

DISCUSSION PAPER No. 364

The global roadmap for achieving SDG 2 within the 1.5 °C limit: Tools and opportunities for implementation

By Francesco Rampa, Fabien Tondel and Koen Dekeyser

April 2024

The global roadmap for achieving SDG 2 ('zero hunger') without breaching the 1.5°C global warming threshold is an initiative of the UN Food and Agriculture Organization. It aims to guide agrifood system transformation strategies that ensure food security and good nutrition, while contributing to climate action. In this paper, we clarify some of the concepts underpinning the roadmap and aim to support its elaboration and roll-out by exploring methodologies and policy processes that can shape implementation.

We examine the intricate linkages between food systems and climate change – the so-called food-climate nexus – and introduce a methodology for the management of these interconnections in practice. Building on a political economy analysis of agrifood systems, the methodology offers guidance on how to assess trade-offs and build transition pathways to possibly alleviate them, while recognising that different actors in agrifood systems often have diverging interests.

The paper also identifies initiatives and policy processes that could be used to contribute to the roll-out of the SDG 2-1.5°C roadmap. The reform of farm and agroindustrial subsidies, for example, is critical for promoting changes in agriculture, food supply chains and consumption patterns. We zoom in on Africa-Europe cooperation, highlighting how multi-stakeholder dialogue and policy coordination could contribute to forming robust alliances around the food-climate nexus, balancing efficiency and fairness. Finally, we indicate a number of policy processes and events that can keep the food-climate nexus high on the international agenda.

Table of contents

Acknowledgments.....	iii
Acronyms.....	iii
1. Introduction.....	1
2. Food systems approaches and political economy methods as useful tools for the roadmap	2
2.1. A food systems approach: understanding and managing intersections and policy options	3
2.2. Integrating governance and statistical methods.....	7
3. Relevant international initiatives and policy processes.....	8
3.1. General processes.....	8
3.2. Production system-related processes.....	9
3.3. Processes for international trade and distribution systems.....	13
3.4. Consumption-related processes.....	13
3.5. Interrelations between processes.....	13
4. The potential of Africa-Europe cooperation to contribute to the roll-out of the roadmap.....	15
4.1. Africa-EU agrifood systems linkages	15
4.2. Joint Africa-EU action at the food-climate nexus.....	17
5. Keeping the food-climate nexus high on the agendas	20
References.....	23

List of boxes

Box 1: Trade-offs and synergies between different objectives in the Nakuru County agrifood system	5
---	---

List of figures

Figure 1: The Sustainable Food Systems Approach	4
Figure 2: Trade balance	18
Figure 3: Upcoming events	21

List of tables

Table 1: Trade-offs and synergies between pathways.....	5
Table 2: Trade-offs and synergies between sustainability dimensions of standard KS-1758.....	6

Acknowledgments

The authors thank Hanne Knaepen and David Laborde for their feedback on an earlier version of this paper. The views expressed in this study are exclusively those of the authors and should not be attributed to any other person or institution. All errors remain those of the authors. We welcome feedback, which can be sent to <fr@ecdpm.org> and <ft@ecdpm.org>.

Acronyms

BAU	‘Business as usual’
ECDPM	European Centre for Development Policy Management
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FCPF	Forest Carbon Partnership Facility
GFC	Global Fertilizer Challenge
GHG	Greenhouse gas
GMP	Global Methane Pledge
IEA	International Energy Agency
IFPRI	International Food Policy Research Institute
IIASA	International Institute for Applied Systems Analysis
IRENA	International Renewable Energy Agency
IISD	International Institute for Sustainable Development
N ₂ O	Nitrous oxide
NDC	Nationally determined contribution
OECD	Organisation for Economic Cooperation and Development
PEA	Political economy analysis
PGS	Participatory Guarantee Systems
R&I	Research and innovation
RED	Renewable Energy Directive
REDD+	Reducing emissions from deforestation and forest degradation in developing countries
SBSTA	Subsidiary Body for Scientific and Technological Advice
SME	Small and medium-sized enterprise
SRI	System of Rice Intensification
TFA	Tropical Forest Alliance
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UNFSS	United Nations Food Systems Summit
US	United States
WTO	World Trade Organization

1. Introduction

During COP28, the Food and Agriculture Organization of the United Nations (FAO) launched a **“global roadmap” for “achieving SDG 2 without breaching the 1.5 °C threshold”** (from now on “the roadmap”). Concretely, the roadmap aims to support UN Member States and other actors in building agrifood systems transformation strategies simultaneously targeting food security and nutrition as well as greenhouse gas (GHG) reduction and adaptation to climate change. This “requires an integrated approach to food and climate action; maximising synergies and minimising or avoiding trade-offs; balancing fairness and efficiency; transparency and consistency in the messaging; coordinated country actions; investments in innovative solutions” (FAO 2023).

This note aims to clarify some of the **concepts** underpinning the roadmap, and supports its preparation and roll-out by exploring relevant **methodological approaches and policy processes** that can shape implementation mechanisms in the pursuit of climate and food security and nutrition goals.

It is well known that certain actions over the past century that were important for global food and nutrition security also significantly contributed to climate change.¹ However, **food and nutrition security and climate mitigation are not inherently conflicting objectives**. For this reason, this note considers **“intersections”** between food security, nutrition and climate objectives and actions, to indicate both negative trade-offs and positive synergies from these are possible; and that in many cases, a specific trade-off can be addressed and possibly turned into positive synergistic action.

The roadmap’s overarching objective is to contribute to **win-win solutions, in particular by avoiding a silo approach** between the goals and actions towards SDG2 and the 1.5 °C limit. The intersections are dynamic so **trade-offs and synergies are also inter-temporal**². While in the short term, in certain contexts, cross-border and country-level trade-offs will emerge, in general there is little doubt that future global and local food security and nutrition also depends on the ability to keep climate change under control. Thus, in the medium and long term, working on the co-benefits of the two policy areas is in everyone’s interest.

¹ See Crippa et al. 2021.

² “A sustainable agrifood system is an agrifood system that delivers food security for all in such a way that the economic, social and environmental bases to generate food security for **future generations** are not compromised” (UNSG High-Level Taskforce on Food and Nutrition Security 2015; emphasis added).

However, this is likely to be a **highly political process with diverging interests** in the short term, given current widespread inequalities in power, food security and nutrition status and climate vulnerabilities, both across and within countries. The status quo in agrifood systems greatly benefits some powerful actors; while considering the great country, income, or location differences³ calls for prioritising fairness, not only efficiency, when simultaneously fighting hunger and reducing emissions. Moreover, the transparency and coordination needed to roll out the roadmap will require effective policy dialogue and multi-stakeholder participation. For these reasons, this note focuses also on **governance of agrifood systems and on participatory and political economy analysis tools**. And the ideas provided for implementation mechanisms around the roadmap will include institutional innovations and incentives, so that the reforms and finance delivered will be feasible and widely supported by various stakeholders, taking into account their interests and capabilities as well as concerns about equity.

Section 2 of this note therefore provides an overview of the food systems approach, which can be used to capture the multiple drivers and outcomes of agrifood systems, the relevant political economy, and suggests participatory tools for supporting policy formulation and implementation. These approaches and methods can provide a foundation for a theory of change for the roadmap, helping to define pathways to climate and food security and nutrition goals and to understand the interconnections between different policy objectives and components of those systems. Then, **Section 3** reviews relevant initiatives and policy processes in different domains contributing to the pursuit of climate and food security and nutrition goals. Rather than initiating new policy processes, as much as possible, the roadmap should in the first place harness the policy fora and initiatives that already act on components of agrifood systems that are critical for the attainment of both the Paris Agreements' goals and SDG 2. **Section 4** focuses on examining the potential of cooperation at the inter-regional level between Africa and Europe to contribute to the roll-out of the roadmap, illustrating concrete examples of intersections and of dialogue processes, milestones and implementation mechanisms to simultaneously support food security, nutrition and climate change targets. Finally, **Section 5** provides concluding remarks on how to keep the food-climate nexus high on the international agenda.

2. Food systems approaches and political economy methods as useful tools for the roadmap

Given its objectives, the roadmap process will require: i) "providing actionable policy and technical pathways adapted to various regions and contexts, hence relevant technical assessments, given agrifood systems are very heterogeneous around the world with wide range of mitigation options; ii) assessing trade-offs and synergies to provide operational pathways to trigger adoption and actions (in particular, the final balance of actions between

³ This includes much stronger climate impacts and weaker capacity to cope for poor citizens, indebted low-income countries, coastal and tropical areas and future generations over the rich citizens, wealthy countries, highland and temperate areas, and present generations.

supply and demand side, and across various income/country ranges are key)” (FAO 2023). Therefore **both will be needed**:

- technical (quantitative) methods such as Generalised Equilibrium Modelling to generate statistical-based scenarios, assess tradeoffs incurred by different policy options, and identify issues for future analysis of SDG2 and 1.5 °C goal (e.g. Laborde and Torero 2023);
- participatory (qualitative) methods addressing the politics and political economy of agrifood systems, as these stakeholder-centred analytical approaches are particularly important to understand support and opposition, costs and benefits, of different policy options around the food security, nutrition and climate intersections, as well as to discuss with local actors what “actionable” means in a specific context (especially given widespread inequalities in terms of food security and nutrition status and climate vulnerabilities).

This section zooms in on this second type of political economy and governance-oriented tools and methods, which would help develop the roadmap through transparent, inclusive and politically-savvy processes, with outreach to a range of stakeholders and considering political and economic feasibility of reforms.

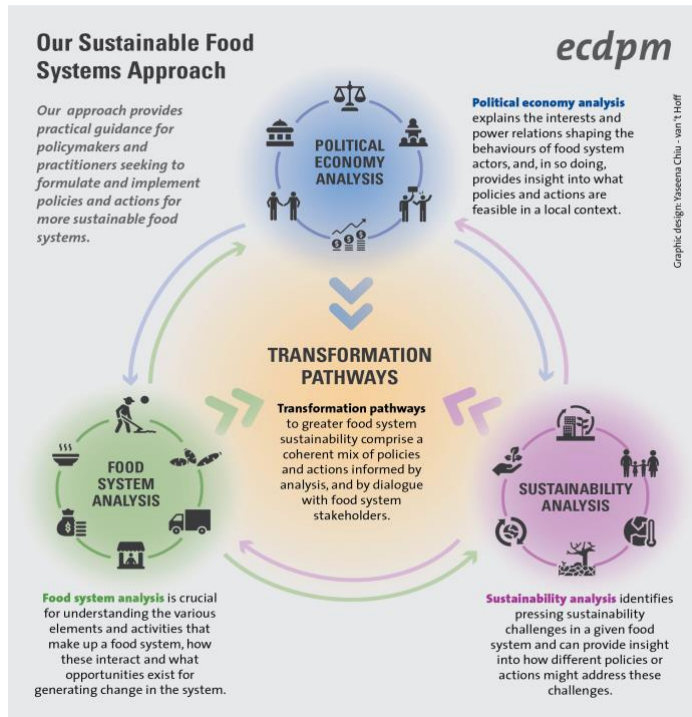
2.1. A food systems approach: understanding and managing intersections and policy options

Understanding and managing intersections in agrifood systems dynamics and interventions require using a food systems approach. However, this approach is often seen as too complicated and resource-intensive. As such, ECDPM developed an **iterative, step-based sustainable food systems approach** that is adaptable to available resources (a fast overview or a deep dive as determined by the user’s objectives), to help navigating the complexity of agrifood systems and to provide a basis for more coherent, effective, and context-appropriate policies and interventions (Dekeyser et al. 2020).

ECDPM’s approach combines **four steps** (as depicted in Figure 1). First, an **agrifood system analysis** uncovers the key activities, drivers, intersections and interactions in the agrifood system under study (including around food insecurity and GHG emissions). Second, a **sustainability analysis** explores the agrifood system’s current sustainability dynamics and future sustainability challenges. Third, a **political economy analysis** (PEA) investigates the governance of the agrifood system by unveiling the power, interests and incentives different actors have in shifting or maintaining the status quo. This helps practitioners to be aware of the political context in which they work and assess traction for proposed pathways and interventions. Together, these three analyses can explain what the agrifood system looks like, how it operates, which sustainability challenges it faces, who makes decisions impacting the agrifood system and why these decisions are made. Fourth, based on these analyses, **transformation pathways are developed** that present targeted and politically feasible options for increasing the sustainability of the agrifood system or specific activities therein (including climate change mitigation options in agricultural and agrifood systems). The feasibility of

these pathways can improve if relevant stakeholders are engaged in pathway formulation and design. Each of these four components informs and helps guide the others, in an iterative process: given the uncertainties involved in complex change processes, pathways also need to be adaptive to respond to unexpected changes in the agrifood system.

Figure 1: The Sustainable Food Systems Approach



Source: Dekeyser and Woolfrey 2021

The agrifood systems approach offers not only a means to compare different intervention options but also a framework for **systematically analysing trade-offs and synergies between various policy objectives** (van Berkum et al. 2018). Indeed, the four-step ECDPM's sustainable food systems approach can help *analyse* the trade-offs (or synergies) that can be expected from specific interventions and develop strategies to better *manage* them⁴. First, the agrifood system and sustainability analyses (steps 1 and 2) explore the **potential impacts of intervention options** on different sustainability outcomes (as opposed to continuing in a business-as-usual scenario). This helps **make likely trade-offs or synergies explicit**⁵. Then, the political economy analysis (step 3) unearths the **power differentials, interests and incentives influencing decisions on how to manage these intersections**. This helps to assess

⁴ Trade off management is not just a technocratic process. It is fundamentally a negotiation between stakeholders who have different interests in the range of possible ecosystem services outcomes' (Franks 2019).

⁵ A variety of qualitative or quantitative methods can be used to weigh trade-offs and synergies between sustainability objectives. These include simulation methods, optimisation methods, multicriteria analysis, spatially explicit methods, integrated modelling methods and stakeholder-centred methods (Gusenbauer & Franks 2019).

potential resistance to interventions (e.g., identifying influential groups of stakeholders who may lose), mitigate their unintended consequences (e.g., to avoid leaving marginalised stakeholders behind) and build on expected synergies. Lastly, when refining transformation pathways (step 4), the development of **targeted strategies to engage with different stakeholders** and gauge opportunities for pathway-supporting coalitions can improve implementation prospects, making choices aimed at maximising the synergies and minimising the trade-offs. The combination of these four steps could also provide guidance on the preparation and implementation of the proposed SDG2-1.5 roadmap pathways.

Box 1: Trade-offs and synergies between different objectives in Nakuru County agrifood system

The usefulness of this approach can be illustrated through its application in the case of the Nakuru County's agrifood system in Kenya (D'Alessandro et al. 2021), where ECDPM worked on how a policy shift towards increased support for indigenous vegetables would interact with current policies in the agrifood system and key drivers and activities therein. The analysis and interviews compared a 'business as usual' scenario, proxied by the long-standing government subsidies for maize, with four transformation pathways⁶ supporting a diversification of the agrifood system.

In addition to the expected impacts of the business as usual scenario and four transformation pathways on the sustainability of Nakuru's agrifood system, results include the **estimation of trade-offs and synergies between different pathways**⁷ (presented in Table 1). This analysed the interaction of each pathway with the business as usual scenario and whether different pathways reinforce or diminish each other's workings.

Table 1: Trade-offs and synergies between pathways

	Current maize support	Standard KS-1758	PGS certification	Public procurement	Seed support
Current maize support	NA				
Standard 1758	-0.2	NA	0.4	0.4	0.4
PSG certification	-0.2	0.4	NA	0.5	0.5
Public procurement	-0.2	0.4	0.5	NA	0.5
Seed support	-0.2	0.4	0.6	0.6	NA

Note: Scale of -1 (high trade-off, red) to 1 (high synergy, green)

⁶ i) Policies and investments to increase the availability of smallholders-saved seeds; ii) Establishing a public procurement scheme for indigenous vegetables (e.g., quotas for meals in schools, hospitals or the army) to provide a 'guaranteed' market for these products; iii) Supporting small scale indigenous vegetable producers in obtaining organic certification through Participatory Guarantee Systems (PGS); iv) Adapting to AIV and enforcing, at the county level, the KEBS Standard on Horticultural Products.

⁷ The data for the trade-off and synergy analysis were collected through interviews with experts from government, farmers' organisations, civil society organisations and private sector. Interviewees scored the impacts, trade-offs and synergies on a scale ranging from -1 (high negative impact or high trade-off) to 1 (high positive impact or high synergy).

Trade-offs exist between the current public maize support and all other pathways considered. Some reasons for this cut across pathways: from a budgetary perspective, higher support for maize means that other crops will receive less resources; in terms of land use, higher maize production trades off with increased production of indigenous crops. Other reasons behind the trade-offs with maize support are pathway-specific: in the case of Participatory Guarantee Systems (PGS), for instance, the public support for maize, aimed at maximising output through subsidies for inorganic inputs, trades off with organic production methods advocated by PGS initiatives.

Trade-offs and synergies can also be estimated between different sustainability dimensions of the same pathway (undernourishment, soil quality, etc.). Table 2 for instance shows that the pathway applying quality standards to indigenous vegetables does trade-off slightly social equity and climate adaptation with the other sustainability dimensions. This reflects the risk that, while the enforcement of the standard may increase market access for the average farmer (thus lowering poverty and undernourishment), it might also reduce opportunities for poorer producers, who may be forced to operate exclusively in informal markets if they struggle with compliance. Moreover, by focusing mostly on food safety, the standard does not provide sufficient incentives to support more climate-adapted production systems.

Table 2: Trade-offs and synergies between sustainability dimensions of standard KS-1758

	Agri-GDP	Poverty	Undernourishment	Undernutrition	Social equity	Adaptation	Soil quality
Agri-GDP	NA						
Poverty	0.05	NA					
Undernourishment	0.03	0.08	NA				
Undernutrition	0.08	0.13	0.10	NA			
Social equity	-0.03	-0.08	-0.05	-0.10	NA	NA*	
Adaptation	-0.04	-0.09	-0.06	-0.11	NA*	NA	
Soil quality	0.13	0.18	0.15	0.20	-0.15	-0.16	NA

Note: Numeric scale of -1 (highest trade-off) to 1 (highest synergy). Colour scale of -0.2 (red) to 0.2 (green)

*No synergy or trade-off

Given the objective of maximising synergies and minimising trade-offs between proposed policy interventions, the insights of such food systems approach, coupling this quantitative analysis with other qualitative PEA methods⁸, show that the three pathways supporting indigenous vegetables (seed support, public procurement and PGS) are perceived as **highly synergistic with one another and can advance several sustainability objectives at once**; and should thus be prioritised by policymakers and other stakeholders. Conversely, **the current policy focus on maize should change**, given its (unintended)

⁸ The above-mentioned estimation of trade-offs and synergies between different pathways is flanked in D'Alessandro et al. (2021) by a deeper stakeholder and drivers of change mapping (with influence and interest diagrams), the analysis of factors currently hindering policy changes, including diverging narratives and conflicting views that may influence pathways' implementation; this helps define engagement strategies fitting for each group.

negative impacts on most sustainability indicators and its trade-offs with other agrifood systems transformation pathways.

While acknowledging the limitations of the exercise⁹, pathway development and implementation based on PEA and explicit actors' perspectives and assumptions, as well as incremental steps, enable a frank and concrete dialogue among stakeholders on the desired outcomes (how the transformed system will look like) as well as the process towards them (who is likely to lose or win). This, in turn, can help improve trade-off management thus reducing adverse impacts of policy interventions on key sustainability objectives and stakeholder groups while improving opportunities for synergistic outcomes. Finally, the **need for constant monitoring of a pathway's trade-offs** is highlighted, as certain trade-offs might only come to the fore when interventions are fully implemented or scaled-up.

This type of agrifood systems Approach and participatory PEA methods can be very **useful to identify milestones and implementation mechanisms to support the SDG2-1.5 °C roadmap**, in terms of politically feasible reforms, as well as cooperation, dialogue and policy processes around the intersection between food security and climate change, based on power, interests and incentives the involved actors have in shifting or maintaining the status quo.

2.2. Integrating governance and statistical methods

The FAO, the agency leading preparations for the SDG2-1.5 °C roadmap, has also been increasingly working on governance and PEA. In 2022 it launched the [FAO Governance Analysis Framework](#), outlining a four-phase, iterative framework to help FAO officers and practitioners working at all levels apply diverse methods to identify and address key governance issues that impact or influence activities related to FAO's work in food and agriculture.

In this context, FAO is also piloting the integration of participatory and PEA methods with technical and statistical modelling methods, which is going to be very important also to help states and stakeholders assess trade-offs and synergies to provide solutions for food security and nutrition which consider the 1.5 °C goals.

In pilot countries such as Uganda and Indonesia, the FAO and its partners (IFPRI, IIASA and IISD) are **analysing the intersections of various SDGs as part of the National agrifood system Transformation Pathways**, including possible trade-offs. This is done at granular data level by combining economic simulation models with qualitative analysis of policies and governance of agrifood systems, including comprehensive actors mapping and interviews¹⁰. This combination allows the multi-disciplinary analysis to: include political economy indicators

⁹ The analysis and consultations carried out in this paper do not aim at providing a conclusive, comprehensively science-based policy-making advice for Nakuru stakeholders. They rather illustrate how the ECDPM's approach can be used for trade-off analysis and management in agrifood systems.

¹⁰ Most political economy statistical models tend to collect data only for few agents characterised as 'strong influencers'; in these FAO pilots data are collected for a wide range of agrifood systems actors, e.g. in Indonesia about 180 stakeholders, who were all involved in the UNFSS National Dialogues

such as judgement of the SDGs intersections and expected benefits of interventions related to the agrifood system Transformation Pathways, according to different stakeholders; and ultimately estimate also the political blockages likely to emerge within every pathway. Policy mixes and proposals for the related trade-offs management are also among the results (e.g. if GHG emissions grow in the short term, accompanying measures will be proposed such as capacity building programs for mitigation practices). A particular focus is on identifying points across the pathways and policy proposals implementation where the problem is likely to be the lack of SDG intersections that are easily recognisable, so to gradually encourage agrifood systems actors to take into account the views of others and providing detailed information needed to create coalitions for change.

In every country, a synthesis paper with options around the policy directions is the most important product of this modelling process, **specifically targeting ministers and high-level officials**, rather than technical officers or econometricians. In Indonesia, the pilot resulted for instance in the model: confirming that strategic agrifood system planning based on nutrition/consumption objectives would in general be more beneficial than one based on crops production; and that no political blockages would emerge from this policy shift, which is also shown to be compatible with the 20 national commodity strategies combining market potential and value addition with smallholder integration in the value chains (to be gradually adapted In Indonesia as part of the National Pathways).

This type of integration among governance and statistical methods can be **very useful to identify milestones and implementation mechanisms to support the SDG2-1.5 °C roadmap**, in terms of politically feasible reforms and cooperation and dialogue processes. Even if still a complex exercise, the fact that the roadmap addresses only one intersection (food security and nutrition/mitigation), among the many within the agrifood system, is a promising factor to base the related coordination and policy processes on the results of these integrated models.

3. Relevant international initiatives and policy processes

This section identifies the main international policy processes that contribute to progress along pathways towards climate mitigation goals for the agricultural and food sectors, and that could be harnessed to contribute to the roll-out of the SDG2-1.5 °C roadmap.

3.1. General processes

Climate change mitigation and adaptation in agriculture and related sectors (forestry notably) is included in the objectives of the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC), the international treaty that primarily aims to stabilise greenhouse gas concentrations in the atmosphere. The Nationally Determined Contributions (NDCs) submitted by member states that indicate voluntary GHG reduction targets and actions in principle include the agricultural sector as well. In addition, the Statement of Action on the United Nations Food Systems Summit (UNFSS) indicates that

the transformation of agrifood systems should contribute to the implementation of the Paris Agreement (amongst other international commitments).¹¹

The Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implementation (SBI) of the UNFCCC initiated the “Sharm el-Sheikh joint work on implementation of climate action on agriculture and food security” to promote approaches, practices and technologies for sustainable agriculture taking into consideration regional, national and local circumstances.¹² The SBSTA and the SBI will produce annual synthesis reports on implementation, including international climate support for agriculture and agrifood systems.

3.2. Production system-related processes

Methane- and nitrous oxide-related processes

While national policies and international agreements to combat climate change focus primarily on carbon dioxide, methane and nitrous oxide account for 22% of global GHG emissions and have a higher warming potential than carbon dioxide. **Methane and nitrous oxide together account for more than 80% of agricultural emissions** (Crippa et al. 2021).

The [Global Methane Pledge](#) (GMP) was launched at COP26 in 2021 to catalyse action to reduce methane emissions (by at least 30% below 2020 levels by 2030). Initially led by the United States (US) and the European Union (EU), the Pledge has committed more than a hundred countries that together are responsible for 45% of global human-caused methane emissions.¹³ In the agricultural sector, the main source of methane is livestock production, followed by rice production.

Scientists and civil society organisations have called for reforming public support to livestock production, which is currently harmful to the climate and the environment, especially coupled payments. Instead, support should be provided for more sustainable practices and technologies, for example, using fertile land to grow crops for human consumption, feeding animals with waste products and on marginal lands, improving animal nutrition and manure management, and capturing methane emissions, while at the same time shifting towards plant-based diets (for example, Pe’er, Lakner and Candel 2022). The Dublin Declaration of Scientists on the Societal Role of Livestock, while stating that the livestock sector is confronted with several challenges regarding natural resources utilisation and GHG emissions, also says

¹¹ SG/2258, 23 SEPTEMBER 2021, Secretary-General’s Chair Summary, Statement of Action on United Nations Food Systems Summit (<https://press.un.org/en/2021/sg2258.doc.htm>).

¹² UNFCCC, 2022. Joint work on implementation of climate action on agriculture and food security. Proposal by the President. Draft decision –/CP.27.

¹³ At the time of writing, neither China nor India have signed up to this initiative. Yet, in 2023, China adopted an action plan for controlling national methane emissions, which was followed by a joint statement by China and the US on climate change that reiterated their commitment on methane. China is the world’s largest emitter of methane, mainly in the energy (especially coal) and agricultural sectors (see [here](#)).

that ‘one-size-fits-all agendas, such as drastic reductions of livestock numbers, could actually incur environmental problems on a large scale’.^{14, 15} Yet, currently, there are no international climate-related policy processes for the livestock sector.

Globally, rice paddies provide a large share of the staple food supply, but they also emit almost 50% of GHGs from croplands, including methane and nitrous oxide (Qian et al. 2023). Practitioners, scientists and farmers have developed and implemented a rice cultivation strategy known as the System of Rice Intensification (SRI) that has maintained or improved rice yields while reducing the amount of inputs, including seeds, chemicals and water (Styger et al. 2011, cited by Williams 2021). The SRI also sequesters carbon (because of the use of organic fertilisers) and reduces methane emissions (because of the mid-season drainage of paddies) and nitrous oxide emissions in comparison to traditional techniques. However, at the time of writing, there are no international climate-related policy processes concerning the rice sector.

Agriculture is the largest source of anthropogenic emissions of nitrous oxide (N₂O), an important GHG.¹⁶ In the agricultural sector, multiple sources and factors contribute to N₂O emissions. Livestock manure left on pastureland or spread on cropland is a major source of emissions (McAllister et al. 2011, Zhang and Lassaletta 2022). The widespread use of **synthetic nitrogen fertilisers** in crop fields, in combination with monoculture and ploughing, is another major source of N₂O emissions from cropped soils and waterways (Lawrence 2021). Although there are no international policy processes for GHG emissions from the use of fertilisers in the agricultural sector (in particular synthetic nitrogen fertilisers), relevant initiatives have been launched:

- The Global Research Alliance on Agricultural Greenhouse Gases is an international network supporting research on efficient fertiliser use, nutrient management, and other practices to reduce emissions from agricultural systems;
- The US Government recently launched the Global Fertilizer Challenge (GFC) to support innovative research, demonstrations, and training to help partner countries with high fertiliser usage and loss adopt efficient nutrient management, alternative fertilisers, and cropping systems.¹⁷ Yet, this type of initiative is likely to be faced with the powerful vested interests of the global fertiliser industry.

¹⁴ See the Dublin Declaration of Scientists on the Societal Role of Livestock at <https://www.dublin-declaration.org/>; see also Leroy and Ederer 2023.

¹⁵ Animal farming and herding play an important role in the cycles of mineral and organic matters supporting agriculture, in particular by recycling the large amounts of inedible biomass that are generated as by-products of food crop production, while at the same time producing nutritious foods. Ruminants can contribute to the exploitation of marginal lands that are unsuitable for food crop production. Livestock systems using agro-ecological practices can also sequester carbon and contribute to healthy soils, biodiversity and ecosystem regeneration.

¹⁶ Nitrous oxide has a warming potential nearly 300 times that of carbon dioxide over a similar timespan (Liao et al. 2020, cited by Williams 2021). See also Reay et al. 2012.

¹⁷ The GFC is supposed to be implemented in partnership with the Agriculture Innovation Mission for Climate (AIM for Climate), a joint initiative by the United States and the United Arab Emirates. AIM for Climate seeks to address climate change and global hunger by uniting participants to significantly

The SDG 2-1.5 °C roadmap could include support for the consolidation of GHG emissions abatement efforts in the livestock, rice and other crop sectors, which involve changes in crop management practices. Yet, tackling the problem of GHG emissions in these sectors requires a holistic approach, which addresses the decoupling of crop and livestock in space and the consumption of products with large amounts of embodied emissions.

Energy-related processes

Although in the NDCs the agricultural and food sectors do not always explicitly address fossil fuel use, some countries have included measures to promote sustainable practices (which are in part driven by subsidies that promote intensive energy usages or energy-intensive inputs in agriculture), renewable energy adoption, and energy efficiency improvements that can reduce fossil energy use in agrifood production and trading systems (IRENA and FAO 2021). Although the link between energy and agrifood systems is important for the green transition, the Net Zero by 2050: A roadmap for the Global Energy Sector of the International Energy Agency (IEA 2021), a reference document for policies for climate mitigation and energy transition, does not include agrifood systems.¹⁸

Objectives pertaining to agrifood systems are also interlinked with energy objectives because of the inclusion of biofuels in the energy mix. The IEA and the International Renewable Energy Agency (IRENA), which supports the adoption of renewable energy, provide data, policy information, and guidance for policy-makers and private sector actors on sustainable bioenergy development, including managing the potential impacts on land, water, food security and nutrition.^{19, 20} With the involvement of the private sector, several initiatives have been launched and mechanisms established to promote the development and regulation of the production and utilisation of biofuels and biomaterials.²¹

Land and forest management

The REDD+ mechanism of the UNFCCC (Reducing Emissions from Deforestation and Forest Degradation) is one of the main international instruments to address deforestation-related

increase investment in, and other support for, climate-smart agriculture and agrifood systems innovation over five years (2021 – 2025).

¹⁸ The concept of the SDG 2-1.5 °C roadmap led by FAO is partly inspired from the IEA's roadmap.

¹⁹ See for example the Bioenergy page of the IEA at: <https://www.iea.org/energy-system/renewables/bioenergy#programmes>.

²⁰ For example, the European Union Renewable Energy Directive (RED) sets mandatory targets for renewable energy use in the European Union (EU) and includes sustainability criteria for biofuels. The directive aims to ensure that biofuels used in the EU meet certain environmental and social standards, including addressing land use change, biodiversity conservation, and food security concerns. Biofuels can also have negative effects on the environment, including emissions of nitrous oxide.

²¹ For example, the Roundtable on Sustainable Biomaterials, the International Sustainability and Carbon Certification, and the Global Bioenergy Partnership.

GHG emissions.²² REDD+ aims to create financial incentives for developing countries to reduce deforestation and promote sustainable forest management. The Forest Carbon Partnership Facility (FCPF), administered by the World Bank, also provides funding for programmes in developing countries to reduce deforestation and forest degradation.

Several private-sector-driven and consumer-based initiatives have emerged to promote deforestation-free supply chains for agricultural commodities. One of them is the Tropical Forest Alliance (TFA), a public-private partnership that aims to reduce deforestation associated with the production of key commodities such as palm oil, soy, beef, and pulp and paper. It brings together governments, companies, and civil society organisations to promote sustainable production, responsible sourcing and eliminate deforestation from commodity supply chains.

Yet, these mechanisms could be better linked to processes for agrifood systems included in the roadmap so as to promote and support with greater efficacy the restoration of degraded soils, carbon sequestration through agriculture and agroforestry, and sustainable pasture land management.

Agricultural subsidies

Agricultural subsidies are a pivotal factor in the economic, social and environmental performance of agrifood systems.²³ Fiscal subsidies largely encourage agricultural and industrial production activities detrimental to the environment and the climate, while failing to support smallholder farmers and improve the accessibility and affordability of nutritious foods (FAO et al. 2022). Instead, public agricultural expenditures could incentivise sustainable farming practices and technologies that reduce GHG emissions and contribute to the capture of carbon dioxide, as stated in the recent report by FAO, UNDP and UNEP (2021) on 'Repurposing agricultural support to transform agrifood systems. The FAO-UNDP-UNEP report indicates entry points into reforms processes, starting with the improvement and standardisation of the measurement, monitoring and reporting of agricultural support. Other potential fiscal measures include the taxation of agricultural inputs and outputs based on embodied GHG emissions. A shift in the allocation of subsidies from staple food products that are excessively produced and consumed, to the production and marketing of fruits and vegetables could improve environmental sustainability and make healthy diets less costly. Public support for research, innovation, extension, and infrastructure (transportation and logistics) can also contribute to the repurposing of agricultural subsidies in ways that favour environment-friendly technologies for the production of nutritious foods.

²² Furthermore, the UN General Assembly has a Strategic Plan for Forests for the period 2017–2030. It features a set of six Global Forest Goals and 26 associated targets to be reached by 2030 on a voluntary basis.

²³ The Organisation for Economic Cooperation and Development (OECD) reports that the total support to agriculture provided by governments of OECD countries, including price support, input subsidies, direct payments, and other forms of assistance, amounts to about USD 540 billion per year. According to UN agencies, worldwide support to food and agriculture accounted for almost USD 630 billion per year on average over the period 2013–2018.

3.3. Processes for international trade and distribution systems

The agreement on subsidies and countervailing measures at the level of the World Trade Organization (WTO) conditions to a large extent domestic policy measures (fiscal subsidies, concessional loans, insurance subsidies, and so forth) that may be used to support climate action in the agricultural sector. Other possible issues at the WTO level that may arise in the future include: (a) unilateral or plurilateral border measures to prevent “carbon leakage” while pricing or taxing domestic GHG emissions in the agrifood sector; and (b) environmental standards for traded goods to protect the climate and natural resources²⁴.

A concerted effort by the WTO members, aligned with the roadmap, is required to make commitments and update agricultural trade rules that are conducive to sustainable agrifood systems. The roadmap should include the strengthening of mechanisms to monitor domestic and trade-related policy measures. At the same time, it should provide space for national and regional trade policies to provide an enabling environment for the development of sustainable agricultural and food systems, the provision of affordable and healthy diets, and adequate remuneration of farmers.

3.4. Consumption-related processes

The EAT-Lancet report, published in 2019, provides an assessment of the global agrifood system and proposes a long-term strategy to promote healthy and environmentally-sustainable diets and transform agrifood systems.²⁵ The EAT-Lancet Commission developed scientific evidence-based targets for healthy diets and sustainable food production globally that are compatible with planetary boundaries. However, at this time, a global consensus on what constitutes healthy diets has yet to form and provide guidance for policy measures in various contexts.²⁶ It is also uncertain whether and how healthy and environmentally sustainable diets can be achieved for a global population of 10 billion people by 2050. The SDG2-1.5 roadmap should include sustainable consumption as a priority.

3.5. Interrelations between processes

The policy processes reviewed above should not be seen in isolation from one another nor from agrifood system processes more broadly. Else, actions resulting from these processes that aim to protect the climate may undermine other agriculture- and food-related objectives,

²⁴ Technical specifications and labelling requirements related to climate change and other environmental issues are ruled by the Technical Barriers to Trade Agreement.

²⁵ The EAT-Lancet Commission reviewed a large body of work on the health and environmental impacts of various diets, with most studies concluding that a diet rich in plant-based foods and with fewer animal source foods confers both improved health and environmental benefits, including reduced GHG emissions.

²⁶ Critical reviews of the EAT-Lancet report include for example Einarsson, McCrory, and Persson (2019) and Zagmutt, Pouzou, and Costard (2019).

or *vice versa*. Or potential synergies between policy changes may fail to materialise if processes are not conducted in a coordinated manner.

For example, efforts to reduce GHG emissions from the use of synthetic nitrogen fertilisers could lead to a decline in agricultural productivity growth, agricultural output, and food availability, if efforts are not adequately made at the same time to produce and use organic fertiliser and manage soil fertility sustainably. While methane emissions from the livestock sector must be reduced to some extent, it is also an alternative source of fertiliser that can contribute to reducing nitrous oxide emissions.

The intersections between food security, nutrition and climate objectives and actions, and between changes in agrifood systems, depend on the context and the outcomes should be assessed for different types of countries and population segments. **The intersections involved in the repurposing of fiscal subsidies require particular attention.** Removing some producer subsidies or making them conditional on climate-friendly practices, given biophysical constraints and currently available technologies, could result in socio-economic gains and a reduction in GHG emissions; but it could lead to a decline in agricultural productivity for smallholder farmers, an unsustainable expansion in cultivated areas, and a rise in the cost of healthy diets becoming unaffordable for low-income households.²⁷

Although there are institutional mechanisms between the WTO and climate and environmental bodies²⁸, **some tensions are likely to persist between trade and environmental objectives, as the WTO promotes 'the elimination of tariff and non-tariff barriers' and 'border measures minimising the use of discriminatory trade measures'**. It is also not clear how multilateral trade and investment facilitation agreements are going to address climate challenges, although they could support the development of climate-friendly agrifood production, trading and consumption systems, taking into account in particular the environmental footprint of trading agricultural and food products over long distances.

As the report 'The State of Food Security and Nutrition in the World 2022' (FAO et al. 2022) recommended, **governments should not only reallocate their existing public budgets to efficiently improve the availability and affordability of healthy and environmentally-sustainable diets, especially for low-income, peri-urban and rural populations; they should also take measures in the areas of consumer protection, education, health and social protection to enable and encourage populations in adopting such diets.** National governments should also provide space and resources for local authorities and communities to pursue strategies for sustainable agrifood systems that are based on the potentialities and specific challenges of subnational and cross-border territories, across the rural-urban

²⁷ The roadmap should also take into account the linkages between adaptation and mitigation policies as they may reinforce each other (in the case of agroforestry for example) or working against one another (for example, if policies aiming to make production and trading systems more climate- and health-friendly hinder market and trade responsiveness to shocks).

²⁸ For example, the UNFCCC participates in meetings of the WTO Committee on Trade and Environment and is an observer to the Committee overseeing the specific trade and environment negotiations, while the WTO Secretariat attends UNFCCC Conference of Parties meetings.

continuum, as suggested by the report 'The State of Food Security and Nutrition in the World 2023' (FAO et al. 2023).

In addition to supporting the management of policy intersections, the SDG2-1.5 degrees roadmap could ensure that initiatives led by different actors do not duplicate each other. **It could indeed facilitate the consolidation of existing and emerging processes reviewed above, to pursue a joined-up approach towards SDG 2 and the objectives of the Paris Agreement.** In particular, rather than establishing new policy processes, this roadmap could contribute to improving and complementing key climate and energy policy instruments, notably the NDCs and the IEA's Net Zero by 2050 roadmap. The methodological tools presented in the preceding section could help the promoters and users of the roadmap find synergies amongst those initiatives and also navigate the choppy waters of international cooperation with political savviness.

4. The potential of Africa-Europe cooperation to contribute to the roll-out of the roadmap

While starting from very different positions, both African and European leaders seek to secure long-term food security and better nutrition and adapt agrifood systems to climate change. Already, Africa and the EU²⁹ collaborate for agrifood investments, trade agreements and development assistance. Yet, a wider and deeper collaboration on the food-climate nexus is needed to achieve SDG2 and the Paris Agreement goals. This section provides an overview of Africa-EU agrifood systems linkages, identifies opportunities for synergies for the food-climate nexus, and proposes options for stronger Africa-EU cooperation in food systems. This is also a way to illustrate examples of dialogue processes and milestones around food-climate intersections that could contribute to the implementation of the SDG 2-1.5 roadmap.

4.1. Africa-EU agrifood systems linkages

African and European agrifood systems are closely intertwined, linked directly and indirectly through trade, investments, development assistance, cross-border pollution, policy spillovers and others. Regarding direct linkages, for instance, Europe is the main destination for many African agricultural exports, which are often facilitated through preferential trade agreements that contribute to sub-Saharan Africa's positive agricultural trade balance with the EU – even though the trade balance with Africa on the whole is more mixed (see figure trade balance).

Most African countries import much from the global food market. Bar rapid and sustained agricultural development, Africa will import more from the global market to satisfy its booming demand (van Ittersum et al. 2016). Europe is one of the largest buyers and sellers of this global market, but its green transition may lower its exports and increase its imports. This could affect African consumers through higher food prices and impact tropical biodiversity by motivating agricultural expansion to fill the supply gap (Dekeyser and Woolfrey 2021).

²⁹ In this paper "EU" is used as a synonym of the European Union institutions and member states of the EU.

Africa receives most of the EU's development spending for food security, with programmes supporting emergency aid, capacity sharing, and research and innovation (EC et al. 2022). Europe and its member states combined are the largest agricultural ODA providers in the world and the largest donors to international agriculture and food institutions such as the RBAs, which are agrifood systems most important support agencies (Dekeyser and Rampa 2023). The recently announced EU-AU Joint Task Force on Fertilisers is an example of how Africa-EU institutions work directly together on issues related to both food security and climate change.

Regarding indirect intersections, European development has contributed to global warming, which is significantly impacting African agriculture. Mitigating climate change is a key internal and external EU policy objective. The EU is also a leading provider of climate adaptation finance, which is hugely important for Africa's vulnerable agricultural systems. There is, however, a severe gap between the EU's quality and quantity of such finance and adaptation needs; and the unfairness that Europeans benefited from carbon-intensive development but Africans unjustly carry costs (Knaepen and Dekeyser 2023).

Policy spillovers affecting agrifood systems mainly go in one direction: EU agriculture and food policies impact African countries, but seldom the other way around. The EU's Common Agricultural Policy is an example of an EU policy with spillover effects in certain African countries, although much has improved. Yet, the EU's European Green Deal is an emerging source of spillover effects on Africa's development. The Farm to Fork Strategy, part of the Green Deal, aims to green the European agrifood system but might have food security and nutrition implications due to higher global food prices and tougher standards making market access for African exports to Europe more difficult (Dekeyser and Woolfrey 2021). Other EU unilateral measures are the regulation for deforestation-free products, which blocks the import of agricultural products from recently deforested land, and the directive on due diligence, aimed at promoting supply chain sustainability. While benefiting land and forest management, these measures may have a high compliance cost for African countries, both in terms of their intended effects on production systems and the additional reporting burden that affects producers (Byiers et al. 2023).

There are thus linkages between African and European agrifood systems that strengthen their respective performances, like trade linkages and development cooperation, and others that weaken them, such as cross-border pollution and negative policy spillovers. Understanding these linkages is the first step: the 2023 AU-EU Agricultural Ministerial called to jointly assess the interconnections between European and African agrifood systems. Specific attention is warranted on those linkages impacting Europe and Africa's food security, nutrition and climate mitigation and adaptation objectives. This should be followed by a process to explore common opportunities between African and EU agrifood and climate strategies and joint actions, following the methodological approaches outlined in the preceding sections and with a view to contributing to the roadmap.

4.2. Joint Africa-EU action at the food-climate nexus

Policy dialogue and collaboration between Africa and the EU can exploit the synergies between each other's transition plans while minimising negative spillovers. A frank and continued dialogue, starting from the linkages between the two continents' agrifood systems, requires a step up from the currently episodic Africa-EU discussions around high-level summits but with insufficient follow-up on declarations made (Tadesse Shiferaw 2023). African and EU leaders should not only find ways to benefit from each other's green transition policies but their policies could also be tweaked to better align with their development and climate adaptation priorities (Usman et al. 2021). This can be part of a broader engagement: deepening alliances and building newer and wider ones between Africa-EU, where Africa strengthens its own role and position and the EU recognises Africa's agrifood system development as relevant for its own long-term prosperity and security, particularly for geopolitical alignment, critical resource trade, and migration management.

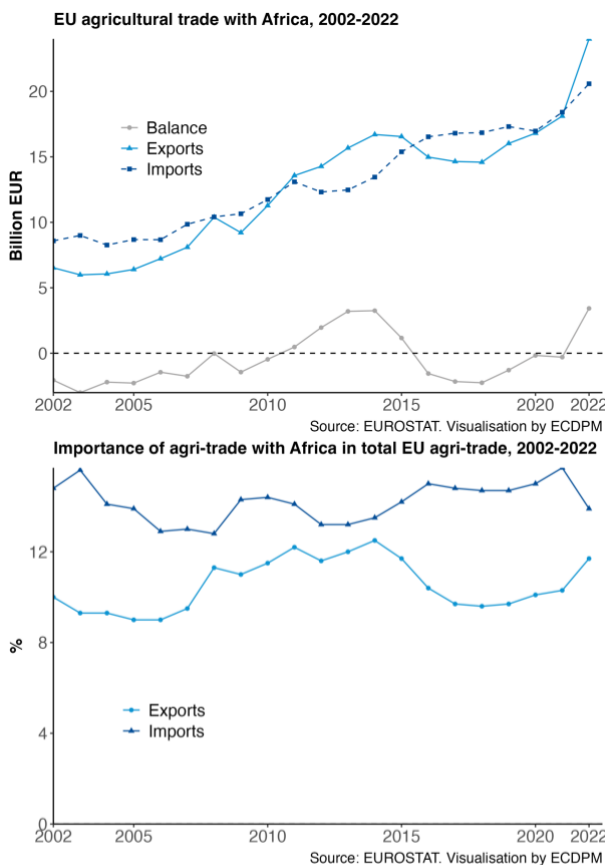
The AU and EU have a history of setting up top-down, high-level expert groups to provide policy recommendations, such as the Task Force Rural Africa and the Fertilizer Task Force. A meeting between AU-EU agricultural ministers is organised every two years, with plenty of scope to increase the ambitions, follow-up, equity, and frequency of the ministerial dialogue process before and after the summits. The AU and EU could involve the Rome-based agencies more in this by creating a mandate for a joint food-climate work programme, involving the SDG 2-1.5 roadmap, at the agencies, focused on marshalling international support for Africa's adaptation needs (Dekeyser and Rampa 2023). Beyond the AU-EU, there are city-to-city collaborations³⁰ and innovative bottom-up initiatives directly involving non-state actors strengthening Africa-Europe agrifood linkages, but which could be better mapped, connected more strongly with each other, and upscaled. Considering the high influence actors such as consumers and companies have on both SDG2 and 1.5 goals, such institutional innovations can provide better input, problem-solving, and fostering partnerships between organisations. Care needs to be taken to support weaker participants, especially women, to engage in these partnerships.

More collaboration on food and climate could benefit both continents, but some factors push Europe and Africa further from each other. In particular, Europe and Africa are somewhat re-evaluating their linkages with other countries as a response to global supply chain disruptions and long-standing import dependencies, amongst others, with several European and African leaders signalling a renewed importance of supply chain resilience and strategic autonomy after a period of strong global market integration. Such policies might impact Africa-EU food trade, investments and agri-R&I. Analysing how European policy, for example, can impact global food security, nutrition and sustainability could help avoid unintended consequences. Including explicitly the food security, nutrition and negative policy spillovers for vulnerable Africans, particularly women, in ex-ante policy assessments would be one way to build more

³⁰ African and European cities are participating in the Milan Urban Food Policy Pact, where cities from all over the world committed to advancing on the common goal of sustainable, inclusive and resilient urban agrifood systems.

policy coherence. Another option is to strengthen and elevate the policy dialogue with partner countries to help analyse possible side effects. African governments, on the other hand, can strengthen its monitoring and evaluation of food security, nutrition, mitigation and adaptation programming to ensure the efficiency and efficacy of international support, which is key for sustaining long-term commitments from supporters. The SDG 2-1.5 roadmap could both be helpful to provide evidence and technical assistance to these policy dialogue and collaborations, as well as draw from such enhanced Africa-EU processes around food-climate ‘intersections’ (including institutional innovations such as better participation of those with high influence e.g. consumers, companies, city councils) to define possible milestones and implementation mechanisms for the roadmap.

Figure 2: Trade balance



Food trade is essential for global food security and nutrition, and especially so for climate-vulnerable and fast-growing African countries (Kinnunen et al. 2020; Janssens et al. 2020). Trade agreements can also help promote food sustainability, including for climate mitigation and adaptation. For example, they can involve sector-specific regulations and sustainability standards to promote the trade of more sustainable food and restrict the trade of illegal or unsustainable products (Rampa et al. 2020). As preferential trade agreements largely determine Africa-EU trade, including food sustainability as an explicit objective, these agreements can stimulate more sustainable practices by trading partners. Integrating sustainability in trade agreements is underway: the recent Kenya-EU trade agreement supports Kenyan farmers to meet EU greening standards while having certain safeguards for shielding its agricultural sector from EU competition³¹. The EU wants to make trade sustainability commitments more enforceable through sanctions and by allowing civil society to

lodge complaints against violations (Allenbach-Amman 2022).

Drawing on the experiences of the EU-Kenya deal and other cases, trade sustainability commitments and related enforcement instruments could thus be considered important

³¹ The Economic Partnership Agreement concluded by EU and Kenya in 2023 is considered by the EU “the most ambitious EU trade deal with a developing country when it comes to sustainability provisions such as climate and environmental protection and labour rights” https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3323.

implementation mechanisms for the roadmap, including as recent research shows that sustainability standards can simultaneously support food security and climate change targets.³² On the other hand, roadmap results could provide useful evidence to inform the provisions related to food-climate ‘intersections’ of future trade agreements between Africa and EU.

Research and Innovation (R&I) is a key area of AU-EU cooperation, as demonstrated by the recent adoption of an ambitious AU-EU Innovation Agenda. While the EU is at the forefront of supporting agrifood system-related R&I, such support often starts from EU global priorities rather than partner needs (EC et al. 2022). These priorities are the result of much political bargaining: the EU is famed as a battleground of national, businesses, and special interests, with its food and agricultural sector having an exceptionally active lobby trying to influence its policies and priorities. Collaboration between AU-EU on climate-related R&I in agrifood systems could involve more end-users – namely farmers, processors, distributors and consumers – in determining the research focus and its implementation; strengthen the link between R&I results and policy and businesses; and tilt the power balance between AU-EU partners towards prioritising more African food strategies and research institutes³³. Given the importance of innovation for a more integrated approach to food and climate action, the roadmap could be helpful to provide evidence for such renewed efforts for more effective and power-balanced Africa-EU R&I collaborations. Moreover, implementation of the roadmap could benefit from the lessons learnt from the wide range of R&I projects, including identifying the success factors and political economy challenges in creating co-benefits for GHG emissions reduction and agrifood system productivity.

The **finance** gap in the food-climate nexus is huge and requires renewed and expanded international efforts to close. Climate mitigation in agrifood systems is complex and challenging; additionally, climate adaptation in Africa alone requires tens of billions in annual investments (UNEP 2022). To support climate adaptation of African agrifood systems, both the quantity and quality of international climate finance need to improve. Quality matters: while the EU is a global leader in climate finance and dedicates 30% of its development spending on climate, its finance is often opaque, biased towards top-down global funds, involves double counting with other investments, and contains many guarantees and loans instead of the needed grants, which add to debt burden (Knaepen 2022). Importantly, climate finance focuses mainly on mitigation, while Africa’s agrifood systems rather require massive support for adaptation and resilience (Knaepen and Dekeyser 2023). Adaptation finance has grown rapidly in recent years, but so did needs. The EU could better help achieve food security and nutrition under climate change in Africa by supporting the doubling of adaptation finance by 2025, as promised at COP26, improving the quality of its current climate financing, and

³² Farmers who adopt sustainability standards/production criteria can lower their material risks by mitigating and adapting to climate change, which can ensure harvest, reduce production costs, and enhance farm performance. This can result in more profitable agricultural operations over the long term and, consequently, more attractive and sustainable investment opportunities (IISD 2022).

³³ The renewed “AU-EU R&I Partnership on Food and Nutrition Security and Sustainable Agriculture” channelled EUR 710 millions of joint R&I investments over 400 projects in the EU and 47 African countries along four priorities, including sustainable intensification.

expanding innovative arrangements such as debt-for-climate swaps³⁴. The roadmap could draw on these challenges and opportunities emerging from the way the EU climate finance supports adaptation in Africa. On the other hand, the roadmap analytical results could support those EU countries interested in providing their climate finance for investments in integrated food and climate plans in African countries.

There are several Africa-EU policy opportunities to push the food-climate agenda forward. The **AU-EU summits** are the high point of continental dialogue. For example, out of the 2022 AU-EU Summit came the Global Gateway Africa-Europe Investment Package, worth EUR 150 billion over seven years, which includes support for more sustainable African agrifood systems. There are **AU-EU ministerials** relevant to the food-climate nexus, such as the biannual Agriculture Ministerial. However, more can be done to ensure Africa-EU follow-up and dialogue after these summits and to implement its declarations.

5. Keeping the food-climate nexus high on the agendas

In response to the food system's GHG emissions, its adaptation to climate change, and its environmental and social costs, the roadmap led by FAO can provide a common framework for promoting mutually reinforcing actions at the international, national and local levels. This framework takes into account also the planetary boundaries that provide the limits for the sustainability of agrifood systems. Within this framework, the roadmap recognises the many possible trade-offs in the food-climate nexus, and the need to pursue and balance different outcomes within pathways enabling the transition of agrifood systems. This note has outlined a methodology to assess those trade-offs and build transition pathways to possibly alleviate them, while recognising that different actors in agrifood systems often have diverging interests. These interests need to be somehow reconciled or navigated, so as to align the actions of those actors. The methodological tools presented in the note enrich the guidance and toolbox provided by the roadmap.

This note has also identified some key initiatives and policy processes that the roadmap could harness and help coordinate better, while avoiding the duplication of efforts. Yet, in most cases, many efforts remain to be made to identify more precisely the measures that could be taken and translate proposals into policies, legislation, regulation and fiscal reforms. The review of these processes makes it clear that the FAO roadmap could work hand-in-hand with other global initiatives, for instance the IEA roadmap should a jointly identified priority be a better articulation of the energy transition with the transition of agrifood systems. The reform of farm and agro-industrial subsidies is also pivotal for the transition of agriculture, food supply chains, and food consumption patterns. At the same time, an effective and just transition in agrifood systems will remain illusory if the issues of socio-economic inequalities underlying food security problems and malnutrition are not simultaneously addressed – including the economic and financial vulnerability of smallholder farmers and small and medium-size

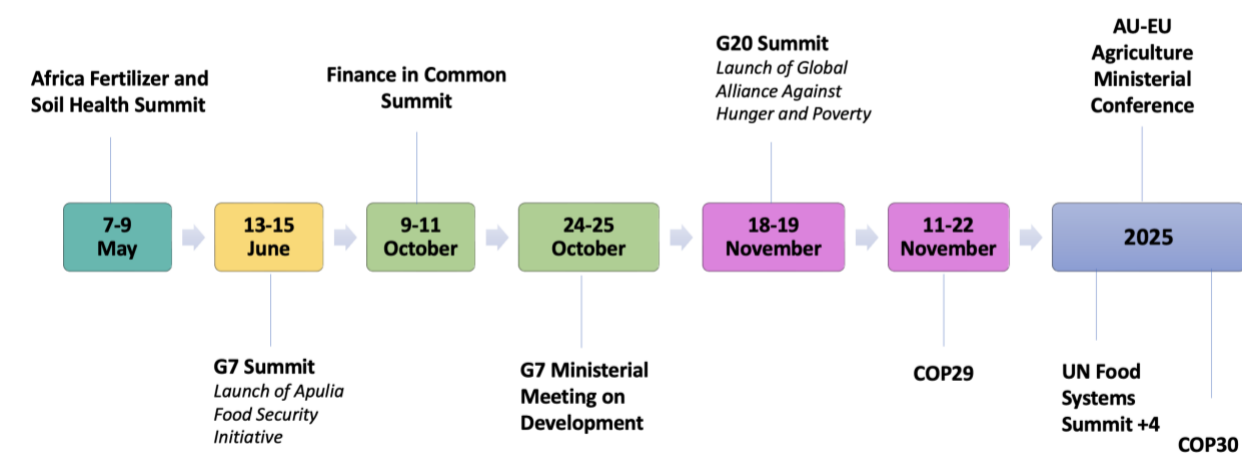
³⁴ A financial mechanism that swaps debt owed by developing countries to developed countries for climate action commitments.

agrifood enterprises. Furthermore, changes in international and regional trading systems will be crucial for the attainment of the targets of the roadmap.

The uptake of the SDG 2-1.5 roadmap and the deployment of actions at the regional level will be crucial for its effectiveness, notably in Africa where food security remains a major challenge and agrifood systems are increasingly subject to climate risks. Existing cooperation relations between Africa and Europe should thus integrate the targets, approach and thematic domains of the roadmap, with an opportunity to do so at the next **AU-EU Agriculture Ministerial** scheduled for 2025; while both African and European actors should foster multilateral actions that support regional transitions. The **Africa Fertilizer and Soil Health Summit** in May 2024 for instance, highlighting the crucial role of fertilizer and soil health for sustainable pro-poor productivity growth, is an important occasion to discuss how the roadmap could support African strategies simultaneously promoting better use of synthetic fertilisers, emission reductions and soil fertility. The agricultural reforms that Europe will undertake, not without challenges, should take into account the linkages between the European agrifood system and those in more vulnerable partner regions, with a view to deploying more appropriately and using in efficient ways development assistance and climate finance. Yet, these (inter-)regional processes should not involve top-down only processes. They should also build on local dynamics and solutions to the challenges facing local actors, farmers organisations and local SMEs, while striking an appropriate balance between economic, social and environmental objectives – between mitigation and adaptation in particular. The roadmap should thus serve as a guide for navigating a multi-level transition rife with uncertainty and unknowns as much as for attaining precise targets based on planetary boundaries and human needs.

Besides these continental dialogues, there are also global policy milestones where to discuss and advance the food-climate nexus agenda. Action should always be on national implementation, but political attention at global and regional levels is critical because high-level political support, cooperation, and peer review are required to effectively implement any planned coordinated action.

Figure 3: Upcoming events



An outcome of the 2021 UN Food Systems Summit was the process to launch national pathways, which outlined national transformation plans for agrifood systems, including in relation to climate goals. As the 2023 UNFSS+2 reviewed progress and obstacles to agrifood system change, including little integration so far between the national food and climate strategies and investment plans, the **UNFSS+4** in 2025 will be an opportunity to promote faster and deeper integration. COP28 highlighted agrifood systems, with the “COP28 UAE Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action” the first ever declaration on this nexus endorsed within a COP at Heads of State and Government level. **COP29** in 2024 will be especially important to discuss the balance between mitigation and adaptation support for low-income countries, and at **COP30** countries will report on their progress on joint food systems and climate action in line with the UAE Declaration. The **Finance in Common Summit** in 2024, an annual gathering of all public development banks and their partners, will be an opportunity to consider the results of its Platform for Green and Inclusive Food systems and to stimulate more, better and faster public and private investments in the climate-food nexus. In 2024 and 2025 also the G7 and G20 could do more to accelerate this nexus agenda. Under Italian Presidency, the **G7 Summit** 2024 is expected to launch a new G7 food security and food systems initiative, with significant deliverables on food-climate synergies possibly adopted at the **G7 Development Ministerial** later in the year. Similarly, just before South Africa takes over the first African G20 Presidency in January 2025, the **G20 Summit** 2024 in Brazil should establish a Global Alliance Against Hunger and Poverty aimed at fighting poverty and hunger while reducing inequality and promoting a just climate transition.

While these events are crucial for showcasing high-level commitment, deepening regular multi-actor dialogues between and beyond these events is needed to move from commitments to implementation. Especially more space for frank and honest dialogues can unearth the opportunities within and between the strategies on the food-climate nexus of different partners. Synergising an improved EU-Africa cooperation on the food-climate agenda with the roll-out of the FAO roadmap, a consistent narrative on the importance of more synergistic food and climate policies and investments throughout these various global milestones, and the flexibility to adapt the roadmap process to local contexts and political economy dynamics, will be particularly important to link such milestones and ensure coherence and complementarity of actions at different levels.

References

- Allenbach-Amman, J. 2022. *EU to strengthen sustainability enforcement in trade deals*, EURACTIV.
- Byiers, B., Medinilla, A., & Karaki, K. 2023. *Navigating green economy and development objectives: The political economy of greening transport in East Africa*, Briefing Note 159, Maastricht: ECDPM.
- Crippa, M., Solazzo, E., Guizzardi, D. et al. 2021. *Agrifood systems are responsible for a third of global anthropogenic GHG emissions*, Nat Food 2, 198–209 (2021).
- D'Alessandro, C., Bizzotto Molina, P., Dekeyser, K. and Ramp, F. 2021. *Understanding and managing trade-offs in food systems interventions: the case of Nakuru county, Kenya*, Discussion Paper 293, Maastricht: ECDPM.
- Dekeyser, K., & Rampa, F. 2023. *Upgrading the EU's policy toolbox for nutrition leadership*, Discussion Paper No. 347, Maastricht: ECDPM.
- Dekeyser, K., & Rampa, F. 2023. *Climate change and agrifood systems adaptation: building roads through Rome*, Briefing Note No. 164, Maastricht: ECDPM.
- Dekeyser, K., & Woolfrey, S. 2021. *A greener Europe at the expense of Africa? Why the EU must address the external implications of the Farm to Fork Strategy*, Briefing note No. 137, ECDPM.
- Dekeyser, K., Rampa, F., D'Alessandro, C., & Bizzotto Molina, P. 2020. *The food systems approach in practice: Our guide for sustainable transformation*, Maastricht: ECDPM.
- Einarsson, R., McCrory, G., and Persson, U. M. 2019. *Healthy diets and sustainable agrifood systems*. Lancet, 394(10194), 215.
- European Commission Directorate-General for International Partnerships, Engel, P., Slob, A., Laanouni, F., Bizzotto Molina, P., Seters, J., D'Alessandro, C., Dekeyser, K., Smaïl, T., Meller, M., Pra, M., Hamad, M., & Escudier, L. 2022. *EU support to sustainable agri-food systems in partner countries 2014–2020*. Publications Office of the European Union.
- FAO. 2023. *Achieving SDG 2 without breaching the 1.5 °C threshold: A global roadmap, Part 1 – How agrifood systems transformation through accelerated climate actions will help achieving food security and nutrition, today and tomorrow*, In brief. Rome.
- FAO, UNDP and UNEP. 2021. *A multi-billion-dollar opportunity – Repurposing agricultural support to transform agrifood systems*. Rome, FAO.
- FAO, IFAD, UNICEF, WFP and WHO. 2022. *The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable*. Rome, FAO.
- FAO, IFAD, UNICEF, WFP and WHO. 2023. *The State of Food Security and Nutrition in the World 2023. Urbanization, agrifood systems transformation and healthy diets across the rural–urban continuum*. Rome, FAO.
- Franks, P. 2019. *Conservation versus food production in Africa: better managing trade-offs*, IIED Briefing. London: International Institute for Environment and Development.
- Fujimori, S., Wu, W., Doelman, J. et al. 2022. *Land-based climate change mitigation measures can affect agricultural markets and food security*. Nat Food 3, 110–121 (2022).

-
- Gusenbauer, D., & Franks, P. 2019. *Agriculture, nature conservation or both? Managing trade-offs and synergies in sub-Saharan Africa*, London: International Institute for Environment and Development.
- IEA. 2021. *Net Zero by 2050*, IEA, Paris.
- IISD. 2022. *Standards and Investments in Sustainable Agriculture*.
- IRENA and FAO. 2021. *Renewable energy for agrifood systems – Towards the Sustainable Development Goals and the Paris agreement*. Abu Dhabi and Rome.
- Janssens, C., Havlík, P., Krisztin, T., Baker, J., Frank, S., Hasegawa, T., Leclère, D., Ohrel, S., Ragnauth, S., Schmid, E., Valin, H., Van Lipzig, N., & Maertens, M. 2020. *Global hunger and climate change adaptation through international trade*. *Nature Climate Change*, 10(9), 829–835.
- Kinnunen, P., Guillaume, J. H. A., Taka, M., D’Odorico, P., Siebert, S., Puma, M. J., Jalava, M., & Kummu, M. 2020. *Local food crop production can fulfil demand for less than one-third of the population*. *Nature Food*, 1(4), 229–237.
- Knaepen, H., & Dekeyser, K. 2023. *EU climate adaptation diplomacy. Searching for common ground with Africa*, Discussion Paper No. 346. ECDPM.
- Lawrence, N. C., Tenesaca, C. G., VanLoocke, A., & Hall, S. J. 2021. *Nitrous oxide emissions from agricultural soils challenge climate sustainability in the US Corn Belt*. *Proceedings of the National Academy of Sciences of the United States of America*, 118(46).
- Leroy, F., Ederer, P. 2023. *The Dublin Declaration of Scientists on the Societal Role of Livestock*. *Nat Food* 4, 438–439.
- Liao, B., Wu, X., Yu, Y., Luo, S., Hu, R., & Lu, G. 2020. *Effects of Mild Alternate Wetting and Drying Irrigation and Mid-Season Drainage on CH₄ and N₂O Emissions in Rice Cultivation*. *Science of the Total Environment*. 698.
- McAllister, T. A., Beauchemin, K. A., McGinn, S. M., Hao, X., & Robinson, P. H. 2011. *Greenhouse gases in animal agriculture—Finding a balance between food production and emissions* *Animal Feed Science and Technology*, 166–167, 1–6.
- OECD. 2019. *Enhancing the Mitigation of Climate Change through Agriculture*, In OECD eBooks. OECD.
- Pe’er, G., S. Lakner and J. Candel. 2022. *Ukraine-Crisis impacts on food security: tackling the short-term shock must be done with a vision in mind of the larger-scale and longer-term threats of the Climate- and Biodiversity-Crises*. Leipzig, Rostock, Wageningen.
- Qian, H., Zhu, X., Huang, S. et al. 2023. *Greenhouse gas emissions and mitigation in rice agriculture*. *Nat Rev Earth Environ* 4, 716–732 (2023).
- Rampa, F., de Schutter, O., Woolfrey, S., Jacobs, N., Bilal, S., van Seters, J., & Frison, E. 2020. *EU trade policy for sustainable agrifood systems*. Maastricht: ECDPM & IPES-Food.
- Reay, D., Davidson, E., Smith, K. et al. 2012. *Global agriculture and nitrous oxide emissions*. *Nature Clim Change* 2, 410–416 (2012).
- Styger, E., Aboubacrine, G., Ag Attaher, M., & Uphoff, N. 2011. *The System of Rice Intensification as a Sustainable Agricultural Innovation: Introducing, Adapting, and Scaling Up a System of Rice Intensification in the Timbuktu Region of Mali*. *International Journal of Agricultural Sustainability*. 9 (1), 7–75.

-
- Tadesse Shiferaw, L. 2023. *The EU-Africa partnership: One step forward, two steps backwards*, ECDPM.
- Tondel, F., D'Alessandro, C., & Dekeyser, K. 2022. *The effects of major economies' policies on climate action, food security and water in developing countries*, Discussion Paper No. 327, ECDPM.
- van Berkum, S., Dengerink, J., & Ruben, R. 2018. *The food systems approach: sustainable solutions for a sufficient supply of healthy food*, The Hague: Wageningen Economic Research.
- van Ittersum, M., van Bussel, L. G. J., Wolf, J. et. al. 2016. *Can sub-Saharan Africa feed itself?* PNAS, vol. 113, nr 52.
- Williams, M. 2021. *Reducing methane emissions from rice cultivation*. Imperial Bioscience Review, February 26, 2021.
- Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A., Jonell, M., Clark, M., Gordon, L. J., Fanzo, J., Hawkes, C., Zurayk, R., Rivera, J. A., De Vries, W., Majele Sibanda, L., Murray, C. J. L. 2019. *Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable agrifood systems*. Lancet, 393(10170), 447–492.
- UNEP. 2022. *Adaptation Gap Report 2022*.
- Usman, Z., Abimbola, O., & Ituen, I. 2021. *What Does the European Green Deal Mean for Africa?*
- WTO. (n.d.). Wto.org. Retrieved on 20 July 2023 from https://www.wto.org/english/tratop_e/envir_e/climate_challenge_e.htm
- Zagmutt, F. J., Pouzou, J. G., & Costard, S. 2019. *The EAT–Lancet Commission: a flawed approach?* Lancet, 394(10204), 1140–1141.
- Zhang, X., Lassaletta, L. 2022. *Manure management benefits climate with limits*. Nat Food 3, 312–313 (2022).

About ECDPM

ECDPM is an independent ‘think and do tank’ working on international cooperation and development policy in Europe and Africa.

Since 1986 our staff members provide research and analysis, advice and practical support to policymakers and practitioners across Europe and Africa – to make policies work for sustainable and inclusive global development.

Our main areas of work include:

- EU foreign and development policy
- Migration and mobility
- Digital economy and governance
- AU-EU relations
- Peace, security and resilience
- Democratic governance
- Economic recovery and transformation
- Climate change and green transition
- African economic integration
- Sustainable food systems

For more information please visit www.ecdpm.org

This publication benefits from the structural support by ECDPM’s institutional partners: Austria, Belgium, Denmark, Estonia, Finland, Ireland, Luxembourg, The Netherlands and Sweden.

© FAO, 2024

ISSN1571-7577