

# RURAL

# 21

The International Journal for Rural Development

3 | 2023  
VOLUME 57

ISSN 1866-8011  
D 20506 F



## Joining forces for agri-food systems transformation

### SENEGAL

A local initiative for mangrove reforestation

### ZAMBIA

Pesticide governance put to the test

### ENVIRONMENT

Actions for a healthy planet

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Dear Reader,

Nowadays, no political agenda will work anymore without the concept of “transformation”. We are to take on the challenge of digital transformation, shape social transformation and promote energy transformation. Entire study programmes are devoted to the process, and, to be on the safe side, organisations keen to stress their forward-looking character have adopted the concept in their name. So is “transformative” the new “sustainable” – a concept which, as important and appropriate as it might be, is running the risk of degenerating to just another buzzword? And haven’t there always been changes – as an inherent element of development?

First of all, change and transformation are often used synonymously, even though they don’t mean the same thing. The Cambridge Dictionary describes the latter as “a complete change in the appearance or character of something or someone”. Here, a long-term process is meant which concludes with the lasting establishment and stabilisation of new structures. This can be initiated e.g. by social needs and/or new technical options/ innovations. Or by profound shocks calling for a radical rethink – in other words, when, to resort to another phrase which has found inflationary use, “business as usual is not an option”.

You are all perfectly familiar with the reason for the latter applying to our agricultural and food systems. They are not capable of providing the global population with sufficient and healthy food within the planetary boundaries. Worse still, with their high freshwater consumption, their greenhouse gas emissions and their representing a threat to biodiversity, they destroy their very own ecological basis. The multiple crises of the last few years have added to all this, with the consequence that Sustainable Development Goal 2 – ending hunger by 2030 – will definitely not be reached.

So we all know very well why we have to transform our agricultural and food systems – see above – and which direction this transformation has to take: towards sustainability, resilience, health, equity and inclusiveness. However, what is more important and much more complex than “why” and “to what end” is the question of “how”. Based on the

global discourses of the past years and the initiatives emerging from them, our authors have identified key levers and cornerstones for successful agri-food systems transformation.

As can be expected, these vary depending on whether they reflect the view of politics, science or civil society. Nevertheless, consensus has been reached on many issues. The transformation pathways have to be systemic and cross-sectoral and must break down complexity. They have to be locally owned, context-specific and include all stakeholder groups. They must regard trade-offs as inherent and create an acceptable compensation for the losers. And they have to contain short-, medium- and long-term activities.

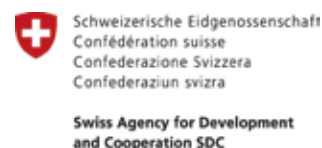
All this sounds like loads of theory – and no end of buzzwords. And indeed, we really do need both to address this complex topic. But this doesn’t mean we are neglecting practical aspects – you can look forward to accounts of experience gained in Ethiopia, Kenya, Rwanda and Tanzania, in Chile and Brazil, and in Bangladesh and Vietnam. And to our next edition, which takes up a further important aspect of sustainable food systems: tackling food loss and waste.

Wishing you inspiring reading, on behalf of the editorial team,



Patricia Sauer Silvia Richter

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**Imprint**

Rural 21 –  
The International Journal for Rural Development

**Published by:**  
DLG-Verlag GmbH  
Frankfurt, Germany

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**Editorial office, distribution, advertising:**  
DLG-Verlag GmbH  
Eschborner Landstraße 122  
60489 Frankfurt, Germany

**Printed by:**  
Bonifatius GmbH  
33100 Paderborn, Germany

Rural 21 is published four times a year.  
The subscription rate is EUR 33.– (Germany), EUR 37.– (EU countries), EUR 51.– (non-EU countries) and EUR 8.30 per issue, plus postage.  
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## Tropentag 2023: Competing pathways for equitable food systems transformation – trade-offs and synergies

The urgently needed transformation of our food systems was at the centre of this year's Tropentag – and with it the hotly contested question of how to analyse and finally overcome the dichotomy between technical solutions on the one hand and alternative options which focus more on paradigm shifts and the respective underlying webs of relations in our food systems on the other. Jointly organised by Humboldt-Universität zu Berlin and the Leibniz Centre for Agricultural Landscape Research (ZALF), the Tropentag – an annual interdisciplinary conference on research in tropical and subtropical agriculture, natural resource management and rural development – took place in Berlin/Germany in late September. It included over 130 presentations in roughly 30 sessions as well as 400 poster presentations. More than 1,000 experts registered for the event, and over 30 pre-conference workshops were held. Germany's Federal Minister for Food and Agriculture, Cem Özdemir, acknowledged the large number of young researchers from all over the globe who participated in the conference and encouraged them to go beyond scientific learning: "Use the networking opportunities because it is only together that we will meet the SDG agenda." The "Meet and greet" exchange between the invited keynote speakers and junior scientists who were able to address renowned researchers with questions regarding career path development and discuss upcoming research opportunities and research topics in an Apéro was a good opportunity for this.

### Gender matters

The topics addressed at Tropentag were very diverse, reaching e.g. from pest and disease control through management of

agroforestry systems to gender perspectives and agri-food value chain development. In the session "Gender and intersectional perspectives in transforming food systems", the research approaches presented from Colombia, Guatemala and East Africa underlined the importance to include women centrally in the transformation of food systems. Women are essential stakeholders regarding knowledge of agricultural practices but are still by far not effectively enough integrated into strategies focusing on agricultural development. Simultaneously, they are often marginalised e.g. in land tenure, even though their share in feeding their families is very often substantial.

In the same session, promising approaches to overcome these hurdles were presented, such as the "women's empowerment in energy index" developed by the Indian Institute of Management and IFPRI. A presentation on gender and climate change adaptation in refugee hosting landscapes in arid tropics of Eastern Africa was particularly noteworthy. In the project presented, house gardens (sometimes of just one square metre) were featured as key to successfully improving the food and nutrition security of refugees in the region. In the fragile contexts where these refugees, mainly women, live, even the smallest projects using e.g. recycled water, organic waste and local materials have proven to be very successful. These are small changes, but they are of essential importance and add up in their impact. Furthermore, the discussion revealed that in such arid areas, the UN Refugee Agency (UNHCR) cannot, for example, allow the use of freshwater for agricultural purposes if human consumption is not adequately covered. If, on the contrary, greywater is used for gardens, water is efficient-



Around 400 posters were exhibited at the Tropentag.

Photo: Martin Grauduszus

ly applied in a cascading manner and supplies affected refugee families with fresh vegetables. Thus, women and children can become partners in ecological stabilisation and restoration efforts in the project "Resource, Recovery and Reuse in Refugee Settlements in Africa" which is led by the International Water Management Institute (IWMI) and World Agroforestry (ICRAF).

### Sustainable land management – key to future food production

In times of an accelerating climate crisis, sustainable land management becomes particularly important to sustain or even regenerate natural resources to guarantee adequate qualitative and quantitative food production in the future. The German Federal Ministry of Education and Research (BMBWF) has acknowledged this by funding four research projects plus one project focusing on accompanying research aiming to develop solutions/ best practice examples in different settings. In the respective pre-session, research strategies in the fields of agriculture, rural development, natural resource protection and food security were openly discussed to

foster mutual learning processes and boost respective knowledge exchange. In this event, the discussion meandered around key topics such as "co-design of innovation", "science communication and knowledge management" as well as "gender sensitivity". In a subsequent World Café format, experts analysed past project experience and put it into perspective with ideal scenarios. The major key message developed is that stakeholders should be at the centre of research and that research is done for and with them. Subsequently, stakeholders should be integrated in research as early as possible – and they should remain at the centre throughout the project lifetime.

### Who decides – governance of food system transformation

Sustainable transformation of food systems is, by definition, a complete change in the character of the respective system towards sustainability. However, often enough, the question remains who decides which pathways are to be taken when. In a session focusing on exactly this topic, researchers presented rather broad approaches, such as an analysis

of the state of urban food policy action in 171 Asian cities in 21 countries, but also narrowed down the discussion on access to agricultural land for Uruguayan youth or governance challenges in smallholder agricultural carbon projects in Kenya. Particularly the latter is of crucial importance, as food systems are very likely to become increasingly important in the debate about climate change. Pay Drechsel of IWMI presented an analysis of the political agenda and the devastating effects of the suddenly implemented ban on the import of agrochemicals in Sri Lanka, the results of which might also be interesting in the context of the current global trend towards agroecology. It was found

that the abrupt ban had a particularly dramatic effect on plantation production in the country. Alternatives were also calculated and discussed in the presentation, such as the use of biowaste as fertiliser, but the vast geographical distances to be covered in the country prevent any economically sound application, which is also true for the import of organic fertiliser, e.g. from China.

### Science meets culture

Beside the pure scientific focus, the Tropentag essentially integrated the arts, as the latter are increasingly becoming important not only for communicating

scientific findings to the public but also, for example, as tool for collecting data. In the light of this growing importance, the organisers reserved a whole floor for a fruitful exchange between the two worlds. One example is the “Agroecology film festival”, where several movies focusing particularly on South America highlighted the struggle for sustaining traditional ways of farming. Furthermore, audiovisual exhibitions and the performance “Cacao: The sound of extinction” allowed the audience to dive into a multi-sensorial immersive experience.

Particularly now, shortly after the heads of many states met in

New York to underline the need for a sprint to achieve the SDGs, the exchange between researchers from different seniority levels, disciplines and continents is needed to boost the dissemination of concepts and ideas in the Global South. The next Tropentag 2024, in Vienna/Austria, will hopefully again be remembered as a buzzing and successful event which has strengthened the urgent transformation of food systems globally.

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**Harry Hoffmann**, Senior Research Associate, Governance of Food Systems Transformation, TMG Research gGmbH, Berlin/Germany

## “Ag tech” can cut billions of tons of greenhouse gas emissions

A new study demonstrates that state-of-the-art agricultural technology (ag tech) and management can not only reduce greenhouse gas (GHG) emissions growth, but eliminate it altogether by generating net negative emissions – reducing more greenhouse gas than food systems add. In fact, employing additional agricultural technology could result in more than 13 billion tons of net negative greenhouse gas emissions each year, as the world seeks to avoid dangerous climate extremes, according to research published in September in *PLOS Climate*. “Our study recognises the food system as one of the most powerful weapons in the battle against global climate change,” says Benjamin Z. Houlton, a professor at the College of Agriculture and Life Sciences at Cornell University, USA. “We need to move beyond silver-bullet thinking and rapidly test, verify and scale local solutions by leveraging market-based incentives.”

The world’s food system network generates between 21 and 37 per cent of the planet’s greenhouse gas emissions each year. With the global population approach-

ing ten billion by mid-century, greenhouse gas emissions of the global food system – if left unchecked – could grow to 50 and 80 per cent by 2050, according to the paper. Previous research has indicated that changing diets around the world is a key to reducing greenhouse gas in the food-system sector. If the entire human population adopted a so-called flexitarian diet by 2050 – which is promoted by the EAT-Lancet Commission – the scientists estimated a gross reduction of 8.2 billion metric tons of greenhouse gas emissions, which falls far short of the net negative emissions goal. “Our study examines both dietary change and agricultural technologies, as various options for slashing emissions,” Maya Almaraz, associate research scholar at Princeton University, USA, says. “This included an analysis of carbon sequestration.” In contrast to the marked benefit of agricultural technology in realising massive sector-wide negative emissions, dietary changes had little effect on carbon sequestration, according to the study.

The new model showed that the most effective way to reduce

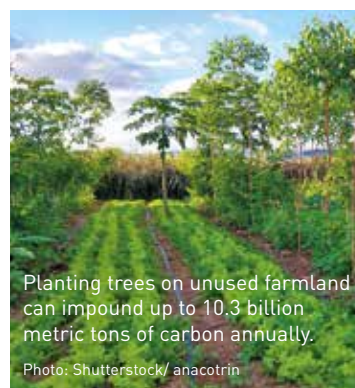
emissions is to boost soil modifications for crops (biochar, compost and rock amendments), develop agroforestry, advance sustainable seafood harvesting practices and promote hydrogen-powered fertiliser production. In a process called “enhanced weathering”, for example, silicate rock dust can be added to crop soils every five years to accelerate the formation of carbonates. This process devours carbon dioxide, which can sequester several billion metric tons of carbon per year, according to the paper. Through agroforestry, planting trees on unused farmland can impound up to 10.3 billion metric tons of carbon annually, while seaweed can be farmed at the ocean surface and then buried in the deep sea, removing up to

10.7 billion metric tons of carbon dioxide. Supplementing livestock feed with additives could reduce methane emissions by 1.7 billion metric tons and applying biochar to croplands may reduce nitrous oxide emissions by 2.3 billion metric tons.

Food-system environmental action needs to start regionally. Houlton said that anaerobic digesters had been converting manure from New York’s dairy farms into electricity since the mid-1970s, reducing emissions, supporting energy self-sufficiency, and assisting in water quality improvements. The biogas resulting from the waste becomes energy that local electric companies can easily use. “We need a portfolio of solutions that are effective locally but have global impact,” he maintains.

“To get the world to net negative greenhouse gas emission – a global imperative to avoid the most dangerous climate impacts – we need to rely heavily on agricultural technology and management techniques,” Houlton concludes.

(Cornell Chronicle/wi)



Planting trees on unused farmland can impound up to 10.3 billion metric tons of carbon annually.

Photo: Shutterstock/ anacotrin



# TRANSFORMING AGRICULTURAL AND FOOD SYSTEMS – WHY AND HOW

**The world has reached a tipping point: up to 783 million people faced hunger in 2022; more than 3.1 billion were unable to afford a healthy diet. While our current agri-food systems fail to ensure access to sufficient and healthy food, they are simultaneously causing alarming environmental damage and enormous health costs. Thus, the transformation of global agricultural and food systems is both necessary and urgent – it constitutes nothing less than one of the prime challenges for humankind.**

By Heike Höffler, Birthe Paul and Pierre Pascal Cerdan Castagnola

With an average 122 million more people pushed into hunger since 2019 due to multiple crises, the Sustainable Development Goal 2 of ending hunger by 2030 will not be reached. This was the bitter assessment by the UN Food and Agriculture Organization (FAO), the World Food Programme and the World Health Organization in July 2023 – just two months ahead of the United Nations 2023 SDG Summit in New York/USA marking the half-way set to achieve the 2030 Agenda.

Current agricultural and food systems not only fail to provide sufficient, affordable and nutritious food, but also destroy their very own ecological foundations. They account for 23 to 42 per cent of global greenhouse gases. Eighty-six per cent of species listed as threatened are at risk from agricultural activities, leading into a biodiversity crisis. Agriculture is responsible for 70 per cent of global freshwater consumption. The impacts of climate change have already reduced global agricultural productivity by around 21 per cent since 1961. German

Federal Ministry for Economic Cooperation and Development (BMZ) State Secretary Jochen Flasbarth got to the point in a conversation with the African Union (AU) and the World Bank in Berlin in January 2023, stating: “Our current agri-food systems are galaxies away from sustainability.”

Against this gloomy background, consensus grows on what is urgently needed: a profound transformation of global agricultural and food systems that provides the global population with sufficient and healthy food within the planetary boundaries. In 2019, the concept of transforming agricultural and food systems finally resonated internationally with the High Level Panel of Experts on Food Security and Nutrition (HLPE) report *Food security and nutrition: building a global narrative towards 2030*. Since then, key actors and institutions have embraced this comprehensive concept at international level. The United Nations Food Systems Summits (UNFSS) in 2021 accelerated the momentum, and food system transfor-

mation has played an ever-increasing role at the United Nations Framework Convention on Climate Change (UNFCCC) COPs (see Figure on page 8).

According to the widely accepted HLPE definition, agricultural and food systems encompass all core elements and activities from inputs at pre-production, agricultural production and supply chains to retail, food environments and consumption of food. It considers drivers of change in food systems such as environmental factors, policy, markets and demographic, social and cultural trends. Food system outcomes are the heart of the concept – impacts on human health, society, economy, and the environment. Piecemeal action will not do, as transformation means major and disruptive changes. Transformation levers can be conceived as areas of work that have the potential to bring about broad positive change beyond their immediate focus. Key levers for global-scale transformation across international reports can be identified as follows: policy, gov-



### CompensAction rewards farmers for climate services

CompensAction was launched in July 2022 by Germany's Federal Ministry for Economic Cooperation and Development (BMZ) under the country's G7 Presidency. The initiative aims to promote Payment for Ecosystem Services (PES) innovations at scale in order to thus provide farmers with incentives for nature- and climate positive agriculture. Ecosystem services can include CO<sub>2</sub> storage, water and soil conservation, biodiversity conservation and other activities, for all of which farmers receive compensation. CompensAction is to enhance smallholder income in low- and medium-income countries. For this purpose, supported by the International Fund for Agricultural Development (IFAD), the initiative has already started the first pilot projects. In Ethiopia, for example, it is supporting forestry. The project aims to introduce sustainable farming practices on 25,000 hectares of land which sequester at least 2.2 tonnes of CO<sub>2</sub> equivalent,

i.e. a range of different greenhouse gases, per hectare and year. In addition, more than 8,000 households are to raise their income by trading emissions credits. In Brazil, the initiative is supporting the development of a financing system for deforestation-free value chains. This is to enable the sustainable management of around 10,000 hectares of forests together with 1,500 families from 2024 on. In Lesotho, there is a national fund for the payment of ecosystem services such as saving water while working or the conservation of biodiversity. The scheme is to reach up to 40,000 people.

CompensAction is being implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH together with the think-tank Clim-Eat, based in Wageningen in the Netherlands.

More information: <https://compensaction.com>

outcomes are not always on the table, and we have to identify and address trade-offs, negotiate acceptable solutions for losers and make sure that disruption results in socially just transformation. Fourthly, we have to shift our focus to systemic change at structural levels, with renewed attention to building evidence-based policy and finance systems.

### Global debate sparking locally owned context-specific transformation pathways

All conceptual considerations are only worth the paper they are written on if we manage to translate this important international debate into meaningful action on the ground. Let us state the most important thing upfront. There is no single global blueprint for the transformation of agricultural and food systems. Neither should there be! As much as challenges are context-specific, so are solutions and transformation pathways. Agricultural and food systems vary considerably across the globe, from rural systems that are dominated by smallholder farmers, subsistence and fragmented markets and oftentimes hunger and malnutrition to industrialised systems with global market participation, high food availability, obesity and environmental pollution. Transformation pathways are in no way linear, but what stands central is a locally determined, desirable combination of productive and economic, sustainable, healthier, resilient, inclusive and equal food system outcomes.

So, if solutions are locally owned and determined, what can the global debate on transformation of agricultural and food systems add to the game? We argue that the transformation of global agricultural and food systems is a global challenge, and that as such, it requires international collaboration. Global agendas, debates and narratives can provide inspiration and orientation, set principles and priorities, and contribute to building one leading vision.

Agricultural and food systems across the globe are characterised by strong, yet often diverting interests. Negotiating priorities in weighing outcomes and trade-offs involves a deliberate process of societal debate at national and sub-national level. Transformation pathways need to be developed at national level and be implemented locally; this was one key result of the 2021 UNFSS. The Stocktaking Event UNFSS+2 in Rome, Italy, in July this year has shown that a number of countries have started to define their pathways and have gathered strength to walk their path, no matter how stony it may be. The defined entry points to national pathways differ and follow different paradigms, varying from climate-smart agriculture in Kenya to sustainable intensification of food production in Zambia, to natural farming in India and agroecology in Mali and Burkina Faso. No matter what the national focus may be, it will be important to monitor not only national progress but also agri-food system outcomes and the aforementioned trade-offs for a just transformation.

Photo: Neil Palmer/ CIAT

ernance and institutions; research, technology and innovation; food finance architecture; (international) trade and food supply chains; food production architecture; and education, (nutrition) knowledge and consumer awareness.

So, what is new you might wonder – is this not just a more comprehensive yet more complex approach summarising everything we are already doing? We beg to differ – as the approach does feature key paradigm shifts that can introduce real changes to how we do things in international cooperation. Firstly, promising single options are no silver bullets, but need to be intentionally combined into innovation bundles to realise their potential for solving real human challenges. Secondly, the realisation stands central that transformation of agricultural and food systems requires systemic approaches with collaboration across sectors, most importantly, combining long-separated agriculture, nutrition/human health and climate/biodiversity. Thirdly, as a systemic concept, trade-offs are an inherent part – win-win

## Development of global discourses towards agricultural and food systems transformation since 2015



### Strategy and engagement of German international cooperation

The role of international cooperation in this context is rather clear: to consistently support and to finance the global agenda of agriculture and food systems transformation towards more sustainability and resilience, and to engage strategically at the level of regional institutions to support transformative efforts e.g. at African Union level, while at the same time providing direct and tangible support to national implementation at country level towards achieving SDG 2.

The German government has set itself a respective framework document. The BMZ Core Area Strategy “Sustainable Agri-Food System Transformation” states that food systems “must be more effective and more efficient, be resilient to shocks of all kinds, and be set up in an environmentally, economically and socially sustainable manner that will enable them to contribute to income and employment, overcome poverty, and create prosperity. The rights and interests of producers – in particular small-scale producers – need to be balanced fairly against those of consumers. Protecting the climate and conserving natural resources, such as land, water and biodiversity, are also essential factors for well-functioning agricultural and food systems.”

This can only be achieved by the aforementioned multilevel as well as multisectoral and multi-stakeholder engagement – including agriculture, health and environmental institutions as well as public, private, science and civil society actors. While governments and science in many countries have been central to the development of agri-food transformation pathways, civil society and, in particular, private sector engagement lags behind and needs to be stepped up. In the context of food value chains development, German development cooperation has vast experience of participatory engagement that will be of use here.

It is further necessary to distinguish between short-, medium- and long-term activities: implementing the necessary transformation encompasses various aid and development instruments that impact at different times. Examples of BMZ's very immediate interventions include the formation of the Global Alliance for Food Security (GAFS) jointly with the World Bank as well as the international conference “Uniting for Global Food Security” in June 2022 as direct answers to the food security threats of the Russian war against Ukraine. As a network of global decision-makers, GAFS has since demonstrated international unity, and a World Bank-managed dashboard now tracks many food security activities and indicators for all affected countries in a transparent

manner. In addition, in 2022, Germany spent 3.5 billion euros on food security – more than ever before – for emergency measures as well as for transformative purposes such as the investments in the multi-donor trust fund “Food Systems 2030”.

Examples of medium-term engagement for transformation are:

- The G7 initiative “CompensAction for food security and a healthy planet” (also see Box on page 7) which, jointly with the International Fund for Agricultural Development (IFAD), pilots and scales compensation measures for smallholder farmers in various countries for their measurable engagement in prioritising the protection of natural resources over agricultural exploitation (payments for ecosystem services); and
- German support of what is known as the repurposing agenda, which aims at transforming the way public money is spent in agriculture, namely a repurposing of environmentally harmful agricultural subsidies.

Concerning long-term engagement, Germany has stepped up its engagement to put the transformation of agricultural and food systems at the heart of multilateral agendas in the leading UN processes and pertinent Conferences of the Parties (COPs), notably COP27 and COP28 of the UNFCCC, COP15 of the



UNCCD, COP15 of the Convention on Biodiversity and the UN Food Systems Summits. The former special initiative “One World – No Hunger” will be continued as the special initiative “Agricultural and Food System Transformation” to implement the BMZ Core Area Strategy. Several new global programmes are to implement the transformative agenda at global, regional and country level. Agreements on activities are underway with a number of partner countries, such as Burkina Faso, Cameroon, India, Kenya, Madagascar, Nigeria, Togo and Zambia.

Halfway through Agenda 2030, the BMZ invited selected partners of its special initiative to the network meeting ‘Partners for Change’ in June 2023. Around 250 partners and representatives from politics, science, the private sector and civil society convened in Berlin to develop policy recommendations for the transformation of agricultural and food systems based on the experience gained from implementation. The final product, a joint political commitment, includes action based on multi- and cross-sectoral approaches, seeking coherence across all levels (see Photo).

### Putting things into perspective – what’s the way forward?

Looking forward, what are the next frontiers in transformation of agricultural and food systems? We see at least four areas of tension and potential conflict – which are nonetheless the areas where crucial progress needs to be achieved:

1. **Continuity vs. disruptive change of transformation:** When it comes to bilateral and multilateral cooperation, disruptive change is not engrained in institutional cultures, nor does it conform with a need for a certain degree of continuity for longer-term development measures. This is threatening the transformative agenda to be watered down by putting old wine in new bottles.
2. **Complexity vs. operational need for simplicity:** While transformative approaches as systemic approaches finally appreciate the complexity of agri-food systems, operational structures often require sufficient simplicity to be implemented effectively. There is a danger of either getting lost in complexity or continuing business as usual by reducing complexity too much for the sake of operationalisation.
3. **Policy vs. private sector engagement:** The renewed emphasis on trans-



From left to right: Indu Jakhar (Government of Maharashtra, India), Moses Musinguzi (Makarere University, Kenya) and Ella Compaoré (Ministry of Health and Public Hygiene, Burkina Faso) handing over the jointly developed policy recommendations to BMZ State Secretary Jochen Flasbarth.

Photo: Photothek, 2023

formative policies so far focuses primarily on political agendas and strategic statements and events and therefore naturally concentrates largely on public actors in international, regional and national institutions. However, we need to keep in mind that the food economy in Africa alone is estimated to be worth 18 times more than all development assistance on the continent. There is this big private sector elephant in the room, and we need to work harder to effectively engage private sector stakeholders in the agri-food transformation for development.

4. **Local implementation vs. global progress monitoring:** It is acknowledged that the transformation of agricultural and food systems needs to be locally owned, context specific and nationally led and implemented. However, for a global transformation agenda to be pursued, we need global comparative measures to track progress towards its outcomes. We need to avoid shying away from universally comparable indicators, for if we don’t dare to measure and compare, we don’t know whether we are progressing. Let’s bear in mind that “What gets measured gets done”.

Way too many people are still going hungry as climate change progresses. The accelerating and overlaying crises of the past years show us that we will not achieve the SDGs with incre-

mental changes. A total turnaround is necessary towards sustainability, resilience and human health. And for this, we need all hands on deck – from climate science to agriculture, rural development and health – to at least attempt to master the enormous task of agricultural and food systems transformation.

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# Policy coherence and food systems transformation

Whenever the implementation of (international) development agendas is at issue, the need to improve the coherence of policy interventions is stressed. But what exactly does this refer to? And what are the challenges countries face in this regard? Comparing the examples of Malawi, Nigeria and Ethiopia, our author discusses these questions, also with view to national pathways to transform food systems.

By Livia Bizikova

In 2021, the United Nations Secretary-General convened the United Nations Food Systems Summit (UNFSS) to advance progress on food systems transformation and towards the Sustainable Development Goals (SDGs). As part of this process, over 100 countries submitted their collaboratively-developed national pathways for food systems transformation. A review of these national pathways showed that they tend to focus on high-level priorities, and that they lack specificity with regard to the policies and actions needed to transform the food systems of individual countries. Coming up with these is difficult because doing so requires addressing economic constraints, policy contradictions, inconsistencies and trade-offs across the diverse policy areas relevant to food systems transformation. Guidance documents intended to assist countries in developing their national pathways stress the importance of improving the coherence of policy interventions, but provide limited direction about specific policy coherence issues countries typically face and the challenges in addressing them.

## What is policy coherence?

There are several definitions used to describe policy coherence. Organisation for Economic Cooperation and Development (2019) guidance on integrating SDGs into national policy-making stresses the importance of policy coherence across sectors and institutions, while the United Nations framework for food system transformation to accelerate the transition to sustainable food systems (UNEP, 2019) refers to policy coherence as ensuring "... consistency, comprehensiveness, and harmonious-compatible outcomes across policy areas and sectors without compromising the integrity of policymakers' goals". Based on this high-level guidance, we consider the following three dimensions of policy coherence:

- horizontal coherence addressing inconsistencies, trade-offs and gaps in related policies across different sectors such as agriculture, education, environment and others,
- vertical coordination and coherence ad-

ressing efforts to harmonise policies and actions from the national down to local levels and thus across spatial and administrative boundaries, and

- temporal coherence addressing the allocation of resources over time and sequencing implementation in the short, medium and longer terms.

There are a range of methodological approaches to assess policy coherence, such as scoring and ranking, trade-off assessment as well as quantitative modelling across policy priorities and planned actions. However, this is an emerging field, so methodologies are still evolving and approaches are often chosen on a case-by-case basis, and in relation to the quality of available documentation.

## Horizontal and vertical coherence

Ideally, all national and sub-national policies should be aligned and consistent with the policy objectives identified in national food systems transformation pathways. This would ensure horizontal coherence between national pathways and all related strategies and policies, for example in sectors such as agriculture, environment, health, business development, education and employment. However, ensuring coherence across different sectoral policies and strategies can become an enormous exercise requiring significant analytical, negotiation and resource capacities (time, effort and expense) for policy-makers. Therefore, we suggest focusing on policies and strategies in a narrow subset of directly-linked policy areas covering (see upper Table):

- agriculture and rural development, agricultural modernisation and promotion strategies including both crops and livestock,
- nutrition and food security strategies including social protection policies, national dietary guidelines, nutritional improvement and food security programmes,
- climate change, climate resilience and disaster management strategies such as National Adaptation Plans (NAPs), Nationally

Determined Contributions under the Paris Agreement (NDCs) and green economy strategies.

Moving beyond these policy areas of critical importance, additional elements could include overall SDG strategies (if available), those focused on educational development, public health policies linked to nutrition and labour market policies affecting employment and compensation.

Coherence challenges can also arise from poor coordination between national, sub-national and local policies and priorities, which leads to inefficiencies and misdirected resources. However, such vertical coherence has proven to be very difficult to achieve in the case of the SDGs, where linkages to the sub-national level are limited (current SDG localisation efforts mostly focus on cities instead of rural areas). Improving capacities of agencies at both the national level (for horizontal coherence) and sub-national levels (for vertical coherence) could help improve policy consistency, harmonise priorities and align actions to better support implementation, with benefits across sectors.

## National pathways – consistent with country policies?

National food systems transformation pathways were developed in a consultative manner and reflect the priorities of governments and non-governmental stakeholders. To transform food systems, priorities identified in national pathways should become integral elements of national policy and strategy design. The national pathways that were submitted typically reflect existing national policy priorities such as supporting climate-smart agriculture, improving food security, improving nutrition and building farmer capacities. But some relevant existing national policies were not reflected in them (see examples in lower Table).

In Malawi, Ethiopia and Niger, for instance, increasing the size of livestock herds is rec-



### Examples of strategies and policies with critical relevance to ensure coherence in three selected countries

	Malawi	Ethiopia	Nigeria
Agriculture and rural development	Agricultural Investment Strategy (2018) National Agricultural Policy (2021)	Growth and Transformation Plan (GTP II – 2015-2020)	Agricultural Transformation Agenda (ATA) (2013) Agricultural Promotion Policy (2016)
Food security, nutrition and healthy diets	The Social Protection Programme (SPP) (2021)	National Nutrition Program (2013) Seqota Declaration (2018) Nutrition Sensitive Agriculture Strategic Plan (2016) National dietary guidelines (2022)	Social protection policy (2022) National dietary guidelines (2006, 2013)
Climate change, resilience and disaster management	National Resilience Strategy (2018) Nationally Determined Contributions (NDCs) (2021)	Nationally Determined Contributions (NDCs) (2021) National Adaptation Plan (2019)	Nationally Determined Contributions (NDCs) (2021) National Agricultural Resilience Framework (2015) National Adaptation Plan Framework (2021)

ognised as a priority policy objective. Here, livestock development is seen as important to address nutritional challenges, strengthen livelihoods and diversify agricultural development. Supporting livestock development while also meeting greenhouse gas emissions reductions targets requires improvements in animal health services and feed quality. In this regard, these countries recently introduced policies to address climate change adaptation and resilience by, for example, supporting farmers' adaptive capacities, nature-based solutions, infrastructure, access to financial services and markets, and emergency preparedness. Very few aspects of these recent climate change adaptation priorities, especially those focused on supporting farmers' skills and practices and access to inputs, are included in the national pathways.

Policy coherence also means that existing policies supportive of food systems transformation and sustainability should be prominently featured in the national pathways. In the context of these three countries, we can mention efforts to reduce food waste and loss as well as food safety and standards. These policy initiatives, which are already underway in some countries, have a low profile, limited political support and few resources. In some cases, they are not emphasised in the nation-

al pathways, while in others, they appear in national pathway documents but not in national policies. Explicit integration in national pathways would provide additional impetus to move existing policies forward and highlight gaps where policy frameworks are missing (see lower Table).

#### Temporal coherence

Achieving temporal coherence requires balancing considerations of urgency, synergy and appropriate sequencing of interventions that build on each other, all while considering available resources. For example, national pathways identify measures related to food security, nutrition and land restoration as well as weather forecasting and surveillance to better anticipate climate disasters. Depending on the local context, investments in forecasting and surveillance may be a higher priority from an urgency and synergy perspective to enable farmers to make long-term investments in cultivation practices or restoration with greater security. These priorities would need to be reconciled with policy implementation and capacities at national and sub-national scales, as part of the efforts towards horizontal and vertical coherence.

Regarding sequencing, there is often need to strengthen key institutions as a foundation for better stakeholder decision-making throughout the agricultural sector. One common recommendation in national pathways including those of the three countries considered here is to set up or significantly improve institutions such as a land registry, agricultural finance and trade services, as well as environmental and disaster monitoring and management. These actions might require considerable efforts and resources but are intended to enable other stakeholders to operate more effectively and efficiently so that they can better drive and respond to other policy initiatives.

#### Shared priorities across countries and opportunities for support

Finally, we observe that there are similarities between priorities outlined in the three countries, and it should be possible to develop common programmes for donor support, regional initiatives and related capacity-building on issues such as food safety and standards, food loss and waste, options to reduce GHGs from agriculture and institutional development. Similar programming, or regional collaboration in these areas, would also allow learning across countries that aim to address similar priorities.

### Examples of gaps in policy coherence (in red) between the national pathways and existing national policies and strategies in the three countries

Country and documents	Crops	Livestock	Food safety, standards	Value chains	Water availability	Food waste and loss	GHG reduction
<b>Malawi</b>							
National pathway	Included	Limited	Included	Included	Included	Included	Limited
National policy	Included	Included	Limited	Included	Included	Limited	Included
<b>Ethiopia</b>							
National pathway	Included	Limited	Included	Included	Limited	Limited	Included
National policy	Included	Included	Included	Included	Included	Included	Included
<b>Niger</b>							
National pathway	Included	Limited	Included	Included	Limited	Limited	Limited
National policy	Included	Included	Limited	Included	Included	Included	Included

Source: based on the submitted national pathways to food system transformation for the three countries

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# Supporting governments in optimising agricultural spending and policies – FAO’s MAFAP programme

Since 2010, the Monitoring and Analysing Food and Agricultural Policies (MAFAP) programme of the UN Food and Agriculture Organization (FAO) has been assisting countries in sub-Saharan Africa in strengthening the effectiveness of agri-food policies with regard to inclusive agricultural transformation. A brief overview.

By Marco V. Sánchez

By filling a gap in policy support to monitor and analyse policy incentives and public spending in greater depth, MAFAP’s economists and policy analysts have been able to shine a light on how coherent countries are with their support to food and agriculture vis-à-vis their agricultural transformation objectives. At the core of MAFAP’s first phase, from 2010 to 2014, was price incentives analysis, which since then has been helping countries to monitor the effects of domestic policies on the prices farmers and traders fetch for their commodities. The programme has also contributed price incentive indicators for Africa in the form of a harmonised global database of support to agriculture through the Ag-Incentives Consortium, composed of FAO, the International Food Policy Research Institute (IFPRI), the Inter-American Development Bank (IDB), the Organisation for Economic Co-operation and Development (OECD) and the World Bank.



A MAFAP team collecting price data from farmers and producers in eastern Uganda.

Photo: J. C. Nkuingoua Nana

Monitoring and tracking public expenditures also gained traction throughout the programme’s second phase (2015 to 2021). This policy support has allowed governments to identify areas in agriculture and rural development that are underinvested or those which would have higher returns on investment, as well as to reveal budget bottlenecks that are clogging up the public purse’s resources to the sector. The analysis led to a greater emphasis on proposing solutions in the shape of evi-

dence-based policy reforms to address specific problems in the agri-food sector, tackling issues such as commodity pricing to trade and marketing issues through to regulatory affairs and public investment strategies.

Since its start, the MAFAP programme has helped bring about over 30 reforms to agri-food policies in sub-Saharan Africa. Now in its third phase until 2027, funded by the Bill & Melinda Gates Foundation and under institutionalisation in FAO, the programme boosts a dedicated data hub on policy monitoring, has recently expanded its scope to several countries in North Africa and South Asia, and is also adapting innovatively to testing times.

## Prioritising budgets

Long considered as a benchmark for agricultural spending, the Maputo Declaration – signed 20 years ago by African Union countries – saw governments commit to allocate ten per cent of all public expenditure to the agriculture sector to spur socio-economic growth. Yet, MAFAP’s monitoring has shown that over the years, many countries in Africa struggle to spend this much, and not all their spending is effective. Given this dilemma, the programme wanted to support countries to spend what they can afford – but much better.

To do this, the MAFAP team developed a multi-sectoral, economy-wide policy optimisation modelling tool to help governments prioritise their spending in the areas where this can be most cost-effective. This tool runs a set of scenarios to advise governments on how to better allocate agriculture budgets across different public investments to get as close as possible to their inclusive agricultural transformation objectives. In doing so, the analysis considers all productive and financial constraints of the country’s economy to provide policy-makers with the most realistic advice possible.

The results coming from the new policy optimisation tool have already been presented this

year to three countries in sub-Saharan Africa, Ethiopia, Uganda and Burkina Faso, providing their Ministries of Finance, Agriculture and Planning Commissions with insights and scenarios that can inform policy-making and future budget allocations to the sector with the best payoffs for society at large. The evidence emerging is showing governments that, if they use the same public money but reallocate it differently, they can boost agri-food output, lift thousands of people out of poverty, create thousands of off-farm jobs in rural areas, and even allow millions more people to afford a healthy diet. Given this potential, the results are proving particularly relevant to inform national development strategies and plans across Africa.

## Looking forward with a climate lens

MAFAP’s future will inevitably focus more on climate change, especially because this phenomenon is having an impact on how effective current agri-food policies and budgets are. The programme will expand its work to understand if agricultural public expenditures are supporting national adaptation plans and climate commitments, the vulnerability of public expenditure to climate change and the potential of specific public projects and activities in agriculture to help build climate resilience.

The policy optimisation tool will be enhanced to account for climate-change effects when optimising the allocation of public resources towards agriculture across several investment areas (e.g. fertilisers, seeds, irrigation, extension, R&D, etc.). This collaboration is to support countries in reallocating and repurposing their public resources to help de-risk climate-smart agricultural technologies and practices that could be scaled up by the private sector.

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## Gender justice – a precondition for resilience

Women and girls in poorer countries are affected in particular ways by the multiple crises the world is currently facing. Uncovering the linkages between gender, resilience and food security, our authors look at ways to support women and girls' capacity to respond to crises and make them more resilient. They also explore what can be done to address underlying gender inequalities.

By Elizabeth Bryan, Ruth Meinzen-Dick and Claudia Ringler



The agri-food sector continues to bear gender inequalities. Significantly more women than men have lost their jobs as a result of the Covid pandemic.

Photo: Jörg Böthling

The world has witnessed a series of compounding, overlapping and, in some cases, reoccurring shocks and stressors in recent years, including the Covid-19 pandemic, the global food crisis triggered by Russia's war on Ukraine, several localised conflicts around the globe and the intensifying climate crisis. Thus, policies, investments and interventions focused on increasing resilience have become essential to help vulnerable populations rebound from these disturbances, while becoming better prepared to handle inevitable future shocks and stressors.

Whereas these multiple crises affect many vulnerable communities in low- and middle-income countries, there are particular gender-differentiated impacts which present unique challenges to the well-being of women and girls. Careful consideration of these gender-differentiated impacts is required for policy and programme responses to meet the needs of women and girls, tackle long-standing gen-

der inequalities and promote sustainable pathways to recovery. Without a gender lens, the proposed measures will fail to meet the specific needs of women and girls and may even exacerbate gender inequalities.

The UN Food and Agriculture Organization (2023) report *The Status of Women in Agrifood Systems* shows that as a result of the Covid-19 pandemic and the related economic crisis, 22 per cent of women lost their jobs in off-farm agri-food systems work in the first year of the pandemic, compared to only 2 per cent of men. Furthermore, the gap in food insecurity between men and women widened from 1.7 percentage points in 2019 to 4.3 percentage points in 2021. These gender gaps are driven by underlying gender inequalities in agri-food systems, such as the fact that women's livelihoods and working conditions are marginalised, informal, irregular and low-skilled and thus more vulnerable to shocks than men's. Moreover, girls and young women face par-

ticular risks when confronted with shocks and stressors, such as a higher likelihood of being withdrawn from school, gender-based violence and economic or sexual exploitation.

Vulnerability and resilience also depend on other intersectional identities, such as age, marital status, class and ethnicity. For instance, women heads of household may face greater limitations in access to land, capital, social networks and labour, while married women may benefit from access to these resources through male household members but have less decision-making authority or autonomy. Similarly, women in different food environments (such as rural or urban contexts) may face different challenges. For example, while women in rural farming communities may experience adverse impacts of droughts on their water security and livelihoods, women in urban contexts may face greater challenges related to flooding and associated health risks, like cholera, given poor water infrastructure and crowded conditions.

So what can be done to support the capacity of women and girls to respond more effectively to disturbances and contribute to the resilience of their households and communities while addressing underlying gender inequalities that make women and girls more vulnerable in the first place? One useful framework for think-

ing about the approaches needed to achieve gender equality and resilience goals is the Reach-Benefit-Empower-Transform Framework. There is growing recognition among development practitioners, researchers and policy-makers that simply reaching women (e.g. including women in programme activi-

ties) is not enough to address gender inequalities. Policies, interventions and investments must ensure that women benefit from these interventions through measured improvements in their well-being (e.g. food security, income and health). This means ensuring that women have access to information and finance needed

**Conceptual linkages between gender, resilience and food security**

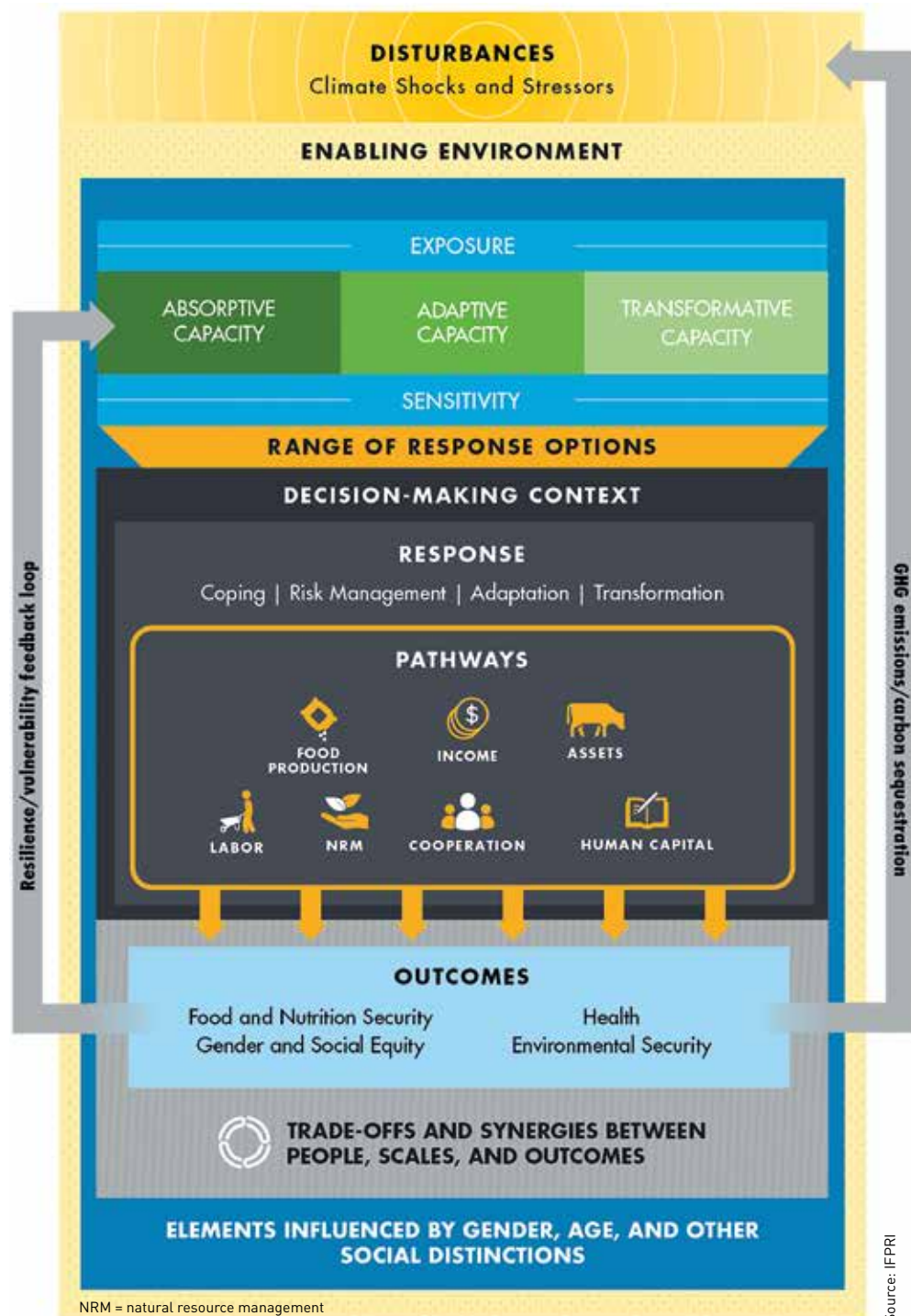
IFPRI’s Gender, Climate Change, and Nutrition Integration Initiative (GCAN) uses a conceptual framework to illustrate the gender dimensions of resilience (see Figure). Each of the components in this framework is shaped by gender differences. Men and women have different levels of exposure and sensitivity to various shocks and stressors, driven by gender differences in livelihood roles, health and nutrition status, and other contextual factors.

For example, men are more likely to migrate away from climate-stressed areas while women remain behind, leaving them more highly exposed to climate stress. Similarly, women tend to have lower resilience capacities to respond to disturbances given less access to information, finance and other services, more limited access to and control over assets, more restrictive social norms and a generally higher work burden compared to men, among other factors. Women’s generally lower resilience capacities limit their ability to respond to the shocks and stressors that they face, including the options available to them. For example, women’s poorer access to information and extension services limits their adoption of climate-smart practices that relate to their livelihood roles and their ability to maintain or increase agricultural productivity during times of crisis, such as the Covid-19 pandemic or after a flood event.

When women are empowered to make decisions in agri-food systems, this can increase their contribution to resilience. In Bangladesh, women’s involvement in agricultural decisions increases the production diversification away from rice towards other crop types, with positive implications for climate resilience (by reducing risks associated with monocropping of rice) and nutrition (through diversified diets). Ultimately, the choices that are made in response to shocks and stresses have different implications for men’s and women’s well-being outcomes. For instance, the combination of climate stressors and the introduction of new climate-smart technologies or practices can influence the allocation

of household labour in ways that exacerbate women’s work burden in agriculture. Recent studies show that women’s labour in-

tensity in agriculture is increasing relative to men’s under heat stress, likely given men’s easier access to alternative livelihoods.





to increase productivity on the plots they manage, take advantage of economic opportunities and grow their enterprises. It means expanding social protection and violence prevention programmes to women in rural areas and providing other incentives to keep girls in school.

Increasingly, interventions aim to facilitate women's empowerment by providing them with more opportunities to make decisions and realise their own goals. Women's groups and networks often represent an important source of resilience as well as a platform for women's empowerment by offering opportunities to share labour, childcare responsibilities, access to savings, credit and government services, the ability to access and build assets, and increased political engagement. However, even efforts to increase women's agency may not be enough to reduce gender inequalities in agri-food systems and increase women's resilience. Gender-transformative approaches (GTAs) may be required for deeper and more lasting improvements in the status of women. Gender-transformative change goes beyond the individual and household levels to remove structural barriers in society. Thus, GTAs require multi-pronged, multi-scale approaches that involve challenging patriarchal norms which underpin harmful cultural beliefs and attitudes, gender inequalities in institutions, policy frameworks and governing structures at multiple scales, and gendered power dynamics and relations. They also depend on engaging men and boys as partners for gender equality.

### Group-based approaches are promising

One example of a project that incorporated gender-transformative approaches is the "Joint Programme on Accelerating Progress towards the Empowerment of Rural Women (JP RWEE)" led by numerous UN agencies and implemented across several countries including Ethiopia, Kyrgyzstan, Nepal and Niger. JP RWEE activities for transforming gender relations included dialogues at the household and community levels to promote more inclusive decision-making processes and engaging men and boys as champions for gender equality. Among these approaches are IFAD's Gender Action Learning System (GALS) intervention and FAO's Dimitra Clubs, which bring men and women together at the household and community levels to listen to each other and work together to solve local challenges. These dialogues also provide a platform for trained facilitators to raise awareness of harmful gender norms, attitudes and

### Resilience

Resilience is a complex concept that is understood and utilised in different ways by different disciplines. We adopt the definition by USAID which describes resilience as "the ability of people, households, communities, countries, and systems to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth" (USAID, 2012, p. 5). Thus, building resilience requires investments and interventions that build adaptive capacities, such as expanding economic opportunities, education, and nutrition and health services, while also identifying and reducing context-specific risks.

beliefs, and to challenge unequal structures (such as local rules governing resource access). Importantly, JP RWEE relied on group-based platforms or approaches aiming to expand economic and livelihood opportunities for women and/or increase their access to resources like microcredit or savings. Research shows that the group-based approaches were core to the successes of the project, which included increasing women's involvement in livelihood decisions, asset ownership, credit decisions and, in some cases, income decisions. Having men take part in the interventions was also crucial to avoid potential backlash from the activities focused on women's groups and to promote changes in gender relations and norms.

While there is limited evidence of the effectiveness of applying gender-transformative approaches as part of resilience-building interventions, clearly, the status quo is not working. Intentional efforts and commitments from the development community to tackle persistent gender inequality is essential to ensure that women from all walks of life are actively engaged in efforts to restore their economies and

communities. Achieving this transformation will require interventions that prioritise gender equality and the empowerment of women and girls, instead of pivoting from it. Women-led and women's rights organisations must take centre stage in designing and implementing interventions and have their voices heard in national and international platforms. A strong focus on justice, equality, inclusiveness and human rights must be at the heart of every effort to build resilient agri-food systems and rural livelihoods. Despite the many challenges that women and girls are facing, they remain essential to the success of any crisis response.

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In times of crisis, girls have a higher likelihood of being withdrawn from school than boys.

Photo: Jörg Böthling



Nutritional education empowers individuals to make informed dietary choices.

Photo: Jörg Böhling

## People-centred collaboration – four key principles for equity and sustainability in the food systems transformation

Launched in 2010, the Scaling Up Nutrition Movement (SUN) set itself the goal of bringing together a wide range of stakeholders and harnessing their collective power to overcome global malnutrition. It is precisely these joint efforts that are needed to create a transformative impact on the global food system, our author maintains.

By Barbara Rehbinder

Global food production could feed everyone, yet equitable distribution, waste, and access persist as challenges. The 2023 *State of Food Security and Nutrition in the World* report shows that in 2022, 30 per cent of the world's population faced moderate to severe food insecurity. A staggering 3.1 billion people cannot afford a healthy diet, while a third of all the food we produce goes to waste, squandering precious resources. This not only raises ethical concerns but also propels us towards an unsustainable future. One key underlying problem is an agricultural focus on quantity over quality, based on industrial-scale monocrop farming. This approach depletes resources and harms ecosystems, intensifying global warming and extreme weather events that in turn harm nutrition. A shift needs to happen towards holistic agroecological practices that nourish people and the planet, promoting resilient ecosystems and mitigating climate risks. As advocates of the Scaling Up Nutrition Civil So-

ciety Network, a global alliance of over 4,500 organisations working for better nutrition and food systems, we are committed to integrating these practices. Crucially, SUN's mandate to bring together all stakeholders and sectors in the fight against malnutrition aligns with the goal of fostering strong, inclusive and fair food systems. By uniting diverse perspectives, we aim to drive the required transformation in the global food system, recognising that addressing malnutrition is a critical pillar of this endeavour.

Below are some principles that we think are crucial to implement in this regard. They are aimed at a wide spectrum of stakeholders, including governments, international organisations, civil society groups, the private sector and donors. The required changes need to be initiated and driven collectively by this diverse range of actors in order to create a transformative impact on the global food systems.

### 1. Investing in local food systems

Supporting local food production, processing and consumption is essential for many reasons. Firstly, it enhances food security by reducing reliance on distant sources, ensuring a consistent food supply, especially during crises. Local foods are often fresher and more nutritious, improving diets and community health. Economically, it stimulates growth by creating jobs and supporting local businesses, leading to a resilient economy. Additionally, local production typically has a smaller carbon footprint, reducing greenhouse gas emissions and promoting sustainability. It also preserves cultural heritage, values traditional practices, and empowers small-scale farmers while reducing food waste through shorter supply chains. Overall, supporting local food systems contributes to a more sustainable, resilient and equitable food system benefiting communities, individuals and the environment alike.



The shift towards supporting local food systems involves a collaborative effort from a variety of stakeholders. Governments must play a pivotal role by re-evaluating trade regulations that may disadvantage local produce. Ensuring convenient transportation and storage of local goods is a shared responsibility, involving both public and private sectors. Additionally, community empowerment is essential, necessitating the involvement of civil society organisations to advocate for and work with local communities. Recognising the intrinsic value of local cultures and crops requires a collective mindset shift, fostered through educational initiatives and awareness campaigns. At the implementation level, practices like agroecology and indigenous farming methods should be promoted, benefiting from the expertise of both local communities and agricultural experts. This multifaceted approach contributes not only to economic growth and the well-being of people, but also to the preservation of our environment.

## 2. Making nutrition central to food environments

Making nutrition central to food environments, rather than prioritising profit, has a range of essential impacts. First and foremost, it prioritises the health and well-being of individuals and communities, aiming to reduce the risk of diet-related diseases and promote overall quality of life. It aligns with long-term sustainability goals by emphasising diverse, balanced diets that are less resource-intensive and reducing the environmental impact of food production. It also fosters nutritional education and awareness, empowering individuals to make informed dietary choices, and promotes a culture of health-conscious decision-making. Nutrition-centric food environments strengthen communities, encourage social initiatives like community gardens, and address food insecurity. Additionally, this approach ensures that vulnerable populations have access to nutritious food and can lead healthy lives, potentially reducing healthcare costs while reflecting ethical considerations by valuing people's health over profit motives in the food industry.

This principle underscores the importance of nutritional education within food systems approaches and countering unhealthy food marketing and advertising. At the implementation level, this involves incentivising and enabling breastfeeding among mothers. It also entails disseminating nutritional information through various channels like advertisements,

school programmes, and workplace initiatives. Equally important is the need for transparent food labelling. The principle also highlights the significance of ensuring access to nutritious food for economically disadvantaged individuals, especially mothers and children, through mechanisms such as financial support and food vouchers.

## 3. Empowering civil society

Civil society organisations play a crucial role in food systems transformation. They represent marginalised voices, leverage local expertise and engage with communities to ensure that solutions align with local needs and inclusivity. They serve as accountability watchdogs, advocating for policies prioritising people's well-being. Civil society brings innovation, acting as a bridge between diverse stakeholders, responding effectively to food crises, and championing social and environmental justice. Empowering civil society might entail providing funding and resources for community-driven initiatives, facilitating training programmes to enhance their advocacy and leadership skills, and involving them in policy-making processes.

To make this happen, it is essential to recognise and support civil society's capacity to drive local solutions and amplify marginalised voices. Governments and donors should actively empower it to bridge gaps and advocate for holistic, context-specific solutions. This approach promotes community-led, locally relevant transformative changes, creating more equitable, effective and sustainable food systems that embrace ethical, inclusive and environmentally responsible practices.

## 4. Ensuring accountability and fulfilment of commitments

Ambitious pledges are easy to make, but upholding these promises requires vigilant oversight and data-driven evaluation of progress. Transparency and integrity lie at the core of this endeavour, necessitating alignment between commitments and actions. Robust monitoring of countries' adherence to their promises, in alignment with strategic frameworks such as the food systems transformation pathways stemming from the national dialogues held in the lead up to the UN Food Systems Summit, serves as a compass. The Nutrition Accountability Framework, a comprehensive tracking mechanism endorsed by the government of Japan, UN agencies, the SUN Movement and others, to hold all data on commitments made

for the Tokyo Nutrition for Growth (N4G) Summit 2021, empowers stakeholders to track progress made and turn commitments into transformative actions in nutrition and food systems. These platforms thus ensure accountability and progress towards a healthier and more sustainable future.

Likewise, vigilant oversight of corporate conduct is essential. While encouraging ethical practices is crucial, placing sole reliance on the goodwill of the private sector is insufficient. Instead, a comprehensive approach is required to ensure that commercial interests align harmoniously with the broader objectives of equitable and sustainable food systems. Robust frameworks for corporate accountability can act as a safeguard, preventing the undue concentration of power and mitigating the potential for conflicts of interest. They create an environment where companies are incentivised to prioritise long-term sustainability over short-term gains, acknowledging their role as critical stakeholders in the pursuit of a nourished and resilient global population.

One common thread that becomes unmistakably clear in this transformative journey is the profound significance of collaboration. While civil society undoubtedly emerges as a formidable driving force, it is vital to recognise that the sheer scale and complexity of the task at hand extend far beyond the realm of any singular entity. Governments, with their regulatory powers and policy-making capabilities, wield a central role in steering the transformation. International organisations bring expertise, resources and a global perspective that are essential for coordinating efforts across borders. Donors play a pivotal role by providing financial support to catalyse change and propel initiatives forward. The private sector's innovation, investment and technological advancements can reshape industries and practices. Within this context, the beauty of the SUN Movement lies precisely in its ability to harness the collective power of these diverse stakeholders – governments, international organisations, donors, the private sector and civil society – all converging with a shared resolve. This convergence is what enables equitable and sustainable food systems, ultimately leading to a thriving global population and a sustainable planet.

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**Elisabetta Recine** is President of CONSEA (Conselho de Segurança Alimentar e Nutricional), Brazil's National Council for Food and Nutrition Security. She is a member of the Steering Committee of the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security (CFS) and of the International Panel of Experts on Sustainable Food Systems.

## “ A system that is uniform is not resilient ”

For many years, Brazil's National Council for Food and Nutrition Security (CONSEA) has been campaigning for alleviating hunger and poverty as well as for the right to food – with success. Its President Elisabetta Recine on achievements, remaining challenges and the power of participation.

### Ms Recine, what are the biggest shortcomings of agri-food systems in Brazil?

Brazil is known for its agricultural and live-stock production capacity, and practically every year, harvest records are announced. However, an important share of this production has a very high environmental cost, either due to the advance of the agricultural frontier in biomes that should be protected, or due to dependence on chemical inputs and petroleum derivatives. Part of this fragility comes from producers who still resist changing the production model, recognise the need to diversify production towards sustainable models, and finally adopt an environmental but also social agenda. The wealth produced by Brazilian agribusiness is not distributed fairly.

### What is the situation of small farmers like?

Most Brazilian farmers are small and medium-sized, but they have the lowest percentage of land and also face challenges in accessing finance and markets. On the other hand, the results of the agricultural census indicated that it is small farmers who are responsible for the greatest variety of food that the population has access to. Since the beginning of 2023, a series of public policies that had been interrupted have been resumed for financing family farming, support for women farmers, public procurement, technical assistance, agroecological transition and other areas. It is expected that with these initiatives it will be possible to reverse the loss of acreage of staple foods such as beans.

### Why is acreage diminishing?

The production of commodities is advancing on land that was previously used to grow basic products, and also due to the lack of a pricing policy, basic products are not competitive, and producers prefer to grow what can generate more income.

### Tell us a bit about CONSEA's role.

CONSEA is an advisory body to the Presidency of the Republic of Brazil. Its main role is to propose and monitor public policies related to food and nutrition security and the Right

to Food. Two thirds of the National Council consists of members of civil society, while the remainder comprises 24 government sectors that work in food and nutrition security. The Council's presidency is also from civil society. Different sectors of Brazilian society are integrated in it, such as family farmers, indigenous peoples, black people, human rights defenders, researchers, peasants and women's organisations, agroecological producers – in short, it has a great diversity of rural and urban representations.

### This sounds like a strong organisation. How did it come about?

To understand this, we have to take a brief look at history. Brazil is a deeply torn country which continues to be abound with inequality. Human rights were long trampled over – a phenomenon which was exacerbated by the military dictatorship from the mid-sixties to the mid-eighties. The subsequent re-democratisation process was linked with a new awareness in Brazilian society. The emergent social movements brought the issue of combating hunger into politics. With the 1988 Constitution ensuring new forms of participation in public policies through councils and social control policies, a new arena for social dialogue has been established. It was in this context that the National Council for Food Security was founded in 1993 – only to be revoked by the then President two years later.

### What happened then?

When Luiz Inacio Lula da Silva took office in 2003, he put combating hunger at the top of his political agenda, which prompted the re-creation of CONSEA. Since 2006, Brazil has had a Framework Law on Food and Nutrition Security, on the basis of which the National Food and Nutrition Security System was formed – with the mandate to organise and strengthen the institutions of the Brazilian State and create formal spaces for social participation through Food and Nutrition Security Councils. The Councils are meant to design, influence and monitor public policies in the field of food and nutrition security and sovereignty. Currently, alongside the National Council, there are Councils in all Brazilian states and in more than 700 cities.



### How does CONSEA cooperate with the government?

All the issues are discussed in plenary sessions and standing committees with government and civil society councillors. Approved proposals are sent to the President of the Republic and the Interministerial Chamber.

### Is there any collaboration with the private sector?

In CONSEA, there are some representatives from the private sector, such as food supply centre associations and organic producers' cooperatives, but the most important representation is from sectors of society that work towards the realisation of the human right to adequate food.

### What do you regard as the greatest successes regarding achieving the right to food in Brazil?

School meals are an important achievement. Part of the food for this purpose is bought from smallholders. Since 2009, the local communities have had to spend at least 30 per cent of the funding they receive on school meals for public purchases from family farming. This amounts to 42 million euros, which benefits the local producers each year. However, the procurement of food for public policies from family farming is broader than just for school meals. It currently covers all public services that provide meals. Public purchases allow family farming to have a guaranteed market, organise its production and expand its reach. This type of initiative has a great impact on generating and strengthening the local economy, reducing poverty and structuring small-scale production. It is important to mention that all this has been inspired by experiences from civil society organisations and movements. Establishing the fight against hunger and poverty as a political priority in 2003 was paving the way for the development of legal instruments that would ensure the continuity of policies and programmes targeting the poor.

### So civil society took a strong lead here ...

Yes, definitely. Another public policy that was inspired by the experience of civil society was the cistern programme in an arid region of Brazil that started in 2000. The One Million Cisterns Programme not only guarantees water for families to consume and produce food, but is developed from a social technology that fosters the empowerment of communities. It's characteristics like these that increase the citizenship of people and communities.

### Let's get back to the smallholders and the support they need.

Our goal is resilient and sustainable food systems. One important aspect here is bringing production and consumption together. Regarding the production side, we want to make sure that small farmers and pastoralists have the right set of tools, so that they can stay on their land and continue to farm it. Land titles are still unequally distributed in Brazil. To support small farmers, it's essential to guarantee production financing, technical assistance and access to markets. Specific actions are also needed to support peasant women and young people. In Brazil, it is also a priority to protect and strengthen the traditional food systems of indigenous peoples and traditional communities. All these actions have a common element, which is the protection and recovery of the socio-biodiversity of the different Brazilian biomes.

### What would you describe as the Council's greatest strength?

Participation! We try to get a wide range of actors together so that they can speak with one voice. And we have cross-sector cooperation. Twenty-four ministries are confronted with civil society demands and are acting in concert. What is crucial is the political recognition of the agenda's significance for development and the reduction of inequalities in the country. The commitment of its members, the diversity and representativeness of the different sectors of Brazilian society, the quality of its proposals, which are based on good practices and an excellent scientific foundation – all of these are our success factors.

### Early in January 2019, the then President dissolved the Council. What impact did this have?

That was a challenging process. Brazilian civil society continued to mobilise, as not only was the Council abolished, but the situation of hunger and poverty worsened. The organisations that were part of CONSEA called a People's Conference for Sovereignty and Food and Nutritional Security, which has been active all these years in defence of policies and programmes.

### Coping – or not coping – with the corona pandemic was also a feature of Jair Bolsonaro's period in office ...

Just like most other countries, Brazil was not prepared for the pandemic. Extreme poverty was already on the advance, the public sector was lacking money and staff, and then the pandemic came on top of all this. The government simply denied the pandemic – a pandemic claiming more than 700,000 lives. The majority of people were struggling to survive day for day, while millions suffered hunger.

### How did civil society respond?

Responses to the pandemic were found locally. There were social movements, donations and solidarity. Farmers produced goods for the towns close by. More than 500 projects addressing this were recorded country-wide. The initiatives were all very local. It has become clear how important it is to be close by those affected.

### Has anything changed with the recent elections in Brazil?

Tackling hunger and inequality are once again among the government's priorities. This announcement raises the expectation that public policies will be redirected towards reducing inequalities by tackling racism, gender and income inequalities and access to land and territory. Considering the economic, social and political structure, this is a major challenge that will require a long-term commitment and permanent mobilisation of the sectors that defend the common good. Brazilian society as a whole needs to recognise that inequalities affect not only the people who suffer the direct consequences but the whole country and our future. In relation to food sovereignty and food and nutrition security, it is expected that the engagement of the different sectors of government that have responsibility for this agenda will be broad and that they will make common commitments to articulate programmes and define priorities and common goals.

### What major challenges are there?

We must transform our food systems towards sustainability. This includes strengthening the agro-ecological transition, fostering territorial markets and guaranteeing physical and financial access to healthy food for all people, especially the most vulnerable communities. Moreover, the rural-urban nexus needs to be much more articulated and closer. Cities also need to recognise that the issue of food needs to be included in urban planning. Food supply needs to be a public policy issue to guarantee physical and financial access to healthy food in all communities. The element that runs through all actions is tackling the climate crisis – from the seed to after the plate all initiatives and actions must contribute to this purpose.

### In a nutshell, what is at the heart of resilient food systems?

Diversity! A system that is uniform is not resilient. Life is only sustainable when it is diverse.



Winnowing with shovels – part of traditional crop farming in the Choke Mountains.



Ditches along the contour lines for efficient irrigation and erosion control.



Well-building for solar water pumps to provide efficient irrigation.

## From vision to action – towards resilient food systems in Ethiopia's highlands

There are many entry points for the transformation of agricultural and food systems towards more productivity, sustainability and resilience. Taking the example of a farmers' cooperative in Ethiopia's Choke Mountains, our authors show how these can be applied and effectively linked, and how many synergy effects can arise to the benefit of entire communities, if just one individual grasps the initiative.

By Valerie Seitz and Birgit Zimmermann

Ethiopia largely consists of green and fertile highlands and mountain regions with a moderate to cold climate. From the Northeast to the Southwest, it is traversed by the Great African Rift Valley, with its tropical-hot regions. Ethiopia remains one of the world's least urbanised countries, and has a rural population of more than 80 per cent, consisting predominantly of subsistence farmers. The majority of the population live in small farms without electricity or water supply which are widely scattered across the entire highlands. The people own an average 0.5 hectares of land which is used as an extensive mixed farming system with animal husbandry and crop-growing. Traditional crop farming comprises tilling by plough and two oxen, manual sowing and harvesting with a scythe by the whole family, drying in the field, thrashing with horses, winnowing and traditional storage in clay vessels or on the clay floor of the huts. In two to three cultivating cycles a year, with only a low level of inputs and usually as rain-fed farming, teff and maize are grown in the lower regions and potatoes, wheat and barley in the highlands. A well-off farmer family owns the livestock needed for crop farming, such as two oxen and horses, as well as some sheep and chickens for subsistence and for livestock breeding. During the day, the farm children tend the livestock, which is free to roam the surroundings and graze, and is fed nothing additionally except leftovers from farming.

### Unsustainable agricultural practices, poor nutrition status

Just like in other countries, the tropical highland regions of Ethiopia are among those areas most threatened by climate change. Nevertheless, just a very small share of them is under conservation. The subsistence farmers depend on the fertile, damp soils of the mountains as their only livelihood source. Along

with low productivity in traditional agriculture and a lack of alternative income sources, rapid population growth – it is reckoned that the population will have reached 250 million people by 2050 – has been forcing the local population to clear-cut forests and even grow crops on steep mountain slopes. Erosion, deforestation and loss of biodiversity are the result. Free-range livestock keeping also leads to soil degradation. In combination with the lack of functioning market structures for farm produce, the traditional production methods result in postharvest losses of up to 50 per cent. Together with climate change, these problems are amplifying pressure on the vulnerable ecosystems. Given the difficult financial situation the smallholders are in, often living on the subsistence minimum, the food situation is also critical. Usually, there are simple dishes without milk or meat products, also thanks to long fasting periods among the Ethiopian Orthodox population. Only little fruit and vegetables are consumed in the highlands, too, which is why, among children in particular, vitamin and nutrient supply is insufficient.

### Entry points for sustainable rural development and their investment costs

There are many approaches to a transformation of the production system towards more productivity, resilience and sustainability:

**Innovative and sustainable production systems.** The permaculture concept, for example, offers a wide range of methods which could be applied on Ethiopian farms. Permaculture is a designing method for the planning of natural habitats and embraces concepts from science, environmental protection, indigenous knowledge and traditional farming practices. For instance, smallholdings can be transformed to a near natural circular econ-



omy with vermiculture, apiculture, the integration of fruit trees in farming (following the notion of a Food Forest) and irrigation by swales, which are ditches along the geographical contour lines of slopes facilitating an efficient distribution and storage of rainwater in the fields as well as erosion control. Sustainable pasture management with fenced-in rotating pastures can prevent overgrazing, deforestation and erosion. Such small-scale innovations can be integrated in the existing traditional systems virtually without investment costs.

The integration of renewable energies on farms, such as micro-biogas plants, small, decentralised photovoltaic plants and water systems with solar-powered water pumps, is feasible with only a low level of investments. This enhances farmers' living standards, creates new opportunities (e.g. through access to the Internet), bridges supply gaps and completes cycles, and protects the environment while remaining sustainable.

As a new type of food in the highlands, fish offers many advantages, especially regarding the provision of nutrients for children. Here, the introduction of innovative technologies such as aquaponics systems in greenhouses would be an option which, however, would require larger, third-party-financed projects. Some of the country's institutions and NGOs have already engaged in research and breeding focusing on edible fish and aquaponic systems, however only at local level, around the major lakes in lower-lying and warmer regions, in which fish also occur in the natural environment and are therefore already part of

the population's diet. Despite the good conditions and the potentially large contribution of fish as food, aquaculture has so far not been established on a larger scale in Ethiopia, especially in the highland regions. There, projects and campaigns promoting the introduction of fish to the local diet would have to be run additionally in order to achieve acceptance among the population.

#### **Market-linkage for smallholder farmers.**

More productive and resilient production systems on small subsistence farms contribute to more diversified and healthier diets, to food security for the country as a whole – including in times of crisis – and to improvements in the living standards of farmers. However, all these small cells of sustainable production systems have to cooperate in a big network. Better linking smallholder producers with the market and the development of new market structures in Ethiopia is essential. One possible way to achieve this could be the setting up of farmers' cooperatives, which raise the marketing and negotiating power of farmers, circumvent middlemen, make market information available to the farmers and, through cooperation, improve the range of products from the producers or the quality of produce, for instance by operating high-quality warehouses. This can considerably enhance the financial situation of smallholder producers, and joint investments facilitating sustainable transformation, for example to purchase farming machinery, become possible.

Better linking the farmers to the market strengthens their economic position and power to take things into their own hands, and tra-



The Mulu Eco Lodge was distinguished as the „Best Tourism Village“ by the United Nations in 2023.



The integration of renewable energies on farms is feasible with only a low level of investments.



The Mulu Eco Village farmers' cooperative.





Trainings on modern apiculture, which provides an additional financial income for the villagers.



The son of a pioneer: Farmer Metadel Asaye's son harvesting vegetables.



The farmers' cooperative of the Mulu Eco Village also operates common infrastructure.

ditional farming methods can be replaced or further developed. Such a structure contributes to more efficient and sustainable value chains with positive feedback effects. Large volumes of post-harvest losses are avoided, and regional and national food security rises.

**Grassroots urbanisation with rural entrepreneurship.** The proposals for solutions so far relate to the transformation of existing traditional farming systems, but they do not change anything regarding the rural-urban migration of landless youth, the formation of informal settlements around the cities and the increase in crime rates because of high (youth) unemployment. Are there possibilities to enable the young generation to lead a life worth living in their home region in a rural environment without owning and cultivating land? Rural entrepreneurship in urban hubs in rural regions can be a possible solution here. Producing and processing agricultural produce with low area requirements in the shape of small enterprises or start-ups can secure livelihoods in small villages in rural regions. Options here include apiculture, chicken farming and selling eggs as well as the production and processing of local superfoods such as rosehip, linseed or moringa, of herbal mixtures and teas or of biological soaps or ointments made of oil and beeswax. All these ideas require only low initial investments and add value on locally available agricultural goods.

Moreover, a concentrated settlement of people in an urban village releases fertile land for food production as well as the regeneration of nature. Both the provision of infrastructure for the population and the management of cropland in a significantly more efficient, productive and sustainable manner are possible with the creation of urban-rural centres. Not only does infrastructure, i. e. mobility, roads, etc., improve the living conditions of the population, it also simplifies linking the rural centres to major markets. The people living in large cities depend on food supplies from rural regions, too. So rural and urban development should be integrated in order to create synergies for both. In addition, people can stay in their home regions, living together with their families and communities, and local traditions and culture can be preserved. A city offering an empowering environment with education, energy, Internet access and its own administration holds a big potential for entrepreneurship and value addition activities of local agricultural produce. A group of Ethiopian academics and people working in an honorary capacity have designed a concept for such a transformation of the country called “Grassroots Urbanisation”.

It features an urbanisation as described above progressing sustainably and is based on empowerment and participation of the local population (bottom-up instead of top-down). A network of numerous small, sustainable urban settlements can emerge instead of constantly growing megacities in which the social and ecological problems grow equally.

From a national perspective, this means that there is not only a potential to lower migration and rural exodus, to improve living and working conditions in rural areas, to raise food security in both urban and rural areas and to promote economic development in rural regions. It can also contribute to national stability as well as security and peace.

### Best practice of sustainable food system transformation

Situated at an altitude of around 3,000 m above sea-level, Metadel Asaye's farm in the northern Ethiopian highlands, the Choke Mountains, shows how such a transformation can be implemented in practice. The Choke Mountains are a highly relevant and sensitive ecosystem which, with its more than 50 tributaries to the Blue Nile, makes a crucial contribution to the volume and quality of the Nile's water and whose functionality thus has direct impacts reaching as far as Egypt.

Metadel is a pioneer and has always sought to achieve change and improvements in the life of the local farming community. For instance, in 2017, he convinced the community of the idea to give communal land to a small, sustainable initiative for agro-ecotourism, of which he has since been a leading (board) member. He applies what he has learnt in the Mulu Eco Village, an initiative founded in 2017 (see below), to his own farm, and his family have thus been working on a transformation of their farm since 2018. This has been possible although the family does not have more financial capital than other farmers in the region. Through the growing network of the initiative and the farming community, more and more opportunities emerged for smaller and larger projects with various partners, such as NGOs, embassies, foreign and local associations or government institutions. For example, a cooperation scheme was formed with a photovoltaic company from the capital and access to governmental programmes run by local authorities on well construction or for biogas plants became easier. Thus, on the farm, step by step, an energy system was installed, as shown in the illustration. Irrigation



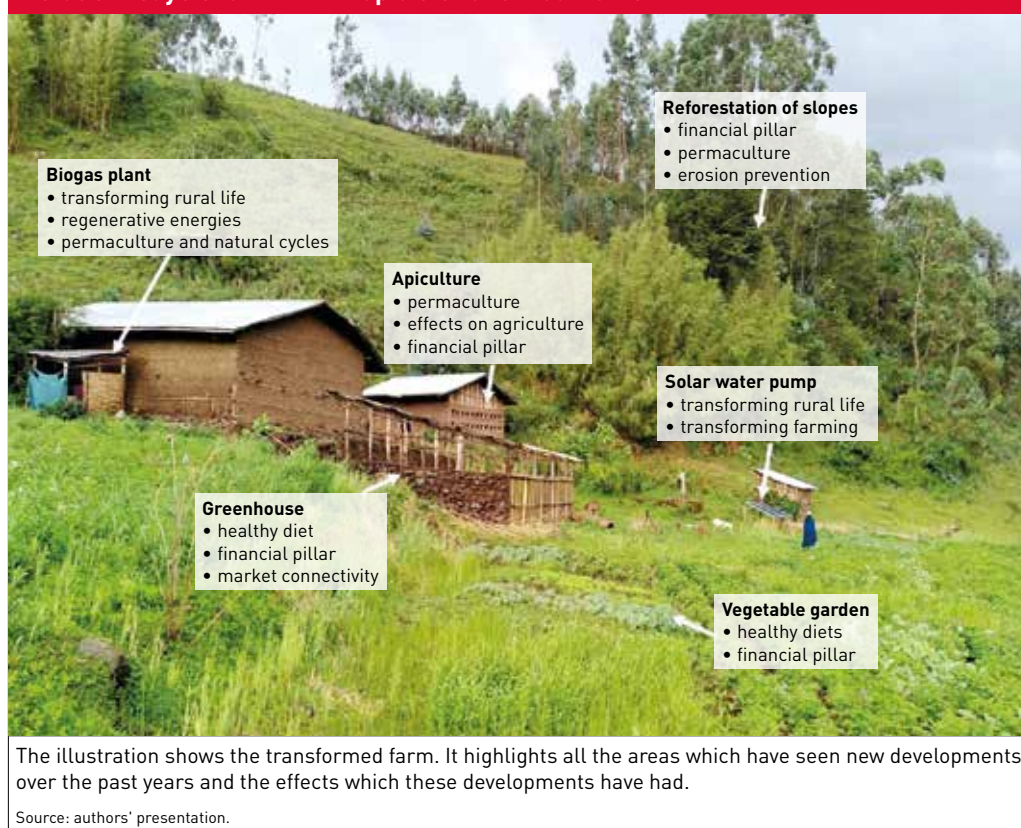
with the solar water pump now also enables crop growing in dry season, which means that now three growing and harvesting cycles of potatoes and grain are possible each year and a vegetable garden as well as a greenhouse can be maintained. The biogas plant turns animal and human faeces and accumulated bio-waste into biogas for cooking and biogas slurry, which is used as an organic fertiliser instead of chemical fertiliser and enhances soil health and fertility. The greenhouse enables the family to grow and consume a wide range of vegetable varieties, especially by storing the day's heat throughout the cold nights. Thus, for instance, tomatoes, zucchini, eggplants, asparagus or tomatoes grow here – at an altitude of more than 3,000 metres!

Now there is no longer any need to grow crops on mountain slopes. These are being reforested with bamboo which, just like apiculture, is a further financial pillar for the family. Bamboo is sold both on the local market and via middlemen to the cities and is used in sustainable building of furniture and houses. All those in the community who are interested in bee-keeping have received training on building better beehives via the Mulu Eco Village network. Thus knowledge of traditional apiculture can be combined with modern methods, and production can then be made even more efficient and sustainable. Thanks to bee pollination, in addition to honey production, keeping bees can contribute to high yields in agriculture, ecosystem conservation and diversified diets for families.

Photovoltaics and biogas enable simple access to electricity, water, sanitary installations and the Internet, and, through making information available, better market networking beyond the local weekly market in the village. Particularly the situation of the women and children on the farm has strongly improved through the transformation, since there is no need anymore to carry water or fire wood to the house. Cooking with biogas on smoke-free stoves reduces both the labour effort and the considerable health hazard, and in the evening, the biogas and photovoltaics offer enough light for doing the homework. Women and children can make use of the time resources thus gained for other activities. Since women are usually responsible for selling goods on the local markets, their financial situation is improving, too, by having more to offer in variety and amounts.

All in all, this enhances the quality of life in the region, which can contribute to reducing rural exodus. The best practice example is meant to

### Metadel Asaye's farm in Ethiopia's Choke Mountains



demonstrate how many positive synergy effects can arise and what possibilities can emerge on the way if just a single individual opts for sustainable transformation, even though there are still many open questions at the beginning (regarding the right strategy, financing, etc.).

### A model for sustainable rural development: the Mulu Eco Village

The farm presented as best practice is part of the above-mentioned Mulu Eco Village, which was founded by two “urban returnees” together with the local farming community, consisting of 250 families, in 2017 and is organised as a cooperative. The Mulu Eco Lodge, a community ecotourism project which was distinguished as the “Best Tourism Village” by the United Nations in 2023, is also part of the Village. The farmers’ cooperative of the Mulu Eco Village is also developing and operating common infrastructure, such as a kindergarten and an education centre, a grinding mill and a health centre.

Over the next few years, the traditional farming systems of all families who are part of the cooperative will be transformed into sustainable production systems such as the best practice farm to ensure more food security, balanced diets and sustainable production systems.

With the aid of external financial support, an urban village, as described above, is planned to be developed, in which the landless youth can process agricultural produce from the surrounding farms and create start-ups. In this manner, the region can be transformed into a model of sustainable rural development and provide inspiration for many other rural communities.

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# The socio-economic effects of the commercialisation of African indigenous vegetables

Changes in food systems not only have nutritional and income impacts for the farmers involved, but can also affect the social fabric of farming communities. A project run by Humboldt-Universität zu Berlin on the effects of the commercialisation of African indigenous vegetables on smallholder farmers in Kenya shows that these are not unilateral.

By Christoph Kubitz, Sarah Hackfort, Arnold M. Opiyo and Susanne Huyskens-Keil

For a long time, African indigenous vegetables (AIV) were part of the local diet in Kenya, but exotic vegetables dominated the commercial vegetable market. The more affluent urban population preferred exotic vegetables such as kale or cabbage (*Brassica oleracea var. acephala*). Neither were AIV yet widely recognised for their positive effects on nutrition and health or their resilience to climate change events. This has changed in recent decades, and AIV are becoming more prominent on markets (also see Figure). While the commercialisation of subsistence agriculture in sub-Saharan Africa is often seen as essential to increase smallholder incomes, its impact on nutritional intake is often unclear. At the same time, resource-sharing within farming communities and gender equality may actually decrease.

Within the framework of the inter-/transdisciplinary project “Inclusive Food System Transition – Social Cohesion, Food and Health” (IFST) of three universities in Berlin, Germany, our subproject on nutrition-sensitive value chains of AIV in Kenya analyses the trade-offs between smallholder farmers’ income, nutritional intake, solidarity within their networks and gender relations in the two counties Kisii and Kakamega in cooperation with Egerton University in Kenya. In both counties, AIV have a large economic potential. In Kisii, land sizes are very small and AIV that can be produced in smallholdings can hence contribute significantly to household income. In contrast,

sizeable sugarcane production was historically located in the county of Kakamega. Yet production collapsed in recent years, leaving a large share of farmers in poverty. Considering increasing poverty and also decreasing land sizes, AIV are now also an important alternative to sugarcane in the county.

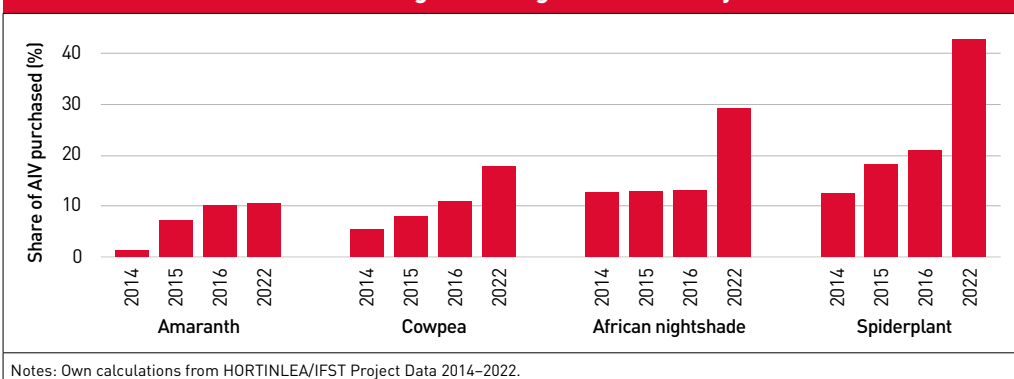
Our project builds on quantitative panel surveys of smallholder farmers between 2016 and 2022 and qualitative data from 20 focus group discussions (FGDs) with male and female farmers in 2022. The panel surveys looked at the long-term effects of commercialising AIV on local and regional markets as well as its impact on income, nutritional intake and social cohesion. The latter aspect was also addressed in the FGDs, which otherwise investigated the effects of commercialising AIV on gender relations. Panel data models show that, in the period reviewed, household income of smallholder farmers in the two counties has significantly increased, with AIV commercialisation – moving from no commercialisation to complete commercialisation – having raised households’ expenditures on non-food items by almost 24 per cent on average between 2016 and 2022. Our results also suggest that AIV commercialisation did not negatively affect nutrition outcomes such as dietary diversity of smallholder farmers since it also led to an expansion of AIV acreage which kept the health-promoting effects of vegetable consumption stable. But neither did it improve

nutrition outcomes as the additional income was not spent on food items, but on areas such as school fees or technologies for farming and processing, e.g. solar dryers.

## Community social interaction and gender relations

Apart from income and nutrition intake, indigenous vegetables are an integral part of community social interaction, too, as they have also traditionally been used as gifts between households. Their commercialisation may thus reduce resource sharing within social networks and alter perceptions of solidarity within rural communities. As our surveys have demonstrated, at about one or two per cent, the share of AIV and of other crops that was given away to other households for free was already marginal in 2016. However, our data indicate that households which market their AIV production more frequently have reduced not only the share of AIV production for their own use, but also cut down the share of AIV production given away to other households to almost zero with a reduction by two percentage points. Concerning the affiliated effect on community solidarity and social cohesion, our results are inconclusive. We found no consistent and significant evidence that solidarity within farming communities had changed over time with AIV commercialisation. Neither did the focus group discussions reveal any unidirectional effect on solidarity, but instead showed that multiple and sometimes opposing mechanisms were at work. For example, the FGDs made it clear that perceived solidarity has decreased due to less frequent gifts of AIV – it was reported that in the past, far more non-monetary exchanges had occurred, i.e. that more vegetables were given away, whereas today, everyone was eager to have a win-win situation. However, some farmers emphasised that they had found this traditional form of solidarity to be partially forced through social norms. In the wake of commercialisation, other forms of social interaction have however also emerged, such as cooperatives (e.g. women farmers asso-

Commercialisation of African indigenous vegetables in Kenya over time





ciations) and more intensive knowledge sharing.

For decades, African indigenous vegetables were mostly grown by women for subsistence, and women's farming activities are known to have a great influence on nutritional intake, livelihood, and resilience outcomes in sub-Saharan Africa. Hence, our project also examined the effect of commercialisation on the gendered division of labour, decision-making power, access to resources, and cooperation strategies among women and men. The focus group discussions highlighted that once men see that AIV are profitable, they become involved in their cultivation. This is also corroborated by our panel data. For instance, we see an increase by 15 and 20 percentage points respectively in selling spider plant (*Cleome gynandra*) and cowpeas (*Vigna unguiculata*) if men are responsible for production. The data show, however, that while AIV commercialisation is associated with men becoming more involved in AIV production and decision-making over time, this does not necessarily diminish women's decision-making power. This is because women retain control over selling vegetables. As perceived by the women interviewed in the qualitative survey, this can be explained by the fact that men are not yet experienced in selling AIVs on markets because they lack knowledge on product quality and safety. In fact, maintaining control over the additional income was perceived as enhancing women's bargaining power. In general, however, when it comes to taking over a domain by men, women develop strategies for withdrawal rather than simply defending their domain, indicating complex intra-household dynamics that cannot be captured by a binary view of household cooperation versus conflict. But the study notes that women in the research region still face an increased labour burden due to AIV commer-



Focus group discussions in Kakamega, Kenya.

Photo: Sarah Hackfort

cialisation and continue to perform most of the care work.

### Summing up ...

While economic empowerment through commercialisation expands women's opportunities and revenue generation, it does not address labour or land rights redistribution, which are crucial to achieving gender equality. Women's labour burden increases, and market-based interactions may replace traditional social practices, potentially also impacting social cohesion. The income gains demonstrated for producers are a strong incentive for continued growth of the AIV sector, and the insignificant effect on nutritional intake and heterogeneous concerns about the loss of community solidarity and social cohesion are unlikely to halt this trend.

In terms of policy recommendations, it is important to promote and support local and regional AIV commercialisation, recognising their potential to improve smallholder farmers'

income, in particular that of women farmers. This includes developing policies for market access, training and providing resources through extension services. The research also highlights the need to invest in research on AIV to generate comprehensive data on their nutritional content, optimal cultivation techniques and post-harvest management as well as research on fortified AIV-enriched products and lesser-studied AIV. Finally, it is important to provide capacity building programmes, technical assistance and financial support to empower young people and women to foster the development of inclusive and nutrition-sensitive value chains in the horticulture sector.

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*The project was conducted in cooperation with IFST project partners Prof Caroline Stokes, Humboldt-Universität zu Berlin and Prof Cornelia Rauh and MSc Ann-Marie Kalla-Bertholdt, Technische Universität Berlin. We gratefully acknowledge the financial support of the German Excellence Initiative/Berlin University Alliance.*

### Indicators for measuring social cohesion and gender relations

In order to survey social cohesion in the context of the IFST case study "Nutrition-sensitive value chains of African indigenous vegetables in Kenya", quantitative data for both 2016 and 2022 was gathered. Here, the personal satisfaction of respondents with their community integration/social integration, supportive interaction with their neighbours as well as satisfaction with social equality in their village/community was elicited. In addition, trust in traditional and governmental institutions has been measured across years. For this purpose, scorecards ranging from 1 to 10 were used. In terms of gender rela-

tions, the respondents were asked to indicate which member of the household was responsible for decision-making in various production steps, such as AIV cultivation or marketing. For the qualitative data gathered in the focus group discussions, the following indicators for social cohesion were used: perceived fairness, solidarity within farming communities, informal sharing arrangements and trust. For gender relations, the following aspects were covered: participation and agricultural labour, decision-making power and access to land and financial resources in Kenya.

## Leveraging the potential of secondary cities

The world faces a malnutrition crisis amid increasing urbanisation. Here, secondary cities are emerging as potential game changers. They are places where public and private initiatives may enhance resilience to food security shocks and offer the potential for urban-rural connections and localised production and consumption. The Nutrition in City Ecosystems (NICE) project shows how nutrition-centred food system interventions can be implemented in practice.

By Kesso Gabrielle van Zutphen-Küffer, Jimena Monroy Gómez, Helen Prytherch and Dominique Barjolle

More than half of the global population now live in urban areas. Urban diets are influenced by factors such as changes in occupation, food marketing and societal norms favouring convenience foods and processed foods over traditional diets. High food prices and income constraints are making healthy diets unaffordable for three billion people. Poor infrastructure and long distances between rural agricultural areas and cities also exacerbate food losses and food safety concerns. But urbanisation is not just about 'mega-cities'; it is also spawning smaller urban areas, known as secondary cities. In 2018, close to half of the world's urban residents lived in settlements or towns with less than 500,000 inhabitants. These cities are the fastest-growing urban areas. Compared to primary cities, secondary cities are typically smaller, closer to rural regions, and in areas where power is decentralised. With their strong urban-rural linkages and potential for localised food production, they play a critical role in sustainable economic and social development and offer unique opportunities to transform food systems for better human and planetary health.

In low-and middle-income countries, a substantial share of the population in secondary cities engage in gardening or farming activities. Farmers in these agricultural hinterlands play a vital role in supplying food, thereby bolstering the resilience of food security in these regions. These connections can also shorten food supply chains, fostering local development and promoting producer-consumer information sharing.

Secondary cities often fall short in economic and political stature compared to capital cities, and this lack of prominence can result in challenges related to infrastructure, governance, autonomy and decision-making capabilities. Yet these difficulties and systemic gaps can be transformed into valuable opportunities for enhancing the food system within these cities – most notably because their size means that the foodshed is relatively close to their urban centres and the consumers living there. For instance, human capital tends to be concentrated



Vegetable vendors packing carrots at the Bazirete market, Rwanda.

Photo: Alice Kayibanda/ Swiss TPH/ Fairpicture

more in capital cities, creating a centralisation of power and skills. However, initiatives like empowering local authorities and transferring knowledge from capital cities to secondary ones can address these issues by providing training and increasing educational opportunities for young people in smaller cities, especially in areas such as urban planning, agriculture and health. Moreover, secondary cities can leverage the skills and knowledge brought by individuals migrating from rural areas. By creating an environment that encourages the integration of rural expertise into urban agricultural practices, these cities can empower rural migrants, preserve traditions and transfer knowledge to the urban population. This approach can also serve to strengthen the links between farmers and urban markets, promoting sustainable collaboration, production and supply.

### The NICE project

It is precisely this potential which the Nutrition in City Ecosystems (NICE) project (see Box) wants to raise. Initiated in 2021, it seeks to foster a more sustainable food system across six secondary cities in Bangladesh, Kenya and Rwanda. By augmenting both the production and consumption of nutritious foods aligning

with agroecological principles, the project aims to enhance nutrition and alleviate poverty. In the targeted six cities, NICE conducted a baseline survey among over 1,200 households aimed at understanding the nutritional and socioeconomic conditions, agricultural practices within the city's food-producing zones, as well as residents' food purchasing and preparation habits. Results showed a substantial increase in food insecurity during the Covid-19 pandemic. Under-5 stunting rates were high, ranging from 9.1 per cent in Busia/Kenya up to 49.4 per cent in Rubavu/Rwanda, while around half of adult women are overweight (between 40.8 per cent in Rusizi/Rwanda and 50.6 per cent in Bungoma/Kenya). Furthermore, many women did not consume an adequately diverse diet in all three countries (Minimum Dietary Diversity–Women/MDD–W is <5 for 29.3 %, 47.5 %, and 67.0 % respectively), even though many of the urban and peri-urban households owned farmland. The main challenges revealed by the survey were the high prevalence of food insecurity and malnutrition. As a large majority of the dwellers have access to micro-and small farming in the urban and sub-urban area, there are options to improve the knowledge and skills of farmers through trainings and to facilitate urban markets to increase access to more fresh and healthy food.



Based on a multi-participatory process with farmers, local authorities, civil society and the private sector, five to nine value chains were selected for improvement in each country:

- Bangladesh: brinjal, bitter gourd, sweet gourd, cucumber, tomato, drumstick, zinc-enriched rice, mango, eggs.
- Kenya: poultry, African leafy vegetables (spider plant, black nightshade), groundnuts, fish (Tilapia), orange-flesh sweet potato.
- Rwanda: eggs, fish, carrots, onions, cabbages, passion fruits, tomatoes.

In addition, over 170 Farmers' Hubs have been established across the three countries. These hubs serve as centres for training in agroecological practices and coaching in business models. Moreover, social marketing campaigns have been elaborated which have reached over 60,000 farmers and consumers through school and health settings, Farmers' Hubs and open market activations. The social marketing strategy aimed to build awareness about dietary diversity and agroecological farming practices. The open market activations consisted of a community roadshow wherein the production and consumption of nutritious and agroecological produced foods were incentivised in a common market ground. These were aimed at pregnant and lactating women and their husbands, mothers with at least one child under five years and their husbands, adolescents and their parents, and farmers.

One of the focus areas of the project is facilitating both horizontal and vertical knowledge exchanges to increase the production of agroecologically-produced foods and drive economic growth and empowerment across cities. While no new policies have been deployed in the cities so far, we have reviewed existing food system-relevant policies across the three countries. In the context of the NICE project, each city created a Multisectoral Food System Platform (MSP) fostering connection with local authorities and stakeholders, consolidating city priorities and jointly formulating strategies. MSPs also facilitate knowledge exchange with youth, women, farmers, civil society and the private sector to align their objectives. In addition, they put in place mechanisms for small grants to improve vulnerable inhabitants' access to more diverse diets. In collaboration with city authorities, MSPs meet regularly, are engaged in capacity building activities to progress the food system agenda and are working to formalise their mandates as part of city regulations or bylaws. For example, in Rwanda, the NICE project has assisted in formulating and executing the Districts Plan to Eliminate Mal-

**The Nutrition in City Ecosystems (NICE) project** is supported by the Swiss Agency for Development and Cooperation (SDC). It is implemented and co-financed by a public-private Swiss consortium comprising the Swiss Tropical and Public Health Institute (Swiss TPH), ETH Zürich, the Sight and Life Foundation and the Syngenta Foundation for Sustainable Agriculture.

More information: <https://nice.ethz.ch>

nutrition (DPEM). In the following year, we will conduct public procurement assessments to expand farmers' outreach through channels that go beyond local open markets. Furthermore, the availability of the selected value chains in the urban market is to be improved by employing branded food carts and promoting the consumption of these selected foods through a social marketing campaign.

### Key learnings and future ambitions

Following the first two years of running the project, some key learnings can be stated. Primarily, it became clear that the project should focus on supporting local actors as they are best positioned to identify and enact impactful interventions in their cities. Furthermore, nurturing the leadership capabilities of these cities and fostering ownership is crucial to sustain and maintain the mechanisms that have been put in place. Insights and actions from all parties need to be combined at different value chain points. It is therefore important to factor in the consumer and farmers' perspective from the beginning, for example, by increasing the market availability of local foods. Nevertheless, linking the production and demand generation sides has been challenging. This largely relates to timing and synchronising the work to ramp up the production of the selected value chains, in tandem with preparing the Social and Behaviour Change campaigns to firstly raise consumer awareness about the importance of nutrition and, secondly, to market the produce.

Now that the production and supply activities start to come together, we are looking more concretely into the link to markets and how to shorten the value chains. Moreover, small and medium enterprises (SMEs) and entrepreneurs are being engaged in the aggregation and processing of the food products. The MSPs are being expanded to bring in the private sector and representatives of consumer groups and civil society. MSP interactions bring differ-

ent expertise together to address pressing issues related to nutrition and food security and tackle challenges such as climate change effects or price increases of imported goods. As production increases and becomes sustainable, possibilities are being explored for the produce from the Farmers' Hubs to be channelled to public institutions such as schools and hospitals.

In terms of knowledge and demand, there will be city-wide activities, involving youth through schools and colleges and community-resource persons like health workers and teachers. The social marketing campaigns will start to encourage aspects such as healthy cooking and purchasing practices to improve dietary diversity among consumers and stimulate demand for a range of nutritious and agroecologically produced foods to be made increasingly available and affordable by the project's supply-side activities.

Furthermore, the insights gained are being used to shape city-level policies and contribute to showcase local initiatives meriting dissemination to national-level institutions in NICE countries, as well as broader city-region networks. Our aim is to drive an impactful, positive change in the city-region food systems by tapping into the potential of secondary cities. However, significant investments and concerted efforts are needed to empower such cities and enhance their capabilities to keep food system transformation high on their political agendas.

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*The authors acknowledge the leadership of the six NICE cities, the multisectoral food system platform members, and the NICE project staff in each country.*

## How effective are policy interventions in food environments?

Many countries of the Global South are experiencing what is referred to as the triple burden of malnutrition, with the population suffering not only from underweight and micronutrient deficiency, but increasingly also from overweight. In order to promote healthier food environments, in addition to nutrition education, legal regulations are being discussed more and more. But are they yielding the desired results? Experiences gathered in Chile.

By Patricia Caro



One of the reasons for the high obesity rate in Chile is that healthy foods are often higher priced than unhealthy, ultra-processed foods.

Photo: Alex Maldonado Mancilla/ shutterstock.com

In Chile, at the beginning of the 20<sup>th</sup> century, the main nutritional problems were undernutrition and micronutrient deficiencies, the causal factors of the high child mortality rate in those years. To address these issues, Chile implemented multiple public health policies and programmes, for example fortified flours with folic acid (1950), water with fluorine (1953) and salt with iodine (1979), and it implemented the National Complementary Food Program (1954). This programme provides fortified dairy products for all pregnant women as well as children under six years of age. Today, the prevalence of undernutrition in Chile is three per cent. However, since the 1990s, Chile has undergone a rapid epidemiologic transition, with an increased prevalence of excess weight and chronic diseases throughout the country. According to the 2016 National Health Survey, 71 per cent of those over 15 years of age were overweight, with this share having increased by 12.4 percentage points from 2003 to 2016. The prevalence of obesity is higher in women (38.4 %). Although among schoolchildren there has been a slight improvement in obesity prevalence, the trend nevertheless prevails that every second child is overweight, making

Chile one of the nations with the worst obesity among the countries in the Organisation for Economic Co-operation and Development (OECD).

One of the factors that may explain the increase in obesity is the change in food systems and chains. Added to globalisation, it has generated an obesogenic food environment, with high access and availability to ultra-processed foods, which are rich in salt, sugar and saturated fats. Not only in Chile but world-wide, calories from meats, sugars, oils and fats have increased in the last decade, while those from fruits, vegetables and legumes have decreased. The National Food Consumption Survey conducted in Chile in 2016 shows that 90 per cent of the population require changes in their diet according to the Healthy Eating Index. Along these lines, Chile stands out in the region for the high and growing level of sales of ultra-processed products and sugary soft drinks, now reaching 646 kcal/person/day. The consumption of sugary drinks is at 7.1 litres/person/month. Ultra-processed foods have characteristics that make them more attractive to people, with hyper-palateness,

less satiety, their comfort, their high glycemic and energy load, their marketing, their portion size, and their lower price standing out among these characteristics. In Chile, ultra-processed foods are easier to access and lower priced than healthy foods. A situation of inequality in their access, consumption and availability depending on the socioeconomic level can be observed. Households at a lower socioeconomic level are more obesogenic environments.

Policies in Chile have focused on the food supply environment. In this sense, public policies are based on and derived from the information provided in the labelling of products and the limits established by the Ministry of Health in the Food Health Regulations for the content of calories, saturated fats, sugars and sodium.

### Public policies to improve the food supply environment ...

To improve the food supply environment, the following principal policies have been implemented:

- In 1996, the Chilean Food and Health Regulations established norms including definitions for nutrient content, rules on nutrient claims (e.g. “free of” or “low in”) and specific health messages which had been voluntary up to this point.
- In 2006, information per 100 g and portion size for calories, protein, carbohydrates, sugars (since 2014), fats (saturated, mono-unsaturated, polyunsaturated) and sodium was included. Reference is also made to allergens, and a list of ingredients in quantity-decreasing order and beginning with front-of-package nutritional (FOP) warning labels is given. When the food and beverage products have a high energy, sugar, saturated fat or sodium content, a black octagon (see Figure) with the suffix “alto en” (high in) is used. In addition, this regulation prohibits marketing of “alto en” foods and beverages directed at children and sales of these products in schools.
- In 2014, through Law 20,780, the tax on



sugary drinks with more than 6.25 gr of sugar/100 ml was increased from 10 per cent to 18 per cent.

### ... and their effects on the health of the population

The policies implemented at the beginning of the century aimed to reduce the prevalence of undernutrition and the child-mortality rate. When undernutrition no longer represented a public health problem and the prevalence of obesity began to increase, policies sought to address the problem from different angles, promoting healthier food environments. Below, some effects are listed that have been observed after the implementation of the public policies mentioned above:

- There have been improvements in the food environment as the food industry modified its products in order to receive fewer seals. Sugar and calorie content was lowered. The percentage of products qualifying for a high-in-sugar label dropped from 80 to 60 per cent, while the proportion qualifying for a high-in-sodium label fell from 74 to 27 per cent.
- Domestic purchases of sugary drinks (i.e. beverages that received the high-in-sugar label) decreased by 11.9 cal./person/day, or 27.5 per cent relative to the counterfactual.
- The purchase of non-sugar-free beverages increased by 5.7 cal./person/day, or a rise of 10.8 per cent relative to the counterfactual.
- There is an overall calorie reduction from purchased beverages of 7.4 cal./person/day, or a decrease of 7.5 per cent relative to the counterfactual.
- The consumption of breakfast cereals with FOP alerts dropped on average by 26 per cent compared to those products without an FOP alert.

“**Food environment** refers to the physical, economic, political and socio-cultural context in which consumers engage with the food system to make their decisions about acquiring, preparing and consuming food.” HLPE, 2017

### Front-of-package nutritional (FOP) warning labels used in Chile



When the food exceeds the following limits for calories (275 calories/100g or 70 calories/100ml), sugars (10g/100g or 5g/100ml), saturated fat (4g/100g or 3g/100ml) and sodium (400mg/100g or 100mg/100ml), the black octagon is used.

■ The consumption of non-sugar sweeteners has increased. With 141.2 gr/person/day, Chile is the country with the second-highest sugar consumption world-wide, three times that in the WHO recommendation. In this sense, the front-package alert allowed the food industry to shift from sugar to non-sugar sweetener. A Chilean study found that 56 per cent of products such as dairy cereals, processed fruits, non-alcoholic beverages, sweets and dessert had at least one non-caloric sweetener in accordance with the law. That is a controversial effect because while sugar consumption has decreased, there is no evidence of the non-sugar sweetener having a beneficial effect on human health.

Despite all the efforts made by policy-makers to tackle the public health problem mentioned above, none of them have yielded the results reckoned with – no significant change in the nutritional status of the population has been observed. The cause of obesity is multifactorial, which is why interventions need to address a whole range of aspects. The hypotheses on which ones they include are varied. The sedentary lifestyle in the population is increasing, the Chilean diet is of lower nutritional quality, the commercialisation of unhealthy foods, especially that focused on children, is strong, and the environment has become obesogenic.

### What are the next challenges?

Food environments play an important role in the access and availability of food. For this reason, it is important that governments stimulate the marketing of healthy foods in mass dissemination channels. Moreover, taxes on unhealthy foods and subsidies on healthy foods could be implemented. However, according to the evidence, their effect on demand is not



Milk being distributed by the relief organisation Gota de Leche in Viña del Mar, Chile, roughly in 1920.


Photo: Biblioteca Nacional de Chile

yet consistent. In future, the use of non-sugar sweetener in the food supply must always be tracked in association with the implementation of policies such as front-of-package food labels and taxes given the uncertainty about their relationship with health outcomes. Moreover, it is necessary to improve access to healthy food and increase the availability of fresh markets around the cities. Finally, it is important that the government exercises control and surveillance of food environments, which allows an evaluation of the policies implemented and a generating of new ones based on evidence. In this sense, it is necessary for the government to evaluate the policies implemented and control compliance with them, for example, to see whether products with high content of critical nutrients have a correct FOP alert.

Today, there are no new policies on the country's public agenda that aim to address obesity or improve food environments. But a group led by academics and members of civil society are seeking to incorporate into Chile's new constitution the right to food based on the components of food security: access, availability, stability, sustainability, and adequacy. In this way, the State would recognise the impact of poor nutrition on the quality of life and well-being of individuals and communities, and would be made responsible for resolving this situation.

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 References: [www.rural21.com](http://www.rural21.com)

## Food systems transformation in Vietnam – research and collaboration lay the foundation

Vietnam aims to transform its food systems in a transparent, responsible and sustainable manner. To help achieve this, the new CGIAR research initiative “Sustainable Healthy Diets through Food Systems Transformation” (SHiFT) is working with the emerging multi-stakeholder platforms in the country in order to support the planning and implementation of specific activities. This article demonstrates success already achieved.

By Tuyen Huynh, Huong Pham and Mark Lundy\*

Collaboration among different actors is crucial to achieving sustainable healthy diets through food systems transformation. Built on research partnerships and policy engagement brought about by the CGIAR research programme “Agriculture for Nutrition and Health” (A4NH), the new CGIAR research initiative “Sustainable Healthy Diets through Food Systems Transformation” (SHiFT; see Box) continues and expands these close collaborations with Vietnamese partners to develop innovative, research-based solutions addressing the complex challenges facing the country’s food systems.

Several types of collaboration have significantly contributed to the Vietnamese food systems through cooperation with national institutions as strategic partners and contribution to national technical working groups and multi-stakeholder platforms. The following three institutions were identified as strategic partners: the National Institute of Nutrition (NIN), the Vietnam Academy for Agricultural and Sciences (VAAS) and the Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD). They were chosen as they play a central (coordinating) role in the in-country food systems transformation agenda and have strong convening power. SHiFT and the strategic partners carry out joint research. They generate data and outputs bringing evidence to food systems transformation processes where appropriate and useful. Moreover they raise awareness of challenges and opportunities, including scalable solutions, and build in-country partner capacity to use evidence and advocate for a stronger focus on sustainable healthy diets in food systems transformation policy processes.

### A new strategy for sustainable agriculture adopted

Recently, the “Strategy for Sustainable Agriculture and Rural Development in the Period 2021–2030 and Vision to 2050” was adopted



A vegetable vendor at My Tho Market, Viet Nam.

Photo: Hoang Dinh Nam/ FAO

in Vietnam. Here SHiFT joined forces with IPSARD to integrate concepts of sustainable healthy diets and sustainable food systems into the Q&A Guidelines to support the implementation of the new strategy. The publication, developed in partnership with various departments under the Vietnamese Ministry of Agriculture and Rural Development (MARD), aims to clarify and define key concepts and terms related to agriculture and rural development. This guideline plays an important role for food systems transformation in the country as it helps government staff and broader stakeholders gain a common understanding of key terminologies related to food systems and sustainable healthy diets.

Another effort to foster food systems transformation is SHiFT’s active contribution to the technical advisory process to promote the approval of the National Action Plan for Transparent, Responsible, and Sustainable Food Systems Transformation (FST-NAP). With the approval of FST-NAP Vietnam is demonstrating high-level commitment after the 2021 United Nations Food Systems Summit (UNFSS). The process through which the FST-NAP is approved highlights the participatory process involving a wide range of stakeholders and sectors. Important milestones here are its formal endorsement and embedding in the government, followed by establishing the process and conditions to ensure the implementation through the so-called Partnership which is now being decided upon by the government. MARD, which is responsible for developing the FST-NAP, has convened technical meetings to prepare the plan, based on input from different departments and ministries. Other stakeholders, including UN agencies, funders and NGOs, also participated in consultations.

The SHiFT country coordinator for Vietnam and the strategic partners contributed to the preparation of the technical reports supporting the above process. These reports aim to clarify key food systems concepts, examine the



current state of Vietnam's food systems and explain the government's need for a new NAP.

### Data collection on food environments and dietary patterns

Initiative researchers are conducting activities to inform a baseline assessment of Vietnam's food systems, including a description of the current actors, their agendas and narratives about their food systems, and their perceptions of the need for transformation. Therefore, in 2022, SHiFT began primary data collection in three sites to characterise food environments and dietary patterns, and to identify micro-, small and medium enterprises delivering food to consumers. This work is to build an understanding of how food consumed by marginalised populations enters food environments and of the barriers and constraints faced by actors as they deliver sustainable nutritious foods and provide decent employment opportunities. Also, the work will deepen the understanding of why people eat what they eat, knowledge necessary to identify solutions to improve delivery and consumption of sustainable healthy diets.

The initiative's activities span five focus areas, or work packages (WPs; see below), that intersect and inform each other. In Vietnam, the following activities have so far been carried out:

#### WP 1 – Consumers and their food environments and WP 2 – Micro, small, and medium enterprises and the informal sector (in collaboration with the National Institute of Nutrition):

- Quantitative households and food environment surveys are completed (in rural, peri-urban and urban areas of Hanoi).
- Participatory videos to understand how adolescents perceive and interact with their food environments are on-going.
- In-depth qualitative research on lived experiences of food environments are on-going.
- Assessment of consumers' perceptions of health and sustainability and the identification of aspects that relate to their motivation, opportunity and ability to eat a healthy and sustainable diet are on-going.

#### WP 3 – Governance and inclusive food systems (in collaboration with IPSARD):

- The analysis of the data collected in Vietnam through the baseline study on perceptions of food systems stakeholders and

### Sustainable Healthy Diets Through Food Systems Transformation (SHiFT)

The initial phase of SHiFT covers three years (2022–2024), and activities will focus on Bangladesh, Ethiopia and Vietnam. After that, the initiative's work will expand to Benin, Guatemala, Honduras, India and Senegal from 2025 to 2030. In all countries, the initiative focuses on the consumer side of the food systems and aims to stimulate the demand for sustainable healthy diets. At the

of the policy landscape of food environment-related regulations is being processed.

#### WP 4 – Trade-off scenario analysis:

- Preparations for foresight modelling of potential trade-offs of (drivers of) food system changes on diets, nutrition, health, and economic and environmental outcomes has started.

#### WP 5 – Catalysing food systems transformation (in collaboration with IPSARD, VAAS and NIN):

- Staff of IPSARD, VAAS, NIN and other stakeholders attended an e-course on food system governance.
- An in-depth capacity needs assessment with strategic partners in Vietnam and an extensive mapping of key stakeholders and multi-stakeholder networks involved in the food systems transformation process are undertaken and reported.
- A process of training of trainers on food system governance and transformation in Vietnam is being implemented.
- Based on experiences in Vietnam so far, a country engagement strategy is being developed in consultation with the strategic partners, helping to develop future activities of SHiFT in Vietnam.

Informed by this evidence-based research in close consultation with strategic partners and other stakeholders, solutions (policies or innovations) are being planned to be implemented and evaluated in the near future to provide evidence for options that could lead to food systems transforming to sustainable healthy diets, providing a decent livelihood for actors without further damaging the environment.

The Vietnamese Government is strongly committed to promoting the process of transforming the country's food systems. Arranging

same time, its engagement with stakeholders generates evidence-based policy options and strengthens capacity to collectively catalyse food systems transformation.

SHiFT is co-led by the International Food Policy Research Institute (IFPRI) and the Alliance of Bioversity International and the International Center for Tropical Agriculture (the Alliance), in close collaboration with Wageningen University and Research (WUR), and with contributions from the International Potato Center (CIP).

specialists' meetings and feedback rounds with various ministries, organisations and advocacy groups has made the process very participatory and enabled it to reach across various sectors. In order to also include the population, both MARD and the Ministry of Health (MoH) are actively disseminating knowledge and information in their own systems at provincial level. The characteristics referred to reflect the important status that food system transformation has acquired in Vietnam, which already serves as an example for other countries to learn from.

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## Welthungerhilfe's food system framework – a compass for practitioners

Welthungerhilfe (WHH) has developed a food system framework to guide practitioners through a set of discrete steps to enhance systemic transformation processes at local, regional and national level. Our authors present the framework in a condensed format and describe how it is used within the organisation.

By Jasmin Koottummel, Hendrik Hänke and Tereza Kaplan

Working towards sustainable and resilient food systems is not a new agenda for development actors. And yet, the question of how to address the complexity of systemic transformation processes to contribute to sustainability and resilience is still challenging, especially at local level. Drawing from its years of experience in working with systemic approaches – across sectors such as agriculture, natural resources management, water, sanitation and hygiene (WASH), market systems development (MSD), multi-actor partnerships (MAP) and integrated food and nutrition security programmes – Welthungerhilfe has developed a framework to unfold the complexity of food systems into manageable parts for systemic transformation. It consists of six phases which can be adapted to context-specific needs, potentials and challenges and guide development strategies, programmes and projects:

**PHASE 1 – Scoping: Explore to what end and for whom transformation is needed. Map out with whom food system transformation needs to happen.** Practitioners have diverse entry and leverage points to work on and to transform food systems. Entry points depend on the local, regional or global context and on the primary purpose which is being pursued to achieve transformation (i.e. environmental sustainability, climate resilience, inclusivity, availability and affordability of nutritious food, etc.). It is therefore crucial to be clear on the pursued aim for food systems transformation as concepts, approaches, system assessment tools and, most importantly, the motivation for change across system actors can differ depending on the envisioned change and context-specific needs.

**PHASE 2 – Diagnosing: Assess how the system is (mal-) functioning by mapping out the current status of system outputs, performance, behaviour and characteristics. In a second step, zoom into key variables of a food system: Which leverage points can help to improve a system's performance towards the defined ambition for transformation?** This phase

focuses on deep dive assessments to outline system performances with respect to e.g. food and nutrition security, resilience, and sustainability. For this purpose, Welthungerhilfe has developed a conceptual framework for food system assessments setting out from the central part of a food system – the food supply system (see Figure).

**PHASE 3 – Visioning: Jointly validate and refine the scope of the transformation that emerged from the scoping and diagnosis phases. Work on a joint vision for food system transformation across system actors and define transformation pathways.** During the visioning phase, we reflect on the findings of assessments with the affected stakeholders. Within WHH's strategic programming, this step is also used to define future programming by outlining the degree of interventions that already contribute to food systems transformation and by highlighting gaps to design long-term solution pathways for sustainable development.

**PHASE 4 – Designing: Identify approaches to transform the key levers, formulate a theory of change and broker a commitment to act.** In the design phase, we collaboratively develop a local action plan of how a transformation should happen in a systematic way and what our role and our partners' role will be at the programme and project levels. It is a phase where informed decision-making is taking place and results chains are designed to monitor change against transformation process targets and whether a transformation results in changes at the outcome level.

As we work in diverse settings within one country, system needs and local transformation strategies are context-specifically designed. In concert with our partners, we differentiate the roles in our engagement accordingly. As a facilitator, we coordinate systemic multi-stakeholder action at regional, national or local level in accordance with national food system transformation commitments and context-specific

system needs. As a contributor, we are part of a transformation process that is facilitated by other actors. In coordination with these, we focus on a combination of interventions that pursue systemic change of a specific key variable (also called leverage points) within the food system. As an implementer, we address immediate system needs to prevent a partial or complete collapse e.g. of the local food market system.

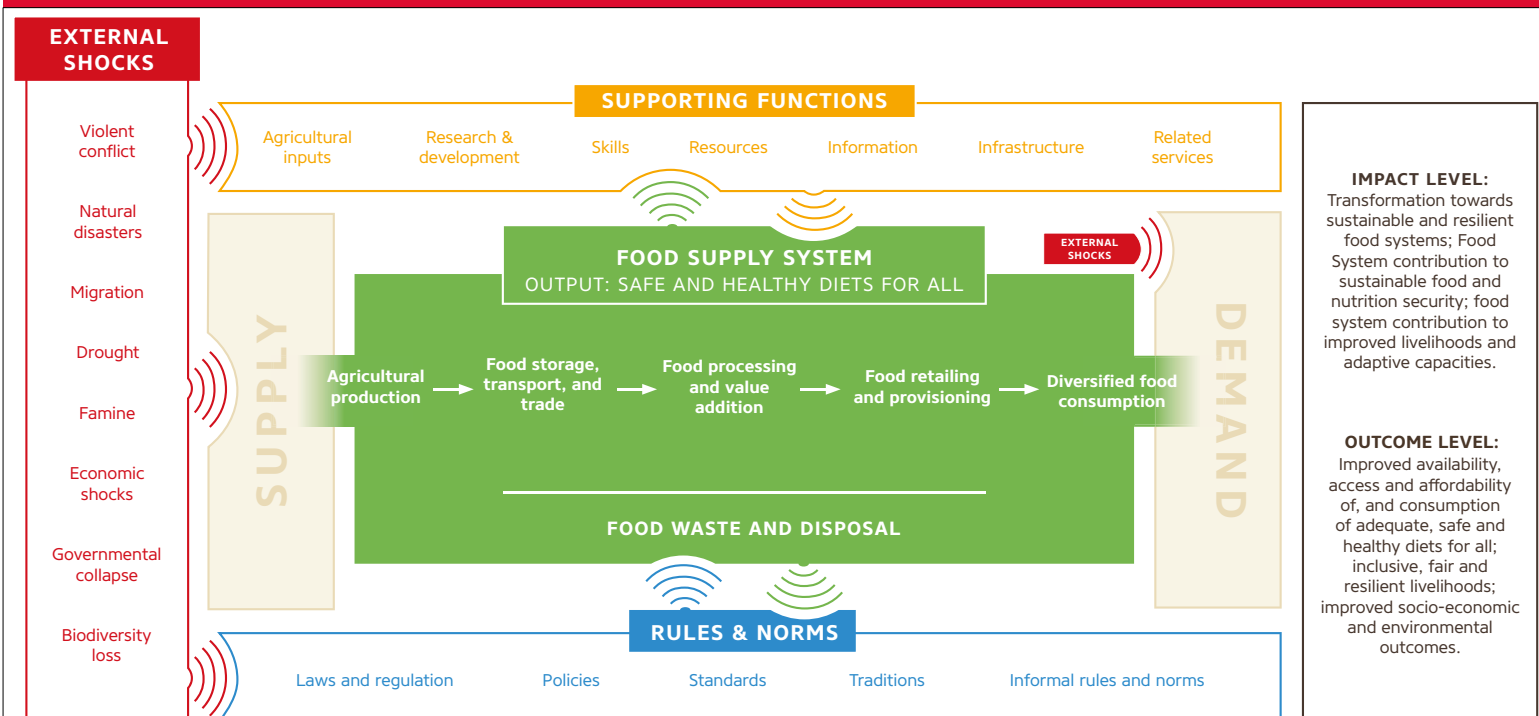
**PHASE 5 – Transforming: Break down the project design and theory of change into interventions or activity packages and design interventions with a systems lens.** Food system transformation needs agile programme management. Prototyping and iterating interventions on a small scale should be considered before implementing them on a large scale. This may involve refining the theory of change, results chain and/or logframe.

To classify the contribution of interventions towards systemic change, WHH has developed a systems marker with which interventions can be classified as uninformed (reinforcing existing system characteristics, i.e. promotion of monocultures), system responsive (addressing system gaps, i.e. supporting the seed market) and system transformative (engaging in multi-stakeholder processes for long-term system transformation). The systems marker can also indicate the level of fragility to shocks and stresses that a specific key variable in a food system or even the whole system faces. Especially in fragile contexts, WHH pursues a complementary systemic approach that covers interventions which would fall under all three categories. First, the immediate food and nutrition security needs of acutely food-insecure populations in fragile contexts must be addressed. Once local capacities are available, long-term change should be driven by local system actors with the aim to reduce fragility in the long run while contributing to improved food and nutrition security.

**PHASE 6 – Measuring, changing and adapting: Monitor system status change and evaluate system trajectory change,**



## Conceptual framework for food system assessments



Source: Welthungerhilfe, adapted from the MSD approach in combination with van Berkum et al., 2018.

**evaluate system change contributions, collaborate, learn and adapt.** Food system transformation is an iterative and continuous process in which it is key to monitor intended and unintended changes of system outcomes as well as structural changes, and evaluate whether and how a project or programme contributes to system trajectory changes. Together with system stakeholders, it is recommended to foster a learning culture, to develop and implement learning plans where appropriate, and to reflect on results and learnings, and adapt the design and implementation of the transformation process to local needs.

### Unfolding multi-level and multi-actor potential for enduring systemic change

Virtually all food system indicators show negative trends and require substantial transformation (food security, climate, biodiversity, equality). Still, the current discourse is largely dominated by academia and policy, but far less by practitioner experience. We are convinced that it is essential for system actors to collaboratively define the scope for transformation, to break down the complexity of food systems transformation into manageable parts and to identify key leverage points to improve the performance of a food system. Hence, we need systemic approaches, especially those that unfold multi-level and multi-actor potential for enduring systemic change.

At first sight, working on these change processes can be an overwhelming task at operational level as multiple effects need to be taken into consideration to outline what is influencing the performance, behaviours and characteristics of food system key variables towards system transformation. WHH has consulted with staff, partners and its advisory committee to what extent a food system status report, a problem analysis and a solution analysis are needed to work on food systems transformation. All types of assessments are relevant. At the same time, we will primarily invest resources to assess potentials to unlock the opportunities of a sustainable and resilient food system to foster safe and healthy diets for all. Development practitioners hardly have the resources needed to conduct multi-annual food systems analyses as implemented by research agencies. This is a sphere of excellence on its own. Development actors should use the outputs of these studies (if available) complementary to their solution analysis to define a manageable multi-stakeholder systems approach towards long-term transformation.

Systemic approaches can challenge the input-output-oriented approaches in development cooperation. To achieve a status change, both approaches have to go hand in hand. Especially in fragile and crisis-affected contexts we must acknowledge that system gaps exist and need to be addressed (often immediately) through direct input support in order to pre-

vent a full system collapse. It is important to design these short-term interventions in ways that they contribute to both short-term (intermediate) improvements and long-term systemic change. Therefore, it has to be clearly defined for and with whom and to what end transformation is to be performed in which timeframe. It is equally important to understand and design one's own role in a system. Facilitating systemic change processes is a profession on its own. It asks development practitioners to be facilitators rather than implementers – sometimes even both. Investing in these skills is essential if we aim to unfold the potentials in the system itself through multi-stakeholder commitment for local change. The number of people without sufficient food is on the rise, and we have to increase the resilience of food systems urgently as climate change, natural resource depletion and conflicts are globally threatening our food systems.

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## Igniting a spark for landscape restoration

A growing demand for land, water and other natural resources in combination with human-induced climate change has put increasing pressure on nature while rapidly eroding the basis for people's livelihoods. In order to counter this, development practitioners are increasingly setting their sights on a landscape approach. Experiences gathered by Helvetas.

By Jens Soth and Annet Witteveen

Restoring landscapes has become crucial for sustainable development, particularly in sub-Saharan Africa. Here, the landscape approach has become a relevant idea among the development sector, climate change experts and environmentalists alike. It integrates the objectives of all stakeholders at landscape level to establish long-term integrated sustainable development. The vision is to transform degraded landscapes from poverty-stricken areas with shrinking soil fertility and biodiversity into ecologically diverse, but at the same time productive regions with high climate resilience. For the rural population, such landscapes would entail a multitude of economically interesting income opportunities so that the impulses to emigrate would vanish.

### Four cornerstones for successful transformation

Based on experience of their multi-stakeholder projects in Latin America, Asia and Africa, Helvetas has pinpointed four elements as relevant to successful landscape restoration processes. These cornerstones should be seen as pragmatic suggestions that have the potential to make the intended transformation a self-dynamic process with high ownership of the locally involved people and entities:

**Combine action on communal land as well as on farmland.** Traditionally, a lot of projects carrying the label “landscape approach” have been implemented with a strong focus on communal land. And indeed the communal land is where local actors can unfold their potential of collective action. But in light of the upcoming challenges and in view of objectives like biodiversity increase or landscape resilience, the farmland has to be a part of the overall landscape restoration planning, too. While this sounds like increasing the complexity, in practice, there are very good synergies. An active group of farmers with awareness about the interconnectedness of landscape elements and actions can be a strong driving force in the creation of the action plan for the restoration of the municipality landscape or as delegates at higher levels of the ad-



Members of a Village Saving and Loan Association in Tanzania's Singida Region working in their joint nursery, where tree seedlings for landscape restoration purposes are produced.

Photo: Franz Thiel/ Helvetas Tanzania

ministrative spatial planning processes (e.g. the district level).

Whatever particularly smallholders might do on their plots – from regenerative measures to increase soil fertility to erosion control or agroforestry –, as a standalone activity on a small farm, the critical mass of impact cannot be reached to master the upcoming challenges. Only in concert with the restoration measures on communal land will the efforts on farmland turn into a synergistic enforcement of landscape resilience.

**Integrate private sector actors and high agroecological ambition.** A holistic approach to the landscape will not unfold any leverage if the private sector involved in the landscape as a buying or processing entity does not participate. Furthermore, the outlook on the economic resilience of the landscape will not be complete if the opportunity for business and job creation is not utilised and shaped. Ideally, partners for domestic value chains as well as partners for export-orient-

ed value chains are integrated. The presence of export-oriented value chains serves a dual purpose. Firstly, these value chains provide an opportunity to involve a substantial number of small farmers, subsequently facilitating the integration of international sustainability standards into local practices. The engagement of small farmers in export-oriented activities not only enhances their income potential but also aligns with global sustainability benchmarks. In turn, domestic market value chains play a vital role in ensuring local food security and promoting the involvement of local stakeholders. Crops intended for domestic consumption are highly relevant in enhancing the livelihoods of local communities. Additionally, they provide an entry point for local processing, which, while maintaining lower quality requirements compared to export crops, contributes to increased empowerment of local actors. The strategic convergence of both export and domestic market value chains promotes resilience by diversifying income sources, reducing dependency on a single crop, and safeguarding against external market fluctuations.



With a broad spectrum of actors engaged in various stages of production and distribution, the potential for cross-learning and knowledge exchange expands exponentially, presenting a unique opportunity to implement high agro-ecological ambitions. Insights into sustainable agricultural practices, resource management and ecological preservation can be shared and applied. Moreover, the diversity of value chain actors allows for experimentation and innovation. Local knowledge, combined with private sector expertise, can result in the adoption of cutting-edge agroecological practices that align with the landscape's unique characteristics. This dynamic interplay fosters a virtuous cycle of continuous improvement, as each actor's dedication to sustainability inspires others to elevate their ecological commitments.

### Local spatial planning from the bottom.

In order to be able to develop long-term impacts at landscape level, formal and administrative approval of the efforts and actions planned is needed. Many landscape projects witness that despite good resources and well-intentioned measures the acceptance by local spatial planning authorities is either lacking or painfully slow. This can be avoided by a thoughtful and respectful participation of the administrative levels from early on, thereby avoiding that the local authorities see their territory as a “pawn in the game” of external forces. In our landscape projects, a lot of emphasis is put on the integration of the most basic administrative levels (e.g. village planning committees) up to mid-level stages (e.g. district level or region/province level).

In many cases the foundation of a resilient landscape is actually well embedded into the objectives of local spatial planning documents or concepts, but hardly has the chance to materialise (e.g. grazing and livestock management plans, water management plans, infrastructure plans). This is an opportunity to utilise “external impulses” to be seen as a “tailwind for transformation” rather than an overpowering force.

**Inclusion of women and youth.** Appearing to be a well-known principle for the development sector, the question arises again and again how it can be implemented pragmatically. One of the approaches, as implemented by Helvetas Tanzania, is the creation of Village Saving and Loan Associations (VSLAs), thereby allowing women's groups reasonable access to resources and opportunities to create assets and profits. As side effects, such associations give women the skills to engage in decision-making processes. With some supportive capacity

building, these skills can then be transferred to village- or even district-level spatial planning processes, thereby offering women and women's groups the opportunity not only to voice their challenges and needs, but also to reflect their priorities within the decision-making for the local planning and action plans.

Youth engagement can practically be realised on two levels: Locally appointed “youth ambassadors for environment” participate in the environmental planning and action committees. They ensure that the environmental challenges of the municipality and its landscape are well understood by the local youth, but also that the voice of the youth with their scope and wish of long-term stability is well embedded in the local decision-making of the spatial planning. Another level aims at the successive education and development of youth leadership for environmental and sustainability aspects. This adheres to the need to give young people who have the potential for leadership a chance to learn, but also to communicate about sustainability priorities of their region, engage in spatial planning decision-making at higher administrative (e.g. district) levels and network with peers, thereby being enabled to unfold a higher leverage. Both levels need an adequate capacity building and time for the young people to engage and unfold their skills.

### An example from Tanzania

The “Kijani Hai” landscape project (Swahili for “living green”) in Africa's Central Corridor is a good example of how the cornerstones mentioned are capable of kick-starting the transformation from a landscape threatened by soil erosion, deforestation, drought and diminishing quality of livelihoods to a regenerative, diverse and climate-resilient landscape with manifold income opportunities. Here, a consortium led by GIZ International Services and Helvetas is collaborating with the cotton-ginning companies Biosustain and Alliance Ginneries and around 45,000 farming families in the Singida and Simiyu region of Tanzania to combine regenerative organic farming with effective landscape restoration in more than 200 villages. The project belongs to the Regenerative Production Landscape Collaborative, a family of landscape projects supported and guided by the Laudes Foundation, which are, beyond Tanzania, implemented in India, Pakistan and Brazil.

The combination of farmland and communal land is achieved by applying organic and regenerative farming measures on the farmland

and reforestation and restoration of overgrazed areas on the communal land. Only with this combination is it possible to yield results in the complex aspects of biodiversity increase or climate resilience. With the collaborating ginning companies contracting the farmers, there is an obligation for high agroecological ambitions via the applied organic standards (EU organic, NOP of the USA). As it is mandatory for these standards to operate locally adapted crop rotations the legumes produced (groundnuts, green grams, chick peas) serve the local markets and thus food security purposes, whereas the export element – the organic cotton – contributes substantially to the farmers' income. By integrating local authorities and entities the kick-started landscape transformation is becoming a regular element of the local governance and the corresponding spatial planning processes. The intended landscape restoration measures are firm and accepted elements of the formal action plans submitted and agreed upon by village committees' district spatial planning authorities. With the communication of these achievements at regional level, the restoration processes are taken up by other districts. Discussion at national level ensures that these measures and achievements are recognised also on higher government levels. More than 200 women groups (VSLAs) have been established, which give over 5,000 farming families additional income opportunities in sectors like bee-keeping, small livestock raising or vegetable production and processing.

### Scope for adaptation

While the above-mentioned cornerstones form a strong foundation for landscape restoration, it is important to note that other landscape practitioners and implementation entities may add additional elements to enhance the approach. For instance, some may place particular emphasis on soil health as a fifth cornerstone, recognising its critical role in overall landscape resilience. Others might advocate for the inclusion of dedicated water management strategies to address the growing challenges of water scarcity. The strength of the landscape approach lies in its adaptability and responsiveness to specific regional and local contexts.

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## Saplings versus sea-level rise

Mangroves provide natural coastal protection and a nursery for many fish. They also store more carbon dioxide than other types of forest. But all over the world, the clearance of mangrove forests is still happening on a massive scale, also in Senegal. An environmentalist and a fisherman's wife are tackling this by replanting new forests.

By Klaus Sieg

Carrying her sandals, Rama Diop picks her way barefoot through the mud, which squelches in response to every step she takes. Now and again, an empty snail shell crunches beneath her feet. "I enjoy coming here, and come often to check on the mangroves. It makes me happy." Screeching, a heron takes flight. Rama Diop scrunches her eyes and watches it cross the vastness with a languid motion of its wings and disappear towards the open sea. In the distance, white-crested waves are just in sight. They roll in and break on the beach of this water-dominated landscape. Here in the delta of the Senegal River, it is easy to get disorientated. The ebb and flow of the tides bring constant change. Pools, creeks and lagoons appear and disappear. The Senegal's spreading torrent keeps finding new ways through the landscape as it makes its way to the Atlantic.

Some of the Senegal delta is a designated nature reserve. But it still has all kinds of threats to contend with. Nature is being invaded by settlements, roads and bridges. A rising number of fishers overexploit the waters, sometimes also damaging the shoreline zones. But most of all, the water level is rising due to global warming and carrying away more and more land. Whole villages are disappearing. Soils are being salinised. Mangroves could help to prevent this. They break the waves and stabilise the soil. Some mangrove forests are capable of absorbing up to 75 per cent of the energy from waves and storms which would otherwise hit the coast unchecked and with full force. But the mangrove that has been spared the ravages of drought, salinisation and urban sprawl in the last few decades is frequently felled for firewood and timber. Thus, Senegal has lost about 40 per cent of its mangroves in the past fifty years, versus an average loss of 20 to 30 per cent for West Africa.

"In my childhood, mangroves grew thickly all along the shoreline." Rama Diop gestures to show the wide river branch. Today, most of the open sandy-silty terrain is devoid of vegetation. Seen from the air, the once-dense greenery looks like the fur of a mangy dog. At least, at first sight. Because on closer scrutiny there are rows of thin, finger-length cuttings – small plants of hope. Which is to the credit of the 56-year-old fisherman's wife. With a group of others from her village, she planted out the cuttings five months ago. Barefoot and bent double, they worked their way forward, always making sure they pushed the plants deep, but not too deep, into the soil and respected the minimum spacing. "Otherwise they don't grow."

The gnarled plants with the long roots appear robust. And in a certain way, they are. After all, a mangrove forest is completely inundated with salt water twice a day. Very few of the world's 70,000 or more tree species can survive that. Indeed, mangrove trees can cope with being immersed for up to one third of the time. But if the sea level rises or a lack of rainfall alters the mix of salty and fresh water, they become stressed. Like all plants they produce oxygen in the course of photosynthesis, but in order to grow they also need to absorb air through their roots. In well-aerated soil with enough sandy particles this is not a problem; in waterlogged mud, it is. So various things can go wrong when it comes to mangrove reforestation. Seedlings can be trampled down by accident, too, or damaged when the fishers haul their boats ashore. No wonder, then, that Rama Diop is glad to see the long rows of seedlings in good condition. "We need the mangroves – more urgently than ever." Nobody needs to explain to her the consequences of global warming and rising sea levels. The

keen-eyed woman only has to set foot outside the door of her modest home. Her village, Bopp Thior, is on an island across the way from Saint Louis, the former capital of the French colonial period. "My uncle used to live over there." Rama Diop points towards the water. No sign of any houses. The river and the ocean swept them away long ago. There is still a plot of land, where Rama Diop used to grow cabbage and tomatoes. But now the soil is salinised and nothing will grow any more. Just like the well that once supplied all the residents of her village with fresh drinking water. Now they have to fetch it once a week by boat from Saint Louis. "And then it's loaded to the brim with canisters."

Mangroves cannot lower the sea level in the short term. But they do stop the water eroding the coast. They also cool the microclimate and bind greenhouse gases. The United Nations Environment Programme (UNEP) classifies them as one of the most carbon-rich ecosystems on Earth. Healthy mangrove forests can store around 1,000 tonnes of carbon per hectare over thousands of years – far more than tropical rainforests and peatlands. Like all plants, mangroves bind carbon dioxide from the atmosphere as they grow. What makes such a great difference in mangrove forests is their soil. Every high tide carries in particles from the sea, including carbon-rich particles, some of which get trapped in the root system and eventually sink and compact. These form an oxygen-poor substrate which is the ideal habitat for microorganisms that release sulphur compounds without decomposing organic waste – and thus without releasing greenhouse gases. This makes it all the more dramatic that mangrove forests are under threat, and not just in Senegal and West Africa. Worldwide, only half of the original area of coverage still ex-



Wetlands International Afrique scientists controlling the growth of mangrove plantings.

Photos: Martin Egbert





A strong team supporting mangrove conservation: Rama Diop and Mamadou Mbodji.



Oysters attach themselves in rows to the root system of the mangroves. When they are collected, the roots are frequently torn off as well.

ists, according to the Mangrove Action Project (MAP), a North American non-governmental organisation.

In that light, the efforts of Rama Diop and other volunteers to reverse the loss of their local mangroves also take on a global significance. She was prompted to get involved by Mamadou Mbodji from the organisation Naturefriends International. “What happens with the mangroves here is important for you in Europe, too,” he says. The environmental activist is a tall and wiry 66-year-old who grew up in Saint Louis himself. Passing old houses with crumbling façades, he strides through the narrow alleys of the island of Saint Louis, heading for the beach. Goats are tied up outside the houses. Battered-looking French-built taxis and a surprising number of horse-drawn carriages clatter through the dusty streets. The beach is strewn with colourful fishing boats. In front of it, most of the last line of buildings is now reduced to rubble and ruins. “The sea is coming closer every year. A third of the houses in this district have vanished into the sea already,” says Mamadou Mbodji.

Work started last year down on the beach to build a sea defence from large stones. “Better than nothing. It will delay the disaster somewhat – but a lot more has to happen, otherwise Saint Louis will be lost by 2050.” Mamadou Mbodji’s eyes twinkle behind his tinted glasses. The environmentalist makes no secret of the fact that he considers mangroves the better solution. Funded by donations, he has so far organised the reforestation of 15 hectares

in total on various sites in and around Saint Louis. Not all the plantations are in such idyllic locations as the one on the small sand island where the fisherman’s wife Rama Diop lives. Mamadou Mbodji points out seedlings in bays adjacent to industrial zones, motorways or densely populated residential areas. Some are damaged. “More and more people are coming to Saint Louis, not least because their fields in the countryside are getting salinised.” It means that the pressure is rising constantly, so plantings need to be better protected. People who did so would be helping themselves.

A wealth of species from the air, land and sea come together in mangrove forests. They are home to wild bees and other insects, innumerable species of birds, reptiles, wild cats, oysters, crabs, crustaceans and fish. For many ocean-dwelling creatures, mangrove forests serve as breeding grounds and nurseries. Used sustainably, they provide a good basic food supply for coastal dwellers.

“Replanting alone is not enough. We must convince people to leave the mangrove forests alone or only use them sustainably.” Yakhya Gueye sits under the sunshade of a rocking boat. Squatting beside him on the boat’s benches are scientists and other colleagues from the organisation Wetlands International Afrique. They have already reforested 300 hectares of mangroves here on the Casamance River in southern Senegal. Now they have come equipped with measuring tapes, gauges and other special tools to check on their growth, take soil samples and document pH values. Apart from re-

viewing their own work, this could also pave the way for large-scale reforestation and access to the global trade in emissions certificates. The non-governmental organisation has backed its previous reforestation efforts with campaigns and practical guidance on proper use of the wealth of natural resources. For example, oysters attach themselves in rows to the intricate extended root system of the mangroves. Collectors who paddle around the forest in dugout canoes often break the roots right off. “It’s easier for them than pulling off the oysters one by one while balancing in the boat – but it can kill off the mangroves.” This is why Yakhya Gueye and his colleagues are teaching the women how to use wooden racks and ropes to tend and harvest wild oysters.

Rama Diop has been taught the same near Saint Louis. But her main concern is restoring the mangroves so that the waters eventually hold enough fish again. “Back in the days when everything here was covered in mangroves, my father’s boat was always full of fish when he returned.” She wants it to be that way again. And to make that happen, the resolute fisherman’s wife, who has waded across squelching mud and bent herself double to push seedlings into the ground, would do it all again any time.

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## “Selling pesticides like biscuits” – challenges of pesticide governance in Zambia

Use of pesticides is rapidly rising in many parts of Africa. While farmers cheer them as powerful substitutes for manual weed and pest control, the precarious institutional environment has been resulting in the uncontrolled use of these inputs, frequently with alarming consequences for the environment and health. An exploratory study in cooperation between Germany’s University of Hohenheim and the Indaba Agricultural Policy Research Institute (IAPRI) in Zambia looks for ways to address the underlying governance challenges.

By Louis Schwarze, Thomas Daum and Regina Birner



While some pesticide dealers in larger towns are professional and officially registered (left), many others in suburbs and rural areas operate in an informal, improvised setup or even as mobile vendors (right).

Photos: Louis Schwarze

While African agriculture was long believed “organic by default”, recent evidence shows that pesticide use is more widespread than often believed and is rapidly surging, a trend that has been coined a pesticide “revolution”. Among the main drivers are imports of low-cost, generic pesticides, mainly from Asia. After key pesticide ingredients such as glyphosate lost patent protection at the beginning of the 2000s, Asian manufacturers rapidly scaled their production capacities, cut production costs and started to supply large volumes across the developing world, including African countries. These generic products are usually imported in bulk and marketed by local traders under plentiful house brands which are competing with traditional international agrochemical companies like Bayer, Syngenta and Dupont for market shares. In response, pesticides have become much more affordable and accessible, especially to smallholders. At the same time, pesticide demand has increased due to labour shortages for weeding and manual pest control during the peak

seasons, which is exacerbated by urbanisation, demographic change and commercialisation of farming. Use of insecticides has also gone up owing to outbreaks of invasive pests (e.g. the fall armyworm) and climate change, leading to increased pest pressure.

Pesticide use in agriculture has been discussed controversially, at the latest since biologist Rachel Carson’s book *Silent Spring* published in 1962, because of its potential environmental and health risks. Nonetheless, given their agronomic utility, pesticides are considered indispensable by most farmers and governments. In Africa, pesticide adoption creates opportunities for food security and rural livelihoods through the reduction of pre- and post-harvest losses and the heavy toil of farming, affecting especially women and youth. However, at the same time, there can be severe health and environmental hazards such as pesticide poisoning, contamination of food and water, and loss of biodiversity that occur because of inappropriate management, renunciation of

protective equipment and use of highly toxic ingredients. Given these potential risks, it is widely accepted that strong regulatory institutions are required to minimise negative impacts. African countries are excessively affected because existing regulatory institutions are often malfunctioning. In the face of the rapid surge in pesticide supply, regulatory capacities are further strained, and fail to enforce basic regulations and monitor the growing pesticide trade and use. In effect, governance challenges such as informal trade of unregistered and fraudulent products, lacking knowledge of pesticide management, limited use of protective measures by farmers, the dumping of pesticide containers into the environment and the excess of maximum residue levels (MRLs) in fruits and vegetables are left largely unaddressed. Internationally accepted concepts such as the International Code of Conduct on Pesticide Management and Integrated Pest Management (IPM) lack implementation, and many hazardous pesticides have still not been banned in numerous countries.



## The research project

In a recent research project, we studied such governance challenges of pesticide management and its institutional environment in Africa in detail, with a specific focus on why they occur and how to address them. In the study, we systematically identified the various challenges that affect private, public and civil governance of pesticides along the pesticide life cycle, using the literature and field research in Zambia.

The research combined four types of qualitative data collection. First, we reviewed Zambian pesticide laws and policies and compared them to international reference documents to identify eventual gaps in their design and implementation. Second, we did 13 participatory mapping sessions (Net-Maps) with key stakeholders along the pesticide life cycle to identify key actors, linkages and their influence levels as well as key constraints. To specify critical aspects, we interviewed an additional 87 key informants representing diverse stakeholders (including private sector, government agencies, research and NGOs). Finally, pesticide management practices and perceived impacts were assessed in 18 farmer group discussions (with 159 randomly sampled farmers), using Participatory Impact Diagrams, which combine mind maps and scoring to reconstruct positive as well as negative causal impact chains graphically in groupwork. Complementary insights were gained through site observation of pesticide markets and interviews with pesticide traders. The field research took place between October and December 2021, in the capital Lusaka and in selected districts in the Eastern Province.

## How pesticide use is perceived

Starting at the farm level, the results of the Participatory Impact Diagrams show a very positive reception of pesticides in rural communities. Most participants rated pesticide net-impacts on their lives either very positive (37.5 %) or positive (24 %). Even though compared to that, for many participants, negative impacts were a “lesser evil”, they were still substantial, causing a large share of participants to be undecided (37.5 %). Yet, only two participants (1 %) stated a larger negative impact. Benefits of pesticides most relevant to farmers were: higher yields and incomes and fewer risks thanks to more effective crop protection, reduced time and workload of farming freeing-up capacities for economic diversification or social activities, and enhanced food

security through long-term preservation of grain (through fumigation). The most relevant downsides were temporary health problems (e.g. skin and eye irritations, headaches and vomiting), risk of chronic diseases (e.g. cancer), suicide cases and contamination of food and animal feeds (see table). Other slightly less frequently mentioned impacts included loss of utile flora and fauna such as edible insects, edible weeds and bees, and killing of wildlife through hunting and fishing with pesticides, resulting in less diverse diets and loss of food sovereignty.

Management errors (mentioned by 67 % of key informants), use of highly hazardous pesticides (67 %), low adoption of protective equipment (63 %) and limited knowledge (73 %) were cited most frequently by key informants as causes of negative health (53 %) and environmental problems (33 %) at farm level. Other reported challenges included limited adoption of integrated pest management (IPM) (27 %) and dumping of pesticides (containers) (47 %). Existence of these challenges was also confirmed through interviews with farmer groups. The underlying economic problems we identified are externalities, imperfect information and bounded rationality. Externalities are negative effects that are caused but not borne by private pesticide users. Information on safe/effective pesticide use and potential risks among pesticide users is scarce, because its acquirement is expensive (high transaction costs) and it is less demanded than socially desirable (merit good effect) and risks/benefits of pesticides are systematically under-/overestimated due to bounded rationality (e.g. optimism and normalcy bias or misperception of likelihood).

## Wide-ranging governance challenges

Examining the supply chain of pesticides in Zambia revealed that many key informants approved the “pesticide revolution” hypothesis, that is the rapid expansion of pesticide use, which is also associated with the emergence of many new pesticide traders and brands. In Zambia, this was reinforced through pesticide subsidies, for example in response to the fall armyworm. After the outbreak of the fall armyworm in 2016, the Zambian Government procured repeatedly large quantities (in total more than three million US dollars) of various insecticides to farmers as an emergency response. Moreover, through transition to an e-voucher-based farm input subsidy programme (FISP) introduced in 2016, pesticides were included as selectable inputs. While the proliferation of pesticide traders has increased pesticide affordability and accessibility, it has caused supply chain governance to deteriorate in various ways. First, suppliers of generic pesticides, unlike traditional suppliers such as Bayer or Syngenta, lack corporate social responsibility policies including voluntary activities such as capacity building and monitoring of cooperating dealers, cooperation with policy-makers and other activities to reduce pesticide hazards. For instance, while premium suppliers voluntarily phased out highly hazardous pesticides (HHPs) in Zambia, generic importers keep stocking them. Second, many small, informal pesticide retailers are emerging in suburbs and rural areas which lack minimum requirements in terms of qualification and pesticide storage and packaging. Sometimes, pesticides are even sold by street/mobile dealers or grocery stores and repacked into unlabelled plastic bags.

### Most-cited positive and negative impacts of pesticides in Participatory Impact Diagrams

Positive impacts		
Impact	% of FGs mentioning impact	Average relevance score*
Higher longevity of stored grain	88 %	2.00
More time available for social activities	88 %	2.00
Effective crop protection/ less yield loss	81 %	2.00
Less labour stress/ costs	75 %	1.89
Capacities to expand/ diversify farm	63 %	1.88
Negative impacts		
Acute health problems (rushes, headaches, etc.)	88 %	1.64
Suicide attempts**	81 %	0.54
Food contamination	81 %	1.50
Poisoning of domestic animals	69 %	1.14
Chronic health symptoms	69 %	1.14

\* Relevance of impacts to farmers was scored on a 3-step scale from 0 = low relevance to 2 = high relevance. FG = farmer group. \*\* The reason for the low relevance score for suicide attempts is that while they were referred to by many farmer groups as an impact of pesticide use, the groups also argued that there was no direct causal relationship since a suicide was the responsibility of whoever committed it and, furthermore, alternatives to pesticides were available.

Three major governance challenges of pesticide traders were pointed out by key informants – low qualification (49 %), hawking (29 %) and counterfeiting (24 %). The identified underlying market failure is information asymmetry, meaning that farmers cannot assess quality of advice and products supplied by pesticide dealers at the time of the purchase. This leads to adverse selection whereby fraudulent, dishonest traders have a competitive edge as they can offer cheaper products. One widespread phenomenon is hawking, i.e. biased, pushy marketing tactics without mentioning risks which was described by one trader as “selling pesticides like biscuits”. The information asymmetry problem also affects food markets where pesticide contamination cannot be immediately seen by consumers. Previous to our research, pesticide-contaminated lettuce had caused a severe case of food poisoning in Zambia, which was often referred to by respondents.

While the Government does maintain an agricultural extension service, the Ministry of Agriculture has so far focused little on handling pesticides and the risks this entails. Pesticide regulation is chiefly up to the Environment Ministry, and deliberations between the two departments have as yet not resulted in any sufficient prioritisation of the issue on the ground.

### Weak regulatory framework and control mechanisms

Our analysis of the institutional environment showed complete or partial absence of public pesticide governance along all stages of the pesticide life cycle. This can be attributed to two major sets of governance challenges.

First, the review of the pesticide law showed several gaps compared to international standards. Especially, the mandates of regulatory actors are not well defined. Moreover, pesticides are not addressed in current agricultural, environmental and health policies. Several highly hazardous pesticides (such as Dichlorovos, Monocrotophos or phosphides) have not been banned, which was criticised by major private and civil stakeholders (53 % of key informants). According to farmer groups, these HHPs are regularly involved in suicide attempts and fatal accidents. Large importers felt the pesticide registration process disadvantages new, potentially less harmful formulations by demanding for tedious testing procedures (29 %). The private sector, academics and NGOs (18 %) identified lack of political will and sense of urgency to tighten and update regulations among public

authorities as the primary bottleneck, driven by a lack of evidence about the true social and environmental costs in combination with opaque policy processes as well as low accountability to affected communities and civil-society organisations (CSOs) that were not participating in the policy process (16 %). Various inspectors and researchers uttered that pesticide regulation, being a joint matter of environmental, health and agricultural ministries, was sidelined and suffered from coordination failures (42 %). Regulatory capture from the private sector could be another reason but was not explicitly mentioned.

Second, enforcement of regulations (57 %), monitoring of pesticide impacts (49 %) and training of pesticide dealers and farmers (56 %) is very infrequent. The main governance challenge is limited funding and staffing of public agencies (53 %) in combination with high transaction costs, due to the remoteness and sheer number of farmers as well as bureaucratic work mode in and between agencies. Consequently, inspectors are “thin on the ground” and rarely able to leave the provincial capitals (private sector, academia). Public inspectors confirmed that inspections of pesticide dealers and border controls were irregular, whereas monitoring of pesticide quality and food contamination was completely absent, especially because laboratories are not available (33 %). Inspectors also stated that environmental impacts are only registered on a complaint basis. Researchers and NGOs lamented that trainings and sensitisation of pesticide dealers and farmers were not included in public budgets, and hence largely left to the private sector and development projects. According to them, the agricultural extension service was officially in charge of training farmers on pesticide management, but in practice its outreach was limited and agronomic topics were prioritised.

### The way forward

To address extensive challenges of pesticide governance in Zambia, fostering political will for stricter regulation and enforcement will be pivotal, especially to fully ban HHPs. Therefore, more evidence and transparency of the true social and environmental costs of pesticide use as well as effective accountability mechanisms are required. According to key informants, international organisations and research can play a major role here, as they have much influence on domestic policy-makers (mentioned by 20 %), e.g. by coordinating stakeholders, elaborating alternative policies, analysing pesticide impacts and supplementa-

ry funding. Consensual strategies to empower and participate civil society organisations (13 %) could help to create accountability for stricter pesticide regulation while barriers to private sector influence must be installed simultaneously. At the same time, research on innovative, transaction cost efficient enforcement models are required. Hybrid models involving private, public and civil actors could be more effective than pure public top-down regulation. For instance, activities such as risk sensitisation of farmers, container recollection and qualification courses for pesticide dealers and spraying agents could become mandatory for pesticide importers. Additionally, regional harmonisation of pesticide legislation within the Southern African Development Community (SADC) could free-up valuable capacities through joint registration and border control. Such harmonisation has been actively promoted, e.g. via the Southern African Pesticides Regulators Forum (SAPReF) and the SADC Guidelines on Pesticide Management and Risk Reduction passed in 2019 but not yet translated into national law. Ultimately, a minimisation of pesticide use through further promotion of IPM or perhaps even taxation will be pivotal, but the vision of a completely pesticide-free agriculture seems hardly realistic and is not reflected in farmers’ preferences. Hence, effective regulation of pesticides is crucial.

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## Healthy planet, healthy people – is it achievable or a pipedream?

The United Nations Environment Programme has recently launched the preparation of the seventh edition of the Global Environment Outlook (GEO-7) report. Since the last report, the condition of the environment has further deteriorated, making a transformative change all the more important. Ahead of the new report's publication, our author once again highlights the most urgent problems and fields of action which were established in GEO-6.

**By K. N. Ninan**

The United Nations Environment Programme (UNEP) has been periodically releasing a Global Environment Outlook (GEO) report prepared by experts from around the world. Since 1997, six reports have been released. The theme of the GEO report's sixth edition (GEO-6) is 'Healthy Planet, Healthy People' and aims to provide a science-based source of environmental information to help policy-makers and society to achieve the environmental dimension of the 2030 Agenda for Sustainable Development and the internationally agreed environmental goals, and

implement the multilateral environmental agreements. It also seeks to identify future options to achieve sustainable development by the year 2050.

### State of the environment

The report notes that the overall condition of the global environment has continued to deteriorate despite efforts across all countries and regions. It concludes that unsustainable human activities across the world have degraded the

Earth's ecosystems, thereby endangering the ecological foundations of society.

- While reviewing the state of the global environment it notes that air pollution is the main environmental contributor to the global burden of disease, causing six to seven million premature deaths and welfare losses estimated at five trillion US dollars (USD) annually.
- Globally, economic and population growth continue to be the most important drivers of increases in CO<sub>2</sub> emissions from fossil

fuel combustion. Current nationally determined pledges to reduce emissions constitute only a third of the mitigation required to limit temperature rise to below 2°C above pre-industrial levels. To achieve this goal, emissions need to drop by 40 to 70 per cent globally between 2010 and 2050 and fall to net zero by 2070.

- Populations of species are declining, and species extinction rates are increasing. At present, 42 per cent of terrestrial invertebrates, 34 per cent of freshwater invertebrates and 25 per cent of marine invertebrates are at risk of extinction. Biodiversity loss disproportionately affects the poor and marginalised communities. Illegal trade in wildlife, fisheries and forest products is worth between 90 and 270 billion USD per annum.
- Human-induced rise in greenhouse gas (GHG) emissions is driving rising sea levels, changes in ocean temperatures and ocean acidification. Mass coral bleaching, induced by chronic heat, has damaged many tropical reefs beyond recovery. The collective annual value of coral reefs is estimated at 29 billion USD. Its loss adversely impacts the lives and livelihoods of coastal communities and marine habitats.
- The oceans play an important role in the global and national economies. Fisheries and aquaculture currently generate 252 billion USD annually. Small-scale fisheries support the livelihoods of between 58 and 120 million people. Fish provide 3.1 billion people with over 20 per cent of their dietary protein and contain other essential nutrients.
- Marine litter, including plastics and microplastics, is now found in all oceans, at all depths. It has a significant negative economic impact on a range of coastal activities. Estimates suggest that the input of plastic marine litter linked to domestic waste mismanagement in coastal areas amounts to some eight million tonnes annually. The damage to fishing gear in Europe alone is estimated at over 72 million USD per annum and the annual cost of cleaning polluted beaches at 735 million USD, and levels are rising.
- Land degradation and desertification have increased, with land degradation hotspots covering about 29 per cent of global land, where some 3.2 billion people reside. Investing in avoiding land degradation and restoring degraded land yields immense benefits. A UNEP study suggests that investing one trillion USD in ecosystem restoration of 350 million hectares of degraded lands over the period 2021 to 2030 will yield ecosystem service benefits worth nine trillion USD and remove an additional 13–26 gigatons (Gt) of GHGs out of the atmosphere.
- Urban clusters have grown by a factor of about 2.5 since 1975, and are affecting, among other things, the hydrological cycle and soil functions, causing urban heat islands.
- In most regions, water quality has worsened significantly since 1990, owing to organic and chemical pollution. Some 2.3 billion people still lack access to safe sanitation. Approximately 1.4 million people die annually from preventable diseases, such as diarrhoea, and intestinal parasites. Human illnesses due to antimicrobial-resistant infections may become a major cause of death from infectious diseases world-wide by 2050.
- About 40 per cent of wetlands have been lost since 1970, with serious consequences for lives and livelihoods. The total annual economic cost of wetland losses over the period 1996 to 2015 is estimated at 2.7 trillion USD.
- Resource exploitation has increased beyond the recovery ability of ecological systems. Globally, two out of every five people lack access to controlled waste disposal facilities.
- Global energy consumption is expected to rise significantly by up to 63 per cent as per some estimates during the period 2014 to 2040. Despite the fast deployment and cost reduction of renewables and improvements in efficiency, without ambitious and effective measures, energy-related GHGs will breach the temperature limits set by the Paris climate accord.
- The health co-benefits of reducing GHGs and air pollutants can outweigh the costs of mitigation. For example, global health savings for limiting temperature rise to 2°C are estimated at about 54 trillion USD, compared with global costs of around 22 trillion USD.

### Transformative changes and innovative solutions

Without transformative changes and innovative solutions, the goal of a healthy planet and healthy people will remain a pipedream. The GEO-6 report notes that pathways exist that show that the healthy planet needed for sustainable development can be achieved. They are associated with achieving sustainable consumption and production patterns for energy, food and water to provide universal access to those resources, while preventing climate change, air pollution, land degradation, loss



The Mae Moh coal power plant in Lampang, Thailand. Air pollution is a major burden of disease.

Photo: jeep2499/shutterstock.com

of biodiversity, water scarcity and overexploitation and pollution of oceans. They include changes in lifestyle and consumer behaviour, cleaner production processes, resource efficiency and decoupling, corporate responsibility and compliance. Here are some examples of measures needed in different sectors and areas:

**Energy sector:** Improving access to clean energy especially among poor and vulnerable sections of the population and enhancing the development and adoption of energy-efficient technologies. Apart from phasing out fossil fuel use, the introduction of low GHG emission technologies including sustainable and equitably produced bioenergy, hydropower, solar and wind energy has to be accelerated. The potential of green hydrogen needs to be tapped. This has important co-benefits for climate, air quality and human health. Pathways that seek to limit temperature rise to 1.5°C–2°C above pre-industrial levels set by the Paris Climate Accord would imply a reduction in the carbon intensity of the global economy by 4–6 per cent per annum between now and 2050.

**Food and agriculture:** Global population is projected to rise to 9.8 billion by the year 2050. To meet the growing food and other needs of an increasing population, food production has to be scaled up by several folds. Sustainable intensification of agriculture which increases crop yields from the same land area with low environmental costs is advocated to





tion is the main environmental contributor to the global

address this challenge. Scenarios achieving the internationally agreed social and environmental targets are typically characterised by doubling the improvement in agricultural yields compared to a business-as-usual scenario but depend heavily on changes in consumption behaviour, improvements in food distribution and reducing food loss and waste, which contributes 8–10 per cent of global GHG emissions. The UN Food and Agriculture Organization (FAO) estimates that around 14 per cent of the world's food production (valued at 400 billion USD) is lost post-harvest; a UNEP report states that another 17 per cent of food is wasted in the retail and household sectors. According to FAO figures, food lost and wasted could feed 1.2 billion people every year.

**Biodiversity and ecosystems:** A UN assessment showed that the world had failed to meet most of the Aichi global biodiversity targets. The post-2020 Kunming-Montreal biodiversity framework for the period 2022–2030 sets out an ambitious plan to implement broad-based action to bring about a transformation in our societies' relationship with biodiversity by 2030, in line with the 2030 Agenda for Sustainable Development and its Sustainable Development Goals, and ensure that, by 2050, the shared vision of living in harmony with nature is fulfilled. Amongst others, the framework calls for reducing the loss of bio-rich areas and critical ecosystems by close to zero by 2030, ensuring the conservation of at least 30 per cent of all terres-

trial areas and inland waters, and coastal and marine areas by 2030, restoring 30 per cent of degraded ecosystems and reducing the threats posed by invasive species by 50 per cent.

**Cities and urbanisation:** Rapid urbanisation is a major driver of global warming, biodiversity loss and pollution. According to a UN report, by 2050, about 68 per cent of the world's population will reside in urban areas. Establishing smart and sustainable cities that rely on modern digital technologies to engage with citizens in addressing key sustainability challenges, such as transportation, consumption patterns, energy, nutrition, water and waste management, investing in mass rapid transit systems based on sustainably produced electricity, increasing the green cover and conserving lakes in urban areas will help in reducing urban heat islands and managing storm water and extreme weather events such as floods.

**Behavioural and lifestyle changes:** Without behavioural and lifestyle changes by individuals and societies it will be difficult to reverse the present trajectory of rapid environmental degradation. Almost 77 per cent of agricultural land is devoted to livestock production which has a large carbon footprint. Shifting towards sustainable and healthier diets is beneficial for protecting the environment and human health. Increasing the consumption of millets which are more nutritious and less water intensive and replacing natural meat with cultured and lab-grown meat are among the measures recommended for reducing pressure on natural resources such as land, water and forests, and reducing GHG emissions.

**Pollution:** The zero-pollution action plan seeks to make ecosystems healthy by drastically reducing air, water and soil pollution by 2050. Tightening regulatory mechanisms and their effective implementation are key to achieving this vision. Sustainable agriculture also requires a reduction in the nitrogen and phosphorus imbalance to reduce pollution of freshwater systems, groundwater, and coastal zones in oceans.

**Data and knowledge:** Improving the data and knowledge base, incorporating traditional knowledge and citizen science to complement science-based information, exploiting the potential of emerging data sources and technologies such as Earth observations, Earth-human system modelling, sensor technology, giving open access to data and international cooperation will help improve monitoring environmental change and formulate effective policies to address the environmental crisis.

**Other measures are:** social and policy innovations; disincentivising unsustainable practices and environmentally harmful subsidies; internalising social and environmental costs; policies to improve resource use efficiency, waste management, reduce toxic substances and solid/plastic waste; financial mechanisms to promote sustainability; nature-based solutions, including those that draw on indigenous knowledge; upscaling local level transformative projects and innovative solutions; investing in ecological infrastructure; improving public awareness about sustainability-driven consumer choices, entrepreneurship, greater corporate social responsibility; creating an enabling environment for niche innovations; removing barriers to change and phasing out of unsustainable products and industrial processes.

An integrated approach can help maximise synergies and minimise trade-offs between sustainability and development goals. For instance, bioenergy crop production will compete with land used for food production and adversely affect food security of the poor and vulnerable sections of the population.

The seventh edition of the Global Environment Outlook (GEO-7) report is titled 'Actions for a Healthy Planet'. Based on the insights provided by the GEO-6 report which showed that current policies have failed to halt environmental degradation, thereby jeopardising achievement of the Sustainable Development Goals and the internationally agreed environmental goals, the GEO-7 report will focus on finding solution pathways and actions in the food, energy, materials/waste, economic and financial sectors so as to address the environmental crisis of climate change, biodiversity loss, pollution and land degradation.

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