proposes that countries create, finance, and implement national plans for women's economic empowerment in transitions towards sustainable production and healthy consumption patterns. The plans will focus on women's empowerment across the value chain from production to consumption. The role of women in enhancing nutrition is supported by scientific evidence and is key for achieving SGD 2. This solution could be merged with solution 10 from AT1, aiming to empower women in a specific and crucial aspect of food systems (production of neglected crops). The solution points out entry points on how to empower women, but remains broad and misses clear directions of implementation. It leverages existing work from international organizations (such as FAO, IFAD, WFP) to engage with local governments and rely on multi-stakeholders (policymakers, rural communities, NGOs) to practice this solution. Yet, it lacks examples of countries that have implemented women-center national plans. Also, it does not provide estimations of costs for the implementation but indicates that part of the solution is to invite donors to finance national plans.	2.00	yes	12
			b	7	7	6	7	27					
			Difference (a-b)	1	0	2	-2	1					
3	39	A just transition to sustainable agriculture through policy reform and public support	a						n.a		1.00	no	v
			b										
			Difference (a-b)	0	0	0	0	0					
3	40		a	10	10	8	5	33	29	The solution calls for transforming agricultural commodities (beef, soy, cocoa, oil palm) to prevent further deforestation or agricultural expansion. It does by involving all multi-stakeholders (governments, civil society, NGO's, private sector) and actors across the supply chain (producers, manufacturers, processors, consumers) in the Forests, Agriculture, Commodity Trade (FACT) Dialogue, driven by the UK government as chair of the COP 26. The solution has been designed and developed for over a decade. It aims to bring this agenda to the forefront of the UK COP 26 presidency's Nature Campaign. It aligns with other solutions in AT2, AT4, and AT5. The solution has the potential to address all pillars of sustainability (ecological, economic, and social) with positive impacts. These are recognized in the expected	1.50	yes	9

		Transforming commodity supply chains to benefit people and to protect and restore nature	b	6	7	6	6	25		The solution has the potential to address all pillars of sustainability (ecological, economic, and social) with positive impacts. These are recognized in the expected outcomes at the COP26 and through the UN Food System Summit. Also, the FACT dialogue would be funded and is supported by the governments involved. Although, it does not specify the source of funding or estimation cost. This is of particular importance since smallholder farmers might cultivate crops with high profitability but a low ecological value (e.g., in the case of oil palm) (Clough et al. 2016). There is evidence that carbon payments could reduce forest conversion (e.g., to rubber), but it would only work if payments match the cost of avoided deforestation (Warren-Thomas et al. 2018). Using an example of Cambodia, Warren-Thomas et al. (2018) estimate that the carbon prices of $30–$51 per tCO2 are needed to break even against costs (opportunity cost, carbon finance, and implementing cost). Further evidence suggests that domestic funding would play a more significant role in tropical forest conservation (Vincent et al. 2014). However, political structures in some countries might challenge the implementation of conservation efforts. Countries with centralized governments or less democratic ones might protect less land. In those cases, more investment would be needed to improve political institutions (Vincent et al. 2014). Also, greening measures should be adapted to local conditions, and payments should be made based on environmental improvements, such as a result-based scheme (Hristov et al. 2020). The design of these economic incentives should, in any case, evaluate crowding-out or crowding-in behavior to adopt biodiversity conservation (Rode, Gómez-Baggethun, and Krause 2015). Given political support, the FACT Multi-stakeholder Dialogue would lead to a road-map and process to work beyond COP26. While the dialogue is at a global scale, it is expected that the implementation would be at a national level, with support from different organizations. Certification bodies should be considered (such as Forest Stewardship Council (FSC)). The solution should take into consideration the implications of its implementation in consumer and producer countries. For example, the European Union regulation of biofuels seeks to limit the oil palm imports as a biofuel by 2030 to halt deforestation. This has caused concern among producing countries and discourages efforts to palm oil sustainable production. The solution misses clarifying how the FACT multi-stakeholder differs from the REDD+ program or aligns goals with this program's efforts. Concerning the impacts, the solution aims at reaching an agreement between states and non-state actors to regulate the trade and production of agricultural commodities to protect and restore natural ecosystems. In turn, these commitments would translate in restoring or increasing biodiversity, climate change adaptation, and progress of the SGD agendas. Yet, the solution should clarify the type of market mechanism proposed to reach these goals. Also, the FACT process to lead to creating a long-standing partnership between governments, companies and civil society organizations, and the involvement at the UN Food Systems Summit would support advancing the COP26. Clough, Yann, Vijesh V Krishna, Marife D Corre, Kevin Darras, Lisa H Denmead, Ana Meijide, Stefan Moser, et al. 2016. "Land-Use Choices Follow Profitability at the Expense of Ecological Functions in Indonesian Smallholder Landscapes." Nature Communications. https://doi.org/10.1038/ncomms13137. Hristov, Jordan, Yann Clough, Ullrika Sahlin, Henrik G Smith, Martin Stjernman, Ola Olsson, Amanda Sahrbacher, and Mark V Brady. 2020. "Impacts of the EU's Common Agricultural Policy 'Greening' Reform on Agricultural Development , Biodiversity, and Ecosystem Services." Agricultural and Applied Economics Association. https://doi.org/10.1002/aepp.13037. Rode, Julian, Erik Gómez-Baggethun, and Torsten Krause. 2015. "Motivation Crowding by Economic Incentives in Conservation Policy: A Review of the Empirical Evidence." Ecological Economics 117: 270–82. https://doi.org/10.1016/j.ecolecon.2014.11.019. Vincent, J. R., R. T. Carson, J. R. DeShazo, K. A. Schwabe, I. Ahmad, S. K. Chong, Y. T. Chang, and M. D. Potts. 2014. "Tropical Countries May Be Willing to Pay More to Protect Their Forests." Proceedings of the National Academy of Sciences 111 (28): 10113–18. https://doi.org/10.1073/pnas.1312246111. Warren-Thomas, Eleanor M., David P. Edwards, Daniel P. Bebber, Phourin Chhang, Alex N. Diment, Tom D. Evans, Frances H. Lambrick, et al. 2018. "Protecting Tropical Forests from the Rapid Expansion of Rubber Using Carbon Payments." Nature Communications 9 (1). https://doi.org/10.1038/s41467-018-03287-9.			
			Difference (a-b)	4	3	2	-1	8				
3	41	Strengthening Indigenous and Tribal Peoples' rights to management of their territories	a						n.a		1.00	no	10
			b										
			Difference (a-b)	0	0	0	0	0					
3	42	Develop a "Codex Planetarius" to determine a set of minimum environmental standards to govern global food trade	a						n.a		1.00	no	14
			b										
			Difference (a-b)	0	0	0	0	0					
3	43	Global movement to protect and restore riparian buffers in private agricultural lands	a						n.a		1.00	no	v
			b										
			Difference (a-b)	0	0	0	0	0					
3	44		a						n.a		1.00	no	20
			b										

		Transforming agricultural innovation for climate, nature and people	Difference (a-b)	0	0	0	0	0					
3	45	Adopting nature-positive livestock production systems	a	8	5	6	5	24	26.5	The proposal struggles to combine local anecdotal examples with a coherent international level food systems policy package. And as such, it does not provide a specific solution, but rather suggests a broad approach to livestock sustainability. It is true that the title "nature-positive livestock production" is very promising, but the proposal appears to include into that a very wide and diverse range of activities(Aynekulu et al., 2020; Horrocks et al., 2019; Teutscherová et al., 2021; Vijn et al., 2020), some with higher sustainability and impacts, some with lower impacts. Many of these technologies are well known(Arango et al., 2020), but their adoption remains limited, so there must be some strong underlying reasons for this lack of actionability. As a matter of fact, it is not clear what are the boundaries of nature positive livestock production. The idea related to the use of modern technological solutions for increasing livestock productivity e.g. sensing technologies, appears to make sense. The costs of individual solutions would also vary widely, but they are in general appear to be not cheap. Without any doubt, the proposal touches an extremely important area of food systems: how to make the livestock production more sustainable, increase the access to livestock products, so as such this could be part of the action proposals, but the way it is formulated now is very generic and broad. Arango, J., Ruden, A., Martinez-Baron, D., Loboguerrero, A.M., Berndt, A., Chacón, M., Torres, C.F., Oyhantcabal, W., Gomez, C.A., Ricci, P., Ku-Vera, J., Burkart, S., Moorby, J.M., Chirinda, N., 2020. Ambition Meets Reality: Achieving GHG Emission Reduction Targets in the Livestock Sector of Latin America. Front. Sustain. Food Syst. 4, 65. https://doi.org/10.3389/fsufs.2020.00065 Aynekulu, E., Suber, M., van Noordwijk, M., Arango, J., Roshetko, J.M., Rosenstock, T.S., 2020. Carbon Storage Potential of Silvopastoral Systems of Colombia. Land 9, 309. https://doi.org/10.3390/land9090309 Horrocks, C.A., Arango, J., Arevalo, A., Nuñez, J., Cardoso, J.A., Dungait, J.A.J., 2019. Smart forage selection could significantly improve soil health in the tropics. Sci. Total Environ. 688, 609–621. https://doi.org/10.1016/j.scitotenv.2019.06.152 Teutscherová, N., Vázquez, E., Sotelo, M., Villegas, D., Velásquez, N., Baquero, D., Pulleman, M., Arango, J., 2021. Intensive short-duration rotational grazing is associated with improved soil quality within one year after establishment in Colombia. Appl. Soil Ecol. 159, 103835. https://doi.org/10.1016/j.apsoil.2020.103835 Vijn, S., Compart, D.P., Dutta, N., Foukis, A., Hess, M., Hristov, A.N., Kalscheur, K.F., Kebreab, E., Nuzhdin, S. V., Price, N.N., Sun, Y., Tricarico, J.M., Turzillo, A., Weisbjerg, M.R., Yarish, C., Kurt, T.D., 2020. Key Considerations for the Use of Seaweed to Reduce Enteric Methane Emissions From Cattle. Front. Vet. Sci. 7, 597430. https://doi.org/10.3389/fvets.2020.597430	2.00	yes	18
			b	8	7	8	6	29					
			Difference (a-b)	0	-2	-2	-1	-5					
3	46	Adopting regenerative agricultural practices for resilient landscapes at scale	a	7	6	8	8	29	28.5	A resilient food system will require adoption of production and consumption practices that ensures sustainability through nature. Sustainable: a wide range of practices mentioned in this proposed solution have been extensively investigated with individual and complementarity effects estimated. Thus, many farmers have been exposed to these practices. Actionable: Many of these practices have been tried by various stake holders (farmers, researches, etc.) Impactful: a large body of literature (Gustafon et al. 2016; King, 2017). As noted in Action Track 3, with about 500 million smallholder farmers cultivating 75% of global agricultural land and producing about 70% of food globally, the potential adoption and impact of regenerative agriculture practices will be enormous. Cost effectiveness: The potential effect of regenerative agriculture on climate mitigation will be significant. However, as indicated by Hasegawa et al. (2018), efforts to mitigate climate change through comprehensive, economy-wide GHG emissions reductions may also negatively affect food security, partially attributed to indirect impacts on prices and supplies of important agricultural commodities.	2.00	yes	4
			b	8	7	7	6	28					
			Difference (a-b)	-1	-1	1	2	1					
3	47		a	8	8	9	10	35	33		1.50	yes	4
			b	8	7	8	8	31					

		Scaling-out Agroecological Production Systems	Difference (a-b)	0	1	1	2	4				
3	48	Increasing agrobiodiversity for improved production and resilience	a	10	7	8	7	32	29	The overall thrust of the proposal is on the safeguarding and wider use of agrobiodiversity in food systems. Increased use of rich agrobiodiversity in food production contributes to many aspects of sustainability(Bioversity International, 2017), with positive impacts on food security through diversified diets. The safeguarding of the agrobiodiversity in the proposal is suggested to be about 1 bln USD. The costs of enriching current food production with agrobiodiversity are not known, but probably will not able excessively higher than current seed production costs for main crops. However, although the diversity gives resilience to production systems with large agrobiodiversity, this also likely involves more diversified requirements for farming skills and procedures across the value chains, ultimately increasing the per calorie price of food(Leclère et al., 2020). Most of the literature on the topic is very positive for agrobiodiversity. This seems justified from environmental sustainability and richer diets perspective. However, exposing agrobiodiversity to more critical scrutiny, especially from the costs and economics perspective, will provide a clearer idea about overall food security implications (which may be still very positive, but current literature appears to be very much influenced by advocacy style thinking, rather than unbiased scientific examination). Bioversity International, 2017. Mainstreaming Agrobiodiversity in Sustainable Food Systems: Scientic Foundations for an Agrobiodiversity Index. Bioversity international, Rome, Italy. Leclère, D., Obersteiner, M., Barrett, M., Butchart, S.H.M., Chaudhary, A., De Palma, A., DeClerck, F.A.J., Di Marco, M., Doelman, J.C., Dürauer, M., Freeman, R., Harfoot, M., Hasegawa, T., Hellweg, S., Hilbers, J.P., Hill, S.L.L., Humpenöder, F., Jennings, N., Krisztin, T., Mace, G.M., Ohashi, H., Popp, A., Purvis, A., Schipper, A.M., Tabeau, A., Valin, H., van Meijl, H., van Zeist, W.J., Visconti, P., Alkemade, R., Almond, R., Bunting, G., Burgess, N.D., Cornell, S.E., Di Fulvio, F., Ferrier, S., Fritz, S., Fujimori, S., Grooten, M., Harwood, T., Havlík, P., Herrero, M., Hoskins, A.J., Jung, M., Kram, T., Lotze-Campen, H., Matsui, T., Meyer, C., Nel, D., Newbold, T., Schmidt-Traub, G., Stehfest, E., Strassburg, B.B.N., van Vuuren, D.P., Ware, C., Watson, J.E.M., Wu, W., Young, L., 2020. Bending the curve of terrestrial biodiversity needs an integrated strategy. Nature 585, 551–556. https://doi.org/10.1038/s41586-020-2705-y	2.00	yes	19
			b	8	7	6	5	26				
			Difference (a-b)	2	0	2	2	6				
3	49	Sustain and Expand Sustainable Resilient Blue Food Production Systems	a	7	7	8	7	29	27	The proposal is about the sustainable use of blue food: fish, aquatic plants, algae, and invertebrates from both marine and freshwater environments. Given dependence of about 20% of human population on blue food for their food security, this is a critical element of food systems(Bennett et al., 2021). Investments into blue food development are likely to have a strong positive impact of food security and nutritious diets. The proposal recognizes potential environmental damages from mismanagement aquaculture production, but does not provide very clear solutions except indicating that governments needs to support only sustainable forms of aquaculture. The amounts of investments needed are not known, but are not likely to be small. Bennett, A., Basurto, X., Virdin, J., Lin, X., Betances, S.J., Smith, M.D., Allison, E.H., Best, B.A., Brownell, K.D., Campbell, L.M., Golden, C.D., Havice, E., Hicks, C.C., Jacques, P.J., Kleisner, K., Lindquist, N., Lobo, R., Murray, G.D., Nowlin, M., Patil, P.G., Rader, D.N., Roady, S.E., Thilsted, S.H., Zoubek, S., 2021. Recognize fish as food in policy discourse and development funding. Ambio 1–9. https://doi.org/10.1007/s13280-020-01451-4	1.50	yes	17
			b	7	6	6	6	25				
			Difference (a-b)	0	1	2	1	4				
3	50	Aligning policies with nature-positive production	a						n.a		1.00	no	v
			b										
			Difference (a-b)	0	0	0	0	0					
3	51		a	6	6	8	5	25	28	The proposal focuses on the critical issue of on-farm and post-harvest food loss. The proposal is written in somewhat perfunctory way, but this is probably because the proponents assume that the topic is well known. The key idea is	2.00	yes	5

		Reducing on-farm and post-harvest food loss	b	8	7	8	8	31		perfunctory way, but this is probably because the proponents assume that the topic is well known. The key idea is investing 1 trillion USD in the spread of refrigeration along the value chains to avoid food losses. The proponents suggest that this will save 400 M tons CO2-eq, raise incomes and reduce food losses. The problem with this calculation from emissions perspective is that refrigeration chains will themselves cause CO2 emissions, so it is not clear what is the net emission reduction. On other aspects, related to food loss reduction and income increases, the positive impacts appear to be more evident. The costs of these interventions are high, by authors calculations this would make up 1 trillion USD. Need to critically compare where the returns from every dollar will be higher. Food Systems Summit brief on Ending Hunger suggests that investments for avoiding food loss are quite high per capita of undernourished and this is not among the highest return options.			
			Difference (a-b)	-2	-1	0	-3	-6					
3	52	Broadening the genetic base of nature-positive production systems	a	7	6	7	5	25	25	Sustainable: with recent advancement in technology this proposition is relatively sustainable. Actionable: the stress on employing networking tools makes it actionable Impactful: Impact is likely to be felt in the long term as technology cost reduces and more countries get involved. Cost effectiveness: Capital in the form of digital infrastructure will be required for the successful implementation.	1.50	yes	19
			b	6	6	7	6	25					
			Difference (a-b)	1	0	0	-1	0					
3	53	$200M Climate Smart Food Systems Impact Investment Fund	a	10	10	5	8	33	29	The solution is very tangible and actionable given the demand for ethical and green investment opportunities. Private financing will ensure the sustainability. Impact of the fund needs to be proven. Impact could be identified at local scale but investment will be done at global level. Pathways are not clear. What will be the measurable outcome (i.e. focus on greener food production or reducing hunger?) No particular focus on vulnerable groups, women, or equity.	1.50	yes	3
			b	6	6	7	6	25					
			Difference (a-b)	4	4	-2	2	8					
3	54	Addressing 'invisible' underwater issues for food systems: The "blue food" revolution	a	8	6	7	6	27	27	This proposal can be combined with earlier proposal on Resilient Blue food production systems. There is no one solution proposed here, but a program of actions consisting of several complex proposals. Actionability of all these measures will require sustained significant financial investments and political will over time. The implementation of these measures will most likely positively contribute to environmental sustainability and social equity, empowering marginalized artisanal producers, thus helping improve the food security of the poorest. The effect on overall food production increases is less clear, so this proposal appears to come from more distributive and environmental angles.	2.00	yes	17
			b	7	6	7	7	27					
			Difference (a-b)	1	0	0	-1	0					
3	55	Delivering healthier diets and restoring land through tree-based food production	a	7	7	7	7	28	28	The proposal suggests incorporating food trees with complementary crops into degraded landscapes. The sustainability of this approach depends considerably on the location for its implementation. In those areas where trees existed before being cut down and there is enough rainfall/water availability to support tree growth this may work well. In very arid areas, the survival rates of trees can be very low, and less sustainable. Similar reason would apply for actionability. Pouring investments to plant food trees in environments where natural functioning of ecosystems doesn't allow for this (e.g. arid rangelands) would be waste of funds, in those areas this also needs to take into account potential intensification of competition for water. Having said this, this strategy could work out well in previously deforested more humid areas, with positive food security impacts.	2.00	yes	4
			b	8	7	7	6	28					
			Difference (a-b)	-1	0	0	1	0					
3	56	Restoring grasslands, shrublands and savannahs through extensive livestock-based food systems	a						n.a		1.00	no	18
			b										
			Difference (a-b)	0	0	0	0	0					
3	57	Enhanced restoration monitoring and data to guide investment	a	8	8	7	9	32	31	The proposal seeks to fill an important gap in current land restoration activities. Its implementation would involve relatively modest funding level. Key impact would be on environmental sustainability, with further potential impacts on increasing agricultural productivity and food production, and hence ultimately reducing food insecurity. Although the causal chain from data to lower food security is likely to take some time. The sustainability would depend on continues efforts, since by definition monitoring would require continues efforts, but this could serve well to increase the targeting and efficiency of much higher levels of investments planned for land restoration and application of land-based climate change mitigation measures globally.	2.00	yes	27
			b	8	7	7	8	30					
			Difference (a-b)	0	1	0	1	2					
3	58	Shifting the way stakeholders engage with evidence to enhance food system decision making	a						n.a		1.00	no	22
			b										

			Difference (a-b)	0	0	0	0	0					
3	59	Strengthening Landscape Partnerships	a						n.a		1.00	no	4
			b										
			Difference (a-b)	0	0	0	0	0					
3	60	Soils Investment Hub	a						n.a		1.00	no	3
			b										
			Difference (a-b)	0	0	0	0	0					
3	61	Building global initiative to address soil health and carbon sequestration	a	7	6	8	7	28	26.5	The key underlying solution in this proposal is creation of carbon market/payments for carbon farming and carbon trading done through a variety of SLM practices and technologies (e.g. conservation agriculture). The key stumbling block for the actionability of this proposal is lack of clear certification and monitoring systems for carbon sequestration in agricultural lands. Moreover, the extent to which a diverse range of croplands could serve as carbon sinks is still uncertain (how big as carbon sink, is it worthwhile, how transaction costs would feature in for measuring and separate payments for each potentially very small farm). Moreover, it takes a lot of time to build up carbon in croplands, but the accumulated carbon could be very quickly lost e.g. through excessive tillage, posing questions to the sustainability of this solution. This solution appears to be more suited to large scale farms. Actionability for small farms will pose considerable challenges. If such transaction costs could be overcome, this could be quite beneficial for achieving food security impacts.	2.00	yes	11
			b	7	6	6	6	25					
			Difference (a-b)	0	0	2	1	3					
3	62	Indigenous peoples' food systems: conservation and biocentric restoration	a	10	10	8	8	36	33.5	The importance of protecting indigenous food systems has been discussed in a structured way. The solution is clear, feasible, and based on evidence. It empowers indigenous peoples, as it delegates leadership and encourages indigenous peoples participation in discussions (at all levels) affecting their food systems. The solution is based on the implementation of the Free Prior and Informed Consent (FPIC) processes, with the technical assistance of international agencies, particularly the FAO. Sustainability is at the center of this solution, having positive environmental, social, and economic impacts. Indigenous peoples have a cultural understanding of their food, the impacts of the environment on their food, and rich food diversity (FAO 2020; Kuhnlein, Erasmus, and Spilgelski 2009). The implementation approach makes it a solution that can go beyond 2030. The solution would be implemented under the Indigenous Peoples Unit of the FAO and based on their previous and future work. Collaboration and partnership with governments, civil organizations, and representatives of indigenous peoples is part of this implementation. The solution has also identified in which countries it can be successfully implemented. No clear if and how the private sector would take part in this solution. It is expected that the solution would facilitate the transmission of traditional knowledge, foster capacity development (with a special interest in indigenous women), and secure indigenous peoples' collective and individual rights in the use and management of their resources. Altogether, the solution can reduce biodiversity loss, conserve biodiversity hotspots, improve carbon sequestration. Yet, there was no information about the possible challenges and barriers of implementation. Strengthening the food systems of indigenous peoples poses unique challenges. For example, the health care system in Nunavut faces high employee turnover and a lack of Inuit-speaking nurses. (Kuhnlein, Erasmus, and Spilgelski 2009). A drawback of the solution is the lacking of information about financing. While this point was not raised, according to the FAO, there are initiatives on indigenous peoples financed under other projects, e.g., Green Climate Fund Projects (FAO 2019). Some of these initiatives consist of supporting the formulation of the Indigenous Peoples Plan (IPP) as part of the Environmental and Social Management Framework (ESMF) or the FPIC process's set-up. The FAO has created a Multi-donor Trust Fund to support the generation and transfer of traditional knowledge from indigenous elders and women to indigenous youth (FAO 2019). Similarly, if donors' contributions increase, it could also be a funding source for implementing this solution (von Braun et al. 2021). The solution contributes to SGD2 and identifies synergies with AT2, AT4, and AT5, and the solutions 1 and 2 under AT3.	2.00	yes	10
			b	8	7	8	8	31					
			Difference (a-b)	2	3	0	0	5					
4	63	Strengthen labour regulations	a	7	7	7	7	28	25		2.00	yes	16

		by placing people's dignity and rights at the centre	b	6	5	5	6	22		There is significant overlap with proposition 64. Key messages from this proposition could be included there.			
			Difference (a-b)	1	2	2	1	6					
4	64	Improve governance of labour markets in food systems	a	7	7	7	7	28	28.5	This solution proposes to strengthen labour market governance and institutions. It is the most comprehensive of four solutions related to labour markets in AT4 (63, 64, 65, 67). It could therefore form the basis for one solution related to labour markets and also include key messages from the other three solutions. The solution takes a systems perspective by highlighting linkages between labour markets, poverty reduction, equality and food security. The proposition is not supported by evidence and the link to the food system specifically not is not very strong. Further details on specific actions, responsible actors and processes to implement the proposed actions would be useful.	1.50	yes	16
			b	7	7	8	7	29					
			Difference (a-b)	0	0	-1	0	-1					
4	65	Promote ratification and effective implementation of international labour standards	a	7	7	7	7	28	25	There is significant overlap with proposition 64. Key messages from this proposition could be included there.	2.00	yes	16
			b	6	5	5	6	22					
			Difference (a-b)	1	2	2	1	6					
4	66	Securing land tenure rights for resilient and sustainable food systems	a	9	5	8	8	30	30.5	Secure land tenure will contribute to sustainable management of land contributing to food security and poverty reduction. There is plenty of evidence for this. The key challenge of this proposal is actionability. This is being an inherent political issue, the implementation of just, equity-based land tenuring could be quite challenging.	1.50	yes	28
			b	8	8	8	7	31					
			Difference (a-b)	1	-3	0	1	-1					
4	67	Institutionalize and mainstream the anti-discrimination and labour rights of migrant (foreign) workers in agriculture and across the food chain	a	7	7	7	7	28	28.5	There is significant overlap with proposition 64. Key messages from this proposition could be included there.	2.00	yes	16
			b	7	7	8	7	29					
			Difference (a-b)	0	0	-1	0	-1					
4	68	Establishing or improving social dialogue mechanisms as powerful means of finding common solutions to problems, advancing decent work and social justice	a	7	7	7	7	28	28.5	Solutions: Promote establishment of new and improving the functioning of existing social dialogue mechanisms, and enhancing collective bargaining and negotiation as platforms for giving plantation workers and small-scale producers a voice in social and economic development and for inclusive development. Targeted Food Systems: relevant for all food systems; all countries and in particular those with large rural economies and agri-food sectors. Time Scale: Medium term. Evidence exists of effective use of Social Dialogues to find sustainable solutions for employment and labour challenges. For example, the successful multi-stakeholder dialogue forums promoted by ILO tripartite constituents – governments, employers' and workers' organizations and other relevant actors (NGOs, academia, private compliances). The initiatives are on the formulation of effective strategies to promote decent working conditions, competitiveness and compliance in specific agri-food (plantation) sectors. Some of the pathways through which Social Dialogues benefits the actors in the agri-food sector are at best abstract and need more empirical evidence. For example, strengthening the commitment of governments to promote social dialogue is extensive and imprecise.	2.00	yes	23
			b	7	7	8	7	29					
			Difference (a-b)	0	0	-1	0	-1					
4	69	Strengthening organization in the agri-food sector	a						n.a		1.00	no	9
			b										
			Difference (a-b)	0	0	0	0	0					
4	70	Promote inclusive and sustainable agroecological network chains for small farmers and indigenous communities linked to rural and urban consumers	a						n.a		1.00	no	4
			b										
			Difference (a-b)	0	0	0	0	0					
4	71	Engaging with cities and local governments for equitable livelihoods	a						n.a		1.00	no	23
			b										

			Difference (a-b)	0	0	0	0	0					
4	72	Bridging the digital divide and increasing access to information and services in food systems	a	4	3	4	4	15	17	The solution proposes to expand digital infrastructure and support the provision of digital services. Digitalization certainly has a role to play in strenghtening the food system and could be one of the game changing solutions. However, in its current form, the proposition is too generic and not backed up by evidence.	2.00	yes	15
			b	4	4	6	5	19					
			Difference (a-b)	0	-1	-2	-1	-4					
4	73	Commitment by main supermarket chains to buy locally	a						n.a		1.00	no	9
			b										
			Difference (a-b)	0	0	0	0	0					
4	74	Global matching investment fund for small-scale producers' organizations	a						n.a		1.00	no	3
			b										
			Difference (a-b)	0	0	0	0	0					
4	75	Invest in the future - making food systems finance accessible for rural people	a						n.a		1.00	no	3
			b										
			Difference (a-b)	0	0	0	0	0					
4	76	Public Development Bank Initiative to Catalyze Green and Inclusive Food System Investments	a						n.a		1.00	no	3
			b										
			Difference (a-b)	0	0	0	0	0					
4	77	Change relationships of power in ways that ensure a fair share of resources through the MAC Protocol (Mining, Agriculture, and Construction) Protocol	a						n.a		1.00	no	v
			b										
			Difference (a-b)	0	0	0	0	0					
4	78	Agri-SME Business Development Platform: the first global multi-stakeholder engine for inclusive and equitable agri-value-chains	a						n.a		1.00	no	9
			b										
			Difference (a-b)	0	0	0	0	0					
4	79	Farmer Field and Business Schools	a	9	9	9	8	35	33.5	Solutions: A participatory, women-focused training and extension approach that helps farmers build skills necessary to increase production, access markets and sell at competitive prices. It builds on the traditional Farmer Field School (FFS) approach, but integrates sustainable agriculture practices, market engagement, gender and equity, food and nutrition security, group empowerment, and participatory monitoring and evaluation. Targeted Food Systems: relevant for many food systems; can be tailored to a variety of different contexts and builds on local knowledge, skills, and abilities. Time Scale: Short – Medium term. Evidence exists on impact of FFBS in improving crop yields, income, women empowerment and nutrition for small-scale farmers and their households. Some key findings from work already implemented by CARE exist in Bangladesh, India, Malawi, Tanzania, Ghana, and Mali. The key publications supporting impact, sustainability and cost benefit assessment of FFBS are as follows .	2.00	yes	22
			b	8	8	8	8	32					
			Difference (a-b)	1	1	1	0	3					
4	80	Social protection in coherence with agri-food systems related sectors	a						n.a		1.00	no	1
			b										

			Difference (a-b)	0	0	0	0	0					
4	81	Integrating Gender Transformative Approaches for Equity and Justice in Food Systems	a	10	6	10	5	31	30.5	The solution provides extensive evidence and arguments on the relevance of gender transformation approaches (GTAs) and calls for integrating GTAs in food systems interventions. Changing social relations and structures faced by women in food systems would be a step forward to advance towards equitable livelihoods. The positive impacts of such approaches could be drawn from examples of initiatives that integrate GTAs in the health and agricultural sectors (Kågesten and Chandra-Mouli 2020; Cole et al. 2014). It is a sustainable solution that enables equitable engagement of women and men, translating into environmental, economic, and social outcomes. It improves child nutrition, access to productive factors (land, technical knowledge, finance), and biodiversity conservation. It focuses on changing the root issues of gender inequalities. The solution indicates that the UN Committee on Food Security workstream on gender would mediate this work's policy process. There is support from governments and development actors. However, it lacks a clear mechanism on how the solution would be implemented. Some experience could be learned from WorldFish, whose work on this agenda is for almost a decade. Scientists at this CGIAR have conceptualized, tested, and scaled up GTAs in several sectors. Cole et al. (2014) guide how other programs could design and operationalize their GTAs initiatives. The solution also does not mention possible challenges and how these would be addressed. Some challenges are shortage of facilitation skills, volunteer fatigue, reluctance to change, lack of understanding about GTAs, measuring impact, and finance (FAO, IFAD, and WFP 2020). A review on gender-transformative programs suggests that interventions should employ an intersectional approach to include other social determinants (race, ethnicity, sexual orientation, poverty, disability, and class) for long-term impacts (Kågesten and Chandra-Mouli 2020). The same systematic review identifies that LGBT or other gender-diverse populations are not part of these programs, reflecting a need to challenge those social norms. Targeting adolescents could influence gendered attitudes and behavior change. There is no information about financing or cost of the implementation of the solution. This aspect is crucial since many GTA initiatives have limited funds and face long-term funding uncertainty (FAO, IFAD, and WFP 2020). Cole, SM, P Kantor, S Sarapura, and S Rajaratnam. 2014. "Gender-Transformative Approaches to Address Inequalities in Food, Nutrition and Economic Outcomes in Aquatic Agricultural Systems." AAS-2014-42. Penang, Malaysia. http://pubs.iclarm.net/resource_centre/AAS-2014-42.pdf. FAO, IFAD, and WFP. 2020. Gender Transformative Approaches for Food Security, Improved Nutrition and Sustainable Agriculture. A Compendium of Fifteen Good Practices. Rome. https://doi.org/https://doi.org/10.4060/cb1331en. Kågesten, Anna, and Venkatraman Chandra-Mouli. 2020. "Gender Transformative Programmes: Implications for Research and Action." The Lancet Global Health, no. 19: 159–60. https://doi.org/10.1016/S2214-109X(19)30528-5.	2.00	yes	12
			b	8	7	8	7	30					
			Difference (a-b)	2	-1	2	-2	1					
4	82	Living incomes and wages in value chains for small-scale farmers and agricultural workers	a	6	7	8	6	27	29.5	The concept of a living income is significant in ensuring equity and social justice. Sustainable: the need to achieve living incomes and wages for farmers strongly advocated but how that proposes solution will achieve it in a sustainable manner is less stressed. Actionable: "… increased sales on fair trade terms can help ameliorate the distribution of the value added along the supply chains". How this will be done to ensure the practicality of the proposed solution is unclear. Impactful: Living income would provide farmers and others on the agri-food chain with a decent standard of living, enough to cover all their production costs and enough to cover their basic needs, like a nutritious diet, children's education and healthcare Cost effectiveness: This proposition will require state/government support (subsidies, price policies, etc.). Thus, public investment is key, as noted in ATA-4 p. 72, "public investments combined with the adoption of sustainable agriculture practices such as agroecology can help increase farm yields and income resilience"	2.00	yes	16
			b	8	8	9	7	32					
			Difference (a-b)	-2	-1	-1	-1	-5					
5	83	Food and peace facility in countries facing the risk, reality or aftermath of a conflict-related humanitarian crisis.	a						n.a		1.00	no	7
			b										

			Difference (a-b)	0	0	0	0	0					
5	84	Strategic food reserves to smooth consumption shocks	a	10	8	10	10	38	27	Clear concept and description but it does not describe the level of stock aggregation, i.e. local, national regional. Also, it is less clear who manages the reserve and how it can be made sure that it will have minimal market distorting effects (some examples show that national government often prefer price stabilization schemes). The solution is sustainable as it meets current needs and has minimal trade-offs but it requires permanent financing. Linking the strategic reserve to early warning systems, and by doing that independent of political influence, could be a game changer. Huge impact proven during previous food crises. Interventions can target vulnerable groups (poor, gender-sensitive). Solution is actionable but depends on funding source and design (which organization will manage the reserve).	1.50	yes	29
			b	4	5	3	4	16					
			Difference (a-b)	6	3	7	6	22					
5	85	Nutrition sensitive social protection schemes supported by public policies and budgets	a	8	8	10	8	34	31.5	Reviewed together with social protection-related propositions in AT1 (propositions 3 and 11)	2.00	yes	1
			b	7	7	7	8	29					
			Difference (a-b)	1	1	3	0	5					
5	86	Blended financing mechanism to small projects/initiatives locally owned by women and youth along agricultural value chain in Northern Uganda	a						n.a		1.00	no	3
			b										
			Difference (a-b)	0	0	0	0	0					
5	87	Climate risk profiling (using AI) tailored local weather patterns and soil/agricultural practices	a						n.a		1.00	no	13
			b										
			Difference (a-b)	0	0	0	0	0					
5	88	Community and individual back-yard gardens utilizing vertical farming tools, local technologies, recycled and upcycled materials, low-cost drip irrigation or hydroponics.	a	6	6	7	5	24	21	Alternative farming solutions need to be encouraged to produce a resilient food system The cross cutting benefits across nutrition, livelihood improvement, water use efficiency, health, environmental and social divides make this proposition (community and individual backyard gardens) a game changer (McClintock et al. 2016).	1.50	yes	20
			b	5	4	4	5	18					
			Difference (a-b)	1	2	3	0	6					
5	89	Empower women's agency and	a	10	5	10	5	30	25.5	The solution states the problem is trying to address and argue how empowering women's agency can help increase their resilience in shock and crises. The solution focuses on three components that aim to place women in leadership positions to advocate their struggles. The three components are assets and tenure rights, leadership in resilience programs and policies, and funding for gender transformative resilience programs. While the solution indicates the countries (and possible organizations) that support this idea, it misses a mechanism of implementation. Johnson et al. (2018) provide strategies and examples of 13 agricultural development projects designed to empower women. For the implementation, the solution should consider that empowering women must include working with men to avoid gender-based conflicts (Malapit et al. 2020; Meinzen-Dick et al. 2019). Therefore, this solution could be bundled with solution 19 (Integrating Gender Transformative Approaches for Equity and Justice in Food Systems) from AT4. There is no information about financing, but the solution could be financed through the contribution of donors or other funds from international organizations (see Pauw et al. 2021)	2.00	yes	12
			b	5	5	6	5	21					

		Empower women's agency and leadership in developing resilience solutions, including the promotion of women's assets and tenure rights	Difference (a-b)	5	0	4	0	9		international organizations (von Braun et al. 2021). It contributes to SGD5. Braun, Joachim Von von, Bezawit Beyene Chichaibelu, Maximo Torero Cullen, David Laborde, and Carin Smaller. 2021. "Ending Hunger by 2030 – Policy Actions and Costs." https://sc-fss2021.org/wp-content/uploads/2021/03/FSS_Brief_End_Hunger_SDG2_Actions_Costs.pdf. Johnson, Nancy, Mysbah Balagamwala, Crossley Pinkstaff, Sophie Theis, Ruth Meinzen-dick, and Agnes Quisumbing. 2018. "How Do Agricultural Development Projects Empower Women? Linking Strategies with Expected Outcomes." Journal of Gender, Agriculture and Food Security 3 (2): 1–19. Malapit, Hazel J., Ruth Suseela Meinzen-Dick, Agnes R. Quisumbing, and Laura Zseleczky. 2020. "Building Inclusive and Empowering Agrifood Systems for Resilience." https://globalagriculturalproductivity.org/wp-content/uploads/2019/01/Agrifood-Systems-for-Resilience_2020_GAP.pdf. Meinzen-Dick, Ruth, Deborah Rubin, Marlene Elias, Annet Abenakyo Mulema, and Emily Myers. 2019. "Women's Empowerment in Agriculture: Lessons from Qualitative Research." https://perma.cc/8AQY-HJNU.			
5	90	Expanded and improved food security forecasting and monitoring, based on the Integrated Food Security Phase Classification (IPC) as the accepted global food security analysis standard	a	9	7	8	8	32	29	The solution closes a gap in the food security analysis better to understand the nature and severity of food security situations. Development agencies and governments widely employ the Integrated Food Security Phase Classification (IPC) to provide aid and support to food-insecure areas. The solution proposes expanding the IPC to include indicators that negatively affect food systems (e.g., market disruptions), leading to increases in chronic food insecurity. The solution contributes to sustainability outcomes among the most vulnerable populations. Also, since the IPC is already an accepted indicator globally, its sustainability beyond 2030 is evident. It has support from leading agencies and funding from multiple donors. Yet, the design, maintenance, and building of this system would require significant funding. The IPC classifies current and projected situations based on available data drawing from multiple methodologies (IPC 2017). However, it is not a tool for monitoring or evaluating intervention responses (IPC Global Partners 2019). The solution is missing a methodology on how to expand the IPC to forecast and monitor food systems. Food systems are complex, and there is limited data on its situational analysis. In addition, the IPC already assesses indicators of nutrition. The solution emphasizes the role of women as a key action required to address this solution. There is evidence that women are crucial in preventing crisis and increase resilience during shocks. However, key actions for this solution should focus on developing the methodologies to expand the IPC and identify the type of data needed and data sources. IPC. 2017. "Integrated Food Security Phase Classification. Evidence and Standards for Better Food Security." http://www.ipcinfo.org/fileadmin/user_upload/ipcinfo/docs/1_IPC_Brochure_2017.pdf. IPC Global Partners. 2019. Integrated Food Security Phase Classification Technical Manual Version 3.0. Evidence and Standards for Better Food Security and Nutrition Decisions. Rome.	2.00	yes	13
			b	7	7	7	5	26					
			Difference (a-b)	2	0	1	3	6					
5	91	E-commerce eco-system solution for rural transformation (platforms to reach last mile households)	a	8	8	8	8	32	24	The solution proposes to strenghten the e-commerce ecosystem. It takes a system perspective by including measures for farmers, digital solutions, connectivity/accessibility and the business environment. It outlines three different models, so could be adaptable to different contexts. While it does not provide evidence on likely impacts, it is nevertheless promising as a game-changer by higlighting potential benefits of digitalization for a particular use case. It could be useful to broaden beyond e-commerce to focus on "digitally enabled marketing" which could also include, for instance, digitally enabled supply chains.	2.00	yes	15
			b	4	4	5	3	16					
			Difference (a-b)	4	4	3	5	16					
5	92	Tools for accelerated breeding and trait mining underserved crops (Germplasm, Sequencing, Trait mining, Phenotyping, Precision Agriculture)	a	8	5	10	6	29	23	Although trait mining techniques have a tremendous potential for a spectacular acceleration of the plant breeding process, this is quite expensive (Nogue et al. 2016) and many countries may be left behind in this regard. This proposition can be linked to others particularly AT 1 (p. 10); the proposition on democratizing precision agriculture. Also see Higgins et al. (2017) and Wezel et al. (2020) about "materiality, knowledge and farmer engagement with precision agriculture technologies", and agroecology and transitioning to sustainable food systems, respectively.	2.00	yes	19
			b	4	5	5	3	17					
			Difference (a-b)	4	0	5	3	12					
5	93		a	10	9	9	8	36	31.5	Solutions: Integrated sustainable soil management (SSM) for more resilient agri-food systems and food security and for halting soil degradation, restoring degraded soils and protecting C-rich and biodiversity-rich soils. Targeted Food Systems: relevant for all existing food systems. Time Scale: Short – Medium term. The propositions of this proposal are in line with already established work of the World Soil Charter and the FAO. The basic	1.50	yes	4
			b	6	7	7	7	27					

		Integrated approach for sustainable soil management: the Global Soil Partnership	Difference (a-b)	4	2	2	1	9		principles of sustainable soil management and the actions to be taken by various stakeholder. So far, the technical and normative tools to adapt principles and practices of sustainable soil management to local needs and stakeholders have been developed. There exist sound scientific evidence and knowledge on the impact of SSM on restoring degraded soils, increasing food production capacity, reducing soil pollution, and improving soil nutrient content, farmers' incomes, soil biodiversity, and water resources. More needed on the selection of best and locally-adapted SSM practices. Understanding the status of soil is also needed to identify the SSM practices needed – through soil analysis, mapping and monitoring. There is also need for policies and enabling financial and political environment. There is a web of strong political, technical and social support on this proposal: Global Soil Partnership, 193 member countries of FAO and the European Union, other UN agencies (such as UNFCCC, UNCCD, UNEP, CBD), international initiatives (Soil Health Institute), soil science societies, universities, research centres, NGOs, farmers' associations, civil society organisations and the private sector. Key publications to consider are and .			
5	94	The Sahel Resilience Initiative, integrating Food for Assets, school feeding, nutrition, capacity strengthening and seasonality.	a						n.a		1.00	no	v
			b										
			Difference (a-b)	0	0	0	0	0					
5	95	Use of international agreements previously negotiated in the Committee of World Food Security. Voluntary Guidelines	a	8	5	5	5	23	19.5	It has been shown that the prevalence of hunger is most severe in countries with protracted crises (FAO et al. 2019), which is largely related to the collapse of local food systems. Therefore, improved management of crisis situations will have a great leverage to reducing global hunger. For this, a coherent framework is essential, however, impact is difficult to associate with the voluntary adoption of the framework. Gender and equity related aspects are considered. The solution is generally feasible but requires widespread adoption, which is often difficult at the global scale.	1.50	yes	v
			b	4	5	4	3	16					
			Difference (a-b)	4	0	1	2	7					
5	96	Harvest-tenure rights provided by mobile grain storages to reduce post-harvest losses in Sub-Saharan Africa	a	10	9	10	9	38	32.5	• Postharvest loss affects the food security and livelihoods of smallholder farmers and food value chain actors (Tesfaye and Tirivayi, 2018). • Post-harvest losses also represent wasted resources (fresh water, farmland and soils, carbon emissions) used to grow food that never meets a consumer. Sustainable: the solution demonstrates diverse and multiple operational contexts Actionable: Some aspects of the proposed solution have already been implemented/tested in different contexts and proven in the literature (eg. Hengsdijk & de Boer, 2017; Chegere, 2018) Impactful: Improved food security, improved food production and steady consumption pattern, as well as reduced risk of environment degradation (AT5, p. 48). Costing/Financing, Efficiency: multiple agency and stakeholders' commitment could make financing more effective and cost efficient.	2.00	yes	5
			b	6	7	7	7	27					
			Difference (a-b)	4	2	3	2	11					
5	97	Agroforestry practices in arid and semi-arid lands.	a	7	7	7	7	28	25	This is similar to the proposal on Delivering healthier diets and restoring land through tree-based food production.	2.00	yes	4
			b	7	5	5	5	22					
			Difference (a-b)	0	2	2	2	6					
5	98	Advance wide-scale adoption of agro-ecology within farms and rangelands	a	8	8	8	7	31	28.5	Solutions: Scaling up of agroecological (regenerative) agriculture – systemic solution underpinning transformative change and supporting socio-ecological transitions towards sustainable agriculture and food systems. Targeted Food Systems: relevant for all food system – ranging from small holder farms to large industrial operations. Time Scale: Short – Medium to Long term. The several consultative engagements heralded by the FAO from 2014-2018 has brought about the development and the approval of the 10 Elements of Agroecology framework to guide FAO's vision on Agroecology. Furthermore, there are several scientific studies supporting agroecology/ regenerative agriculture. Several institutions and companies have also prioritize the implementation and support to regenerative agriculture, including; Rodale Institute Danone, General Mills, Cargill, and Walmart etc. The Scaling up Agroecology Initiative bringing together different UN Agencies and stakeholders (WFP, IFAD, CBD, UNDP, UNEP, and World Bank) to catalyze scientific evidence, knowledge and cooperation to support agro-ecological transitions at different levels. Furthermore, the Transformative Partnerships Platform (TPP) – launched by CIRAD and the CGIAR – is intended to boost the amount of evidence available on the impacts of agroecological approaches to building resilience of livelihoods and landscapes across a wide range of different contexts. More research and evidence is needed on the costs-benefit analyses of such approaches.	2.00	yes	4
			b	8	6	6	6	26					
			Difference (a-b)	0	2	2	1	5					

5	99	Local and public procurement schemes specifically targeting smallholder farmers and small and micro/small/medium-sized enterprises	a						n.a		1.00	no	6
			b										
			Difference (a-b)	0	0	0	0	0					
5	100	Universal Food Access: Enacting Food as a Public Good.	a						n.a		1.00	no	1
			b										
			Difference (a-b)	0	0	0	0	0					
5	101	Enriching child's food and nutritional education and situation through web-based tools, including food into the curricula, and providing school meals	a	10	8	10	8	36	36	To create resilience and produce positive changes in our current food systems within environmental limits, the solution proposes to change children mindset towards healthy diets. This means, to mainstream healthy food habits from an early age. The solution is supported by scientific evidence, and its implementation is feasible at all levels (local, national, global) (Downs and Demmler 2020; Silva, Santos; Tenreyro 2013; Global Panel 2017; Kufuor, Beddington, and Simmons 2018; Halliday, Platenkamp, and Nicolarea 2019; FAO 2019; Schreinemachers et al. 2020). State municipality actors and school principals are the main key change-agents in this solution. The solution emerged as a public demand, which reflects the urgency and need of such interventions. The solution identifies the challenges of implementation, but misses the alternatives on how to address them. One important aspect is the strong institutional support needed in this solution (e.g., for food procurement, capacity building). The content focuses primary on school meals, and do not provide examples of other instruments (as in the title) such as web-based tools and food in the curricula. In many countries, consumers shape their food preferences or learn about nutrition via social media. The solution could explore social psychological theories or studies to design their interventions and increase their impact. Also environmental psychology provides insights on how to change behaviors and mindsets (de Leeuw et al. 2015; Abrahamse et al. 2005; Steg et al. 2014; Van der Werff, Steg, and Keizer 2013; Bolderdijk et al. 2013). The solution recognizes that investments on such initiatives take time to deliver outcomes, which would be visible beyond 2030. For the implementation, intergovernmental organizations and civil society organizations would support those countries where investment is scare. Although there is no information about funding or estimated cost, contribution of donors could be directed to this solution (von Braun et al. 2021). This solution could be merged with solution 14 (Foster a global conversation around coherence for food environment policies for healthier children) from AT1. Abrahamse, Wokje;, Linda; Steg, Charles; Vlek, and Talib; Rothengatter. 2005. "A Review of Intervention Studies Aimed at Household Energy Conservation." Journal of Environmental Psychology 25 (3): 273–91. https://doi.org/10.1016/j.jenvp.2005.08.002. Bolderdijk, Jan Willem, Madelijne Gorsira, Kees Keizer, and Linda Steg. 2013. "Values Determine the (in)Effectiveness of Informational Interventions in Promoting pro-Environmental Behavior." PLoS ONE 8 (12): 1–7. https://doi.org/10.1371/journal.pone.0083911. 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			b	9	9	9	9	36					
			Difference (a-b)	1	-1	1	-1	0					
5	102	Adaptive human-centric approach to resilient and sustainable water management	a						n.a		1.00	no	17
			b										
			Difference (a-b)	0	0	0	0	0					
5	103	Long-term conservation of food	a	9	8	8	9	34	32.5	Minimising monoculture and high-input dependent agriculture will help ensure achievement of biodiversity and also reduce agriculture related greenhouse gas emissions, as climate change is a major driver of biodiversity loss (Ray et al. 2019). Sustainable • Investments in orphan crops (fonio) as a way of ensuring biodiversity, reducing pollution from input use and	2.00	yes	19

		diversity in gene banks and in the field, and sustained diversification of the food basket.	b	9	8	5	9	31		minimizing the impact of climate change. It is sustainable because of opportunity for community involvement in implementation. Impactful • It will be impactful because if the intended/proposed solutions are implemented, nutrient rich quality and diversified food will be available low cost. Cost effectiveness • Expected to be cost effective because of low input use nature of these orphan crops			
			Difference (a-b)	0	0	3	0	3					
5	104	Community-based decision-making mechanisms and information systems on land rights and access and control	a						n.a		1.00	no	8
			b										
			Difference (a-b)	0	0	0	0	0					
5	105	The Global Network Against Food Crises	a						n.a		1.00	no	7
			b										
			Difference (a-b)	0	0	0	0	0					
5	106	Establish a global centre for risk assessment and policy response on conflict and hunger	a						n.a		1.00	no	13
			b										
			Difference (a-b)	0	0	0	0	0					
5	107	Systemic approaches to risk analysis including tools	a	6	8	5	5	24	27	Systemic and cross-cutting approaches to risk analysis and action as well as the continued learning and exchange is essential to risk management. National risk inventory systems can provide important support to inform policy making, particularly social policy response. However, impact is difficult to associate with a risk assessment tool. The solution is feasible and can be implemented at all levels, local, national, regional. Positive spill-overs can be expected when implementation is done at different layers. Generally, the solution is sustainable but so far is it not fully development across different areas of food system risks.	2.00	yes	13
			b	8	8	6	8	30					
			Difference (a-b)	-2	0	-1	-3	-6					