(TMG) ThinkTankforSustainability
Töpfer Müller Gaßner

IMPACTS OF FOOD

FORESEE SERIES 4C
CLIMATE | COVID-19 | CONFLICT | COST OF EXTERNALITIES

REPORT 3

Blind Spots in the Debate on Agri-Food Systems Transformation

COORDINATING AUTHORS

Tavseef Mairaj Shah, Olivia Riemer

CHAPTER AUTHORS

Chapter 1: Nadia El Hage Scialabba
Swette Center for Sustainable Food Systems, Arizona State University

Chapter 2: Pat Mooney
ETC Group, International Panel of Experts on Sustainable Food Systems (IPES-Food), and Institute for Agriculture and Trade Policy (IATP)

Chapter 3: Patrick Caron
French Agricultural Research Centre for International Development, (CIRAD ART-DEV)

Chapter 4: Maureen Gitagia & Elizabeth Kimani-Murage
African Population and Health Research Center (APHRC)

Chapter 5: Tania Martínez-Cruz
Free University of Brussels

Chapter 6: Michael Hamm
Flying Goat Associates

Chapter 7: Kathleen Merrigan
Swette Center for Sustainable Food Systems, Arizona State University

Chapter 8: Ulrich Hoffmann
Association of German Scientists

REVIEWERS (MEMBERS OF THE CLIF PROJECT AND EXPERT GROUP):

Martina Fleckenstein (WWF International), Michael Mulet (WWF Germany), Alexander Müller (TMG – Think Tank for Sustainability), Wei Zhang (IFPRI).

REPORT EDITOR

Stephen Roche

LAYOUT

Designers For Climate Studios

REQUIRED CITATION

Caron, P., Gitagia, M., Hamm, M., Hoffmann, U., Kimani-Murage, E., Martinez-Cruz, T., Merrigan, K., Mooney, P., Riemer, O., Scialabba, N.E.H., and Shah, T.M. (2023). Blind Spots in the Debate on Agri-Food System Transformation. In FORESEE (4C) – The Transformation of Agri-Food Systems in Times of Multiple Crises (4 Cs: Climate, Covid-19, Conflict, Cost of externalities). Berlin: TMG – Think Tank for Sustainability. Report 3

DISCLAIMER

The content reflects the findings and opinions of the authors and does not necessarily reflect the position of TMG Research.

DOI: https://doi.org/10.35435/1.2023.3

Cover photo credit: Riccardo Mayer

Plouging fields using traditional methods as part of the Regreening Africa project in Ghana.
Photo credit: Kelvin - World Agroforestry (ICRAF)

Contents

Preface

Why we urgently need an international policy framework to govern agri-food systems transformation

The internationally agreed sustainability goals of the 2030 Agenda, the Paris climate agreement and the goals of three **Rio Conventions** that address, respectively, climate (UNFCCC), land restoration (UNCCD) and biodiversity (CBD) **cannot be achieved without a transformation of the world's agri-food systems**.

Today's increasingly industrialized and concentrated agri-food systems are contributing to accelerated biodiversity loss, climate change and other environmental impacts, while failing to address rising food insecurity, malnutrition and food waste. They are also undermining more biologically diverse and climate-resilient food production and distribution systems that are built around smallholder production and local markets.

Transformative agricultural practices, on the other hand, **have the potential to future proof agri-food systems**. An example is when farming sequesters atmospheric carbon, effectively creating a massive carbon sink in the ground, while simultaneously improving soil health.

At the same time, the world continues to feel the impacts of multiple interlinked crises: a climate emergency; ongoing consequences of the COVID-19 pandemic; distortion of global trade in agricultural commodities by the Russian war in Ukraine and its contribution to rising energy and food insecurity; continuing conflict hotspots within countries and across national borders; and the environmental, social and health impacts and external cost of unsustainable production and consumption patterns. We refer to these crises collectively as the **"4 Cs" – Climate, Covid, Conflict and Costs**.

Beyond their immediate consequences, the 4 Cs have introduced new variables that **necessitate a rethink of how to implement existing multilateral agreements**. The 4 Cs impede progress made on internationally agreed sustainable development goals and hence appropriate strategies need to be developed in face of these new challenges to achieve inclusive and sustainable global development. A unique characteristic of today's agri-food systems is that they are simultaneously a casualty, an underlying cause, and a potential solution to these crises. Transitioning to sustainable and resilient agri-food systems has, therefore, the potential to mitigate and respond positively to these crises. However, this can succeed only if proposed transformative actions duly factor in the 4 Cs.

Achieving the right to food for all while transitioning to a more socially inclusive and environmentally sustainable future therefore calls for nothing less than the transformation of our agri-food systems. While a systemic international agreement for agri-food systems transformation has yet to be developed – which from experience could take up to a decade to negotiate and ratify – **the three Rio Conventions could offer insights on possible entry points, as well as pathways towards the required transformative actions**. Not only do they draw their legitimacy from three legally binding international treaties but with their joint focus on the environmental pillar of sustainable development, the Conventions already have a broad mandate to pursue greater synergies.

This provides a fitting starting point for jointly exploring how to address agri-food systems transformation with the existing mandate of each Convention coordinating the efforts. A possible approach is to build on the "Food Days" introduced at all three sessions of the Rio Convention Conference of the Parties in 2022, to practically demonstrate how to **move beyond consensus on the need for urgent transformation towards specific proposals** on what needs to be done, and who should take responsibility for initiating action.

Such efforts can benefit from adopting **True Cost Accounting approaches**, which undertake integrated assessments of all externalities of agri-food systems. This **can support decision makers** to quantify both the value that a transformation of agri-food systems can bring to global sustainability processes, as well as the costs of inaction.

The coordinated action of the three Rio conventions under an **international policy framework would also provide the necessary financial resources** for the required transformative measures. Under this framework, transformative actions in agri-food systems can be funded based on their contributions to fulfilling the mandate of the three Rio Conventions, using a mechanism similar to the Rio Markers mechanism of the European Commission.

Corresponding actions under an international policy framework will also be needed at the regional and national levels. **A whole-of-government approach is required** to stimulate exchanges and negotiations across sectors and make tough choices about how to balance global goals with local needs. The 'synergies agenda' can be further expanded upon by revisiting existing commitments and targets that touch on food security, social inclusion, international trade, and other relevant elements within the Rio Conventions to drive more transformative actions. This would strengthen political structures that focus on the right to food, healthy nutrition, and protecting land, biodiversity and climate.

The FORESEE (4C) Report Series: A brief outline

TMG's new report series *FORESEE (4C) – The Transformation of Agri-Food Systems in Times of Multiple Crises* informs the debate on agri-food system transformation in six ways:

1. Identifying the key issues and hence the need for transformation of our agri-food systems,
2. Analysing the conditions that make transformation both urgent and complex,
3. Assessing the extent to which the existing policy landscape is suitable for transformative action,
4. Analysing the debate to better understand where different actors agree or disagree on transformation pathways,
5. Identifying blind spots and neglected issues in the debate,
6. Proposing recommendations on how to advance the conversation.

The first report, Current Conditions & Policy Frameworks of Agri-Food Systems Transformation takes a systems view of the aforementioned challenges. It outlines the ecological, health and social challenges of current agri-food systems and analyses how these interact with the 4 Cs (Climate, Covid-19, Conflict and Costs). Furthermore, the report reviews the existing policy frameworks at the international level that inform the direction of, and could potentially steer, the transformation of agri-food systems.

The second report, State of the Debate on Agri-Food Systems Transformation, conducts a critical discourse analysis to examine alignment, as well as divergence in current understanding of agri-food systems and potential pathways for agri-food systems transformation. The analysis further reveals important blind spots that have only been marginally addressed in the transformation debate but are essential for a holistic approach.

Current gaps in the agri-food systems transformation debate are analyzed in more detail in the third report, Blind Spots in the Debate on Agri-Food Systems Transformation, which also provides recommendations to address these gaps.

The report series was developed by TMG together with a group of experts from different disciplines and backgrounds. In an iterative process of meetings and workshops, the experts provided advice and feedback on the development of the reports and contributed as authors to the second and third reports in the series. The research was made possible thanks to funding under the Assessment and Communication of Climate Impacts of Food (CLIF) project through the International Climate Initiative of the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection.

Alexander Müller
Managing Director,
TMG - Thinktank for Sustainability

Olivia Riemer
Programme Lead,
TMG - Thinktank for Sustainability

Dr. Tavseef Mairaj Shah
Research Associate,
TMG - Thinktank for Sustainability

Truck full of pineapples at the fruit market in Kampala, Uganda. Photo credit: Nurlan Mammadzada

Fruit market in Zambia.
Photo credit: Rich Mathews

Key messages

1. The debates on agri-food systems transformations are dominated by questions of food security and the environmental, social, and technical aspects of change. There is, however, not enough emphasis on how to manage the just transformation of agri-food systems.

2. In addition to intensifying deliberations on the governance of agri-food systems, a discussion space is needed to address the influence of corporate power and power asymmetries.

3. Transformative measures are difficult to sustain in a polarized landscape. Hence it is important to understand and address the underlying opinions and ideologies that drive the diverging pathways towards transformation.

4. A human rights approach to food and nutrition security can guide the process of transformation, building on existing international human rights frameworks.

5. The concurrent crises of climate, Covid-19, conflict, and the high cost of externalities (4 Cs) have shown that we can no longer afford to subordinate the issue of resilience in the discourse on agri-food systems. Indigenous knowledge, traditional practice systems, and local solutions have a positive role to play in increasing our understanding of resilience.

6. Governments need to adopt True Cost Accounting (TCA) to address the issue of externalized costs. By quantifying the benefits of transformative action, TCA provides a powerful argument in favour of reducing externalities.

7. This should be accompanied by a modification of trade regulations around food to represent food as an essential life-supporting system and not just another commodity.

Introduction

Gaps and blind spots in the agri-food systems transformation debate

The transformation of agri-food systems[i] requires moving beyond silo approaches and hence a coordination between different constituent sectors of the systems. This coordination however should not be limited to communication between these sectors and an agreement on a set of definitions. This should rather translate into a concrete strategy based on systemic solutions that contribute to healthy, equitable, resilient, and sustainable agri-food systems. In this regard, there is a need for concerted cross-sectoral efforts aimed at transforming the agri-food systems. Such efforts must also aim at a redress of the different blind spots and closing the existing gaps in the debate.

As discussed in the previous report of this series entitled '*State of the Debate on Agri-Food Systems Transformation*', different aspects of agri-food systems need to be addressed in order to achieve a sustainable systems-level transformation. When analysing the policy landscape and the state of the debate, we can see that several significant areas are under-addressed, while others are completely ignored. This report continues the conversation on the 4 Cs (Climate, Conflict, Covid-19, Cost of externalities) from where the last report ended and talks about these gaps and blind spots that are important to address on the path towards agri-food systems transformation.

Using the methodology of discourse analysis, this report discusses major gaps in the debate with special focus on the 4 Cs, which are likely to change the conditions under which the transformation of agri-food systems must take place and are therefore of central relevance to any proposed transformation pathways and entry points. This report explores the following eight themes which have profound relevance for the transformation of agri-food systems: governance; corporate and multi-stakeholder pressure; polarization; human rights; indigenous knowledge and agri-food systems; resilience; True Cost Accounting; and international trade.

In view of the aforementioned crises – the 4 Cs (Climate, Covid-19, Conflict, and Cost of externalities) – an analysis of the existing policy landscape and the debate around agri-food systems transformation[ii] revealed gaps in the discourse and blind spots that need to be addressed for a sustainable agri-food systems transformation. These gaps are summarized

i For details on the analysis see Report 1 of the *FORESEE (4C) – The Transformation of Agri-Food Systems in Times of Multiple Crises* series.
ii For details on the analysis see Report 2 of the *FORESEE (4C) – The Transformation of Agri-Food Systems in Times of Multiple Crises* series.

in the following chapters, followed by recommendations on how to close them. Furthermore, this report aims at addressing the *how* of the transformation process whereas the what is often addressed in the transformation pathways proposed by different international and intergovernmental organizations and institutions.

IDENTIFIED GAPS & BLINDSPOTS		Relevance to agri-food systems transformation
1	Governance	Empowering people and communities to engage with **decisionmaking** in agri-food systems
2	Corporate interests	Resolving the **power imbalances**, particularly, in view of the multistakeholder approach
3	Polarization	Addressing polarization by bringing **everyone** to the table
4	Human rights-based approach	Approaching agri-food transformation from a **human rights** perspective
5	Resilience	Building resilience in the agri-food systems to **avoid breakdowns** in the face of crises and shocks
6	Indigenous & traditional systems	Acknowledging the role of **Indigenous and traditional systems** in the transformation
7	Accounting for externalities	**True Cost Accounting** (TCA) of the externalities of the agri-food systems
8	Trade dynamics	Modifying **trade regulations** to acknowledge food as more than a trade commodity

FIGURE 1 Addressing the current gaps in the transformation discourse will help advance the transformation and make agri-food systems more inclusive, sustainable and resilient.

1 Governance systems

The role of multi-level good governance in the agri-food systems transformation

Governance is defined[iii] as "the act or process of governing or overseeing the control and direction of something". The American essayist Lionel Trilling made the point that "the way a nation thinks determines in the end the quality of its governance."

Food systems governance refers to the institutions, rules, and norms that shape how food is produced, distributed, and accessed across borders,[1] and how governments, civil society, philanthropic organizations, transnational corporations, and other actors are involved in decision-making and draw on vastly different resources in exercising power.[2]

Resource degradation from food-related activities and extreme weather events are projected to worsen in the coming years, and food price volatility and supply disruptions are becoming more frequent.[3, 4] For these reasons, food system transformation is on the agenda of all relevant international and government agencies, with a view to stabilizing food supply. food system governance must simultaneously consider social, nutritional, environmental, and economic outcomes.

However, food systems are currently locked into unsustainable trajectories due to various self-reinforcing dynamics, including profit-driven innovations, power consolidation and incoherent policies.[5] While public and private actors, representing multiple sectors such as agriculture, environment, health and trade, ought to work together to properly shape food systems, there is no level playing field among and between the different interest groups. Thus, the great challenge is to ensure equal participation and coherent policies across sectors and stakeholders

Political economy reveals the responsibilities of different actors and the need for structural transformation of food systems governance.[6] Considering that food system governance shapes policies, legislation, planning and financing, the following questions determine the contours of the subsequent discussion:

- Who are the key stakeholders in agri-food systems?
- What are their interests and values and how do they advance these?
- Are global governance structures conducive to the development of sustainable food systems?

iii Merriam-Webster Dictionary, https://www.merriam-webster.com/dictionary/governance

1.1 Multi-level governance of agri-food systems

There is a lack of common vision on what constitutes the ideal governance arrangements, policy processes and institutional arrangements to shape decision-making in the food sector. Different governance initiatives (i.e. public, private, multi-stakeholder) deal differently with the competing and sometimes conflicting goals of a sector characterized by multiple actors (millions of producers and billions of eaters) and institutions, multi-scale food systems (local, regional, national, global) and a range of interacting and non-linear factors, such as bargaining power and the prevailing stakeholder paradigm.

The few studies that consider food system governance identify several different analytical frameworks, including:

- Governance of social-ecological systems, i.e. institutions and their dynamic interaction with bio-physical systems;
- Network governance, i.e. interactions between interdependent nodes and forms of network governance;
- Transition theory, i.e. analysis of socio-technical regime shifts using a multi-level perspective that breaks the food system into three principal domains: niches, regimes, and landscapes. Niches are dynamic, rapidly changing, institutionally protected spaces that allow technical and social innovations to mature; regimes are characterized by locked-in mechanisms, established institutions, incentives and interests; while landscapes entail longer timeframes including processes that cannot be controlled by stakeholders (e.g., climate change) but can influence niche-regime interactions;
- Multi-level governance, i.e. distribution of public authority across different jurisdictional levels and related coordination dilemmas;
- Eenvironmental policy integration, i.e. integration of environmental sustainability across policy domains, challenges to integrate different public policies to achieve environmental goals; and
- Meta-governance, i.e. analysis of the 'governance of governance' referring to multi-actor processes that define the rules regulating their interactions when dealing with a particular problem.[7]

Although there are different forms of governance, what is needed is a universally agreed framework to evaluate and adopt good governance arrangements for the various agri-food system actors. The lack of such a tool leaves decision-makers in the dark on how to navigate their food systems to achieve multiple outcomes (e.g., healthy diets, ecological quality, and equity). Good governance explicitly takes into account all affected stakeholders, including those that are not in a position of power. A sustainability-oriented governance structure contains values and responsibilities that are clearly stated and through which transparency and accountability are ensured, with active participation by all stakeholders. An analysis of the 2021 UN Food Systems Summit (UNFSS)[iv] identifies authority and legitimacy[v] as key challenges of global food governance for transformative food systems.[8]

iv The key messages of the food system Summit were encapsulated in the closing speech by the UN Secretary General and form the basis of the discourse analysis as presented in the previous report of this series entitled, State of the Debate on Agri-Food Systems Transformation.

v Authority and legitimacy are intertwined in policy language but distinct. Authority is the right to act (rightful power) because citizens give legitimacy to act on their behalf. Authority and legitimacy exist in government, organizations and individuals. Thus, legitimacy refers to the popular acceptance of a regime as an authority. Traditional Knowledge Act No. 7 of 2013. | FAOLEX

1.2 The bargaining power of transnational corporations drives current agri-food systems governance

The global food system is influenced by transnational corporations, philanthropic organizations and power networks that transcend the purview of nation states' decision-making. Starting with the East India Company in the seventeenth century, transnational companies have long followed the template of reaping profits from resource mining while externalizing the social costs of production by deferring legal responsibility to companies (legal persons) rather than its members (natural persons).

As has been well documented by the NGO Erosion, Technology and Concentration Group (ETC Group), interlocking oligopolies operate all along agri-food supply chains, with anti-competitive impacts in seeds, supermarkets[9] and along all food system transformation pathways. The global agri-food system is not only dominated by Big Agribusiness, Big Biotech, Big Pharma, Big Data, and Big Fintech, but also by the invisible horizontal holdings of asset management firms (such as BlackRock) that acquire stakes in multiple competing firms in the same market segment. In the face of rising shareholder activism, the United Nations, national governments, and civil society have little chance of setting an agenda that challenges corporate power.

The UN Food Systems Summit marked the culmination of a shift from multilateralism, whewe accountability rests with governments, to multi-stakeholderism, where private-public partnerships led by a variety of UN institutions, corporate trade associations, non-governmental organizations and academics are backed by powerful actors. Multi-stakeholderism is characterized by a lack of transparency and a complex process of public accountability. While multilateralism *per se* is an arrangement for collective action[vi] to fulfil shared objectives, multi-stakeholderism tends to follow a governance arrangement where the space for those most affected by food insecurity and malnutrition to voice concerns and participate in decision-making on food system transformation is narrow[vii]. To maintain hard-won spaces (such as the Civil Society Mechanism of the Committee on World Food Security), 'food sovereignty' stakeholders are calling for an 'inclusive multilateralism' grounded in state accountability, human rights and the active and meaningful participation of those most affected.

1.3 Techno-science and speculative financialization characterize current agri-food systems

Around 1600, the European philosophers René Descartes and Francis Bacon introduced the concept of mechanization, which reduced living beings to mechanical objects and nature to something to control and conquer through science and technology. This concept still prevails today in the mainstream scientific paradigm, justifying the exploitation of natural resources and denigrating traditional[viii] farmers' and Indigenous People' knowledge systems. Thus, techno-science is equated to progress and development in the agri-food sector, while holistic empirical knowledge is considered solely the province of the poor and marginalized.

vi See https://www.oneplanetnetwork.org/programmes/sustainable-food-systems/multi-stakeholder-mechanisms

vii Multi-stakeholderism is discussed in the next chapter.

viii Traditional knowledge is knowledge (whether in tangible or intangible form) that is or was intended by its creators to be transmitted from generation to generation and (i) originates from a traditional community or (ii) is or was created, developed, acquired, or inspired for traditional purposes.

As the governance of food systems is shaped by power relations involving struggles over access to resources, business-as-usual and technological narratives dominate the innovation debate and consequently the political agenda and institutional structures. In fact, the mechanistic definition of food systems in discussions at the 2021 Food Systems Summit on 'science, technology and innovation' has been criticized by the coalition of farmers, activists, scientists and consumers referred to in the sister report entitled *Policy Landscape and State of the Debate* as the 'food sovereignty group', as it relies on a narrow view of science and knowledge to push for technology -driven food systems development, digitalization and financialization. The power imbalance is such that the 'food sovereignty group' struggles to claim authority based on knowledge, expertise and solutions to problems rooted in social, ecological, and economic context.

Technology and digitalization in agriculture enables more precise management in the field and in the market but the right to privacy, knowledge and application are being usurped by a handful of voracious corporations. In fact, Big Data collects data from precision farm equipment, processes it through opaque algorithms and artificial intelligence (AI) processes and sells it back as data-driven insights, entrenching the market advantage of large agribusiness.[10]

Agricultural technologies are becoming ends in themselves rather than economic means to sustain agricultural activity. Rather than assisting farmers, smart technologies often lead to their displacement (in search of 'better' livelihoods or due to dispossession), while extracting data and raw materials from the land (through drones, driver-less tractors, monocultures and synthetic inputs) to manufacture lab-grown foods or grow food indoors (e.g., vertical farming, hydroponics, aeroponics, aquaponics, bioreactors). It has been estimated that this trend could lead to the abandonment of 300 million farms and the forced migration of over 1 billion people.[11]

This techno-science paradigm guides the perspectives of the group of industrial farmers, powerful agri-food businesses and affiliated scientists teaming with inter-governmental institutions and governments known as the corporate innovations group (detailed in the sister report entitled *Policy Landscape and State of the Debate*) and their ways of imagining future food systems derived mainly from laboratories (as opposed to soil-based food production). This conceptualization of the world, coupled with advances in genomics, biotechnology and nanotechnology, inspired transhumanists such as Silicon Valley engineer Ray Kurzweil[12] to transcend the limitations of the physical body by merging it with machines and artificial intelligence.

The industrial agri-food sector has not only divorced agriculture from nature, but has also fully commodified food, separating the price from the value of food. The WTO Agreement on Agriculture of the mid-1990s wove agricultural specificities into the fabric of industrial regulations, exacerbating specialization and the externalization of environmental and social costs. In 1991, the decision by the leading investment bank Goldman Sachs to invest in food derivatives in the New York Stock Exchange marked the beginning of aggressive speculation in food commodities,[13] resulting in rocketing food prices despite plentiful food supply. Food financialization was the driving factor behind the food price crises in 2008 and 2022, as failures in financial systems immediately translated into agri-food system failure.

The financialization of food and agriculture is conducive to more land grabbing and further corporate concentration.

1.4 Governance in the context of multiple crises 4 Cs

Many of the challenges caused by the 4 Cs (climate, conflict, Covid-19 and the cost of externalities) can be linked to the dominant governance model of corporations that have financialized the global food economy. The dominant agri-food system has heavy social, economic, and environmental impacts; Greenhouse gas (GHG) emissions from industrialized agriculture contribute to climate change, the over-exploitation of natural resources results in conflicts, deforestation and wildlife capture have, at least partly, contributed to the Covid-19 outbreak (as wildlife exits its natural habitat and gets closer to humans), and speculation and high energy prices cause food price spikes and inflation, even when the other costs of food production remain externalized.

As multiple crises intensify, governments tend to focus on immediate population needs and sacrifice longer-term responsible management. A case in point are the EU's current discussions on loosening environmental rules within the Common Agricultural Policy (CAP), such as land set-asides and pesticides, in order to increase production and compensate for disruptions to the grain trade due to the war in Ukraine.

Beyond time horizons whereby crises trigger emergency provisions to respond to immediate needs, the economy is not limited to the primacy of the financial capital and a just economic system requires good governance for societal wellbeing.

What types of mechanisms can ensure good agri-food governance? How can the relations of power and influence be effectively addressed? How can our fragile and volatile food system be transformed into something more viable and resilient in the context of deglobalization? Governance for food system transformation raises questions of power, as well as engaging with different knowledge systems.

The 'corporate innovation' and 'food sovereignty' groups are struggling to establish authority and claim legitimacy through very different approaches. Corporate power is exercised through structural forces and changes (e.g., mergers and acquisitions that increase influence, multi-stakeholderism) to shape the terms by which food systems governance is deemed legitimate. Food sovereignty is expressed through collective action, arguing that food producers are not simply stakeholders but rights-holders whose voice governments have a duty to meaningfully include.

What is needed is a universal values framework guiding the good governance of agri-food systems, as well as translating principles into practice through operational indicators. The FAO-SAFA Guidelines[ix], co-developed by private and public stakeholders and based on best practices, spell out good governance themes and key performance indicators essential for a comprehensive assessment of agri-food system sustainability.[14] These include:

- Corporate ethics expressed through mission statements and due diligence;
- Accountability in the form of holistic audits, responsibility, and transparency;
- Participation through stakeholder dialogue, grievance procedures, and conflict resolution;

ix FAO, 2014. The Sustainability Assessment of Food and Agriculture systems (SAFA) Guidelines - Version 3.0 (fao.org)

- Rule of law through the establishment of legitimacy, remedy, restoration and prevention, civic responsibility and resource appropriation;
- Holistic management in the form of sustainability management plans and True Cost Accounting.

As the True Cost Accounting (TCA) methodology is increasingly used to assess trade-offs and synergies in agri-food systems, TCA evaluations[15] ought to consider *bargaining power distribution* beyond current environmental, social, and corporate governance (ESG) standards of transparent accounting and shareholder accountability.

1.5 Conclusions and recommendations

Policy measures are urgently needed to redress power imbalances and prevent free-riding behaviour and to progress towards a coherent policy framework. Action in the form of anti-trust and competition laws at national and international levels will be needed to limit the concentration of power as well as to create a level playing field for different forms of knowledge. This includes the following measures:

Building a common vision of good governance

- **International**: Agree on a good governance framework with essential components, such as accountability.
- **National**: Create a ministry dedicated to food systems and coordination between associated areas including agriculture, public health and safety, trade, environment, and culture, to oversee domestic food policy and promote a consistent approach to implementation and enforcement across domestic food-related portfolios.
- **Local**: Establish food councils and build local Good Food Charters with goals, strategies and actions, developed based on feedback and guidance from all stakeholders and designed to capture the goals and priorities of many farms, foods and health initiatives (e.g., Michigan Good Food Charter).

Addressing the lack of fair playing field among stakeholders

- **International**: Develop a United Nations Treaty on Competition
- **National**: In the transition from industrial to digital agriculture, consider liability for eventual harm through legislative and policy actions similar to the precautionary and polluter-pays principles. The Rio Declaration principles address requirements for states to develop domestic policies supportive of sustainable development and, inter alia, liability and compensation for environmental damage.
- **National**: Public support (e.g., subsidies, research) should not be driven only by materialistic science but also by transdisciplinary and empirical knowledge and evident outcomes achieved by those practicing agroecology.
- **Local**: Establish vibrant local food systems through local procurement and community support for entrepreneurship and cooperation, drawing on positive examples (e.g., community-managed natural farming in Andhra Pradesh, India).

- **All levels**: Build a critical mass of like-minded agroecological people, as described in the Long Food Movement.[x]

Addressing complexity, cross-cutting issues, competing needs, different scales and feedback loops

- **International**: As geopolitical alliances are forcing change in global trade negotiations; the time is ripe to put food sovereignty[xi] at the centre of agriculture trade.
- **National**: Lobbying spending on supporting policies is commonly greenwashed with negative lobbying efforts by 'middlemen'[xii], creating a gap between rhetoric and action. Disclosure of direct and indirect corporate lobbying to public policy is needed, along with a cap on financial or in-kind political contributions.
- **Local**: Integrate food policies into local governance, including urban planning, with the aim of producing public goods in local environments.

x IPES-Food & ETC Group, 2021. A Long Food Movement: Transforming food systems by 2045.

xi Food Sovereignty is a more holistic term than Food Security. It recognizes that control over the food system needs to remain in the hands of farmers, for whom farming is both a way of life and a means of producing food. It also recognizes the contribution of Indigenous People, pastoralists, forest dwellers, workers and fisherfolk to the food system. It ensures that food is produced in a culturally acceptable manner and in harmony with the ecosystem. This is how traditional food production systems have regenerated soils, water, biodiversity and climactic condition, for generations. Food Sovereignty Systems| FAO

xii GRI, 2022. Scrutiny on the man in the middle – lobbying. The GRI Perspective, Issue 7, 15 June 2022.

Photo credit: Riccardo Mayer

2 Corporate interests

Addressing corporate power and multi-stakeholder pressure

The advent of powerful new information platforms impacting every sector of the global economy has led to greater corporate concentration and heightened alarm that the primacy of governments and multilateral institutions is being jeopardized by a new set of transnational (or supranational) actors.

Recognizing the growing public alarm and regulatory unease, corporations are pressing for new, inclusive, and consensus-based multistakeholder governance strategies to assuage policymakers and civil society while still assuring themselves the market access and technological freedom they desire.

In tandem with what the World Economic Forum (WEF) has dubbed Industry 4.0, the agri-food sector has adopted the same consolidation strategy and a platform of bio-digital technologies they describe as Agriculture 4.0. Agriculture 4.0 is promoting a fast, efficient governance model that offers large agribusiness freedom of operation camouflaged by a kind of collegial transparency known as multi-stakeholderism.

The move toward a multi-stakeholder approach to agri-food system governance became evident during the 2021 UN Food Systems Summit which was, itself, proposed by the multi-stakeholder WEF, which is governed by 1,000 of the world's largest corporations. When the WEF proposed the Food Systems Summit in 2019, public and government alarm over internet security and the hegemony of a handful of IT corporations was rising, but concern over the transnational power of trillion-dollar behemoths was tempered by an even greater alarm that the climate crisis, combined with biodiversity loss, had become a major threat to global food security. Both agribusiness and Big IT argued that these crises could only be addressed on a new bio-digital platform and then only if the intergovernmental community created the entrepreneurial space and regulatory environment that would allow private science to work its magic.[16]

Three years later both the new technology platform and the multistakeholder model are in jeopardy. The manifest urgency of the 4 Cs has heightened government anxiety but the unanticipated complexity and fragility of corporate supply chains – especially in the health and food industries – has revealed weaknesses in the capacity of the IT companies and technologies to manage their own systems. The 4 Cs have similarly exposed the dangers of multi-stakeholder

initiatives. Governments in the Global South were understandably infuriated with the COVAX governance model that blocked their access to Covid-19 and monkey flu vaccines. Closer to the food system itself, a recent study of commodity-based multistakeholder initiatives judged them to be "not fit for purpose".[17] Most notably, civil society organizations and social movements closely linked to food and agriculture and multilateral governance systems roundly rejected the 2021 Food Systems Summit and the pressure to endorse multi-stakeholder strategies.

2.1 Why do corporations need multi-stakeholder governance; what's wrong with it; and what are the alternatives?

Towards the end of 2022 the feverish pace of corporate takeovers abated, at least temporarily, amid worries about inflation, higher interest rates, and increasing regulatory review especially in food and agriculture. Nevertheless, the world's biggest IT and agri-food players are already committed not only to Agriculture 4.0 but to further consolidations. Between 2015 and 2018, Bayer's takeover of Monsanto, the merger of Dow and DuPont, and SinoChem's acquisition of ChemChina/Syngenta – with little outcry from either governments or civil society – persuaded companies that even bigger consolidations would be tolerated. Accordingly, the top IT and venture capital companies have doubled down on food. Venture capital investment in agri-food technology experienced an annual compound growth rate of 32%, reaching €17.8 billion by 2019. In 2020, there were more than 1,600 digital AgTech startups in the market. By 2025, the market for agricultural drones and robots is expected to reach USD 5.7 billion and USD 20.3 billion respectively.[18] The markets of first interest are, of course, in Europe and North America but this new platform resulting from the confluence of agriculture and digital technologies has already engaged more than 500,000 farms in India and Africa and companies see enormous potential in Argentina, Brazil and China. Industry reports, including the latest ones in 2022, not only forecast massive consolidations but expect that big IT players such as Amazon, Alibaba, Google, IBM, Microsoft, Qualcomm will use their digital breadth to converge or control most or all the links in the food chain. Just as the seed and crop chemicals sectors have been consolidated, fertilizer, farm machinery, farm insurance and trading companies are also vulnerable. Scale, however, is a significant factor and the IT giants cannot profit if they're not allowed to grow.

Around the world, governments are reviewing their anti-trust/competition policies and the popular mood among legislators and civil society is increasingly hostile to mammoth companies. Agriculture 4.0 must transform and control the global policy environment and, to do this, its proponents must persuade the public and policymakers that the world's future food security depends on them delivering their technologies at scale.

2.2 What is multi-stakeholderism?

Building on the 50+ years of experience of the World Economic Forum,[xiii] the Global Compact between corporations and the UN, the public-private collaboration rolling out Covid-19 vaccines via the World Health Organization (WHO) and the Food System Summit, the agri-food industry and some states advocate for a form of multi-stakeholderism while civil society and most governments are experimenting with other more inclusive and effective forms of multilateralism that don't undermine the nation state.[17, 19].

Advocates of multi-stakeholderism argue that the urgency and complexity of interrelated global negotiations makes constructive action practically impossible. They propose that a smaller, more manageable – but still representative – group of key stakeholders from industry, government, civil society and the science community is capable of reconciling differences through semi-formal dialogues that can produce solutions ultimately endorsed by governments and UN bodies or other multilateral institutions.[20]

Opponents maintain that multi-stakeholder groups replace open debate with an opaque process that inevitably privileges the world's most powerful corporations and governments. Granting them free rein in historically intergovernmental forums could allow them to greenwash the SDGs and food security just as they have greenwashed ESGs and GHG emissions. Representation by the scientific community and civil society, critics insist, would only be token. Even if multi-stakeholder recommendations are submitted to governments or UN agencies, all parties (including those not invited to the dialogue) would be under pressure to endorse the consensus.[11]

Critics recognize that individual companies and trade associations regularly lobby (and pressure) governments through bilateral channels and shape scientific debate through sponsored research. Furthermore, powerful governments routinely employ carrot-and-stick aid and trade instruments to win concessions from the Global South, but such manoeuvres are inelegant and sometimes ineffective. Creating a multi-stakeholder group not only disguises bilateral pressure tactics but provides an aura of "science-based" collegial decision-making enhanced by the participation of purportedly independent civil society actors and scientific institutions – all or most of whom look to governments, industry, and/or foundations for funding. On those occasions where genuine grassroots movements are engaged, they are still disadvantaged as cultural outsiders lacking the financial support available to their antagonists who can access limitless resources.[21]

Industry already invests heavily in lobbying governments and UN agencies. Although "lobbying" is ill-defined around the world, the best estimate for the US and Europe is that companies spend an annual average of USD 5.5 billion plus an additional USD 1 billion in critical election years. There is general agreement that the number of industry lobbyists is growing substantially, and their numbers and resources rise proportionately with the importance of the policy. The cost/benefit analysis for companies is difficult to ascertain but one estimate is that corporate influence over EU policies cost taxpayers EUR 120 billion per annum. From a different angle, McKinsey (the global consulting company) estimates that the adoption of Open Government initiatives (thus exposing corporate influence) would save governments between USD 3 – USD 5 trillion each year.[22]

xiii For a description of the first 30+ years of the World Economic Forum, please see Geoffrey Allen Pigman, *The World Economic Forum,* Routledge, 2006.

Why then would industry risk exposure to an additional and (theoretically) transparent layer of governance?

The only credible answer must be that it is not an additional burden but an additional tool and that, rather than transparency, multi-stakeholderism offers speed and protection. To win support for inevitably controversial new bio-digital technologies (with levels of risk far beyond GMOs) and to move to the next stage of cross-sectoral industry concentration, IT players (and the agri-food companies they might acquire) need visible buy-in from societies and their governments. Multi-stakeholderism does this expeditiously.

2.3 What are the alternatives?

Various alternatives have been shown in the recent past to function in a more inclusive manner than multi-stakeholderism. Indigenous peoples have always cooperated through community decision-making processes sometimes called deliberative dialogue. Civil society has a long experience with a wide range of formal and semi-formal policy and budget processes from the municipal to the national level. In Latin America, experience with community-based budgeting in states dates back to the immediate post-war years. It is only recently, however, that civil society and governments have explored new national and international governance approaches.

The economic and food crisis (2008–2009) opened up a political space that allowed CSOs and social movements to restructure the long-dormant UN Committee on World Food Security turning it into the undisputed UN policy forum for food and agricultural issues. While the CFS is clearly multilateral (i.e. intergovernmental), it commands the active participation of not only the Rome-based agencies, but also those elements of other agencies that are linked to food and agriculture. The genius of the CFS is that it also welcomes the active engagement of other "rightsholders" (Indigenous People, social movements and others in civil society) as well as so-called "stakeholders" (i.e. the agri-food industry). The CFS has also attracted foundations and academic (including scientific) organizations. Although far from perfect – and subject to the whims and machinations of governments and secretariats – the CFS is a robust work-in-progress that has taken on and advanced tough topics with energy and transparency. All players are both at the table and heard.

2.4 Conclusions and recommendations

Efforts to transform food system governance may take years or decades for the different initiatives to bear fruit. The CFS, for example, was a good idea whose time had not arrived when it was established in 1974 but it has grown to become a critical policy-making body since 2009. Important advances in peasants' rights, land tenure and agroecology have been years in the making as a consequence. The ongoing reality of the 4 Cs will not only be with us for some time but may render the unlikely likely in short order. Hence, a reconsideration of the food system framework must include both short and long-term structural possibilities.

For a sustainable agri-food systems transformation, the issues of strong corporate influence on governments and intergovernmental organizations needs to be thoroughly addressed. This is particularly relevant at a time of multiple crises, where various facets of the crises are linked to the interests of different stakeholders. Nevertheless, the challenge to food systems posed by the 4 Cs has created the space for experimentation and improvement.

The following recommendations would benefit from further exploration:

- The Committee on World Food Security (CFS) and individual multilateral agencies should require that **companies and trade associations publicly register as lobbyists, clearly stating their policy interests, detailing their expenditures, and disclosing their meetings** with secretariats, diplomats, and others where these policy issues are addressed. Recent positive moves toward Open Governance Partnerships and Open Registries should be reviewed and adapted to multilateral institutions.
- Although requirements differ from country to country, publicly traded companies are normally obliged to disclose a range of information to government departments. The nature of **this information should be reviewed with the goal of making all but market-sensitive information publicly available**. Corporate information routinely shared with shareholders should also be made available to rightsholders (governments and civil society – including and especially trade unions).
- Multilateral institutions should **review their procedures to facilitate Freedom of Information requests from all parties** that have a registered status with the institution. Building upon the experience of the World Bank and International Monetary Fund (IMF), **other multilateral agencies should facilitate information requests and research resources of rightsholders** who may be impacted by their policies and programmes.
- Civil society and academic institutions are actively exploring legal initiatives linked to the Right to Food and the Rights of Peasants, Indigenous Peoples, and other Rural Peoples not only through the Human Rights Council but also with respect to the International Criminal Court (ICC) and the International Court of Justice (World Court). Recent developments in environmental law – often directly impacting the Right to Food – suggest opportunities that may be pursued through the ICC. Likewise, the World Court's flexibility in addressing administrative issues of concern to UN agencies suggests opportunities to consider agency responsibilities and inter-agency mandates and relationships.
- Progress in implementing and broadening participation in the Aarhus Treaty[xiv] should be evaluated with the possibility of expanding its mandate to include the Right to Food.

xiv Aarhus Treaty, https://unece.org/environment-policy/public-participation/aarhus-convention/text

Monoculture maize crop, Namibia.
Photo credit: Hannes Thirion

3 Addressing polarization

Overcoming polarization by bringing everyone to the table to reshape agri-food systems.

Food system transformation is a complex yet urgent task that makes it necessary to fulfil multiple international agreements on human rights, food security, sustainable development, and climate change mitigation and adaptation. One of the factors that contributes to this complexity and hinders transformation is the wide variety of actors that claim a stake in the process, who may or may not get a place on the table and an equal say in the discussion. This chapter delves into the issue of bringing all actors to the table in view of the existing polarization of the food system transformation debate. The chapter draws on the author's previous publication as the main source, in addition to referring to other published literature on this topic.

3.1 The status quo

"The need for change!"

There is no longer doubt about the need for a radical transformation of our food systems.[23, 24, 25] This was the reason for organizing a United Nations Food Systems Summit during the UN General Assembly in New York on 23 September 2021. Because of the strong interactions across sectors (synergies, trade-offs and feedback loops), such a transformation is not only needed to address all forms of malnutrition but also to achieve the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development. According to the Independent Group of Scientists appointed by the UN Secretary-General,[26] food can be considered one of the six entry points to move towards sustainable development. The recent Covid-19 crisis and the war in Ukraine have further complicated the situation while intensifying its urgency. For many years people have identified agriculture as the main culprit for climate change and biodiversity erosion, with strong links to health and social crises.

"Obstacles to change!"

Despite such a consensus and the available scientific evidence on what to do and how to do it, transformation is not happening either at the necessary speed or scale. Despite alerts, the so-called 'dominant' model remains. Reactions complaining about "bla, bla, bla" discourses that maintain procrastination are growing and becoming more and more violent. In this regard, the author notes in his book 'Coexistence and Confrontation of Agricultural and Food Models A New Paradigm of Territorial Development?' that "Opposition between the proponents of local or organic food, who proclaim the need for quality, human and environmental health, and

social justice, and the defenders of economic interests and the efficient organization of supply chains, who raise the spectrum of shortages. The former often demonize the latter, considering them vile poisoners of the planet and humanity. The latter, in return, denigrate the former, calling them irresponsible 'lefties' and 'champagne socialists'. The divides continue to grow between producers and consumers, between rural dwellers and urban ones, between defenders of ecological causes and advocates of economic pragmatism, between localists and globalists, all accentuated by the hyper-mediatization of subjects and the functioning of social networks, without any structured spaces for dialogue."[27]

3.2 Is it possible to navigate beyond the Manichean dualism that fosters extremes and increasingly generates confrontation?

This duality certainly corresponds to a fruitful stage of political organization of confrontation. However, it would be safe to assume that the polarization promoted by merchants of doubt and exacerbated by the current hyper-mediatization can only lead to two scenarios: a procrastination resulting from power relations or a potentially violent revolution with unpredictable effects. Hence, it is necessary to move beyond dualism in order to overcome both the naivety of a consensus incapable of modifying the status quo and the violence and uncertainty of confrontation.[27]

As the UN Food System Summit showed, the required transformation is made difficult because of divergent views and misalignment in relation to development models. This can be summed up by the following seven types of controversies or contradictions: (i) the confidence in a technological miracle and the difficulty of connecting the technical and institutional dimensions of innovation to ensure its contribution to public good and sustainable development; (ii) the interaction between scientific and political spheres and the need to move beyond a science posture that knows and prescribes; (iii) the measure of performance and the design of metrics that account for agriculture and food multifunctionality and all dimensions of sustainable development; (iv) the need to provide public frameworks for action in order to shape favourable food environments versus faith in markets to perform such a task; (v) the definition of what common good means to organize and articulate the engagement of different categories of stakeholders and identify and enforce rights; (vi) the implementation of the notion of sovereignty and the identification of scales at which governance and regulation should be reviewed and articulated, including market scales; (vii) the status of diversity, the importance of context specificities and the way coexistence should be politically managed.

Looking more closely at the paradox of the growing divide between the calls for change and the impression that nothing is actually changing, we can observe an increasing number of so-called 'alternative' initiatives. Striking examples include urban food policies, the explosion of 'organic' farming, and new behaviours with respect to the consumption of animal products. However, such initiatives are rarely given credit for their environmental and social benefits and are unable to influence public policies and global frameworks. They tend to remain on the fringes; described as 'radical' by their detractors, they seem incapable of driving structural transformations of agri-food systems at a significant scale.

"The need for dialogue!"

Moving transformation forward thus requires dialogue, as a process to address contradictions and collectively agree on pathways. Choosing a path of negotiation through dialogue means the rejection of the status quo on the one hand, and an uncertain revolution on the other hand. Such a choice may be supported by mediation, i.e. a process by which a mediator uses appropriate methods (e.g., elicitation, reformulation, support to negotiation) to help different stakeholders with divergent views resolve a disagreement and agree on a way forward. It is not by chance that dialogue has been acknowledged as one of the main pillars of the UN Food Systems Summit. This was based on two assumptions. The first is the preference for the permanent coexistence of different stakeholders and their joined contribution to designing and implementing a transformation pathway that is acceptable to all. The second assumption is that the confrontation and articulation of different perspectives may help generate and implement such a hybrid trajectory.

Many dialogues were initiated ahead of the Summit (see https://www.un.org/en/food-systems-summit/dialogues). They demonstrate a desire to characterize the synergistic and contradictory interactions and disagreements that need to be taken into consideration when identifying a transformative pathway. The dialogues also highlighted the need for incentivization, arbitration, regulation and investment mechanisms. Such an orientation has shown that dialogue is a long-term process which requires trust and confidence, appropriate methods to move beyond the incapacity to design agreements and even to listen to each other, safe spaces to organize the dialogue, and specific support to those stakeholders who are not prepared to engage or are in an asymmetric position.

"Articulating change at different scales!"

Since it relies on institutions and stakeholders who are, beyond their divergences, tied to each other by a common destiny, the level of national territory is particularly relevant to develop the agreement needed to implement the transformation pathway. It is also at this level that we can address the problems the world is facing and solve those challenges that the state and the market are both failing to address: climate change, conservation of resources, anticipation of migratory processes, political stability, etc. As Valette *et al.* state, "the territory is more than a mere framework mobilized for innovation. Localized agri-food systems illustrate this capacity of territories to stimulate the emergence of organizational and institutional innovations, to themselves become drivers of change.... Because of the proximities and the forms of social capital that constitute it, the territory is, in fact, a form of organization that permits the internalization of certain transaction costs, the minimizing of economic risks, the facilitation of learning processes, the leveraging of know-how and traditional knowledge, the guaranteeing of the application of quality criteria to a product or a form of production..., all the characteristics that make it an asset that can be mobilized in the processes of production....".[28]

Acting at the local level is not sufficient. The author notes in his book 'Coexistence and Confrontation of Agricultural and Food Models A New Paradigm of Territorial Development' that "A significant transformation at the scale of global challenges cannot be achieved solely by the infinite reproduction of local initiatives. Several decisions that condition the behaviour of actors have to be taken at other scales or in other spaces: legislation, policies, organization of markets, etc. These decisions pertain, in particular, to scales at which public policies are designed and

implemented to stimulate local innovation, resolve tensions and conflicts, regulate processes of differentiation and competition, guarantee respect for rights and justice, and ensure territorial planning and cohesion."[27] This questions the scaling-up paradigm, based on local success stories which would then be replicated to impact at scale. Not only are such success stories usually not reproducible because of natural and institutional specificities, but impact at scale also requires complementary actions at different scales. An agreement built locally to implement a transformation pathway can be exported to other places and to other scales in order to enable a project, a vision of the world, or a process of transformation. Such an agreement can contribute "to the design of appropriate national public policies, whether in supporting local dynamics or making relevant choices and trade-offs. It becomes the basis for a global transformation process to be undertaken by relying on the complementarity of local innovations, territorial dynamics, national policies and international frameworks. As an iconoclastic proposal, we can even suggest that desirable transformations can be initiated by the implementation of mediation processes at the scale at which alliances are possible, before influencing the processes taking place at other scales and coming up against irreducible clashes."[27]

3.3 Conclusions and recommendations

The 4 Cs have accelerated awareness of the need for action on agri-food systems. These crises offer an opportunity for change and open new avenues, as most stakeholders are most often inclined to react rather than anticipate. It brings us back to the etymology of the word 'crisis', which refers to situations when something must change and when there is an 'after' to be designed. A crisis is a detonator. This is not about building back (i.e. returning to *normality* after an exceptional event), but about building differently. It is about inventing new long-term models and pathways and escaping from the trap of short-termism.

This specifically means entering into innovative and innovation arrangements with relevant stakeholders to identify agreements, pathways, solutions, metrics, and to implement monitoring methods and mechanisms to stimulate learning processes. Given the uncertainty and the complexity of the current context and the expansion of fake news and misinformation, foresight exercises are of particular importance, and may rely on a variety of approaches. Rather than looking at trends and projections – which are useful to share alarms and alerts – such approaches must explore both plausible and possible futures, anticipating and assessing transformative pathways and building the required collective intelligence.

If we bring to the same table all actors that have a stake at one or other level, dialogue can take place at different relevant scales, from local to global, to identify transformative pathways that should be articulated consistently across scales. Yet, because of the political configurations, dialogue is not always possible, nor predisposed to be successful. A possible strategy would then be to look for dialogue at the scale where it might help designing a pathway, be it local, national, regional, and then take advantage of this success to convince at other scales through advocacy and confrontation.

Science has an important role to play to support such a process. It is not just invited to design new technology but to think the unthinkable, interacting with policymakers in new ways as suggested by Hainzelin *et al.* (2021): "designing together rather than transferring and applying knowledge, and fostering dialogues, co-learning, and convergence rather than confrontation

and polarization". According to the authors, this 'business as un-usual' approach should rely on the following pillars:

- "Generating actionable knowledge, data, and metrics to move beyond obstacles and address trade-offs and barriers to change, including power asymmetries, path dependency, conflicts of interest, and risk and uncertainty." This means acknowledging new complex research issues based on their relevance to address problems (e.g., obstacle to change), designing specific open research arrangements, and ensuring trans-disciplinarity.
- "Articulating models, knowledge, and place-based innovation to design, implement, and assess specific transformative pathways: this [also] requires specific arrangements, dialogues, and approaches, including scientific approaches."
- "Connecting expertise mechanisms to address multisectoral and multiscale processes toward sustainable development; at the international level, the joint mobilization of IPCC, IPBES, and HLPE/CFS is necessary to address the interconnected challenges of climate, environment, and food systems". The need to create a safe space for this to happen was also highlighted in the report entitled *Everyone at the Table* by the European Commission (Directorate-General for Research and Innovation of the European Commission et al. 2022).[xv]

xv Everyone at the table - Publications Office of the EU (europa.eu), https://op.europa.eu/en/publication-detail/-/publication/b3e25405-eb99-11eb-93a8-01aa75ed71a1

Women sorting coffee beans at a washing station, Rwanda.
Photo credit: Yaroslav Astakhov

4 Human Rights-based Approach

Approaching agri-food systems transformation from a human rights perspective

Our shared vision for a sustainable food system is of a world where human rights-based and nature-positive approaches are adopted in our food system to ensure that everyone is free from hunger and that adequate food (i.e. food that is nutritious, safe, culturally acceptable and physiologically appropriate) is accessible to all.

It is a vision in which natural resources are managed in such a way that ecosystem functions continue to support current and future human needs. We envision a world where smallholder farmers, including crop farmers, pastoralists and fisherfolk, benefit from profitable farming, enjoy decent employment conditions, receive fair prices for their produce, and have the opportunity to actively participate in and benefit from economic development. In this vision individuals (including rural women and men) and communities enjoy food security, control over their livelihoods, and equitable access to resources that they use effectively. However, as shown in the previous chapters, our global food system is not geared towards fulfilment of this vision, with global conflicts, high costs of externalities, the climate crisis, and the COVID-19 pandemic (4 Cs) posing the most significant challenges to feeding the world's growing population. Our food system is rapidly approaching a breaking point, necessitating transformation more than ever before. A human rights-based approach centred on the right to food and nutrition can be a critical catalyst for hastening the transition from today's unsustainable food systems to a future in which everyone has access to healthy and sustainable food, degraded ecosystems are restored, and climate change is reversed.

4.1 Normative foundations and substantive aspects of the right to food

The right to adequate food as a human right is legally recognized internationally. It safeguards all people's right to feed themselves in dignity, whether by producing or buying food. The foundational basis for recognition of the right to food in international law is the Universal Declaration of Human Rights (UDHR). Increasingly, the right to food is no longer a moral duty or a political choice. It is a binding commitment, based on international treaties that many states have ratified. It is recognized in various international laws including the International Covenant on Economic, Social, and Cultural Rights (ICESCR) (United Nations 1966), the Convention

on the Elimination of All Forms of Discrimination against Women (CEDAW) (United Nations 1979), the Convention on the Rights of Persons with Disabilities (United Nations 2008), and the Convention on the Rights of the Child (CRC) (United Nations 1990). The Committee on Economic, Social and Cultural Rights (CESCR) General Comment No. 12 defines the right to food as follows: "*The right to adequate food is realized when every man, woman and child, alone or in community with others, has physical and economic access at all times to adequate food or means for its procurement*."[29]

The key elements of the right to food include availability, accessibility, adequacy, and sustainability. These elements cut across the food systems pathways from production to consumption. Food availability refers to the availability of food in sufficient quantity, quality, and nutritional value in the home or market. Food accessibility has two components: economic and physical. Economic access implies that all financial costs incurred in obtaining food for an adequate diet do not hinder or endanger the realization of other basic needs (e.g., housing, health, or education). Physical access implies that everyone, including vulnerable members of the community such as infants and young children, the elderly, and the physically disabled or ill, has access to adequate food. Food adequacy refers to an individual's dietary needs, which must be met not only in terms of quantity but also in terms of the nutritional quality of the available food. It also includes the significance of non-nutritional values associated with food, whether cultural or social. Food sustainability refers to the availability and accessibility of food for both current and future generation29. If any of these elements is not fully met, the right to food cannot be realized.[30]

The state bears primary responsibility for the realization of the right to food. The right to food imposes three types of state obligations: to protect, respect and fulfil (facilitate and provide)29. General Comment 3 of the International Covenant on Economic, Social and Cultural Rights (ICESCR) elaborates on the nature of the state's obligations. Article 2 of the ICESCR obligates state parties to work towards the progressive realization of the rights recognized by the convention, including the right to food. States are expected to take progressive steps, involving legislative, policy, and judicial mechanisms, to realize the right to food. Article 11 (2) of ICESCR mandates that state parties to the convention take measures to improve production methods, distribution and conservation of food through the application of scientific and technical knowledge, sharing knowledge of nutrition principles, by transforming agrarian systems for the efficient development and use of natural resources, and by implementing the essential steps to ensure an equitable distribution of the world's food supply. The FAO Voluntary Guidelines support progressive realization of the right to food.[31]

4.2 Progressive realization of the right to food

The UN Sustainable Development Goals (SDGs) are based on human rights and emphasize the significance of the progressive realization of the right to adequate food for everyone. This requires states to take deliberate, practical, concrete, adequately funded, and timely steps to actualize the right.

Significant progress has been made in recent years to realize the right to adequate food. The right to food is now codified in 106 countries, either through constitutional arrangements or

through the direct applicability in law of various international treaties that protect the right to food.[32] However, based on evidence from the FAO database on the Right to Food around the Globe, only 29 countries explicitly protect the right to food in their constitutions, while 17 others implicitly do so under related rights. Making the right to food a constitutional right ensures its permanence in a country's legal framework while removing it from the political realm and fluctuating political environments. Adoption into the constitution necessitates the development of appropriate laws and policies. Because all laws must comply with constitutional provisions, a constitutional right to food provides the strongest possible basis for actualization of the right to food. The inclusion of the right to food in a constitution implies that this right cannot be easily revoked, ensuring greater permanence than ordinary laws.[33] It also improves accountability since constitutional provisions limit the actions and policies of all branches of government. It requires all branches of government to take steps to respect, protect, and fulfil the right to food by enacting appropriate laws and implementing policies and programmes. Constitutional recognition is also an important step in empowering people to realize their right to food because they can use the right to food recognized in the constitution to demand policies and laws that create an enabling environment for them to realize their right to food.[33]

National policy and legal frameworks are vital for ensuring the implementation of the right to food. Framework laws are more specific than constitutional provisions in that they establish broad obligations and principles.[33] The ICESCR recommends the adoption of framework laws to enable the implementation of the right to food.[29] According to available data, ten countries have adopted framework laws on food security or the right to food, and nine more are in the process of doing so.[32] This pattern has most likely changed and accelerated. However, we see that only a few countries have implemented the legal framework, though some more countries are working on it.[32] The ICESCR has advised countries to enact framework legislation to protect the right to adequate food and nutrition, in accordance with the 2004 FAO Voluntary Guidelines and the Committee's General Comment No. 12 on the right to adequate food. In the face of inequitable food systems, countries lacking a legal framework must move with urgency to establish a legal framework and other mechanisms required to realize the right to food. The benefits of framework law include the ability to specify the content and scope of the right, establish state and private actor obligations and appropriate institutional mechanisms, and provide remedies to violation of rights. Furthermore, framework laws enhance government accountability and promote access to judicial and administrative recourse mechanisms.[32]

4.3 A human rights-based approach to agri-food systems transformation

The FAO Voluntary Guidelines on the Right to Food offer practical guidance on how to implement the right to adequate food in a variety of policy and programme areas using a human rights-based approach. A human rights-based approach incorporates the principles, norms, standards and goals of the international human rights system into governance and development.

The implementation of the right to adequate food through the human-right based approach is guided by a set of fundamental principles that can be represented by the mnemonic PANTHER: participation, accountability, non-discrimination, transparency, human dignity, empowerment,

and rule of law.[34] These principles are found across the FAO Voluntary Guidelines to support the right to food. In terms of the right to food implementation, these principles imply that: (a) individuals and communities have the right to actively, freely, effectively, and significantly participate in all decisions that affect their lives, particularly those that may affect their ability to access food (participation); (b) authorities must be held accountable for their actions and omissions in implementing this right, and mechanisms are needed to allow people to challenge both (accountability); (c) the enjoyment of the right to food should not be limited based on identity factors such as ethnicity, religion, socioeconomic status, disability, gender, or age (non-discrimination); (d) there is public access to information on food-related laws, policies, programmes, and budgets among other critical information (transparency); (e) all actions affecting people's lives and livelihoods, as well as their ability to exercise their right to food, must be undertaken in a manner that respects the person's absolute value (human dignity); (f) individuals and communities must be given resources, including relevant information, and access to institutional support in order to make the best decisions and choices (empowerment); (g) governments' authority must be exercised in strict accordance with constitutions and other laws in force, and legal processes must be followed (rule of law). Based on the outlined principles, communities can be empowered to better understand their food systems, assert their rights, and seek redress when those rights are violated. On the other hand, governments have obligations to protect, respect and fulfil the right to food in an inclusive, transparent manner, respecting the dignity of the people and following the rule of law.

A critical factor in the global food system crisis is that states, businesses, and transnational corporations have repeatedly failed to meet their commitments and have not been held accountable. The human rights-centred approach provides accountability mechanisms for states, entities, and individuals involved in human rights violations and environmental degradation in the food system. It is no secret that many of the world's food systems currently violate human rights, exacerbate inequalities, endanger biodiversity, and contribute to climate change. Human rights violations have been recorded in the report of the International Panel of Experts on Sustainable Food Systems, which details the negative effects of current food systems on human health and well-being (IPES-Food). First, poor working conditions are making people sick. For example, risks associated with acute and chronic pesticide exposure affect the physical and mental health of farmers, agricultural workers, and other workers in the food value chain. Second, adverse health effects result from people being exposed to contaminated environments 'downstream' of food production, such as through the contamination of soil, air, and water resources or through contact with pathogens derived from livestock (e.g., contamination of drinking water with nitrates, agriculture-based air pollution, anti-microbial resistance). Other health risks are caused by people eating contaminated or unsafe foods, adopting unhealthy diets that lead to obesity and non-communicable diseases, or lacking sufficient access to nutritious food.[35]

One of the root causes of these issues is transnational corporations' increasing dominance of food systems over the last 60 years, which has resulted in a power imbalance, human rights violations, and environmental degradation. States, in exercising their obligation to protect and in fulfilling international treaty obligations, must protect people's rights from being violated at the hands of corporate power and provide effective remedies, while corporations must respect human rights. Through a human rights-based approach to food systems, corporations would

be held accountable for environmental degradation and any violations of the human right to food. This approach would address long-standing power disparities in access to land and water. It would also address critical issues such as land tenure, fair markets, and imbalances in seed privatization and monopolization.[36, 37]

The world has recognized that a human rights-based approach is required to transform our food systems (Right to Food Rapporteur, 2021), as it repositions our understanding of food systems to acknowledge and actively address its social and economic drivers. It also allows those most affected by inadequately functioning food systems to participate in the discourse on food system transformation. Most importantly, it establishes a mechanism for the general public to hold governments, individuals, transnational corporations and businesses accountable. The human rights framework also opens up new avenues for identifying, analysing and resolving root-cause issues. Individuals and civil society are empowered by the rights-based approach to participate in decision-making, assert their rights, and seek redress. The realization of the right begins with individuals who are empowered to assert their rights and, as a result, bring about changes that transform their food system. One can better understand how food systems are remade by listening to people when they assert their rights, bearing witness to when rights are violated, and noting how those violations are remedied and when they are not.[37]

4.4 Final thoughts

In the words of the UN Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy, and sustainable environment, David R. Boyd, "If we fail to employ a rights-based approach to protecting the biosphere, future generations will live in an ecologically impoverished world, deprived of nature's critical contributions to human well-being, ravaged by increasingly frequent pandemics, and riven by deepening environmental injustices. If we place human rights and nature at the heart of sustainable development and succeed in transforming society, humans could attain a just and sustainable future in which people live happy, healthy, and fulfilling lives in harmony with nature on this planet."[38]

4.5 Conclusions and recommendations

The human rights approach must be at the heart of the shift to sustainable food systems. Through participation, the human rights approach can assist people in organizing themselves to fully participate in the creation of their own food systems. People can unite to fight inequitable food systems and assert their human rights. It also provides an accountability mechanism through which the state, private sector, and individuals can be held accountable for any actions in the food system that result in environmental degradation or human rights violations.

Human rights are guaranteed and protected by different international declarations, treaties, and agreements, so a human-rights approach to agri-food systems could find the supporting anchors in these international agreements. The human rights-based approach is based on the realization of the rights and begins with individuals who are empowered to assert their rights and, as a result, can lead to changes that, in the end, transform their food system. To make progress on agri-food systems transformation by implementing the right to adequate food through the human-right based approach, political action at various levels is required, including:

- To address the current most pressing global challenges of climate change, conflict, Covid-19 and high externalized costs of food production, governments around the world should implement the Right to Food Guidelines with urgency.[39]
- Governments should work to explicitly recognize the right to adequate food in their constitutions, recognizing it as a citizen's right to which all organs of the state must adhere.
- National legislatures should be encouraged to adopt framework laws that establish a participatory mechanism as part of a national strategy for the realization of the right to food.
- Human rights must be prioritized in the transition to sustainable food systems. The human rights approach can help people organize themselves to fully participate in the creation of their own food systems through participation.
- Governments should embrace the human rights principles of participation, accountability, non-discrimination, transparency, human dignity, empowerment, and rule of law in governance with regards to the implementation of the right to food. This would mean creating a conducive environment for public participation, a free environment for civil society and citizens to hold the government accountable, affirmative action to ensure inclusion of vulnerable and marginalized populations, provide information on strategies, programmes and budget for public scrutiny, provide resources and institutional support to citizens to enable them to participate in decision making, facilitate an environment for decent work and for people to feed themselves in dignity, and provide safety nets for the most vulnerable people.

5 Indigenous and traditional systems

Acknowledging the role of indigenous knowledge and traditional practices

We live in an era of food crisis. The dominant model to improve food security is collapsing because it follows a productivity-based approach in which the yields per unit of land, water, or input must be maximized no matter what. But this rationale is leading to unsustainable food systems and a climate crisis. Intensive agriculture uses 70% of the world's freshwater and is responsible for 30% of greenhouse gases emissions[40] and 80% of deforestation.[41] This intensive agriculture model emerged in the 1960s with the Green Revolution thanks to high-yielding crop varieties and chemical inputs. The goal was to increase food production as several regions of the world were facing chronic food insecurity.[42] While we cannot deny that the Green Revolution contributed to improving food security in some regions of the world,[41,43] the socioeconomic, cultural, and environmental costs have been immense 41, and these have been borne disproportionately by[41] Indigenous Peoples.[44,45]

A major problem with the current agricultural model is its dependency on a few food crops, which greatly undermines resilience to unexpected events. Wheat alone accounts for approximately 20% of humanity's caloric intake and just three grains (wheat, maize, and rice) account for at least 50%.[46,47] Just 25 crops account for a full 90% of the total human caloric intake. Covid-19 disrupted food supply chains, causing the rate of global malnourishment to increase from 8.4% to 9.9% in a single year.[48] In an era of climate change, climatic variability affects food production and major crops, threatening food security.[49] Also, due to Russia's invasion of Ukraine, we are experiencing food price hikes[50] as both countries are major producers of wheat and fertilizers. But are there alternative ways to ensure food security while protecting the planet and being resilient? The answer is yes, and Indigenous Peoples have some lessons to teach the world in that regard.

5.1 Old wines, new wineskins: Lessons from Indigenous Food Systems

The world has a lot to learn from Indigenous People and their food systems because they have shown themselves to be champions of resilience and adaptation despite the historical and systemic discrimination and marginalization they have been subjected to. There is no generic definition of Indigenous People, but the United Nations recognizes that indigenous people,

communities, and nations are "those which, having a historical continuity with pre-invasion and pre-colonial societies, developed in a given territory and consider themselves distinct from other sectors of the societies now prevailing on those territories, or parts of them. They form at present non-dominant sectors of society and are determined to preserve, develop, and transmit to future generations their ancestral territories and their ethnic identity as the basis of their continued existence as peoples, following their cultural patterns, social institutions, and legal system." (ONU, 2004:2)

There are 300 million Indigenous People in the world belonging to 5,000 distinct indigenous cultures, distributed in seven socio-cultural regions, and speaking 4,000 of the 6,000 existing languages. Though they make up only four percent of the world population, they represent 95% of the world's cultural diversity, inhabiting areas that are home to 80% of the planet's biodiversity.[51] They have adapted to a broad range of conditions, from the arid lands of Chad to the cold lands of the Arctic or the humid Amazon region. What has made Indigenous People resilient is their deep knowledge of their territories and cycles. Most importantly, they put nature at the centre and have a holistic approach to food security and well-being. Although Indigenous People have demonstrated their expertise in resilient agriculture, current dominant agricultural practices such as monocropping are displacing Indigenous People' food systems are causing immense environmental damage and biodiversity loss (Jacques *et al.* 2012), such as the case of the native bees in the Mayan indigenous regions of Mexico.[52] The following sections highlight some of the salient features of the indigenous food systems which can offer key lessons for agri-food systems transformation.

5.1.1 Food generation and seasonality of food

A major difference between indigenous food systems and dominant food systems is that the former relies on generation rather than production.[53,54] This means that Indigenous People do not only plant crops on their land, but are also pastoralists, hunters, gatherers, and fisherfolk; they know what, where or when to fish, gather or hunt. Their territory is an important component of their food systems because knowing the natural cycles of their territories allows them to get food, medicines, shelter, and fuel (whose availability varies seasonally) throughout the year.

FIGURE 2 A milpa system in Tamazulápam del Espíritu Santo: Maize, beans, potatoes, and a peach and avocado tree. Photo credit: Tania Martinez-Cruz.

An example of this is in Tamazulapam del Espiritu Santo, the Ëyuujk indigenous community in the highlands of Oaxaca, Mexico. Ëyuujk people use *milpa* systems (intercropping maize, beans, pumpkins, chayote or mirlington, fruit trees, potatoes, among others) (Figure 1). They have a constant source of food and know what to harvest throughout the year to have a rich a nutritious diet. While there is still maize in the fields and it is green, Ëyuujk people can harvest beans, flowers, and green corn to make soups; when maize is mature, and it is time to harvest, they can eat chayote and make fresh tortillas. Furthermore, when the time of harvest has passed, and the field seems empty, there are roots of the chayote (Chinchayote) that people dig and make into a soup and other foods. In the rainy seasons, when maize is still growing in the field, Ëyuujk people can harvest mushrooms. While the Ëyuujk people only use them as food, other Indigenous People use mushrooms for spiritual purposes and it is therefore important to know which specific variety to harvest, a knowledge that is only passed from one generation to other through everyday practices and language.

Indigenous peoples have a deep knowledge of their territories, which has allowed them to adapt to a broad range of environments. For example, in the desert of Arizona, the Tohono O'odham people harvest Sahuaros, a cactus fruit, in the driest season of the year when it has high amounts of sugar. Their deep knowledge of their territories and cycles allows them to adapt to a broad range of conditions, knowing which food to use for fuel or which plants could be used for medicine to boost the immune system. According to a study by FAO and Biodiversity International,[52] indigenous food systems contain over 250 edibles and medicinal plants. If extreme events occur such as floods or drought, these systems are less likely to be adversely affected because the diversity allows them more room for manoeuvre. It is astonishing that the world relies largely on just 25 major crops, yet there are many thousands of plant species with nutritional or medicinal properties that remain largely unexplored by modern science.

5.1.2 Nutritional value of Indigenous Peoples food systems

Indigenous Peoples' health has been affected by the current agricultural models because they have displaced not only traditional foods but also traditional practices in the territories once protected by Indigenous Peoples. Kuhnlein (2018) has documented how displacement of diets negatively affects Indigenous People's health; this displacement is usually driven by insensitive and culturally inappropriate policies, migration, or forced displacement.[55] In a study conducted in Canada with Inuit people, the younger generations suffer from diseases that older generations do not have due to dietary changes.[56] The same study indicates how indigenous systems can provide rich and nutritious diets and make communities more resilient and how these systems have been threatened by mainstream and culturally insensitive policies.

There is a vast richness within indigenous food systems is remains largely unknown to conventional science and policy. For example, in the Solomon Islands, a study by FAO (2021) reported that the traditional food system contains 238 foods, including 127 different species, and the banana fe'i are much richer in vitamin A than plantation-grown bananas.[53] Another example is how Indigenous People in the Arctic have diets rich in Vitamin D from what they hunt or fish and how the replacement of these foods has harmed their health.[54] "*We learned to hunt collectively, and how to process the deer to get a nutritious food for the days of low light, we also learned to preserve the food or keep it in good shape for the cold seasons*" (Personal Interview, Selkup woman, 2021).

Linking the experience of the Selkup people of Siberia to Mexico, colonizers exported maize to different sides of the world during times of colonization, expecting it would have the same nutritional value. Surprisingly, colonizers learned that the secret was not in the maize itself but in the more than 600 ways to cook it and combine it with other foods/crops.[57] A study[xvi] in Guatemala comparing *milpa* systems and monocropping reveals that maize grown in *milpa* systems is more nutritious than that grown in conventional monocropping.[58] Thus, food and nutrition security are not a synonym for production; food diversity is at the heart of Indigenous Peoples' food systems.

5.2 Indigenous Peoples' agri-food systems and their knowledge, territory, and languages

Indigenous knowledge is the backbone of Indigenous Peoples' resilience because it has allowed them to adapt to different conditions and environments. A central part of this knowledge is the languages used to store and transmit traditional knowledge. Indigenous food systems are repositories of knowledge that has been systematically tested and refined over time.[59, 60] For example, the *milpa* systems of Central America cultivate three crops known as the three sisters (maize, beans and pumpkins); while maize is the staple and main crop, it also allows beans to grow as they climb on its stalk, the beans provide nitrogen to the system, and the pumpkin leaves help reduce erosion. The *milpa* system is highly sophisticated, with each component playing a role in maintaining the system's equilibrium.

In the Mixteca region of Oaxaca, Mexico, an area with poor soils and low rainfall, Indigenous People dig holes deep enough (30 cm) to plant their maize to use the residual humidity or set fields along the potential intermittent currents of water formed during rainy seasons. So-called 'improved' seeds were not adopted in indigenous territories in Mexico because they required ideal conditions of soil, water, and fertilizers, while Indigenous People have adapted their maize seeds over centuries, knowing where to plant short-cycle varieties or specific varieties depending on the location of their fields or knowing which varieties would perform well in difficult conditions.[61] Some studies suggest that the intercropping of a *milpa* system can produce a total yield higher than a monocropping system,[57] while others indicate that intercropping can meet the nitrogen needs of the system. Finally, many of the Indigenous People's rituals linked to Mother Earth are also related to maize, so preserving their seeds and maize is also a matter of cultural identity; this is the case of the Ëyuujk people in Tamazulápam, that make maize dough figures for rituals or have specific foods linked to life or other important processes in life (Figure 2).

An essential component of Indigenous Peoples' knowledge is the orality which differs from conventional science in which written records are kept. For Indigenous People, it is the practice of everyday life and orality that keeps knowledge alive. Indigenous languages and orality play an important role in preserving indigenous food systems. It is estimated that, every 3.5 months, worldwide, a language dies, and with it much of the knowledge of its speakers.[62] Some studies indicate a link between linguistic diversity and biodiversity; therefore, there is an urgent need to work to preserve these languages and their speakers.[63] Women and youth play a role in

xvi In this study, the Potential Nutritional Adequacy (PNA) index is used to evaluate the recommended nutritional intake for a person per day and the contributions of milpa systems versus monocropping in Guatemala.

FIGURE 3 Tamales are made up of native maize, native beans, and native piper auritum and are covered with maize leaves. This food is only cooked after conducting specific rituals to celebrate with family and friends Tamazulápam. (Tania Martinez-Cruz)

keeping and transmitting this knowledge. Martinez-Pérez *et al.* (forthcoming, 2023) indicate how women, despite migration, are responsible for maintaining the knowledge and traditions alive in Tamazulápam, similar to other communities.[64] Thus, if we are serious about efforts focused on transforming food systems, we must involve women and youth as active partners.

An issue of great concern is the murder, marginalization, and criminalization of Indigenous People. These drivers also cause knowledge loss. Every year, more than 200 environmental activists are murdered, one-third of them Indigenous People defending their territories from extractive industries and policies that forcibly displace them.[65] Territories play an important role for Indigenous People, and it is not surprising that they fight to protect them and the biodiversity in them. For example, many indigenous cultures celebrate a powerful sense of belonging to a place and explain how umbilical cords are buried to mark their belonging to the earth, their responsibility towards it, and how life begins and ends there (Martinez-Cruz, 2020). For the Zapotec indigenous people in Yavesia, Oaxaca their forests are regarded as sacrosanct, and are viewed as the territory where their main god lives, and water is a regarded as a sacred trust, by virtue of it being essential for food and life cycles on earth.[60]

5.3 Moral economies and collectivity as weapons of resistance

A major distinction of Indigenous Peoples' food systems is their moral economies, and the values of collectiveness, reciprocity, and looking after each other enclosed in them. When Covid-19 hit the world, many Indigenous People conducted collective quarantines because individual/household quarantines did not fit the logic of the communities. They knew that the best way to resist the disease, because it was unknown and there were no vaccines, was through collective action (by locking down themselves collectively). For example, in Santa Maria Huitepec, an Ëyuujk village in Oaxaca, Covid-19 did not hit until November 2020, seven

months after the state of emergency was declared in Mexico. Despite there being no public transportation in the community, the people organized and placed a barrier across their main road, and posted guards to prevent anyone entering the community. Another strategy was that many people returned to the communities because they said resisting a lockdown was less taxing in the community than in the cities. For example, Juana, a 70-year-old grandmother from a Zapotec indigenous community, despite living alone, was taken care of by the members of her family and the community as they also placed a collective lockdown and had no Covid-19 cases reported even 18 months after the pandemic hit Mexico. In Tamazulápam del Espiritu Santo, access was denied to external people, and only traders of the region were allowed; an old man was satisfied with the measures "*We are doing okay. Actually, we do not need what they (people from other regions) sell because they sell unhealthy food and also, we get enough from other villages?*" (Personal interview, Ëyuujk man, August 2021).

Other values of the governance systems and values of Indigenous Peoples are ensuring everyone is well and that rules are set and respected. During the Covid-19 pandemic, as prices were rising in some cities and supermarkets due to the laws of supply and demand, the local authorities ensured that no abuses were committed in terms of price fluctuations for food and that everyone could access food in communities such as Tamazulápam.[60]

People also share seeds, exchange labour, and celebrate life, a good harvest, a blessing, or work collectively to improve a process or take corrective actions. For example, for the Eyuujk people, when a child is born, every family eats a collective meal based on maize called mä'ätsy to celebrate life; for the Zapotecos of Yavesia, when they go to the field to sow their *milpas*, they have collective meals and exchange tortillas. This potentially leads to seed exchange as tastes, flavours and food is a central part of the encounter, or how families including children and elders on a rainy day sit in a circle in the patio of their houses to take the grains of maize from the cobs and engage in conversations prior to sowing.

5.4 Resilience in times of crisis and knowledge coproduction

Collective action, values of reciprocity, and sharing are at the heart of Indigenous Peoples' culture and food systems. What guarantees survival is not money but food self-sufficiency, and collective action is central to their resilience and survival. Zapotec people from Yavesia indicate that being resilient is about food sovereignty rather than security because they want to preserve the maize that they use for the wide range of foods they like and that their seeds are adapted to a wide range of lands, from the warm lands next to the rivers where no potatoes can grow to the lands uphill where they plant blue maize and potatoes but must walk hours to get to their fields. They recall that from 1960 to 2010, they reduced their farming land because they migrated six months a year to make money. They also recognized that they had extreme weather events in their childhood and youth, but they did not struggle because they had so many fields cropped that they had enough food to harvest, even if a field or two were lost. However, in 2010 a hurricane hit them, and they had money but no food because local food supply chains had been disrupted by the hurricane and the rise in tortillas prices due to the biofuels boom in the US.[60] This time they were not resilient and struggled; they had to go to other little villages higher in the mountains to buy food and said, "*Never again this will happen to us; we were ashamed to call ourselves peasants and unable to feed ourselves*" (ibid).

Indigenous peoples from Yavesia then started to work with an agronomist; they taught the agronomist why their *milpa* systems and keeping their native seeds were important and why they object to the use of monocropping and 'improved' seeds. The agronomist taught them how to improve their *milpa* systems while preserving the elements that were worth it for them. Indigenous peoples from Yavesia indicated that since 2014 while they had been testing and proving different technologies,[xvii] they were able to triple their food production;[60] hence despite the Covid-19 crisis and the current rise in prices, they are better prepared to face a food crisis. This experience shows how Indigenous People combine their systems with other knowledge and technologies to improve their livelihoods.

While there is a growing recognition of Indigenous Peoples' knowledge, it is essential that any experience taken from them and intervention made in their territories that affect their livelihoods is done with their free, prior, and informed consent. Their knowledge has indeed been the basis of many developments and even the improvement of many crops, but it is essential to acknowledge and credit them. Most importantly, if we aim to implement interventions, we need to consult and engage with them in a meaningful way.

5.5 Conclusions and recommendations

At a time of multiple crises (climate change, conflict, externalized costs of food production, and Covid-19), there are many lessons that the world can learn from Indigenous Peoples, traditional practices, and local solutions from different parts of the world. These knowledge systems and practices have been undermined and marginalized for decades or centuries, yet, they have shown tremendous resilience. It is time to change the current food paradigm and not only learn from Indigenous Peoples' knowledge and practices but also learn about their territorial management and values; they are stewards of the bulk of the world's remaining biodiversity. However, their practices and livelihoods are currently threatened by dominant food paradigms that do not see beyond productivity and simplicity, that forcibly displace them, and that erode their culture, languages, territories, and identity. In an era of conflict, they can also teach us how to be more empathetic, create stronger support networks, look after each other, and maybe turn into reality the goal of universal food access.

In an era of multiple crises, we need not only modern technology and knowledge but also a change in our mindsets. From the experience of Indigenous Peoples and traditional knowledge and practice systems, we can learn how to approach food sovereignty and a healthy planet as achievable goals. In this regard, a wider acceptance and recognition on different political levels, better documentation and purpose-based propagation, and a deeper understanding of Indigenous Peoples' and traditional knowledge systems can play a decisive role in agri-food system transformation.

xvii In this document the author uses the term 'technology' to mean anything that achieves an end (Richards, 2009). Thus, it can be a native seed that plays a role in my community to guide their spiritual life or the gene to resist drought as engineered by conventional scientists.

The following actions can support the integration of Indigenous peoples' knowledge, traditional practices, and local solutions in food system transformation dialogues and strategy forming:

- Supporting meaningful participation of indigenous in policy processes by providing capacity-building, funds and other forms of support.
- In addition to supporting innovations in agricultural research through funding, state patronage, and infrastructure, indigenous, traditional, and local practice systems should be given the necessary support to realize their full potential.
- Research on the systems benefits and contributions of these alternative knowledge and practice systems should be encouraged without misappropriating or misrepresenting them.
- In general, the single-metric approach that is used to support or discredit systems based on just one parameter should be discontinued. This can lead to a wider adaptation of local solutions to global challenges.
- Indigenous knowledge and traditional practice systems need to be given an equitable seat at the table of discussions around agri-food systems transformation, even if based purely on the fact that they have been able to and still feed communities without the extensive intervention of modern agri-food innovations.
- Furthermore, there can be a completely evidence-based inclusion of these alternative knowledge and practice systems with proper documentation, acknowledgement, and mainstreaming of such systems. This can lead to bigger and more impactful contributions of these systems to the transformation of global agri-food systems.

6 Systems resilience

Including the resilience of agri-food systems in the transformation discourse

Agri-food systems have been under increased scrutiny in recent years – especially from the standpoint of social and environmental sustainability.

Typically, this scrutiny has not incorporated the notion of resilience. Resilience is typically defined as "the capacity of a system to continue providing a desired set of services in the face of disturbances, including the capacity to recover from unexpected shocks and adaption to ongoing change."[66] If we consider the various services of the food system (e.g., food security, employment and livelihood, natural resource management) we typically consider the sustainability of the system – e.g., can we provide food and nutrition security to a region or nation (in the present and in the near future) while meeting social welfare and environmental preservation goals. This, however, says nothing about the resilience of the system. And the shocks are coming fast and furious – from Covid-19 to 500-year droughts in many parts of the world, to the Russian invasion of Ukraine.

'Sustainability' and 'resilience' can be thought of as fellow travellers but are not identical or substitutable entities. This has been a subject of contention but can most usefully be distinguished by thinking of sustainability as the ability of a set of services to be maintained at a certain level without compromising the future while resilience is concerned with the ability to recover from and adapt to shocks. Walker *et al.* describe resilience as the capacity "of a system to respond to change through adaptation or transformation while maintaining structure, function and identity."[67]

Elmqvist *et al.* have shown that systems with more sustainability, but less resilience tend to have highly efficient systems, process optimization, zero waste, circular economy, and regulation-based governance while those with more general resilience are characterized by intentional design with more diversity, redundancy (multiple pathways to an outcome), and connectivity; cross-scale systems perspective; and polycentric and collaborative governance.[68] From an economic perspective they are probably somewhat less 'efficient'. For example, we can grow all of our wheat via agroecological methods and ensure that supply chains and consumer practices lead to very low levels of waste, but if it is all coming from a small number of varietals produced in one or a few regions and moved through a uniform supply chain then it is very susceptible to system shocks. We will have a difficult time insuring food and nutrition security in such a scenario – and that is the one we currently experience.

6.1 Resilience in the context of agri-food systems transformation

The range of crises in today's world provides a clear context for the necessity of incorporating resilience analysis and development into food systems transformation. It is as important as considering the food system's sustainability. Since World War II the world has become increasingly globalized. While distant trade has occurred for millennia, until quite recently most communities were essentially 'localized'. That is, communities were much more dependent on their own resources, connectivity, and knowledge. Now, in the broadest sense, at least the countries of the Global North are not dependent on a local community's resources and knowledge while being very dependent on global supply chains to satisfy both needs and wants. Supply chain issues as the worst of the Covid-19 pandemic recedes are illustrative of this.

The understanding of resilience in agri-food systems has become more developed in the last decade. Important aspects of improving resilience in agri-food systems are maintaining diversity and redundancy (spare capacity, in varieties of specific crops, in range of crops, in dietary patterns, and in the supply chains moving products among others), managing connectivity, and managing slowly developing shocks (e.g., climate change) and feedback loops within an agri-food system. Governance mechanisms such as fostering complex adaptive systems thinking, encouraging learning, broadening participation, and promoting polycentricity support the resilience of agri-food systems.[65, 69]

There are two types of 'shocks' to a food system that can test its resilience – fast (occurring in a relatively short time span) and slow (occurring over a longer period). The resilience of a system is an indication of its ability to both influence and react to these in a manner that avoids a 'regime shift' – a transformation to a different state. In the case of agri-food systems a regime shift would probably greatly reduce its ability to meet food and nutrition security needs. Fast shocks include such things as pest destruction of a crop, non-availability of truck drivers to move the raw product to market, breakdown at a processing plant, lack of retail markets to sell the products, or increasing costs to the consumer. Slow shocks include such issues as climate change (and its effects), conflict, and Covid-19. In something as influential as the global agri-food system these variables are often both impacted (exacerbated or ameliorated) by the system and impact the system in question.

The resilience of a system is an indication of its ability to both influence and react to shocks in a manner that avoids a 'regime shift' – shifting of the agri-food system to a state that precludes its ability to meet food and nutrition security needs. Without considering 'resilience' as a key component of food system transformation we are left without a clear idea of a new regime's ability to weather shocks and disturbances of any type.

6.2 Resilience in the context of the 4 Cs

Focusing on the principle of diversity is useful for considering the range of slow shocks we are seeing across the world – especially climate change, conflict, and Covid-19.

Climate change

We are seeing an increased severity of temperature increase, flooding, wildfires, and drought as a result of increasing atmospheric greenhouse gas concentration. Climate change results in a host of local, regional, and global crises which appear to be rapidly escalating. Does our current agri-food system as well as the dominant proposals for adaptation allow us to be resilient as these escalate? Probably not. For example, it is clear that production systems focused on building soil organic matter perform (defined as production/hectare) better than those that don't during periods of drought and have smaller production variation across seasons yet these still account for a small percentage of total global production. Also, these organic and agroecological production systems are not incorporated into national and regional policy to a great extent. Rather, most decisions currently in play for dealing with climate change involve crop genetic manipulation and/or technology-based production. On the consumption side it is clear that dietary pattern shift away from heavy animal product dependence and towards greater plant dependence will also provide greater flexibility in supply chains – yet very little public policy is geared towards such a shift.

Conflict

The Ukrainian and Russian wheat supply is a classic case of how a lack of diversity in supply points and in grain crops consumed can lead to rapidly escalating prices, increased food insecurity and malnutrition. The wheat harvest is heavily challenged in parts of Ukraine and the supply chains to global markets are largely severed at this point (some shipments have occurred but they are susceptible to the fast changing dynamics of war). There is also the potential for increased conflict on smaller scales across the globe as people rebel due to price and availability constraints. What is required is the diversification of both production and consumption of food as an important aspect of food systems resilience.

Covid-19

The Covid-19 pandemic highlighted the fact that the resilience issues within food systems are greatly impacted by other systems. The fracturing of some of our political systems (e.g., the US Covid-19 response and political disagreements led to a great deal of social discord) meant a fractured response to the pandemic leading to large-scale industry/supply chain shutdowns. This in turn directly impacted the global supply chain for food leading to shortages.

6.3 Conclusions and recommendations

This chapter begins with a proposition: to enhance the resilience (and sustainability) of our global agri-food systems. A starting point for most of the Global North is to reinvigorate the notion of regionalized agri-food systems – that is, a greater percentage of food consumed by the population is produced within the region/nation. For most of the Global South, the key to resilience is to maintain/enhance their existing rich regional agri-food systems – that is, that they should avoid 'going the way of the North'. This is not meant to imply that global trade and

movement of food should be eliminated but rather that there should be a dynamic balance: a significant percentage grown closer to home while recognizing that the migration of people over the last few centuries means foodways and cultural patterns are often different to the food production environment in which people live. There needs to be a shift in dietary patterns generally to help our food system become more resilient but we shouldn't expect or demand that people shift all their cultural patterns around food. A resiliency framework will, by necessity, begin to include elements that allow the food system to experience shocks while preserving its inherent character and purpose of insuring universal food and nutrition security. There are many instances around the globe of NGOs, communities, government, and some private sector entities working to enhance the global agri-food system's resilience. And these are not nearly scaled enough at this point to significantly impact needed change. It will require bold action from many perspectives to succeed. There are a number of steps that can be taken in this context and are outlined as follows.

Resilience is a vital aspect of agri-food systems and, alongside sustainability, should be among the main aims of agri-food system transformation. The interlinked 4 Cs crises have introduced slow and rapid shocks to food systems worldwide, further highlighting the need for resilient agri-food systems. A summary of recommendations aimed at increasing the resilience of agri-food systems at local, national, and international level is presented below:

Local Policy/Action

- Create strategies to advocate at national and international levels for the opportunities identified below.

National Policy/Action

- Create a research portfolio that develops an analysis of diversity and redundancy[xviii] in the existing agri-food system. Examine the extent to which a region/nation's food system is dependent on imports. Explore opportunities to increase regional production and identify supply chain needs.
- Create a research portfolio that identifies points connectivity of regional and global suppliers and examines how these can be strengthened by creating governance structures that balance power relationships.
- Create a research portfolio that identifies factors similar to the 4 Cs that could potentially cause disruptions to food and nutrition security.
- Create a research portfolio that identifies feedback mechanisms in system components and develop an understanding of how these interact to affect slow and fast variables.
- Examine grain crops other than rice, wheat, and maize that would be more suitable in hotter and drier climates to diversify grain production around the globe.
- Allow regions and nations to be more self-sufficient by identifying infrastructure, training, development, and governance challenges as well as regional and national goals for self-reliance to balance imports in grains, thus creating larger regional to global supply chain ratios.
- Diversify production strategies with major increases in agroecological and organic practices to reduce seed and input dependence while identifying the implications of land use, dietary

xviii Protecting redundancy in the food web helps ensure ecological resilience -- ScienceDaily

patterns, training, development, and governance for such a shift.

- Diversify the supply chains of the diversified crop and production-point portfolio and build in redundancy.
- Diversify consumption patterns to incorporate more items that can be produced within one's region including greater reliance on plant-based diets among the population.
- Foster complex adaptive systems thinking among all actors in supply chains as well as those involved in governance.
- Broaden participation and encourage learning by those within supply chains as well as all citizens.
- Promote broader participation in governance within private-sector supply chains and within public-sector governance structures.
- Expand opportunities for all people regardless of gender, ethnicity, and economic status to meaningfully participate in supply chains.
- Evolve public sector policy quickly to enable the research and action steps above including funding both for research and to enable a broader range of people to develop meaningful livelihoods within supply chains.
- Develop 'gold standard' private sector policy development to codify strategic planning and implementation for resilience.

International Policy/Action

- Support national governments in the policy actions mentioned above, for example by creating sample public sector policies to enable the outlined research and action steps. Support of policy should also include international funding for research to enable a broader range of people to develop meaningful livelihoods within food supply chains.
- Create a platform for national policymakers to exchange information on diversifying production and consumption strategies and to expand participation opportunities in food supply chains for all people regardless of gender, ethnicity, and economic status.

Photo credit: Riccardo Mayer

7 True Cost Accounting

Accounting for the cost of externalities across agri-food systems

Many advocates of food system transformation decry food as 'too cheap', pointing to externalities of food production, processing, distribution, and consumption that are not factored into the market price of food. True Cost Accounting (TCA) is designed to reveal the total cost of food by including costs typically left out of food cost assessments and market prices. Among the many examples of externalities are impacts on biodiversity, human health, food waste, and animal welfare.

The 2018 TEEB Agri-food Evaluation Framework produced by a ground-breaking project of the UN Environment Programme provides a rationale for organizing TCA across four capitals: natural, produced, human, and social.[70] Since then, many studies have employed the TEEB Agri-food Evaluation Framework as well as other analytical approaches all aiming to estimate the 'true' cost of food, at various levels, from individual foods to global estimates. Many of these efforts can be found in the TMG inventory.[71] Notable activities include the work of the Global Alliance for the Future of Food (GAFF)[xix] which supports TCA research and a TCA community of practice, the Capitals Coalition[xx], which promotes a protocol for use in corporate reporting, and the Rockefeller Foundation that lists TCA as one of its three top funding priorities.[xxi] Also of note, several countries have begun using TCA in a limited way to engage stakeholders in participatory processes to identify agricultural land use policies (e.g., Brazil, China, Columbia, India, Indonesia, Kenya, Malaysia, Mexico. Tanzania, and Thailand[xxii]). The Scientific Group for the UN Food Systems Summit (UNFSS) commissioned a discussion paper for the 2021 Summit that broadened the understanding of TCA, elevated it as a tool, and estimated the externalities of global food production at USD 19.8 trillion – nearly double the value of current total global food consumption (USD 9 trillion).[72] Most recently, the Food Agriculture Organization (FAO) of the United Nations is preparing the 2023 edition of the State of Food and Agriculture (SOFA) on TCA and its importance to sustainable and healthy diets.

xix Global Alliance for the Future of Food, https://futureoffood.org/
xx The Capitals Coalition – redefining value to transform decision making, https://capitalscoalition.org/
xxi True Cost of Food: Measuring What Matters to Transform the U.S. Food System - The Rockefeller Foundation https://www.rockefellerfoundation.org/report/true-cost-of-food-measuring-what-matters-to-transform-the-u-s-food-system/
xxii This information comes from the draft UNFSS discussion paper.

7.1 Accounting for the externalities in the agri-food systems

There is widespread agreement among food transformation advocates that externalities of food production must be taken into account. There is disagreement, however, on several aspects of TCA. First, on whether and how to value certain externalities, such as slavery and species extinction. Are there certain things that should never be valued in monetary terms – the common unit of analysis in TCA – and never considered interchangeably with other system components like wages and soil health? Monetizing externalities is a powerful strategy for creating visibility with no comparable substitute. Advocates for monetization point to the insurance industry that establishes a value for the loss of a life, as imperfect as that price is, and despite broad recognition that life is intrinsically priceless. Cost-benefit analysis (CBA), embedded in government decision-making processes across the globe has failed to account for most externalities because of this longstanding discomfort with monetizing. Yet better to acknowledge the difficulty in accessing values and the imperfection of monetizing while nevertheless proceeding with it, which is how TCA will overcome the historic shortcomings of CBA.

Second, there is disagreement on the end goal for TCA. At one end of the continuum, some people stress that the goal is not to make food more expensive but rather to provide transparency that empowers public and private sector decision-makers to better understand the implications of proposed actions so that they may adjust for sustainability. At the other end of the continuum, some people, including the authors of the Food Systems Summit discussion paper on TCA, suggest the end goal is a redesign of the economics of food to create 'true pricing', meaning significantly higher market prices for food. There is agreement, however, that an array of government mandates and financial support to make food accessible to all people is needed.

Finally, many people are working to refine the methodology of TCA. This work is stymied by lack of publicly available data in certain areas of analysis, which requires remedy. There is ongoing discussion about the appropriate level of complexity – do we need to cost out food on every aspect and down to the penny or it is sufficient to provide directionality for decision-makers? And there are discussions about nomenclature; is TCA the best term for this practice or, as some have more recently advocated, should it be referred to as True Values Accounting?

7.2 Food Systems Summit deliberations on True Cost Accounting (TCA)

The Food Systems Summit discussion paper proposes more than a dozen recommendations, some of which are too vague to be actionable. However, several are clear and have broad support among TCA advocates, including a call for international harmonization of TCA principles and practices and creation of a corresponding methodological toolkit to enable business and government professionals to undertake practical TCA analyzes. The idea of integrating TCA into business sustainability reporting also has broad appeal and seems particularly timely given current efforts to strengthen ESG reporting mechanisms to prevent greenwashing. Most recommendations, however, focus on transforming the food system via true pricing. Whether it is requiring integration of TCA into National Accounts and GDP, providing financial support for SMEs and smallholder farmers to allow their products to be sold at a true price, or using technology to help calculate true prices, these ideas are more controversial and unlikely to

be adopted. To this point, it is important to note that little of the draft paper made it into the final version, *Science for Transformation of Food Systems: Opportunities for the Food System Summit*.[73] The limited discussion of TCA in the final paper is indicative of the unresolved tension between TCA as a tool for transparency (supported in the final paper) and TCA as a tool to increase food prices to reflect its true cost. Indeed, the final paper expresses concern over the impact the 'true costs' of food would have on farmers and low-income consumers.

7.2.1 TCA in the context of agri-food systems transformation

"Transforming food systems means transforming our way of thinking" is an apt statement from the GAFF website. TCA makes transparent the interlinkages among the many parts of the food system and is an essential tool for the radical recalibration of economic analysis fundamental to transformation.

7.2.1.1 Aspirational narrative transformation pathways

Two recent events in the United States highlight the need for TCA to be embedded in our transformation work. First, in June 2022 the US Department of Agriculture announced its Food Systems Transformation Framework.[74] While USDA is making welcome and overdue investments in urban and organic agriculture and addressing issues of anti-competitive and monopolistic behaviour in the US food system, the so-called framework fails to address underlying structural issues and steers away from dismantling the harmful subsidies and polices that have produced the 'cheap' food system of today. Rather than transformation, the USDA framework is an add-on to a corrupt system. Second, 2022 US food prices are forecast to be 9.5% higher than in 2021.[75] While some of these price hikes may be necessary, investigative work by the Groundwork Collaborative[xxiii], as reported in the New York Times and other outlets, finds CEOs celebrating record-breaking profits due, in part, to the inability of people to understand the causes of inflation and protest price fixing.[76,77] In each of these cases, application of TCA would focus on substantive issues requiring debate and systemic change.

It is one thing to undertake TCA as a technocratic and neutral accounting exercise. The critical juncture is what comes next: TCA as an enabling tool. Once the full accounting sheds light on political decisions, it is reasonable to expect increased pressure on governments and businesses to act. This realization, coupled with the complexity and novelty of TCA, may cause leaders to hesitate in adopting TCA. One possible way to jumpstart broadscale adoption of TCA is to apply it to the biofuels sector. Biofuels evaluation has been fraught with conflicting analyzes and has been a matter of robust public debate over the years. With severe pressure on the energy sector due to the Russian invasion of Ukraine, the need for clarity on the choices before society is urgently needed. Clear communications about TCA outcomes and their implications would greatly aid leaders across the globe.

xxiii Home Page – Groundwork Collaborative https://groundworkcollaborative.org/

7.3 TCA in the context of the 4 Cs

True Cost accounting (TCA) assumes increased importance in the transformation narrative in the context of the 4 Cs as explained as follows:

Climate

As stated in the Food Systems Summit draft paper, "the quantification of carbon emissions is relatively mature" aided by technologies such as satellite imagery, modern sensors, and big data. But myopic consideration of carbon emissions misses/undervalues broader ecosystem services that use of TCA can reveal. With policy-makers contemplating carbon markets and/or financial incentives for soil health practices, traditional agriculture stakeholders are engaged in climate discussions that may result in billions of dollars in financial awards for 'carbon farming'.[78] TCA can enlarge understanding of 'climate smart' farming beyond carbon to account for many additional aspects now missing from policy debates and result in better deployment of public resources.

Conflict

The Russian invasion of Ukraine is having many impacts on the global food system. One of these is a lack of fertilizers,[79] leading to record-high prices and shifts in planting decisions. The fertilizer crisis presents an opportunity to rethink how we grow crops rather than uphold the current production system reliant on synthetic inputs.[80] TCA can help make the choices clear by providing a holistic assessment of the costs and benefits of different food cultivation systems including various methods for soil health.

COVID-19

No food issue received more attention in the US media at the height of the pandemic than the breakdown of the US meat processing sector. Pre-pandemic, the sector was hailed as highly efficient. But concentrating meat processing in just a few facilities combined with poor treatment of workers led to a crippled sector. As a result, there is active discussion among policymakers about the need to value food system resiliency over efficiency. TCA is a tool to help clarify what resiliency requires by showing the trade-offs regarding supply security for different food production strategies.

High (externalized) costs of food production

As discussed in the previous section, food prices are on the rise. This has led to media coverage of food prices that will continue for the foreseeable future. As reporters seek to explain rising food costs, TCA can be flagged as a tool for improved understanding of the full costs of food that may alter behaviour from that of average consumers all the way to the actions of people at the highest levels of government and private industry. At the same time, policymakers can use TCA to better understand the hidden costs of current agri-food system (e.g., biodiversity loss) that will lead to the increasing acceleration of the costs of food in the future (e.g., due to the loss of necessary ecosystem services). TCA can inform the process of internalizing external cost that is necessary to create sustainable agri-food systems.

7.4 Conclusions and recommendations

The use of True Cost Accounting (TCA) in transformation strategies for agri-food systems is essential due to the 'externalized' costs of food. These unaccounted costs which are borne by society as a whole act as a major impediment to sustainable agri-food systems, as they distort production and consumption decisions in favour of agri-food systems that deplete natural, social, and human capital. In order to realize the full potential of TCA in food system transformation, it must be embedded in governmental decision-making.

The following recommendations aim at embedding TCA in agri-food system transformation policies and governance discourse:

Actions:

- TCA should be used as a neutral analysis (as an accounting methodology, not as a value assigning system) and as a means to an end, not the end itself. Recognizing TCA as a modern and improved form of cost-benefit analysis (CBA) can be helpful to its implementation as governments are already well acquainted with the CBA methodology.[81] CBA is undertaken by government officials across the globe to assess the implications of proposed policies. Hence, conversations should begin immediately with CBA theoreticians and practitioners.
- To demonstrate the utility of TCA, retrospective policymaking exercises should be undertaken. Retrospective review is currently built into the US federal rulemaking process, where a certain number of rules are chosen for post-implementation reflection. For example, applying TCA post-facto in the case of the 2013 US ruling that allowed chicken processors to speed up conveyor belt lines, might show that TCA would have more highly valued worker health, resulting in a different proposed rule, and a different pandemic experience in the meat processing sector.

Strategic collaboration with healthcare professionals – the most obvious partners in TCA advocacy – to widely utilize TCA to advance health metrics would contribute to knowledge and coalition building. To this end further research effort should include:

- Identifying which data is needed to execute TCA, especially that which may be missing or insufficient. Government funding for data collection and publication will be needed to address knowledge gaps.
- Fundamental research on methodology should continue, particularly related to measuring social and human capital. More advanced evaluations of welfare dimensions and inter-generational equity measurement are needed, as flagged by the UN Food Systems Summit.[71]
- Based on information on the externalities of food production and consumption derived from TCA analysis, research on the internalization of external costs can promote suitable policies and interventions to inform the design of sustainable agri-food systems.
- Based on continued research and methodology development, a set of universal TCA principles should be established that can be adapted across different levels and sectors.
- Education and capacity building on TCA is needed among researchers and professionals to create a wider network of TCA practitioners as well as education and capacity-building on TCA for decision-makers in policy and business to support the application of the tool for sustainable decision making.

Malagasy rice farmers, Madagascar.
Photo credit: Damian Ryszawy.

8 Food trade dynamics

The role of international trade arrangements in agri-food system transformation strategies

Agroecological production systems are seen as key to overcoming the economic, social and ecological crises of the global agri-food system, which is significantly controlled and managed by a small number of large, globally acting transnational companies (TNCs).

Agroecology is promoted as a means to supply healthier food, improve agricultural sustainability and revitalize local communities, including by improving the livelihoods of farmers. From a social and political perspective, agroecology includes decentralized embedded political governance adhering to the principle of subsidiarity, the decentralization of economic life and economic localization, the recognition of equity and protection of diversity and breaking artificial boundaries and hierarchies of knowledge systems.[82] This is then embedded in the concept of and struggle for food sovereignty, which is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and to define their own food and agriculture systems.[83]

As a locally focused food system, agroecology also implies a way to avoid the long international supply chains that characterize the conventional food system. As emphasized by the agronomist Clare Hinrichs (2000), direct agricultural markets are central to the creation of spaces where consumers and producers interact face to face in an arena of exchange that is imbued with more social meaning than conventional retail spaces.[84]

One of the key challenges, however, is to identify the extent to which such 'localized' agroecological systems get or remain entangled in the structures of conventional food markets, notably through international trade, and may thus not escape the logic that governs conventional food and agricultural markets as well as their international supply chains.

International trade is required to bring the production structure and volume of produced agri-food products into line with consumption. In addition, through trade comparative cost advantages can be realized that may improve the livelihoods of the farmers concerned. Trade also tends to give new impulses to technical and managerial innovations but may also lock producers into specific technologies and production systems. Furthermore, trade evens out local production instability, which is of increasing likelihood in times of weather extremes caused by climate change.

Almost one quarter of agri-food production in developing countries is internationally traded.[xxiv] However, if one takes into consideration the significant share of agricultural production that is not part of the monetary economy in developing countries (subsistence agriculture often represents half and more of total food production in these nations), the trade intensity of the agri-food sector is likely to be well below 10% of total production. Such a low figure might suggest that trade and its underlying rules have little significance for national food production and agricultural policy. Yet, the analysis below shows the opposite.

8.1 The changing nature of international trade, its rules, food security, and sustainable agri-food systems

International trade has changed in nature since the mid-1990s, when the World Trade Organization (WTO) was established, and agricultural products were fully brought under international trade rules. The big changes concern: (i) ending of the dominance of the US and the EU in international agricultural markets; (ii) the consolidation of global markets of seeds, agricultural inputs, food processing, trade and retail, each dominated by not more than a handful of TNCs; (iii) the emergence of the BRICs countries (Brazil, Russia, India and China, but also Argentina, Chile, South Africa, Thailand and others) as major agricultural producers, exporters, processors and consumers; (iv) the steady growth in population and, more specifically, in dietary preferences, creating demand for more meat and therefore animal feed; (v) the advent of biofuels, transforming various product markets and merging food and energy markets; and; (vi) the deregulation of financial and commodity futures markets that came in lockstep with the end of government interventions in agricultural markets geared either to price or supply control. These changes in trading conditions are determining what is grown, what is traded, to whom and at what price. They are also creating power asymmetries between the actors in international agricultural supply chains.[85]

WTO rules and related bilateral, regional and plurilateral liberalization agreements (outside of the WTO) affect agricultural production, trade, and consumption through disciplines on market access and export competition as well as through provisions for domestic governmental support, which should be minimally trade-distorting. What, at first sight, appears to be a technicality, turns out, on closer scrutiny, to subordinate agricultural to trade policy (in fact, it belittles sectorial policy as non-trade concern or trade-distorting), deprives sovereign states of policy space required to reflect the national or regional specifics of agricultural, social and cultural conditions, and exposes national producers to the demanding requirements, risks and volatility of international markets.

Agriculture was de facto excluded from the rules set by the General Agreement on Tariffs and Trade (GATT) of 1947 until the conclusion of the Uruguay Round of Trade Liberalization and the subsequent creation of the WTO in the mid-1990s. The sector was widely seen by developed countries as too economically, socially, and politically sensitive to be governed by the GATT rules. Since the conclusion of the Uruguay Round, however, agriculture has been subjected to the WTO rules and, with a few exceptions, is generally treated like any other industrial sector, such as the steel or car industries. WTO rules encourage specialization of production and concomitant increase in its scale so that maximum economies of scale can be realized. Mass

xxiv ((Import + export value) / 2) / value of agricultural GDP. Calculated on the basis of UNCTAD Handbook of Statistics.

production of food tends to reduce production costs and increase availability of food but does not necessarily overcome the problem of food accessibility. Low food prices are notably problematic for small-scale farmers, agricultural labourers, and pastoralists, who account for 60–80% of those suffering from hunger in the developing world. Therefore, liberalization of agricultural trade on its own is not an effective means of combating hunger and malnutrition and facilitating a sustainable food system. Moreover, as global markets take over from local markets, diversity is replaced by monocultures. The ensuing loss of ecological functions formerly provided by biodiversity is compensated for in the short term by an escalated use of agro-chemicals, which cause serious environmental impact whose costs are externalized. Intensive use of external inputs, chief among them energy, is a systemic part and problem of such production systems.

According to various experts,[86,87] the Agreement on Agriculture (AoA), which is the specific rule framework for agricultural production and trade under the WTO, does not specify food security as the key or overriding objective. Rather, food security is seen as a complicating factor (among the so-called non-trade concerns), which might distort market mechanisms. The AoA should redefine non-trade concerns and recognize their importance for achieving effective food security and facilitating sustainable food systems. A reformed AoA should also allow national policy space for food sovereignty. It should also not be forgotten that the slow progress in the current multilateral liberalization round of the WTO (i.e. the Doha Round, initially termed the 'Development Round') has led to the emergence of a large number of bilateral, regional and plurilateral trade liberalization agreements, which often have rules that go beyond those of the WTO and its AoA, including 'behind-the-border' measures on competition policy, public procurement and investment rules. De facto, the AoA and these agreements have a significant bearing on national agricultural and rural development policies. Likewise, it is important to recall that the structure of trade negotiations normally takes the form of package deals with compromises in trade liberalization between agricultural and industrial goods as well as services, which may lead to a situation in which key issues influencing food security and sovereignty as well as sustainable food systems become a bargaining chip in the negotiations.

What is at issue in the Doha Round WTO negotiations, which started in 2001, and the deliberations on the other bilateral, regional and plurilateral trade liberalization agreements is nothing less than the challenge of strengthening public investment and flanking measures in support of sustainable agriculture and rural development to combat hunger, foster rural development and farmer livelihoods, and overcome the environmental crisis in agriculture.

In this regard, the special conditions of agriculture (as distinct from industrial sectors) need to be recognized:

- Unlike many other products, food is absolutely essential for human life and therefore part of an essential human right with a different set of rules.
- Soil, as the most important production factor in agriculture, is local in nature and highly diverse.
- Specialization and mass production have biophysical limits in agriculture as diversified production, the preservation of biodiversity and the recycling of nutrients are essential requirements for the sustainability of the agricultural production system and enhanced resilience to climate change.

- Farmers are not only food producers and providers of raw materials for industrial uses, but also managers and guardians of an agroecological system whose sustainable functioning and environmental health is imperative for sustained productivity.
- Agricultural markets are often very volatile due to crop failures or bumper harvests.

8.2 Harnessing and modifying international trade rules in support of agroecological production

Two clusters of issues seem to be most suited to fostering agroecological production: (i) WTO members should redefine how food security, the realization of the human right to adequate food and the achievement of sustainable food systems are no longer treated as derivations from but as recognized principal objectives of agricultural trade policy; and (ii) reducing the excessive dependence on international trade for food security[84] in the interest of food sovereignty.

8.2.1 Creating a range of flexibilities in Doha Round negotiations for achieving food security and sustainable agri-food systems

First of all, the existing flexibilities under WTO rules to provide more national policy space on reinvestment in agriculture and support to smallholders in the form of inputs, extension services and infrastructure should be fully exploited.

It might be surprising at first sight, but quite a number of the potential measures that can effectively support agroecology, food security and rural livelihoods fall under clusters of measures that are already exempt from further trade liberalization commitments, i.e. measures under Article 6.2. (the so-called 'development box' of the AoA), and measures in Annex 2 of the AoA (the so-called 'green box').

Article 6.2. covers public investment and input-support measures for low-income and resource-poor farmers. This support, however, makes no distinction between conventional and sustainable forms of agricultural production. Public support to large-scale, industrial agriculture will certainly not be covered by Article 6.2., although, unless formally challenged in the WTO, governments have a certain flexibility in interpreting and stretching the limits of such support. One could suggest a better understanding of what "low-income, resource-poor" producers actually are, as there is no commonly agreed definition. Usually, it seems to refer to the size of the farm.

The allowed public support measures under the 'green box' in Annex 2 of the AoA are very comprehensive and concern the following clusters:

- general support services (e.g., research and development, pest control, advisory and extension services, inspection and control, marketing and infrastructure);
- public food reserves/stocks;
- national food support programmes;
- direct support payments to producers for:
    - income support, but decoupled from production volume,

  - compensation for crop failure or crop failure insurance,
  - structural adjustment measures (aimed at reducing production volume),
- public funds in support of measures within a government defined environmental and conservations programmes; and
- public funds for regional support programmes.[xxv]

The public support measures for agro-environmental programmes are currently limited to compensation for higher costs or losses incurred by producers. They do not allow incentive measures to expand production volume.

The current Doha Round negotiations envisage a revision of the criteria to be applied to the clusters of public support measures listed in the 'green box' as this was initially crafted for developed countries in support of structural change and reducing production capacity. The package of measures adopted at the WTO Ministerial Conference in Bali in December 2013 provides for a concretization of general public services, which will explicitly be allowed as agro-environmental programmes in developing countries. This includes measures of settlement and resettlement of farmers, land reform programmes, rural development and livelihood security programmes, and drought and flooding management programmes.

The breadth and the depth of the allowed public support to agro-environmental programmes are not the principal problem. Rather, they concern:

- The financial capacity of developing country governments for implementing such support programmes. The flexibility options under the green box are currently mostly used by a small number of large rapidly industrializing countries, such as China, India and Brazil.[88, xxvi] Also there is more room for flexibility in the use of the 'blue box'[xxvii], which China has started to avail of in addition to the EU, Japan and Norway.
- The lack of a clear will or strategy on enhanced public support to agriculture and small-scale farming at national level.[xxviii]

Second, Doha Round negotiations should strive to exclude the designation of food reserves as trade-distorting support. Such schemes serve the needs of food-insecure vulnerable groups.

Third, the Doha Round deliberations should also ensure that national or international supply management schemes, including marketing boards or commodity agreements are not prohibited.[xxix] Such schemes can help counter price volatility, on the one hand, and market power asymmetries following market consolidation, on the other.

xxv This list was further refined in the 2013 Bali Ministerial with a decision on certain green box measures (see: https://www.wto.org/english/thewto_e/minist_e/mc9_e/desci37_e.htm).

xxvi For a detailed review see ICTSD, 2014:11. Whereas total recent public support to agriculture accounts for some 21% of agricultural production value in developed countries, it accounts for just 11% in developing countries.

xxvii For subsidies that are tied to programmes that limit agricultural production volume.

xxviii In the Maputo Declaration of 2003, the member countries of the African Union (AU) committed to increase the level of public support to agriculture within five years to 10% of governmental spending. In 2008, however, only seven out of 53 AU member countries had achieved this goal. Actually the same number of countries had recorded a drop in the share of public spending on agriculture (Actionaid, 2009).

xxix Article XX (h, i and j) of GATT 1947 has a limited exception for international commodity agreements. In various free trade agreements, such as the EU FTAs with African countries, this exception has been purposefully deleted. For a more elaborate analysis, see Lunenborg (2009).

Fourth, the negotiations should guarantee flexibility for developing countries to insulate domestic markets from the volatility of prices on international markets, in accordance with the principle of special and differential treatment. The negotiations should materialize the proposed Special Safeguard Mechanism, which is supposed to counter the risk of agricultural dumping on domestic markets of developing countries. In addition, 'special products' provisions were suggested to achieve lower tariff reductions designated as critical for food security, sustainable rural development and rural livelihoods.

Estimates suggest that almost 90% of the USD 540 billion in subsidies given to farmers globally every year contribute to sustainability crises by damaging people's health, fuelling the climate crisis, destroying nature and worsening inequality. Worthy of particular attention are the subsidies for meat and their supply chains (e.g., a shift from beef/pork to poultry would be more sustainable). Meat supply chains are very long with feed usually imported from far away. The increase in meat consumption, especially in Asia, has food security implications elsewhere.[xxx]

Despite the phasing out of formal export subsidies under WTO rules, the European Union remains the world's largest exporter of meat and dairy products despite high domestic production costs. By imposing strict and rather high import tariffs on these products, the EU price level is stabilized, but cross-subsidization fuels exports. Besides allowing import protection against such practices under WTO rules, the EU should assure greater coherence between trade and development-assistance policy in reforming the Common Agricultural Policy (CAP) framework to avoid any form of export dumping (the area-related subsidies for export products should be phased out).

Fifth, the Doha Round negotiations should aim at medium- and long-term changes to the existing WTO framework to ensure that pro-food security programmes are not categorized as trade-distorting support. This should include changes to the 'green box' criteria and rules on safeguards.

8.2.2 Harnessing flexibilities and new opportunities outside the WTO framework for achieving food security and sustainable agri-food systems

Few topics are as important to WTO members as agriculture. And yet, in the last 20 years the Doha Round negotiations on agriculture have not only made meagre progress but they have also not modified its structure[xxxi], nor considered or incorporated new pressing topics, such as sustainability. Similarly, the WTO negotiations on environmental goods and services, which also partly concern agriculture and agri-food products, have also not yielded any tangible results yet (WTO, 2022). In the words of the United Nations Special Rapporteur on the Right to Food, "it is hard to see multilateral progress in the coming months or even years in the agriculture space on many of the present issues. This will place ongoing pressure on countries with agriculture export or import interests to explore regional or bilateral arrangements. It also undermines the ability of the world to meet UN sustainability goals."[84, 85]

xxx For more information see https://thediplomat.com/2022/07/chinas-main-food-security-challenge-feeding-its-pigs/

xxxi The key thematic clusters are: domestic support; market access; export competition; export restrictions; cotton subsidies; special safeguard measures; and public stockholding for food security purposes.

Against this background, the dynamics on coherence between trade rules, national and international sustainability challenges and targets, including for agriculture and food, have moved away from the WTO to bilateral, regional and plurilateral trade and investment agreements and NGO- and business-led initiatives, fostering sustainable production and consumption, particularly through voluntary sustainability standards.

There are various efforts in this regard ranging from trade preferences for environmentally preferable products and services on the importer's side, the use of sustainability labelling schemes linked to sustainable public or private procurement, and supply-chain policies to emerging international carbon offset market arrangements that facilitate trade in low-carbon-content products, as well as fair competition rules in the context of public support for facilitating production and trade (i.e. public money should only go to public goods and services). There are, however, many conceptual and practical issues to be clarified and resolved on most of these topics, and there are risks of discrimination. As regards sustainability labelling, for instance, there are only few real success stories[xxxii], but many failures or unfulfilled expectations, in particular as regards livelihoods of farmers, power disequilibrium along supply chains. or 'green-washing'.[xxxiii]

A helpful recent development is the promulgation of due diligence regulation that places a general requirement on large corporations, including food traders, processors and retailers, to exercise due diligence in respect of human rights' and labour abuses as well as environmental harm in all their operations and supply chains.[xxxiv] The EU Commission presented its final draft for a due diligence law in international supply chains in February 2022, which is now under discussion. In addition, there is a draft EU Commission proposal for regulation of deforestation-free products that besides timber also includes imports of beef, coffee, cocoa, palm oil and soy.

8.3 Reducing excessive dependence on international trade for food security

The permanently declining food price level since the mid-1970s prompted international financial institutions and other bilateral donors to encourage developing countries to modify their food production patterns – shifting emphasis from the production of staple foodstuffs to cash crops for export (notably fruits, vegetables and cut flowers in addition to the colonial legacy commodities such as coffee, cocoa, tea, bananas etc.) and using the increasing export revenues thus generated to import cheap staple food from the international market to meet domestic consumption needs. This strategy also re-oriented private and public agricultural investment, which gradually undermined the food production capacity of the national market.[xxxv]

To counter the tendency of soaring international staple food prices and their volatility in recent years it is wise for developing country governments to strengthen food sovereignty, in general,

xxxii The supportive role of sustainability standards in implementing the EU Forest Law Enforcement Governance and Trade (FLEGT) Voluntary Partnership Agreements (VPAs) as a public scheme and various fair-trade standards as private schemes are widely considered to be successful examples.

xxxiii A very problematic role concerned the use of voluntary sustainability standards in implementing the EU Renewable Energy Directive. For a more elaborate review see: Hoffmann and Bhutani, 2021: section III c.

xxxiv Prominent examples are the UK Modern Slavery Act (2015), the Australian Modern Slavery Act (2018), the California Transparency in Supply Chains Act (2012), and the EU Non- Financial Reporting (NFR) Directive (2014/ 95/ EU). The French Due Diligence of Corporations and Main Contractors Law (Devoir de vigilance des sociétés mères et des entreprises donneuses d'ordre) of 2017 is the most comprehensive to date (for more information see Hoffmann & Bhutani, 2021, section III, A, 4).

xxxv The Least Developed Countries (LDCs), for instance, imported some 20% of their food shortly before the food price crisis of 2008–2009 and the financial import bill in this regard had already doubled before the crisis (De Schutter, 2011: 13).

and the production capacity of smallholders in particular. The objective should be to become regionally and nationally largely self-sufficient and to increase the capacity of truly sustainable forms of production, notably various forms of agroecological production. To get there, a national strategy is needed that exploits the flexibility potential and mechanisms of the above-outlined development and 'green boxes' in the AoA.

The reliance of world diets on staples such as soybeans, corn or wheat is problematic in this context. Reducing reliance on such products in favour of root vegetables/tubers, squashes etc would increase the resilience of food systems.

A further aspect of strengthening food sovereignty is the toleration under international trade rules of consumer preference for regionally and locally produced food, which are seen as safe, environmentally more sustainable, and supportive of regional economic and social development. Besides, there are cultural, historical and religious reasons why consumers prefer certain local products. Such products rarely compete directly with 'mass' products readily available in international food markets, which would imply that their promotion (including through government support) would not violate the non-discrimination principle of the WTO. Irrespective of this fact, it would legally provide more certainty if the AoA were modified to allow such local preferences.[xxxvi] In fact, this can be done in WTO-legal ways, including through subsidies (choice of products or beneficiary farmers), labelling etc. A key issue in this regard is how it can be ensured that subsidies actually flow to smallholders instead of large farmers and the related supply chains (processors, seed companies etc) and how WTO members can monitor this. Larger flexibility should probably be coupled with more transparency, a clear strategy which could be communicated to WTO.

8.4 Conclusions and recommendations

Since the mid-1990s, when the World Trade Organization (WTO) was established and agricultural products were fully brought under international trade rules, international trade dynamics have affected the way food is traded. Various experts[84, 85] state that the Agreement on Agriculture (AoA), which is the specific rule framework for agricultural production and trade under the WTO, does not specify food security as the key or overriding objective of trade. Food security is rather seen as a complicating factor (among the so-called non-trade concerns), which may distort market mechanisms. Given the growing calls for food system transformation, trade agreements and frameworks must adapt to allow this transformation to take place. The following points broadly cover the recommendations in this regard:

- The AoA should redefine non-trade concerns and recognize their importance for achieving effective food security and facilitate sustainable food systems. A reformed AoA should also allow national policy space for food sovereignty. In this regard, WTO members should: (i) ensure that food security, the realization of the human right to adequate food as well as the achievement of sustainable food systems are recognized as principal objectives of agricultural trade policy rather than mere derivations; and (ii) work towards reducing the excessive dependence on international trade for food security[84] in the context of food sovereignty.

xxxvi For more information in this regard see: Fuchs und Hoffmann, 2013: 266-275.

- Existing flexibility under WTO rules to provide more national policy space on reinvestment in agriculture and support to smallholders through government provision of inputs, extension services and infrastructure should be fully exploited.
- A number of the potential measures that can effectively support agroecology, food security and rural livelihoods fall under clusters of measures that are already exempt from further trade liberalization commitments, i.e. measures under Article 6.2. (the 'development box' of the AoA), and measures in Annex 2 of the AoA (the 'green box'). Article 6.2. covers public investment and input-support measures for low-income and resource-poor farmers. This support, however, makes no distinction between conventional and sustainable forms of agricultural production. These existing flexibilities and room in the current WTO rules should be fully exploited to support agroecological production methods to further food system transformation.
- Estimates suggest that almost 90% of the USD 540 billion in global subsidies given to farmers every year contribute to sustainability crises by damaging people's health, fuelling the climate crisis, destroying nature, and worsening inequality.[89] A repurposing of such subsidies to support sustainable agricultural systems could be achieved within the existing framework.
- The Doha Round negotiations should aim at medium and long-term changes to the existing WTO framework to ensure that pro-food security programmes are not categorized as trade-distorting support. This should include changes to the 'green box' criteria and rules on safeguards.
- In order to counter the tendency of soaring international staple food prices and their volatility in recent years, developing country governments must strengthen food sovereignty, in general, and the production capacity of smallholders, in particular. The reliance of world diets on staples such as soybeans, corn or wheat is problematic in this context. Reducing reliance on such products in favour of root vegetables/tubers, squashes etc. would increase the resiliency of food systems. An important aspect of strengthening food sovereignty is the toleration under international trade rules of consumer preference for regionally and locally produced food, which is seen as safe, environmentally more sustainable, and supportive of regional economic and social development. Besides, there are cultural, historical, and religious reasons why consumers prefer certain local products. Such products rarely directly compete with 'mass' products in international food markets, which would imply that their promotion (including through government support) would not violate the non-discrimination principle of the WTO. Irrespective of this fact, it would legally provide more certainty if the AoA were modified to allow such local preferences.

The author gratefully acknowledges comments on the draft by Peter Lunenborg (South Centre, Geneva), Niklolai Fuchs (Manager, GLS Trust, GLS Bank Bochum) and Rudolf Buntzel (Consultant, Bread for the World)

Women buying vegetables at a market in Harar, Ethiopia.
Photo credit: Javier Ballester.

Outlook

In this series of reports entitled *'FORESEE (4C) –The Transformation of Agri-Food Systems in Times of Multiple Crises (4 Cs: Climate, Covid-19, Conflict, Cost of externalities)'* we have discussed the status quo and existing policy framework in the context of agri-food systems transformation.

The different pathways proposed by different actors in the agri-food systems were analyzed and classified based on their overarching approach. This was followed by an analysis of the debate around the transformation and a detailed description of the blind spots in the debate and recommendations on how to address them.

These reports aim to inform strategic policymaking on the transformation of agri-food systems and forms the basis for further work on the project on the *Assessment and Communication of Climate Impacts of Food (CLIF).*

In the next reports to be published in the framework of this project we will talk about different opportunities that can drive the transformation of agri-food systems. This includes the identification and classification of the different levers and agents of transformation based on relevant case studies from different regions of the world. The next strategic report is aimed at enabling decisionmakers to address the relevant actors and to take strategic measures to support the transformation of agri-food systems.

Bags and sacks of spices.
Photo credit: Kjeld Friis

References

1 Matias E. Margulis & Jessica Duncan. Global Food Security Governance. in Critical Perspectives in Food Studies (eds. Mustafa Koç, Jennifer Sumner & Tony Winson) 270–295 (Oxford University Press, 2016).

2 Canfield, M. Transnational Food Law. in The Oxford Handbook of Transnational Law (ed. Peer Zumbansen) (Oxford University Press, 2021).

3 John, D. A. & Babu, G. R. Lessons From the Aftermaths of Green Revolution on Food System and Health. Front Sustain Food Syst 5, 21 (2021).

4 Lal Srivastav, A. et al. Climate-resilient strategies for sustainable management of water resources and agriculture. doi:10.1007/s11356-021-14332-4/Published.

5 Anderson, C. R., Bruil, J., Chappell, M. J., Kiss, C. & Pimbert, M. P. Agroecology Now! Agroecology Now! 199 (2021) doi:10.1007/978-3-030-61315-0.

6 Béné, C. Why the Great Food Transformation may not happen – A deep-dive into our food systems' political economy, controversies and politics of evidence. World Dev 154, 105881 (2022).

7 Rafaele Vignola, Peter Oosterveer & Chris Béné. Conceptualising food system governance and its present challenges. https://edepot.wur.nl/561830 (2021).

8 Canfield, M. C., Duncan, J. & Claeys, P. Reconfiguring Food Systems Governance: The UNFSS and the Battle Over Authority and Legitimacy. Development 2021 64:3 64, 181–191 (2021).

9 ETC Group. Plate Tech Tonics. Mapping Corporate Power in Big Food Corporate Concentration by Sector and Industry Rankings by 2018 Revenue. https://www.etcgroup.org/files/files/etc_platetechtonics_a4_nov2019_web.pdf (2019).

10 Kelly Bronson. The dangers of big data extend to farming. The Conversation https://theconversation.com/the-dangers-of-big-data-extend-to-farming-184531 (2022).

11 Mooney, P. et al. A Long Food Movement: Transforming Food Systems by 2045. https://www.ipes-food.org/_img/upload/files/LongFoodMovementEN.pdf (2021).

12 Kurzweil, R. & Grossman, T. Fantastic Voyage: Live Long Enough to Live Forever. (Penguin, 2005).

13 Frederick Kaufman. How Goldman Sachs Created the Food Crisis – Foreign Policy. Foreign Policy https://foreignpolicy.com/2011/04/27/how-goldman-sachs-created-the-food-crisis/ (2011).

14 FAO. Sustainability Assessment of Food and Agriculture Systems (SAFA) Guidelines version 3.0. https://www.fao.org/3/i3957e/i3957e.pdf (2014).

15 Mark Eigenraam, Reiss McLeod, Kavita Sharma, Carl Obst & Amanda Jekums. Applying the TEEBAgriFood Evaluation Framework: Overarching Implementation Guidance. https://futureoffood.org/wp-content/uploads/2021/01/GA_TEEBAgriFood_Guidance.pdf (2020).

16 ETC Group. Food Barons 2022: Crisis Profiteering, Digitalization and Shifting Power. Mapping Corporate Power in Big Food. https://www.etcgroup.org/files/files/food-barons-2022-full_sectors-final_16_sept.pdf (2022).

17 MSI Integrity. Not Fit-for-Purpose: The Grand Experiment of Multi-Stakeholder Initiatives in Corporate Accountability, Human Rights and Global Governance. https://www.msi-integrity.org/wp-content/uploads/2020/07/MSI_Not_Fit_For_Purpose_FORWEBSITE.FINAL_.pdf (2020).

18 Handbook Digital Farming: Digital Transformation for Sustainable Agriculture . Handbook Digital Farming (Springer Berlin Heidelberg, 2022). doi:10.1007/978-3-662-64378-5.

19 Pigman, G. Allen. The World Economic Forum : a multi-stakeholder approach to global governance. (Routledge, 2007).

20 Gleckman, H. The Three Covid Crises and Multistakeholderism: Impacts on the Global South. https://www.foei.org/wp-content/uploads/2022/07/Report_three-COVID-crises-and-multistakeholderism_Friends-of-the-Earth-International-and-Transnational-Institute_2022.pdf (2022).

21 Truijens, D. Interest Groups and Experimentalist Governance in the EU: New Modes of Lobbying. Interest Groups and Experimentalist Governance in the EU (Palgrave Macmillan Cham, 2021). doi:10.1007/978-3-030-64602-8.

22 Laboutková, Š., Šimral, V. & Vymětal, P. Transparent lobbying and democracy. Transparent Lobbying and Democracy (Palgrave Macmillan Cham, 2020). doi:10.1007/978-3-030-36044-3/COVER.

23 HLPE. Nutrition and Food Systems, A report by The High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. https://www.fao.org/3/i7846e/i7846e.pdf (2017).

24 HLPE. Food security and nutrition: building a global narrative towards 2030. A report by The High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. https://www.fao.org/3/ca9731en/ca9731en.pdf (2020).

25 Caron, P. et al. Food systems for sustainable development: proposals for a profound four-part transformation. Agron Sustain Dev 38, 1–12 (2018).

26 Independent Group of Scientists appointed by the Secretary-General. Global Sustainable Development Report 2019: The Furture is Now - Science for Achieving Sustainable Development (United Nations, New York). https://sustainabledevelopment.un.org/content/documents/24797GSDR_report_2019.pdf (2019).

27 Patrick Caron. Confrontation Between Models: Coexistence to Navigate Between the Naivety of Consensus and the Violence of Polarisation. in Coexistence and Confrontation of Agricultural and Food Models: A New Paradigm of Territorial Development? (eds. Pierre Gasselin, Sylvie Lardon, Claire Cerdan, Salma Loudiyi & Denis Sautier) (Springer Netherlands, 2023).

28 Valette, E., Caron, P., D'Eeckenbrugge, G. C. & Wassenaar, T. General conclusion and outlook. in Living territories to transform the world (eds. P. Caron, E. Valette, T. Wassenaar, G. C. d'Eeckenbrugge & v. Papazian) (éditions Quae, 2017). doi:10.35690/978-2-7592-2731-0.

29 CESCR Office of the High Commissioner for Human Rights (UN). CESCR General Comment No. 12: The Right to Adequate food (Art. 11). Preprint at https://www.refworld.org/pdfid/4538838c11.pdf (1999).

30 Muigua, K. Achieving the Right to Food for Sustainable Development in Kenya. http://kmco.co.ke/wp-content/uploads/2018/08/Achieving-the-Right-to-Food-for-Sustainable-Development-in-Kenya-19th-July-2018.pdf (2018).

31 FAO. Voluntary guidelines to support the progressive realization of the right to adequate food in the context of national food security, adopted by the 127th Session of the FAO Council. https://www.fao.org/3/y7937e/y7937e.pdf (2005).

32 Knuth, L. & Vidar, M. Constitutional and Legal Protection of the Right to Food around the World, Food and Agriculture Organization of the United Nations. https://www.fao.org/3/ap554e/ap554e.pdf (2011).

33 United Nations Rapporteur on the Right to Food Olivier De Schutter. Briefing Note 01 - May 2010: Countries tackling hunger with a right to food approach. Preprint at https://www2.ohchr.org/english/issues/food/docs/briefing_note_01_may_2010_en.pdf (2010).

34 Golay, C. & Büschi, M. The right to food and global strategic frameworks: The Global Strategic Framework for Food Security and Nutrition (GSF) and the UN Comprehensive Framework for Action (CFA), FAO. https://www.fao.org/3/ap556e/ap556e.pdf (2012).

35 IPES-Food. From Uniformity to Diversity: A paradigm shift from industrial agriculture to diversified agroecological systems. International Panel of Experts on Sustainable Food systems. https://www.ipes-food.org/_img/upload/files/UniformityToDiversity_FULL.pdf (2016).

36. Special Rapporteur on the right to food, M. F. Right to Food in accordance with Assembly resolution 75/179. Preprint at https://digitallibrary.un.org/record/3936776 (2021).

37 Special Rapporteur on Human Rights and the Environment, D. R. B. Human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment in accordance with Human Rights Council resolution 37/8. Preprint at https://digitallibrary.un.org/record/3814570 (2019).

38 Why all human rights depend on a healthy environment, - Greenpeace Aotearoa. https://www.greenpeace.org/aotearoa/story/why-all-human-rights-depend-on-a-healthy-environment/.

39 FAO. Voluntary Guidelines to support the progressive realization of the right to adequate food in the context of national food security: The Right to Food. https://www.fao.org/3/y7937e/y7937e.pdf (2005).

40 Fanzo, J. C. & Downs, S. M. Climate change and nutrition-associated diseases. Nature Reviews Disease Primers 2021 7:1 7, 1–2 (2021).

41 FAO. The future of food and agriculture: Trends and challenges. https://www.fao.org/3/i6583e/i6583e.pdf (2017).

42 Pingali, P. L. Green Revolution: Impacts, limits, and the path ahead. Proceedings of the National Academy of Sciences 109, 12302–12308 (2012).

43 Shiferaw, B. et al. Crops that feed the world 10. Past successes and future challenges to the role played by wheat in global food security. Food Secur 5, 291–317 (2013).

44 Keith Griffin. The Political Economy of Agrarian Change: An Essay on the Green Revolution. (Springer, 1979).

45 Gordon Conway. The Doubly Green Revolution: Food for All in the Twenty-First Century. (Cornell University Press, 1997).

46 Awika, J. M. Major cereal grains production and use around the world. ACS Symposium Series 1089, 1–13 (2011).

47 Chivenge, P., Mabhaudhi, T., Modi, A. T. & Mafongoya, P. The Potential Role of Neglected and Underutilised Crop Species as Future Crops under Water Scarce Conditions in Sub-Saharan Africa. International Journal of Environmental Research and Public Health 2015, Vol. 12, Pages 5685-5711 12, 5685–5711 (2015).

48 International Institute for Sustainable Development. Why we must rethink the use of nitrogen fertilizers. https://www.iisd.org/articles/analysis/tackling-hunger-nitrogen-fertilizers (2022).

49 Tripathi, A., Tripathi, D. K., Chauhan, D. K., Kumar, N. & Singh, G. S. Paradigms of climate change impacts on some major food sources of the world: A review on current knowledge and future prospects. Agric Ecosyst Environ 216, 356–373 (2016).

50 The World Bank. The World Bank Food Security Update. https://thedocs.worldbank.org/en/doc/4cda3ceaa5a01b7590e7105fd5e6ca4f-0320012022/original/Food-Security-update-LXVI-July-15-2022.pdf (2022).

51 Claudia Sobrevila. The Role of Indigenous Peoples in Biodiversity Conservation: The Natural but Often Forgotten Partners. https://documents1.worldbank.org/curated/en/995271468177530126/pdf/443000WP0BOX321onservation01PUBLIC1.pdf (2008).

52 Vides-Borrell, E. et al. Polycultures, pastures and monocultures: Effects of land use intensity on wild bee diversity in tropical landscapes of southeastern Mexico. Biol Conserv 236, 269–280 (2019).

53 FAO and Alliance of Bioversity International and CIAT. Indigenous Peoples' food systems: Insights on sustainability and resilience from the front line of climate change. Indigenous Peoples' food systems https://www.fao.org/documents/card/en/c/cb5131en (2021) doi:10.4060/CB5131EN.

54 FAO. The White/Wiphala Paper on Indigenous Peoples' food systems. The White/Wiphala Paper on Indigenous Peoples' food systems https://www.fao.org/documents/card/en/c/cb4932en (2021) doi:10.4060/CB4932EN.

55 Kuhnlein, H. v. Vitamin D intake by Indigenous Peoples in the Canadian Arctic. Public Health Nutr 21, 1986–1987 (2018).

56 FAO Nutrition Division. Indigenous Peoples' Food Systems: the many dimensions of culture, diversity and environment for nutrition and health. FAO publications catalogue 2022 https://www.fao.org/documents/card/en/c/250ee74b-9c3f-5dc1-8086-6e0b78b22795/ (2009) doi:10.4060/CC2323EN.

57 el Poder Del Consumidor. El poder de... El maíz. https://elpoderdelconsumidor.org/2017/08/poder-el-maiz/ (2017).

58 Lopez-Ridaura, S. et al. Maize intercropping in the milpa system. Diversity, extent and importance for nutritional security in the Western Highlands of Guatemala. Scientific Reports 2021 11:1 11, 1–10 (2021).

59 The Global-Hub on Indigenous Peoples' Food Systems. Rethinking hierarchies of evidence for sustainable food systems. Nat Food 2, 843–845 (2021).

60 Eulalia Martínez-Cruz, T. El problema del "expertise" y la necesidad de crear diálogos interculturales en desarrollo internacional. LASA FORUM:DOSSIER: CLIMATE CHANGE AS A CULTURAL PROBLEM: TRANSDISCIPLINARY ENVIRONMENTAL HUMANITIES AND LATIN AMERICAN STUDIES 53, 21–26 (2022).

61 Martinez-Cruz, T. E. On continuities and discontinuities: The making of technology-driven interventions and the encounter with the MasAgro Programme in Mexico. (Wageningen University, 2020). doi:10.18174/508387.

62 Rogers, C. & Campbell, L. Endangered Languages. Oxford Research Encyclopedia of Linguistics (2015) doi:10.1093/ACREFORE/9780199384655.013.21.

63 Gorenflo, L. J., Romaine, S., Mittermeier, R. A. & Walker-Painemilla, K. Co-occurrence of linguistic and biological diversity in biodiversity hotspots and high biodiversity wilderness areas. Proc Natl Acad Sci U S A 109, 8032–8037 (2012).

64 Martinez-Perez, Y. A., Martinez-Jimenez, T. & Martinez-Cruz T.E. Soo tu'knë'mt nyëxëmo'oyëta' jëts soo ëkäts xyëmo'oyëta'/ Living as Ëyuujk (Mixe) within the Mexican State: How we name ourselves and how we are named by others, Forthcoming. in Unnamed book project coordinated by Smithsonian Museum (Smithsonian Museum, 2023).

65 Global Witness. Defending Tomorrow. https://www.globalwitness.org/en/campaigns/environmental-activists/defending-tomorrow/ (2020).

66 Biggs, R., Schlüter, M. & Schoon, M. L. Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems. Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems (Cambridge University Press, 2015). doi:10.1017/CBO9781316014240.

67 Brian Walker, C. S. Holling, Stephen R. Carpenter & Ann Kinzig. Resilience, Adaptability and Transformability in Social–ecological Systems. Ecology and Society 9, (2004).

68 Elmqvist, T. et al. Sustainability and resilience for transformation in the urban century. Nat Sustain 2, 267–273 (2019).

69 Vroegindewey, R. & Hodbod, J. Resilience of Agricultural Value Chains in Developing Country Contexts: A Framework and Assessment Approach. Sustainability 2018, Vol. 10, Page 916 10, 916 (2018).

70 UNEP. The Evaluation Framework - The Economics of Ecosystems and Biodiversity. https://teebweb.org/our-work/agrifood/understanding-teebagrifood/evaluation-framework/ (2018).

71 TMG ThinkTank for Sustainability. True Cost Accounting - Inventory Project. https://tmg-thinktank.com/projects/tca-inventory (2021).

72 Hendriks, S. et al. The True Cost and True Price of Food. A paper from the Scientific Group of the UN Food Systems Summit. https://sc-fss2021.org/wp-content/uploads/2021/06/UNFSS_true_cost_of_food.pdf (2021).

73 von Braun, J., Afsana, K., Fresco, L. O., Hassan, M. & Scientific Group for the UN Food Systems Summit. Science for Transformation of Food Systems: Opportunities for the UN Food Systems Summit. https://sc-fss2021.org/wp-content/uploads/2021/07/Scientific-Group-Strategic-Paper-Science-for-Transformation-of-Food-Systems_August-2.pdf (2021).

74 USDA. USDA Advances Food System Transformation with $43 Million for Urban Agriculture and Innovative Production, Adds New Urban County Committees. https://www.usda.gov/media/press-releases/2022/06/03/usda-advances-food-system-transformation-43-million-urban (2022).

75 USDA. Economic Research Service - Summary Findings: Food Price Outlook, 2022 and 2023. https://www.ers.usda.gov/data-products/food-price-outlook/summary-findings/ (2022).

76 Lindsay Owens. Opinion | Corporate Profiteering Is the Culprit for Inflation - The New York Times. New York Times https://www.nytimes.com/2022/05/05/opinion/us-companies-inflation.html (2022).

77 Tobias Burns. Inflation is providing cover for price fixing: economists | The Hill. The Hill https://thehill.com/policy/finance/3564912-inflation-is-providing-cover-for-price-fixing-economists/ (2022).

78 Julia Dahm. Carbon farming: EU ministers find the devil in the details – EURACTIV.com. Euraktiv.com https://www.euractiv.com/section/agriculture-food/news/carbon-farming-eu-ministers-find-the-devil-in-the-details/ (2022).

79 USDA. Impacts and Repercussions of Price Increases on the Global Fertilizer Market | USDA Foreign Agricultural Service. https://www.fas.usda.gov/data/impacts-and-repercussions-price-increases-global-fertilizer-market (2022).

80 Merrigan, K. A. Embedding TCA within US regulatory decision-making. in True Cost Accounting for Food: Balancing the Scale (eds. Barbara Gemmill-Herren, Lauren E. Baker & Paula A. Daniels) 179–188 (Routledge, 2021). doi:10.4324/9781003050803-12/EMBEDDING-TCA-WITHIN-US-REGULATORY-DECISION-MAKING-KATHLEEN-MERRIGAN.

81 Kathleen Merrigan. Fertilizer prices are soaring – and that's an opportunity to promote more sustainable ways of growing crops - The Conversation. https://theconversation.com/fertilizer-prices-are-soaring-and-thats-an-opportunity-to-promote-more-sustainable-ways-of-growing-crops-183418 (2022).

82 Dale, G. , Mathai, M. V. , & Puppim de Oliveira, J. A. Green Growth: Ideology, Political Economy, and the Alternatives. (Zed Books, 2016).

83 International Movement for Food Sovereignty. DECLARATION OF NYÉLÉNI. Preprint at (2007).

84 Hinrichs, C. C. Regionalizing food security? Imperatives, intersections and contestations in a post-9/11 world. J Rural Stud 29, 7–18 (2013).

85 Burnett, K. & Murphy, S. What Place for International Trade in Food Sovereignty? in Food Sovereignty: A Critical Dialogue (2013).

86 United Nations Special Rapporteur on the Right to Food, O. D. S. The World Trade Organization and the Post-Global Food Crisis Agenda: Putting Food Security First in the International Trade System. https://www.wto.org/english/news_e/news11_e/deschutter_2011_e.pdf (2011).

87 Brodeur, J. et al. Legal Analysis - Improving the Coherence of International Standards: Recognizing Agricultural and Food Specificity to Respect Human Rights. (Carswell, Bruylant, 2010)

88 Terrence P. Stewart. WTO Negotiations On Agriculture — Slow If Any Progress To Date - WITA. https://www.wita.org/blogs/wto-negotiations-on-agriculture/ (2022).

89 FAO, UNDP & UNEP. A multi-billion-dollar opportunity – Repurposing agricultural support to transform food systems. https://www.fao.org/3/CB6683EN/CB6683EN.pdf (2021) doi:10.4060/cb6683en.

4C **FORESEE SERIES**

CLIMATE | COVID-19 | CONFLICT | COST OF EXTERNALITIES

ABOUT THE PROJECT

TMG Research gGmbH aims to help develop a more systematic understanding of how agri-food systems can be transformed as part of a project on the Assessment and Communication of Climate Impacts of Food (CLIF), funded through the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) and jointly implemented with corsus and WWF Germany. This project promotes sustainable consumption patterns and helps companies, policymakers, and consumers choose more sustainable options in relation to food. The main contribution of TMG to this project is in developing a more systematic understanding of how to transform agri-food systems by publishing a series of strategic reports on the current status of agri-food systems and the likely drivers and agents of their transformation.

This report is part of the *FORESEE (4C)* series on *The Transformation of Agri-Food Systems in Times of Multiple Crises*, which explores the status quo of the current agri-food system in the light of challenges linked to the multiple crises. This part of the series reviews the blind spots and gaps in the debate around agri-food systems transformation and how these hinder the transformation. Furthermore, this report offers recommendations on how to address these gaps to facilitate an agri-food system transformation aligned to the leading themes of people, planet, and prosperity. The report was drafted by TMG with contributions from an extended group of experts.

TMG Research gGmbH
EUREF-Campus 6–9
10829 Berlin, GERMANY
+49 30 92 10 74 07 00
info@tmg-thinktank.com
www.tmg-thinktank.com

(TMG) ThinkTankforSustainability
Töpfer Müller Gaßner

IMPACTS OF FOOD

Supported by:

Federal Ministry
for the Environment, Nature Conservation,
Nuclear Safety and Consumer Protection

based on a decision of
the German Bundestag

IKI INTERNATIONAL CLIMATE INITIATIVE