

**DISCUSSION PAPER No. 327**

## **The effects of major economies' policies on climate action, food security and water in developing countries**

**By Fabien Tondel, Cecilia D'Alessandro and Koen Dekeyser**

July 2022

The growing demand for food, water and energy, in conjunction with climate change, puts pressure on land and freshwater resources. This problem can be acute in developing countries, where many households and producers have inadequate access to these commodities. While development is primarily driven by national policies, outcomes are often also influenced by external factors, especially the policies of developed countries and emerging economies. This paper explores the possible effects of these factors on climate action and food and water security in developing countries.

For instance, this study finds that subsidies for projects in the fossil fuel sector in developing countries, alongside international private finance, contradict climate mitigation commitments and may also negatively affect agriculture and water. Industrial and trade policies that promote imports of soybean and palm oil contribute to deforestation in producing regions and have knock-on effects on water and smallholder farmers. And policies encouraging investments in infrastructure, such as large-scale dams, while enabling economic growth, may also have adverse effects on water access for vulnerable communities.

Solving the trade-offs associated with these policies and ensuring that they work in unison requires a better integration of policy interlinkages around the water-energy-food nexus in legislative and regulatory impact assessments, followed by a reorientation of financial flows. Yet, the foreign policies of developed countries and emerging economies also need to create an enabling environment for low-income, vulnerable countries by reducing their external footprints.

---

## Table of Contents

Acknowledgements .....	iii
Abbreviations and acronyms .....	iii
1.Introduction .....	1
1.1. Background .....	1
1.2. Purpose of the study and research questions .....	2
1.3. Analytical framework, method and scope .....	2
1.4. Preview of overall findings.....	4
2.Climate action.....	5
2.1. Drivers, trends and preview of findings.....	5
2.2. Policies shaping fossil-fuel-based and clean energy systems.....	9
2.3. Policies driving the development of infrastructure .....	13
2.4. Policies shaping production and trading systems in developing countries.....	15
2.5. Policies driving land use and the conservation of tropical forests .....	18
2.6. Policies conditioning social adaptation and resilience to climate change .....	20
2.7. Policies driving climate finance for developing countries .....	22
3.Food security .....	26
3.1. Drivers, trends and preview of findings.....	26
3.2. Supply-side policies affecting small-scale food producers through international trade.....	28
3.3. Trade policies impacting food security and malnutrition outcomes.....	29
3.4. Energy and biofuel policies impacting food security .....	32
3.5. Investment promotion policies driving land use and shaping agri-food value chains .....	33
4.Water.....	35
4.1. Drivers, trends and preview of findings.....	35
4.2. Infrastructure policies driving dam and hydropower investments .....	37
4.3. Policies driving agricultural water management, irrigation technology and infrastructure .....	39
4.4. Policies driving spatial development, urbanisation and access to water and sanitation.....	41
4.5. Trade and investment policies driving water-intensive international value chains.....	43
4.6. Foreign and international cooperation policies driving the management of transboundary river basins	47
5.Overview of hotspots and interlinkages between the climate, food and water sectors.....	49
5.1. Primary policy drivers .....	49
5.2. Cross-sectoral spillover effects .....	50
5.3. Major policy coherence hotspots .....	51
6.Concluding remarks.....	52

---

Annex 1: The water-energy-food nexus .....	55
Annex 2: Thematic Dutch development cooperation objectives and SDGs .....	56
Annex 3: Overview of policy coherence hotspots.....	60

## List of Boxes

Box 1: Preview of policy coherence hotspots affecting climate action, food security and water .....	4
Box 2: Preview of policy coherence hotspots affecting climate action .....	8
Box 3: Preview of policy coherence hotspots affecting food security .....	27
Box 4: Preview of policy coherence hotspots affecting water outcomes.....	36

## List of Figures

Figure 1: GHG emission drivers and public policies .....	6
Figure 2: Feasible responses to risks due to climate change and adaptation options .....	8
Figure 3: Impacts of various drivers are transmitted through food systems, undermining food security and nutrition .....	27
Figure 4: Key drivers of water insecurity.....	36

---

## Acknowledgements

This paper was financially supported by the Policy and Operations Evaluation Department of the Ministry of Foreign Affairs of the Netherlands (IOB). The authors wish to express here their sincere thanks to Ferko Bodnár, Marit van Zomeren and Pim de Beer at IOB for the support to the study and the valuable comments on previous drafts of the paper and suggestions that they provided.

They are also grateful to the persons interviewed, experts and practitioners, who generously took time to share valuable information, including Paul Engel at Knowledge Perspectives & Innovation, Gerardo van Halsema and Catharien Terwisscha van Scheltinga at Wageningen University & Research, Mizan Khan at the International Centre for Climate Change and Development, Fahmida Khatun at the Centre for Policy Dialogue in Bangladesh, Rathana Peou Norbert-Munns at the Food and Agriculture Organization, and their colleagues Hanne Knaepen, Alfonso Medinilla and Francesco Rampa at ECDPM.

Alexandra Beijers and Sanja Terlević effectively supported the editing of the paper.

The views and opinions expressed in this paper are those of the authors and do not necessarily reflect the opinions of ECDPM nor those of the Dutch government or IOB.

## Abbreviations and acronyms

ABP	Algemeen Burgerlijk Pensioenfonds
ACP	Africa, Caribbean and Pacific
AfDB	African Development Bank
BRICS	Brasil, Russia, India, China and South Africa
CAP	Common Agricultural Policy
CBAM	Carbon Border Adjustment Mechanism
CDM	Clean Development Mechanism
CDP	Customer Data Platform
CFP	Climate Finance Partnership
CIWA	Cooperation in International Waters in Africa
COP26	Conference of Parties 26
DAC	Development Assistance Committee
DFI	Development Finance Institution
ECA	Export Credit Agency
EGD	European Green Deal
EIB	European Investment Bank
EIP	External Investment Plan
ETP	Effluent Treatment Plant
ETS	Emissions trading system
EU	European Union
FATF	Financial Action Task Force
FCDI	Flood Control, Drainage and Irrigation
FDI	Foreign direct investment
FLEGT	Forest Law Enforcement, Governance and Trade
GAP	Güneydoğu Anadolu Projesi
GSP	Generalised System of Preferences

---

G20	Group of Twenty
G7	Group of Seven
GBM	Ganges-Brahmaputra-Meghna
GDP	Gross domestic product
GHG	Greenhouse gas
GW	Gigawatt
IOB	The Policy and Operations Evaluation Department of the Ministry of Foreign Affairs of the Netherlands
IFC	International Finance Corporation
IFF	Illicit Financial Flows
ILO	International Labour Office or International Labour Organization
IMF	International Monetary Fund
INDC	Intended Nationally Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
IPR	Intellectual property rights
ISSB	International Sustainability Standard Board
IWRM	Integrated Water Resources Management
Kt	Kilotonne
LDC	Least developed country
LIC	Low-income countries
LNG	Liquefied Natural Gas
MDB	Multilateral Development Bank
MENA	Middle-East and North Africa
MIC	Middle-income country
MS	Member State
MW	Megawatt
NAP	National Adaptation Plan
NDC	Nationally Determined Contributions
ODA	Official Development Assistance
OCI	Oil Change International
OECD	Organisation for Economic Co-operation and Development
PaCT	Partnership for Cleaner Textile
PCD	Policy coherence for development
PPP	Public-Private-Partnerships
RBO	River Basin Organisation
RMG	Ready-Made Garment
RSC	RMG Sustainability Council
RST	Resilience and Sustainability Trust
SAI	Sustainable Agriculture Initiative
SDG	Sustainable Development Goal
SIA	Sustainability Impact Assessment
SFWG	Sustainable Finance Working Group
SME	Small and Medium-sized Enterprise
TCFD	Task Force on Climate-related Financial Disclosures
TIP	Thana Irrigation Program
TRIPS	Trade-Related Intellectual Property Rights
UK	United Kingdom
UN	United Nations

---

UNEP	United Nations Environment Programme
UNOPS	United Nations Office for Project Services
US	United States
USD	United States Dollar
VPA	Voluntary Partnership Agreement
WASH	Water, Sanitation and Hygiene
WB	World Bank
WEF	Water-Energy-Food
WMO	World Meteorological Organization
WTO	World Trade Organization

---

# 1. Introduction

## 1.1. Background

**The food and agriculture, water, and energy sectors are essential for the development of modern societies and the well-being of people.** The 2030 Agenda for Sustainable Development notably formulated sustainable development goals (SDGs) for food security (SDG2), water (SDG6) and energy (SDG7). With steadily growing populations and economies, urbanisation, and changing consumption patterns, the demand for food, water, and energy has risen dramatically, which has put tremendous pressure on the natural resources on which their provision depends.<sup>1</sup> In many developing countries, in particular, governments and civil society actors are still struggling to ensure that households and enterprises have adequate access to food, water and energy, especially amongst low-income, vulnerable populations, while also being more and more confronted with environmental problems.

**Public policy objectives in the food, water and energy sectors are strongly interlinked, at different levels. They are also closely interconnected with policies concerned with cities and human settlements (SDG11), sustainable consumption and production patterns (SDG12), the protection of ecosystems (SDG15), and, importantly, climate change (SDG13).** The allocation of available land and water resources for different uses, including agricultural production, industry processes, cities, energy generation and so forth, entails both trade-offs and synergies. These sectors not only compete with each other for the use of natural resources, but they also depend on each other, with, for example, agricultural and food production depending on the supply of energy. By using natural resources, they also interact with ecosystems.

**Rapidly changing climatic conditions – to which the energy, food and agriculture sectors have contributed – add complexity and uncertainty to these interconnections.** Climate change often exacerbates anthropogenic stresses in water, land and ecological systems. It is expected to affect natural and man-made water systems most severely – the majority of climate-related natural disasters are related to water. These stresses, in turn, have social consequences, especially for the most vulnerable population segments. The connections at the *nexus* of the sustainable development goals for food, water, energy and climate change are thus multidirectional. In developing countries in the sub-tropics, the combination of slow-onset climate change and more frequent weather hazards with strong tensions amongst those three sectors and socio-economic inequalities poses risks in terms of food and water security as well as social cohesion, stability and peace.<sup>2</sup> Recent developments in the Sahel region illustrate how these risks can materialise.

**While national policies are usually the primary drivers of outcomes in the areas of food security and nutrition, water, energy and climate change in any given country, external policy factors can also affect outcomes in these areas** (Medinilla, 2021). **These external factors may arise in particular from large economies whose policies shape international development in various domains.** In this case, policymakers in these influential countries – be they advanced or emerging economies – could play a role in more effectively supporting the attainment of climate, food and water goals in developing countries. Notably, they could mitigate the negative spillover effects of their internal and external policies, alleviate trade-offs, and exploit potential synergies with government policies in these countries and their development assistance policies. **Yet, responding to this challenge first requires a better understanding of**

---

<sup>1</sup> The excessive use of natural resources and the disturbances in biophysical processes caused by human activities has led to the crossing of planetary boundaries. See the notion of planetary boundaries here: *The nine planetary boundaries - Stockholm Resilience Centre*.

<sup>2</sup> The interdependencies between water, energy, food and climate objectives in the European Union (EU) external action linked to the European Green Deal were recognised by the *Council of the EU*. It also recognised the links between climate change, pressures on natural resources, and international stability and security. See also the *Working document of the European External Action Service on Climate Change and Defence Roadmap*.

---

**whether and how the policies of such external actors play a role in the nexus of climate action, food security and water.**

## 1.2. Purpose of the study and research questions

This study was commissioned by the Policy and Operations Evaluation Department of the Ministry of Foreign Affairs of the Netherlands (IOB) to inform an evaluation of the Dutch policy in the areas of climate change, food security and water,<sup>3</sup> including the coherence of Dutch policies with regards to these objectives.<sup>4,5</sup> **It primarily aims to identify and assess cases in which the policies of developed countries have effects that are in contradiction with, or supportive of, the attainment of sustainable development goals in the areas of climate action, food security, and water in developing countries.** For short, we call such cases ‘policy coherence hotspots’ or just ‘hotspots’.

The research questions for this study are as follows:

- Which developed country policy or EU policies have turned out to be coherent or incoherent with – and had significant positive or negative effects on – food security, water or climate in developing countries?
- What are the policy coherence hotspots (that is, the strongest cases of incoherence or synergy, according to a ranking of those policies) for food security, water and climate?

**Our main focus is on their non-development cooperation policies.** These policies can either be primarily internally-oriented, such as industrial policies, or externally-oriented, such as trade policies. Taking into account the changes that took place in the global distribution of power and wealth, our exploration of policy coherence hotspots includes not just the policies of developed countries, but also those of emerging countries.

This study is not intended to produce new evidence about the effects of specific policies, nor does it intend to analyse the interactions between two or more policies and their combined effects. Instead, **using existing information and evidence showing plausible effects (focusing primarily on the harmful effects) of policies on climate-related, food security and water outcomes in developing countries, we seek to identify potential hotspots across a wide range of policy areas.** We do not aim to be exhaustive, but rather identify the most relevant hotspots, that is, the policies with the strongest and most widespread spillover effects. Lastly, examining the institutional and administrative processes that contribute to policy coherence is beyond the scope of this study.

## 1.3. Analytical framework, method and scope

**This study takes as reference the SDGs concerning climate change, food security and water (2, 6, 7 and 13) of the 2030 Agenda for Sustainable Development,** which is the main international policy framework for eradicating poverty and achieving sustainable development in all countries by 2030.<sup>6,7</sup> It assumes that developing countries and international development partners who provide official development assistance (ODA) pursue these goals. Given the purpose of the study, we particularly focus on the objectives and the (fewer) targets of the Dutch development

---

<sup>3</sup> This evaluation is informing the planning of the new Dutch development, foreign and trade policy, particularly concerning the stronger emphasis on climate action and the importance given to international cooperation and partnerships.

<sup>4</sup> These objectives were defined in the policy document on foreign trade and development cooperation: *Beleidsnota. (2018). Investeren in Perspectief Investeren in perspectief: Goed voor de wereld, goed voor Nederland.* Den Haag: Ministerie van Buitenlandse Zaken (the associated budget document provides more details on these objectives).

<sup>5</sup> The Dutch Ministry of Foreign Affairs has an action plan on policy coherence for development that was adopted by the government in 2016 and revised in 2018. This plan focuses on trade agreements, investment regimes, tax evasion, the fight against climate change, and the sustainability of production and trade.

<sup>6</sup> The Addis Ababa Action Agenda, which was adopted in 2015, is an integral part of the 2030 Agenda. It provides a framework to finance sustainable development by aligning all financing flows and policies with economic, social and environmental priorities.

<sup>7</sup> The study covers only terrestrial systems and, to a limited extent, coastal systems, excluding oceanic systems.



---

cooperation policy that have been adapted from the SDGs. The two sets of goals are included in Annex 2. **The study also refers to the Paris Agreement, the legally binding international treaty on climate change**, adopted in 2015 and entered into force in 2016, which aims to *'limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels, and reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate-neutral world by mid-century'*. This selection of goals and targets serves to define the sub-thematic areas we consider when assessing the possible effects of external policy drivers in developing countries.

**Our general framework of analysis integrates three perspectives on sustainable development.** First, conceptually, **the SDGs are interconnected and the transformative potential of the 2030 Agenda can be realised only through a holistic approach** that minimises trade-offs and maximises co-benefits between SDG-related objectives in context-sensitive ways. As shown by the 2019 Global Sustainable Development Report<sup>8</sup>, some interconnections amongst SDGs are tighter than others. From this perspective, the concept of the water-energy-food (WEF) nexus is useful for this study. It recognises the interlinkages between water, energy and food security and the resulting (intended or unintended) cross-sectoral effects of sectoral policies (ODI, ECDPM, DIE, 2012). Figure A1.1 in Annex 1 provides an overview of the complex interrelations and interdependencies among water, energy and food – which are highly context-specific.

Second, besides domestic factors, **the pursuit of the 2030 Agenda depends on global systemic issues or factors linked to external policies and international institutions and agreements** (for example, trade and financial regimes). These external drivers can hinder or facilitate progress towards sustainable development objectives, particularly in developing countries (for example, agricultural and rural development; Southern Voice, 2020). Third, as finance alone is not sufficient to promote and achieve the 2030 Agenda, **appropriate and coherent policies should ensure that finance is used and combined effectively to achieve results and that it is not wasted or underused**. Policies should also help mobilise more financing for development via domestic tax revenues, domestic private finance, and both public and private international finance (ODI, ECDPM, DIE, 2013).

Lastly, **for each thematic area of focus, we refer to sectoral frameworks that guide the identification of policy drivers and the analysis of causal relationships between these drivers and outcomes.**<sup>9</sup>

**This study methodically reviews existing information and evidence to understand the drivers of current outcomes in climate-related, food security and water domains; identify and appraise the policies of developed countries and emerging economies that may have impacts on developing countries in these domains; and analyse the transmission of their effects.** We look in particular for effects that would hinder the attainment of relevant sustainable development goals. Given the purpose of the study, the interest is to look primarily at policies having simultaneous or knock-on effects on several sectors. **Given the breadth of the exercise, our approach to the literature is pragmatic – and likely still contains gaps and biases.** We started from existing research relating to policy coherence to pre-identify hotspots. We then refined our literature search depending on existing findings, current and emerging policy debates and reform processes. We used a variety of sources of information, including scientific documents (e.g., academic journal articles), policy-oriented publications, sectoral studies done by practitioners, and articles from journalism (published in print or online news outlets). We paid attention to sources of information and existing studies from countries of the 'Global South'. We looked for factual information and evidence converging towards policy contradictions or synergies. We also conducted a rapid case study of Bangladesh to understand how possible policy coherence issues occur at the country level. For this purpose, we conducted interviews with a few resource persons.

---

<sup>8</sup> Independent Group of Scientists appointed by the Secretary-General, Global Sustainable Development Report 2019: The Future is Now – Science for Achieving Sustainable Development, (United Nations, New York, 2019).

<sup>9</sup> These frameworks are briefly presented at the beginning of each thematic section.

---

The study considers primarily the effects of the policies of ‘developed countries’ on ‘developing countries’. While the United Nations system does not formally define these two categories, in practice **developed countries usually include 14 countries in the EU, the United Kingdom (UK), other European countries,<sup>10</sup> Australia, Canada, Japan, New Zealand, and the United States (US)**. The major developed countries (the G7) include Canada, Japan, France, Germany, Italy, the UK, and the US. Developed countries are industrialised, have high incomes, high living standards, and highly developed infrastructure and technologies. Developed countries are members of the Organisation for Economic Cooperation and Development (OECD) and its Development Assistance Committee. **This study also includes the policies of emerging countries whose policies have cross-border effects on developing countries.** Thus, we also consider the policies of Brazil, Russia, India, China (PRC), and South Africa (the BRICS), which play increasingly important roles in global politics and economics – China is a special case owing to its greater economic and political clout. Besides G7 and BRICS countries, high-income, fuel-exporting countries should also be considered, although, due to the time and resource constraints of this study, their policies are not closely examined. Nonetheless, we consider the policy statements and commitments of the Group of Twenty (G20), which includes one of them, Saudi Arabia. **As regards developing countries, we consider countries on the overlapping lists of developing countries, low-income and lower-middle-income countries, and least developed countries of the UN.**<sup>11</sup> We consider in particular the list of the Netherlands’ partner countries for development cooperation.<sup>12</sup>

#### 1.4. Preview of overall findings

**We briefly present in Box 1 the major hotspots identified through our investigation** into the effects of developed and emerging countries’ policies on climate action, food security and water outcomes in developing countries. Some policy coherence issues appear linked to each other. This selection of major hotspots is based on the appraisal of the strength of the spillover effects of policies and the level of confidence in the available information and evidence conducted in Section 5. These major hotspots are not listed in any order of importance.

##### **Box 1: Preview of policy coherence hotspots affecting climate action, food security and water**

- I. Public support (export credit subsidies notably) for fossil fuel exploration and production projects in developing countries, while supporting economic growth, also leads to the generation of greenhouse gas (GHG) emissions and thus adversely affects climate mitigation objectives and the environment. In conjunction with user subsidies for fossil fuels provided by developing country governments, they also affect the food and water sectors, either positively or negatively (the effect on water efficiency may be negative for instance). At the same time, the private financial and insurance sectors continue to provide considerable amounts of financing to the fossil-fuel sector, including in developing and emerging countries, and to supply chains linked to deforestation. This happens despite commitments from both political and financial corporate leaders to divert financial flows away from economic activities causing emissions and nature degradation.
- II. Policies supporting international trade and investment play a major role in shaping production and trading systems in developing countries, which influence the energy intensity of their economies and their use of natural resources. A notable case is that of industrial and trade policies facilitating imports of soy (largely for animal feed), beef, palm kernel or oil, and other agricultural products from producing regions where deforestation or forest degradation occurs. In some developing countries, foreign trade and investment policies contribute to the production and exportation of agricultural and manufactured products (textiles for example), which generate economic opportunities but put considerable pressure on natural resources, water in particular. Those external policies also influence the orientation of national policies in developing countries, which may be unfavourable to investments

---

<sup>10</sup> Iceland, Norway and Switzerland.

<sup>11</sup> See United Nations Standard Country Code, Series M: Miscellaneous Statistical Papers, No. 49, New York: United Nations. ST/ESA/STAT/SER.M/49. See also *Country classification*.

<sup>12</sup> See *Countries and regions | Development cooperation | Government.nl*.

in local and regional value chains.

- III. Energy, industrial and trade policies drive the importation of minerals from developing countries, notably for batteries and other electrical and electronic equipment that underpin clean and efficient energy systems. This may contribute to deforestation and forest degradation, in addition to other social and political spillover effects. At the same time, the policies supporting the exportation by advanced economies of 'high-tech' clean energy equipment to developing countries, in a context of intense competition in the international market, may orientate policy measures and investments in the latter away from 'low-tech' clean energy solutions that poor populations need.
- IV. Agricultural producer subsidies in developed countries and, increasingly, in emerging countries may affect international food commodity markets and trade and thus have implications for developing countries. This may cause distortions in international markets and trade, which may in turn negatively affect domestic farmers and processors (by lowering prices), undermine the local sector (by discouraging investments into productivity-enhancing agricultural and industrial assets), and entail livelihood losses.
- V. Public policies supporting infrastructure development in developing countries (for transportation, energy production and distribution, telecommunication, factories, commerce, and so forth) largely contribute to energy utilisation and GHG emission patterns. They also affect the integrity of the natural environment and climate-related vulnerabilities. Large dams, for example, boost the supply of electricity, but lead to land-use changes and may have adverse effects on water access for vulnerable, downstream communities. Those policies also contribute to shaping spatial development and urbanisation, which drive population settlement dynamics and, in certain places, lead to unsustainable withdrawal of freshwater, water pollution, and increased vulnerabilities to sea-level rise and storm surges.
- VI. Finally, illicit financial flows, largely linked to the exportation of commodities from developing countries to developed and emerging countries, negatively affect governments' ability to finance climate-related disaster risk management, social protection and other public goods essential for building resilience to climate change. At the same time, public and private financing for climate adaptation and resilience remains inadequate, while official development assistance is stagnating.
- VII. The foreign policies of major developed countries and emerging economies often put economic and security objectives ahead of social and environmental objectives, thus contradicting development cooperation goals. They may also play a role, positively or negatively, in shaping cooperation amongst neighbouring developing countries concerning the provision of regional public goods. Bilateral relations do not always support regional cooperation for the management of transboundary river basins and are sometimes in contradiction with development cooperation aims towards regional water arrangements.

The rest of the paper is organised as follows. The next three sections investigate possible policy coherence issues by thematic area, first for climate action, then for food security and nutrition, and lastly for water. Each thematic section is subdivided according to sub-themes generally corresponding to relevant sustainable development targets. The following section provides an overview of the identified hotspots, looking at their effects across the three main policy areas. The last section provides some concluding remarks and perspectives.

## 2. Climate action

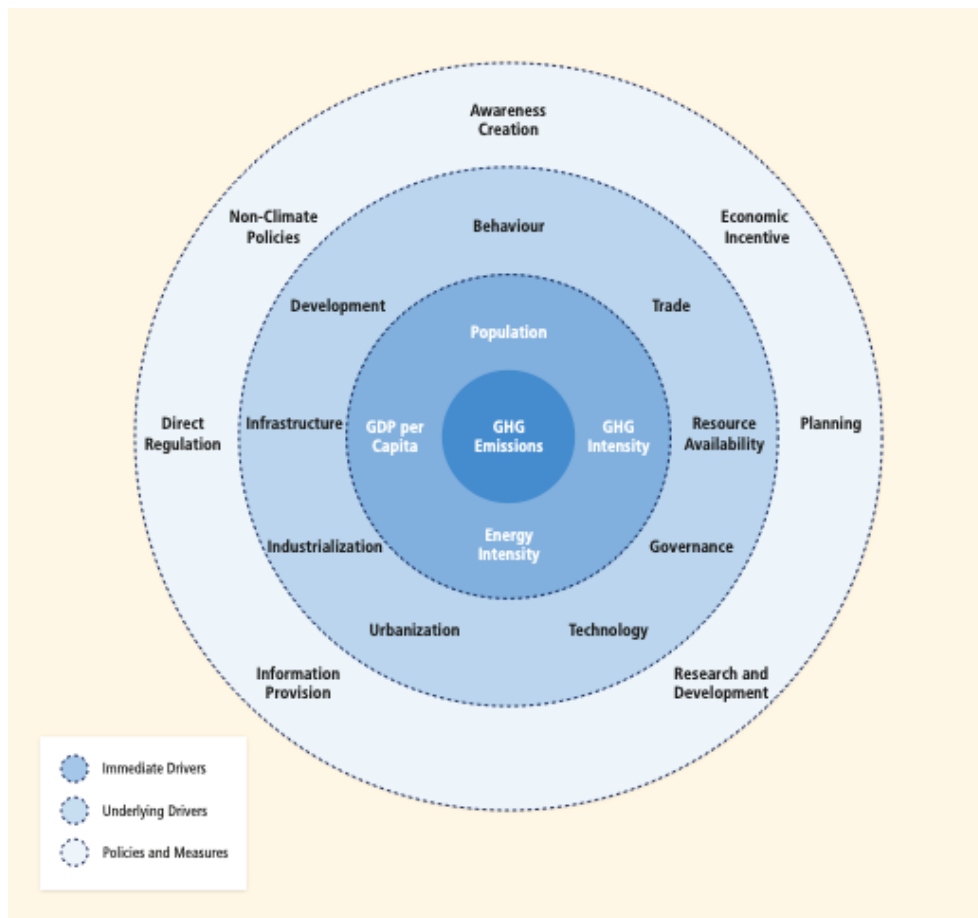
### 2.1. Drivers, trends and preview of findings

We distinguish the effects that external policies may have on climate change mitigation in developing countries from those on adaptation and 'climate-resilient development'. **For mitigation, we take our reference analytical framework from the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC; Blanco *et al.*, 2014).** This framework outlines the causal links between GHG emissions, the direct drivers of emissions, the underlying drivers,

and public policies (see Figure 1). This framework is useful for assessing potential future emissions and mitigation measures.

The immediate drivers of total GHG emissions are derived from the decomposition of energy utilisation and other activities causing GHG emissions into factors.<sup>13</sup> The underlying drivers are derived from the identification of processes, mechanisms and socio-economic variables that determine emissions, depending on more foundational factors such as fossil fuels endowment and availability, consumption patterns, structural socio-economic and technological changes, and behavioural patterns. In this framework, policy measures can modulate the underlying drivers. Such modulations can in turn change the GHG emission factors, causing shifts in the immediate drivers and eventually altering emission trends. There can also be feedback loops from the direct and the underlying drivers to the policy measures.

**Figure 1: GHG emission drivers and public policies**



Source: Blanco et al. (2014).

**At the global level, anthropogenic carbon dioxide emissions coming from the combustion of fossil fuels have been the main contributor to the rising carbon dioxide concentration level in the atmosphere. Land use, land-use change, and forestry is the second-largest source of carbon dioxide emissions.**

<sup>13</sup> 'For energy, the factors are population, gross domestic product (GDP) (production) and gross national expenditure (GNE) (expenditures) per capita, energy intensity of production and expenditures, and GHG-emissions intensity of energy. For other sectors, the last two factors are combined into GHG-emissions intensity of production or expenditures' (Blanco et al., 2014).

---

According to the International Energy Agency (IEA), electricity and heat generation is the largest contributor to GHG emissions (in the energy sector, oil, followed by coal and then natural gas, have been the main sources of emissions; IEA, 2021). **Power generation and transport, which relies on the combustion of fossil fuels, together accounted for more than two-thirds of total emissions in 2019.** The remaining third was due to the industry and buildings sectors. **When electricity and heat generation are counted as part of the emissions of the final sectors, industry is the largest contributor of emissions,** generating more than 40% of global greenhouse gases in 2019. The transport sector was responsible for 27% of world emissions and buildings for a quarter of them. **The growth in GHG emissions over 2010–2019 was mainly due to power generation and transport.**

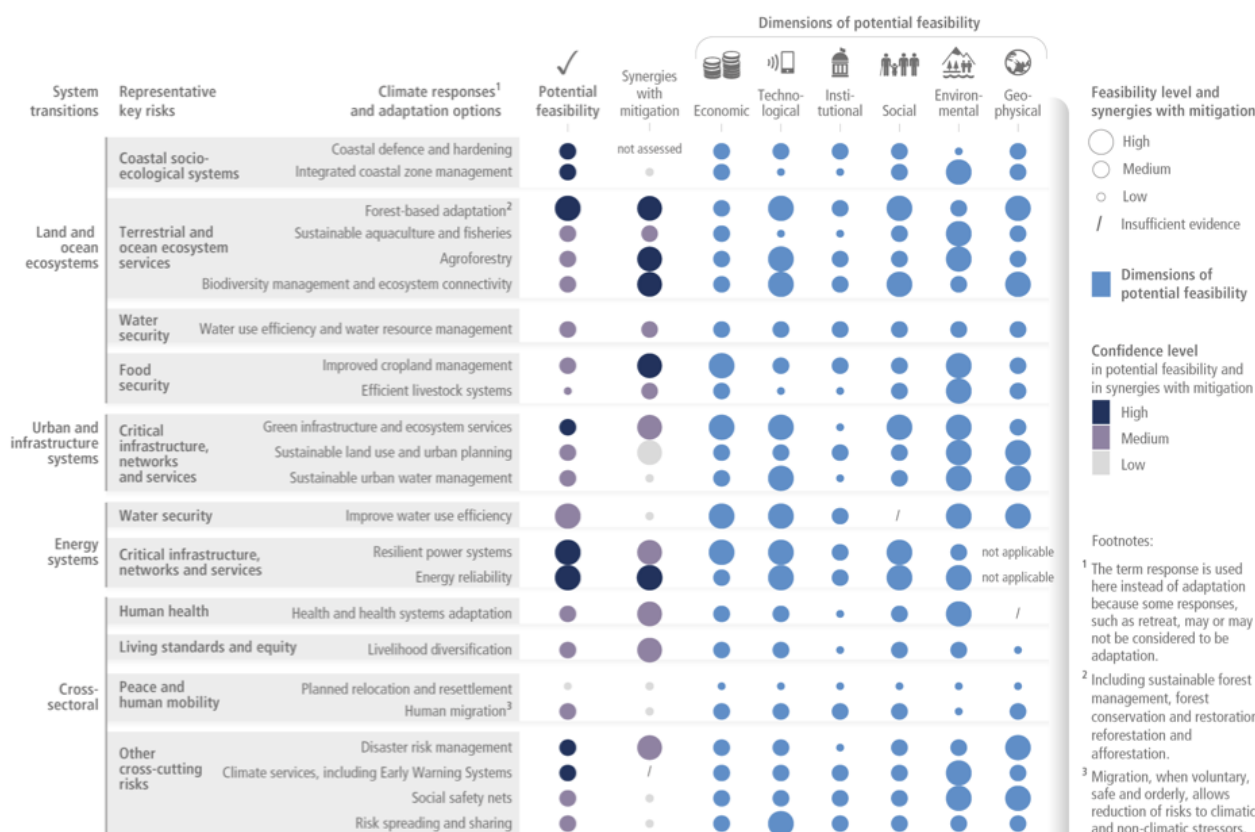
**For developing countries, including the least developed countries (LDCs), nearly 90% of their GHG emissions over 1970–2010 originate from agriculture, forestry and other land use.**<sup>14</sup> Emissions from developing countries have grown at a slow pace, at less than the population growth rate, up until now. Their cumulative emissions still represent a small share of global emissions. However, economic growth, industrialisation and urbanisation in developing countries are associated with increasing GHG emissions from the combustion of fossil fuels and deforestation.

**For adaptation, we take our reference analytical framework from the Sixth Assessment Report of the IPCC Working Group II on impacts, adaptation and vulnerability (IPCC, 2022).** This framework outlines the main responses to mitigate climatic risks and adaptation measures in different ‘systems’ (see Figure 2). These systems include land and ocean ecosystems; urban and infrastructure systems; and energy systems. Other measures are cross-sectoral. The feasibility of those measures depends on several factors that the framework identifies – these include governance and the effectiveness of decision-making processes. Across the world, governments are taking adaptation measures and economic and social actors are taking action to adapt to climate change. Yet, progress in adaptation is made unevenly across countries, sectors and communities.

---

<sup>14</sup> This category of activities also include livestock rearing and the use of wood as fuel for cooking and heating.

**Figure 2: Feasible responses to risks due to climate change and adaptation options**



Source: IPCC (2022).

Box 2 below presents the main policy coherence hotspots that can impact climate mitigation and adaptation.

### Box 2: Preview of policy coherence hotspots affecting climate action

Several policies of major developed and emerging countries were identified as having an influence on climate objectives in developing countries. Both climate mitigation and adaptation are concerned.

First, developed and emerging countries still provide public support to the development of the fossil-fuel sector abroad, including in low- and lower-middle-income countries. Second, clean energy policies in developed countries and emerging economies have impacts on developing countries. The rising demand for minerals, including rare earths, entering the production of clean-energy electrical equipment and electronics is accelerating the exploitation of deposits in developing countries and tropical forest regions. At the same time, the rapid development of clean-energy technologies in industrialised countries and their worldwide commercialisation is having an influence on markets and the policy environment in developing countries.

External policies shaping infrastructure development in developing countries can have major consequences on GHG emission patterns. Be it for traditional uses or climate adaptation, infrastructure development alters the natural environment and ecosystems, thereby modifying the factors of vulnerability of communities to climate-related hazards. Policies supporting international trade and investment have played a major role in shaping production and trading systems in developing countries, which has had considerable impacts on their energy and natural resource utilisation patterns. The case of

---

developed and emerging country policies facilitating imports of soy (largely for animal feed), beef, palm kernel or oil, and other agricultural products from producing regions where deforestation or forest degradation occurs, is illustrative of current contradictions between trade and climate objectives.

The orientation of foreign policies in favour of economic relations with developing countries, or international security concerns, has probably contributed to the neglect of social objectives and public goods, notably those that are essential for the resilience of societies to climate change. These include social protection and the inclusion of marginalised communities – for example, pastoral communities’ access to land and water resources. Similarly, humanitarian and security policies play a role in stability, which is a key factor in adaptation and resilience processes.

Financial and tax policies are critical for ensuring that climate actions are adequately financed. While international climate finance for adaptation has increased in recent years, it remains inadequate compared to the estimated adaptation costs. Low-income, vulnerable countries have relatively low capacities to finance climate-related disaster risks. At the same time, policies that promote sustainable private investments through various instruments and agencies, while having some beneficial effects, also carry risks of distorting capital markets (with blending) or setting norms that are ill-adapted to developing country contexts (with taxonomies and non-financial disclosure standards). Furthermore, illicit financial flows, largely linked to the exportation of commodities from developing to developed and emerging countries, negatively affect governments’ ability to finance public goods and services that support adaptation and resilience building.

Lastly, external policies still allow international private financial and insurance sectors to provide considerable amounts of financing for industries carrying out fossil fuel projects in developing regions with tropical forests, despite commitments from both political decision-makers and financial corporate leaders to divert financial flows away from ‘climate-unfriendly’ and ‘nature-negative’ activities.

## 2.2. Policies shaping fossil-fuel-based and clean energy systems

Energy production and utilisation are major drivers of GHG emissions. They are thus priority areas for climate mitigation efforts. External policies that encourage the development of fossil-fuel-based energy systems and low-energy-efficiency technologies in developing countries give rise to trade-offs between climate mitigation objectives and economic development objectives. Ensuring that fossil fuel production and utilisation contribute to the deployment of high-energy-efficiency and renewable energy technologies is critical for minimising those trade-offs and supporting GHG emission and socio-economic development trajectories that are compatible with international climate commitments.

### 2.2.1. Policies supporting fossil fuel exploration and production

**Across the world, subsidies provided by governments to fossil fuel producers, traders, distributors and consumers are in contradiction with their climate mitigation commitments** (Timperley, 2021b; Tankersley and Friedman, 2021). The utilisation of fossil fuels in large quantities encouraged by those subsidies also contributes to air pollution and affects human health as well as public budgets. At the global level, fossil fuel subsidies amounted to USD 4.7 trillion (6.3% of the gross domestic product, GDP) in 2015, with coal (Hume, 2021) and oil together accounting for 85% of those subsidies according to Coady *et al.* (2019).<sup>15</sup> China (USD 1.4 trillion), the US (USD 649 billion), Russia (USD 551 billion), the EU (USD 289 billion), and India (USD 209 billion) provided the largest amounts of subsidies in 2015. Those subsidies take diverse forms. As an example, the OECD/IEA review of fossil-fuel subsidies in the Netherlands (OECD and IEA, 2020) reports that the country has ‘13 fossil-fuel subsidy measures in the form of tax exemptions or reductions,

---

<sup>15</sup> See also the *website of the Energy Policy Tracker* showing the amount of public support to the fossil-fuel sector provided by G20 governments since the beginning of the coronavirus pandemic.

---

*benefitting both the production and consumption of fossil fuels', causing an annual revenue loss for the government of at least EUR 4.48 billion.*

International Energy Agency data show that advanced, OECD countries that still subsidise fossil energies are also the biggest supporters of green energies, while non-OECD countries, including some G20 countries, tend to provide more support to fossil fuels than to renewables. At the global level, total support for fossil energies still exceeds that for renewable energies.

**While generally fossil fuel subsidies are mainly due to national policies, state actors in developed and emerging countries provide support to investments in the fossil-fuel sector in developing countries, particularly in Africa and the Middle East** (Ferris, 2021). China has been by far the biggest financier of fossil fuel investments abroad, followed by Japan and Korea. The largest single financier of fossil fuel projects and companies in Africa in recent years is the China Development Bank. According to the NGO Oil Change International (OCI), the share of fossil fuels in advanced country public finance for the energy sector going to Africa and the Middle East was much higher than that of renewable energies, and the former even increased between 2013 and 2019.

**Advanced countries have supported fossil fuel projects in developing countries mainly through export credit agencies (ECAs) and also through development finance institutions (DFIs).** ECAs provide financing or support to access export credit (for example, with export credit insurance subsidies or guarantees) for energy companies exporting goods and services to developing countries and emerging countries. DFIs provide public support for the development of energy projects abroad.<sup>16</sup> The Netherlands, like other EU and OECD countries, has been providing export credit support for fossil fuels (van Geuns *et al.*, 2018).

**Yet, since 2019 there has been a shift towards clean energy in international public finance for the energy sector, and especially a shift away from coal-based energy financing.** Similarly, since the Paris climate agreement, the share of fossil fuel projects in multilateral development banks' energy finance has decreased significantly. The EU recently committed to ending export credit support for new unabated coal-based energy projects in third countries, which was followed by a similar agreement at the OECD level in the context of COP26.<sup>17, 18</sup> On the occasion of COP26, a group of governments and public banks from both the north and the south committed to stopping new direct public support for unabated fossil-fuel-based energy projects abroad by the end of 2022.<sup>19</sup> In 2021, South Korea and Japan, the world's second- and third-largest coal financiers, respectively, after China, both pledged to end their public coal investments abroad. The largest users of coal outside Europe and North America are emerging countries rather than developing countries.<sup>20</sup> China is by far the largest coal consumer in the world. India is the second biggest coal user and is followed by Brazil, Indonesia, Kazakhstan, South Africa and Turkey, which might be the most affected countries by those policy changes. Russia is a smaller, yet still significant, consumer of coal compared to the two Asian giants.

---

<sup>16</sup> The biggest share of financial support from G20 governments was provided via ECAs, which disbursed an average of USD 2.6 billion a year to help finance clean energy projects, while spending USD 9.9 billion on finance for fossil fuel projects from 2013 to 2019. G20 DFIs as a whole spent an average of USD 1.7 billion a year on clean energy projects versus USD 7.7 billion on fossil fuel projects during that period.

<sup>17</sup> See *Ban on export credits for coal-fired electricity projects agreed at OECD*.

<sup>18</sup> Previously, the OECD DAC committed to ending ODA for new, unabated coal-based power generation by the end of 2021 and to limit the use of ODA in financing fossil-fuel-based power generation investments to particular cases where no technically and economically feasible alternative is available (OECD, 2021).

<sup>19</sup> See *Statement on International Public Support for the Clean Energy Transition - UN Climate Change Conference (COP26) at the SEC – Glasgow 2021*.

<sup>20</sup> See *Coal consumption, 2000-2016 - World Atlas of Global Issues*.



---

The European Investment Bank (EIB) put a fossil fuel project funding ban at the end of 2021. France, for example, will stop providing export finance for oil exploration and production projects by 2025, and for gas exploration and production projects by 2035.<sup>21</sup> The UK government stated its intention to do the same.<sup>22</sup> The US administration is developing a plan for phasing out the financing of fossil fuel projects abroad with public funds.

The IEA has recommended to stop developing new coal, oil, or gas production capacities after 2021, to attain the objective of net-zero emissions by 2050. **Some claim that fossil fuel projects, by providing energy and generating financial resources and technical capabilities, support socio-economic development pathways towards net-zero emission objectives, provided that appropriate accompanying measures and interventions are implemented** (an often-cited example is Nigeria<sup>23</sup>). Some are also concerned by the fact that rich countries phase out support for fossil-fuel-based projects in developing countries, especially in the poorest countries (Ahmed, 2021), while the former still carry out investments to secure their supply of fossil fuels or to internationally pursue political and economic goals (Moss and Gyude Moore, 2021; Ramachandran, 2021). Others argue that, in developing countries, revenues from fossil fuels do not necessarily help the energy transition (Brutschin and Fleig, 2016; Manley and Mihalyi, 2021) nor lead to inclusive economic development, for example in the cases of Nigeria (Chinery and George-Ikoli, 2022), Ghana and Mozambique (Geuskens and Butijn, 2022). In any case, setting emission abatement conditionalities for new fossil fuel projects (especially for coal), supporting interventions to reduce emissions of methane and black carbon, and encouraging energy efficiency gains are critical accompanying actions for minimising trade-offs between climate and development policy objectives. Furthermore, as the stability of international coal, oil and gas prices is a critical factor for enabling effective policies promoting clean energies in developing countries, developed and emerging countries' policies affecting the stability of fossil fuel markets can undermine the former's energy transition.

**Bangladesh provides a relevant illustration of the effects of external support to fossil-fuel-based energy systems.**

Until recently at least, international partners (Japan notably) and financial actors have supported investments in coal- and gas-fired power plants in Bangladesh (Islam, 2021a). The energy system in Bangladesh relies largely on natural gas, oil and coal, especially gas- and coal-fired power plants; and the country has an overcapacity and is dependent on costly imports of coal and liquid natural gas, whose prices fluctuate and create energy cost risks (IRENA, 2021). The cost of the power system has put an unsustainable financial strain on the state budget, which negatively affects its ability to withstand climate-related natural disasters. The Bangladeshi state provides subsidies for fossil fuels (Mujeri *et al.*, 2013), which has weighed on public resources (Zhang, 2018; Dipa *et al.*, 2015; Timilsina and Pargal, 2020), slowed down the adoption of renewable energies (Islam, 2021b), despite the declining cost of solar and wind power, and contributed to the rise of the country's GHG emissions – although they remain relatively small compared to advanced countries.<sup>24</sup>

### 2.2.2. Policies encouraging the development of clean energy systems

In developing countries, the provision of energy to marginalised segments of populations is a major challenge for governments (International Renewable Energy Agency and Climate Policy Initiative, 2018). Research done by Southern Voice on access to 'affordable, sustainable and clean energy for all' indicates that the demand from households for affordable and clean energy is strong (Crentsil *et al.*, 2020). In Ghana, for example, this research shows that the promotion of affordable and clean energy has an influence not only on economic and climate mitigation outcomes but also on food security, access to water and sanitation, health and gender equality – and on climate adaptation

---

<sup>21</sup> Regarding the French policy, see White (2020).

<sup>22</sup> See *Statement on International Public Support for the Clean Energy Transition - UN Climate Change Conference (COP26) at the SEC – Glasgow 2021*.

<sup>23</sup> See *Secretary Antony J. Blinken Before Virtual Meeting with Nigerian President Muhammadu Buhari and Foreign Minister Geoffrey Onyeama - United States Department of State*.

<sup>24</sup> Bangladesh's total greenhouse gas emissions and per capita emissions respectively amount to 198,970 and 0.5 kilotonne (kt) of carbon dioxide equivalent, whereas the Netherlands, for example, emits 178,640 kt of carbon dioxide equivalent in total and 8.8 kt on a per capita basis, according to *data from the World Bank*.

---

processes too. **Advanced countries' policies and international agreements may facilitate the development of clean energy systems in developing countries, but they may also have unintended consequences.**

Recent initiatives supported by northern actors promoting clean energy systems and the transition away from fossil fuels in developing and emerging countries show improvements in the way they cooperate to promote the energy transition. A notable initiative is the **Just Energy Transition Partnership** intended to support the transition away from coal in South Africa, the most industrialised African economy (Kumleben, 2021). This partnership is financially supported by France, Germany, the EU, the UK and the US, with grants and concessional loans. It is innovative in the sense that a coalition of countries supports a South-Africa-led change process that comprises measures addressing the negative spillover effects on coal-dependent regions and workers. Another one is the **Climate Finance Partnership (CFP)**, which has established a private equity fund, blending public and private financial resources, to finance infrastructure projects and companies contributing to climate mitigation efforts in emerging and developing countries.<sup>25</sup> The CFP aims to finance investments in low-carbon and renewable energy systems, energy efficiency technologies, and electric transportation systems in Latin America, Asia, and Africa. It involves public development agencies and banks (including France, Germany and Japan), private asset managers, energy companies, commercial banks, insurance companies, pension funds and philanthropies.

**However, policies that promote only clean energy technology transfers<sup>26</sup> (which are usually linked to commercial interests) and the exportation of environmental goods and services may be inadequate in developing country contexts.** Investments underpinning the deployment of clean and renewable energy systems are largely carried out by the private sector, which is responsible for more than 90% of those investments according to the International Renewable Energy Agency and the Climate Policy Initiative (2018). The incentives driving the investments of corporations and private financiers in clean energy systems, which are motivated by private gains, may not coincide with the needs and capabilities of low-income countries (LIC) and particularly of marginalised communities (Khan and Ahmed, 2015). The policies of advanced economies, for example China and EU countries, also seek to expand market opportunities for renewable energy technologies and products in developing countries and emerging markets, in an increasingly competitive sector (Medinilla, Sergejeff and Domingo, 2022). This can pose a problem for countries that do not have sufficient public resources to invest in the transition towards sustainable energy for all, locally appropriate, low-cost technologies and waste management capabilities, and whose policies are heavily influenced by vested interests in the fossil-fuel-based energy sector (Bronstein, 2021).

Southern Voice's research (Crencsil *et al.*, 2020, and Southern Voice, 2020) suggests that **finding synergies between the energy transition in advanced countries and in developing countries requires supporting research innovation and industrial capabilities** so that developing country actors can make use of existing technologies or design new ones according to local needs and means. Yet, in developing countries, there is a paucity of research and innovation support from the state and international development partners for the deployment of affordable, energy-efficient and clean energy technologies. **While considerable amounts of development finance are directed to the energy sector and energy-intensive economic activities, too little is allocated to basic research and innovation for energy technologies in developing countries** (microgrids, clean cooking stoves, and so forth).

**Trade-related rules may also have unintended consequences for energy and climate objectives in developing countries.** The effects of the World Trade Organisation (WTO) trade-related intellectual property rights (TRIPS) on developing countries' ability to make use of climate-friendly energy technologies and adapt them to local contexts depend on several factors. On the one hand, TRIPS, alongside international standards, may constrain innovation in developing countries (Andreoni *et al.*, 2019). On the other hand, they allow for fairly permissive compulsory licensing provisions (without the authorisation of the patent owner) in developing countries. Moreover, at a certain level of

---

<sup>25</sup> See *Davos 2020 Climate Finance Partnership Press Release* | *Business Wire*.

<sup>26</sup> See for instance OECD (2021).

---

technological development and domestic market size, developing country policymakers may prefer to grant some level of protection to domestic inventors with strengthened intellectual property rights (IPR), using tighter compulsory licence provisions for example (Mattoo and Subramanian, 2013).

Multilateral trade rules on production and export subsidies may lead to suboptimal outcomes in the case of environmental goods such as solar panels (Mattoo and Subramanian, 2013). For goods contributing to climate mitigation, subsidies can have beneficial effects on GHG emissions in exporting countries, in importing countries (by lowering prices and encouraging the use of low-GHG technologies), and globally by intensifying competition in sectors developing and commercialising such goods. **However, according to WTO rules, domestic subsidies for specific sectors developing and producing green products, while not being prohibited, are actionable by member countries if the latter assess that their domestic production or exports are reduced as a result.** Export subsidies are prohibited, even for clean energy and other low-GHG technologies.<sup>27, 28</sup> To alleviate constraints on the international diffusion of climate-friendly technologies, Mattoo and Subramanian (2013) proposed to raise the level of permissibility of subsidies, while still regulating the most trade-distorting forms of subsidies.

## 2.3. Policies driving the development of infrastructure

### 2.3.1. Effects on GHG emissions

Infrastructure is a central factor in climate action and sustainable development. The Paris Agreement on climate change includes the infrastructure sector among the key enablers of greenhouse gas reduction and climate change adaptation. Several parties to the agreement have submitted Intended Nationally Determined Contributions (INDCs) with components on infrastructure.

Infrastructure projects consist of roads, railways, pipelines, ports, maritime routes, airports, telecommunications, industrial zones, logistics centres, commercial buildings, urban infrastructure and so forth (Hildyard and Hildyard, 2017). Infrastructure development is driven in large part by public policies, with policy decisions determined by multiple factors, including economic growth, trade, extractive resources needs (oil, gas, minerals and so forth), demographic growth, people movement, private financial flows and so forth.<sup>29</sup> Over the past two to three decades, there has been an acceleration in the development of infrastructure, especially in developing countries and emerging countries in Africa, Asia and Latin America (Ruiz-Nuñez and Wei, 2015). The fact that there are large gaps between low-income countries and emerging economies<sup>30</sup> suggests that this trend will persist for the coming decades.

**Infrastructure is essential for socio-economic development and access to public services. Yet, a large share of total GHG emissions is linked more or less directly to infrastructure.** 79% of all greenhouse gas emissions are linked to infrastructure according to a recent report by the United Nations Office for Project Services (UNOPS), the United Nations Environment Programme (UNEP) and the University of Oxford (Thacker *et al.*, 2021), while infrastructure represents 88% of all adaptation costs. The sectors of energy, transport (maritime and terrestrial) and buildings (logistics, housing, commercial, hospitals, schools and so forth) together are the largest source of greenhouse gas emissions. These sectors also affect air quality as they generate aerosols, especially in large urban areas.<sup>31</sup> The production of aerosols that have uncertain effects on climate change – except for soot, also known as black carbon – and contributes to the greenhouse effects.

---

<sup>27</sup> See WTO Agreement on Subsidies and Countervailing Measures.

<sup>28</sup> Economic and technological competition amongst powerful countries also lead to barriers to trade in environmental goods, as the continuing case of Chinese solar panel imports in the United States shows (see the recent *Financial Times* interview with the head of Solv Energy, the leading operator of solar farms in the US), which undermine the diffusion of climate mitigation technologies.

<sup>29</sup> On trends in infrastructure development and their drivers, see PWC (2020).

<sup>30</sup> See *Trends and Challenges in Infrastructure Investment in Low-Income Developing Countries - GOV.UK*

<sup>31</sup> Air quality degradation, in turn, causes multiple health problems (see Amato *et al.*, 2015).

---

**International policy guidelines and coordination mechanisms have not adequately ensured that infrastructure investments are compatible with climate and sustainable development objectives** (Aizawa and Schuele, 2016). Recent political commitments, such as those of G7 leaders on the climate crisis and infrastructure development<sup>32</sup> and the European Commission (Bilal *et al.*, 2021), could potentially lessen contradictions between climate and infrastructure policies.

### 2.3.2. Effects on the natural environment and socio-economic adaptation

Besides being a major factor underpinning socio-economic development and yet causing environmental degradation, **infrastructure policy choices determine to a large extent spatial and urban development patterns**. Thus, they shape the exposure and vulnerability to climate change of territories and communities. **Infrastructure development may make lagging territories, in terms of economic development and public services, and marginalised communities, such as slums in large urban areas, more exposed to climate hazards and more vulnerable to slowly-degrading climatic conditions**. It may also reduce the ability of populations to adapt and become more resilient, for example by limiting their opportunities for resettlement, whereas geographic mobility is crucial for adaptation processes as the case of Bangladesh shows (Chen and Mueller, 2018).

**Among water-related natural disasters, floods cause the largest physical and economic damage and are among the main drivers of population displacement** (PBL, 2018). Every year, floods affect more than 100 million people globally. Flood-related risks are on the rise, especially amongst communities living in rapidly growing cities in coastal areas and deltas. In developing countries and emerging countries, these types of urban territories, which are growing rapidly and concentrating economic activities, urban populations are becoming increasingly vulnerable to climate- and water-related disasters (see also 4.4.; PBL, 2018).

Adaptation efforts in the water sector, in particular the building of protection against floods, sea-level rise, storm surges and other water-related impacts of climate change, thus represent 54% of total expected adaptation costs. **However, policies encouraging the adoption of certain flood protection technologies have sometimes had unintended consequences, creating other vulnerabilities**. For example, in Bangladesh, Dutch-style polders constructed several decades ago have become a cause of waterlogging during the monsoon season because of the rise of upstream tidal river beds due to the accumulation of sediments brought in by tides (Rahman *et al.*, 2021).<sup>33</sup> This phenomenon has had adverse consequences for livelihoods, for example, for women who are left alone when men travel to cities for seasonal work, landless people, and other marginalised social groups in the southwestern part of the country.

**While protective infrastructure (sea walls for example), developed with the help of international technology transfers and engineering services often supplied by foreign companies, play an important role in reducing climate-related natural disaster risks, they may also undermine the protection provided to human communities and wildlife by the natural environment** (Browder *et al.*, 2019). Moreover, the development of coastal infrastructure for maritime transportation, marine aquaculture, industrial activities, cities and so forth has contributed to the degradation of mangrove forests and wetlands that can protect coastal communities against storm surges and sea-level rise effectively and at a low cost. Instead, policies supporting the protection and restoration of the natural environment, river basins, lakes storing large volumes of water, floodplains absorbing excess water runoffs, and ecosystems may be more effective in mitigating the impacts of climate change and sheltering the most vulnerable segments of populations and their habitats from floods and droughts associated with it.

---

<sup>32</sup> See *Commitment on infrastructure development*.

<sup>33</sup> See *Living polders: dynamic polder management for sustainable livelihoods, applied to Bangladesh* | NWO.

---

Climate adaptation projects in the water, sanitation, and hygiene (WASH) sector, which in developing countries are often supported by international development and humanitarian assistance, tend to focus on current vulnerabilities with regard to climate change, and not take into account future climatic conditions and climate-related risks that will bear on water infrastructure and services (Mueller *et al.* 2021).<sup>34</sup>

**The modalities of development assistance supporting infrastructure investments can lead to unintended adverse effects on climate change adaptation processes.** For instance, in Bangladesh, considerable investments in infrastructure have been made and financed by the state and development partners to mitigate the effects of storms and flooding (embankments and cyclone shelters for example). **However, corruption, embezzlement of funds and low-quality constructions notably, has had severe effects on the delivery of those infrastructure projects** (Khan *et al.*, 2020). In southwestern Bangladesh, poorly-functioning multi-level governance has led to discrepancies between the actions taken by the central government and climate adaptation investments made by local authorities and non-state actors (Kulsum *et al.*, 2021). The involvement of individuals (land owners, business owners and other local community members) and civil society organisations with an interest in the infrastructure in monitoring implementation leads to lower levels of corruption (Khan *et al.*, 2020). Local indigenous communities may play a role in promoting nature-based solutions such as the restoration of tidal river basins.<sup>35</sup>

## 2.4. Policies shaping production and trading systems in developing countries

### 2.4.1. Trade and investment policies

International economic policies have played a major role in shaping production and trading systems in developing countries, including their reliance on the utilisation of fossil fuels and their vulnerability to climatic shocks and other exogenous factors, such as the coronavirus pandemic – which revealed the vulnerabilities built-in international supply chains. **Over the past decades, advanced countries' trade and investment policies have contributed to their reliance on imports of raw materials and low-cost manufactured goods from developing countries and the offshoring of manufacturing activities.** Given that extractive and manufacturing activities are energy-intensive, those policies have had implications for climate policy outcomes in developing countries. **The negative cross-border spillover effects of supply chains are one of the main areas where EU countries have so far made little progress in implementing the SDGs** (SDSN and IEEP, 2019).

**At different levels, developed countries have formulated policies and deployed resources to increase trade with developing countries.** Through the General Agreement on Tariffs and Trade (GATT) and then the World Trade Organization, the multilateral trading system has provided developing countries with preferential access to the markets of developed countries. Several developed countries have established generalised system of preferences schemes providing developing countries with non-reciprocal preferential market access. Amongst developing countries, LDCs have benefitted from special trade arrangements. For example, with the Everything But Arms trade scheme, the EU has granted LDCs duty- and quota-free market access for most of their exports since 2001. As the generalised system of preferences was being established, the structural adjustment programmes supported by the Bretton Woods institutions, between the 1980s and early 1990s, encouraged developing countries to liberalise their economies and trade and attract foreign direct investments (FDI).

In the 2000s, the WTO led the Aid-for-Trade Initiative to mobilise and deploy more resources to alleviate constraints to trade in developing countries. Aid for trade increased from the early 2000s to the late 2010s, in absolute terms and as a share of ODA. It supported mainly economic infrastructure (transport, telecommunication, energy and buildings for productive activities).<sup>36</sup> Developed countries have also promoted imports, exports and foreign direct investment

---

<sup>34</sup> Personal communication with Gerardo van Halsema, Wageningen University and Research.

<sup>35</sup> See *Bangladesh: Involving communities for free rivers | Both ENDS*.

<sup>36</sup> See *Policies to promote trade (International cooperation and multilateral mechanisms)*.

---

in developing countries, which are closely interlinked,<sup>37</sup> using various policy instruments. While developed country policymakers have ostensibly intended to support inclusive economic development through trade and investment policies, they have also sought to enhance access to markets, natural resources and low-cost labour in developing countries, to the benefit of multinational enterprises (OECD, 2002).<sup>38</sup> More recently, the private sector has become increasingly involved in facilitating trade and investment in developing countries, for instance, through the Global Alliance for Trade Facilitation.

**Trade- and investment-related policies directed at developing countries and emerging countries have certainly generated benefits for the latter – as well as for developed countries.** Trade facilitation has been critical for creating new economic opportunities, reducing poverty and building the resilience of local and regional markets for essential goods, particularly staple food commodities. The Global Investment Competitiveness Report 2017/2018 (World Bank, 2018) indicates that FDIs generally benefit developing countries, allowing them to gain technical know-how, improve the skills of their workforces, enhance productivity, create business opportunities for local firms, and so forth, although FDIs may also have drawbacks.

**At the same time, aid for trade – especially for the transport, energy and buildings sectors, which are large sources of GHG emissions – as well as the expansion of international trade and the offshoring of energy-intensive industries to developing countries has increased the carbon and environmental footprint of developing countries in recent decades.** While OECD countries are still responsible for most of the historical GHG emissions, the current GHG emissions and projected cumulative emissions of China, other emerging economies and developing countries are rising rapidly, in both absolute and per capita terms (Clements, Gupta and Liu, 2021). The growth rate of emissions of emerging economies has overtaken that of developed countries, a trend that has gathered pace during the coronavirus pandemic.<sup>39</sup> **Other forms of environmental degradation and socio-economic inequalities linked to export-oriented industrial growth may have increased vulnerabilities to climatic shocks, although wealth creation has probably contributed to building resilience.** Although international specialisation might have brought out efficiencies in the use of fossil-fuel-based energy and natural resources such as water, international trade itself has a significant carbon footprint (OECD, 2016b) and benefits from fossil fuel subsidies that go to the transport sector (OECD, 2021). **Thus, developed countries’ policies promoting trade and investment in developing countries are to some extent in contradiction with climate mitigation objectives in developing countries.**

**The textiles and clothing sectors illustrate the benefits as well as the negative impacts of international trade and value chains supported by external policies.** Textiles and clothing manufacturing activities that have relocated from industrialised countries and developed in low-income countries several decades ago contributed to the economic growth of the latter. It has had some negative effects on workers, as documented early on by a report of the International Labour Office (ILO, 1996). This sector also contributes to climate and environmental outcomes. In Bangladesh, where the textiles and clothing industries constitute a major part of the national economy, these manufacturing activities utilise significant amounts of electricity derived from fossil fuels and generate environmental pollution (see 4.5). Energy efficiency in the textiles and garment sectors (ADB, n.d.) is a matter of policy coherence for European actors<sup>40</sup> and other importers that promote trade and investment in this country while also promoting climate and clean energy objectives.

---

<sup>37</sup> See *International trade, foreign direct investment and global value chains - OECD*.

<sup>38</sup> Multinational enterprises have become more prominent actors on the economic policy agenda following a wave of industrial consolidation that took place in earnest in the 1990s, in particular in North America, Europe and Japan, and coincided with the emergence of global value chains.

<sup>39</sup> See *Global Energy Review: CO2 Emissions in 2020 – Analysis - IEA*.

<sup>40</sup> See *EU trade relations with Bangladesh*.

---

### 2.4.2. Green transition policies

**Recent policies of developed countries aiming to mitigate climate change potentially have far-reaching consequences for economic relations with developing countries.** Efforts to ‘decarbonise’ production and trading systems in advanced countries, by promoting low-GHG-emission technologies and norms in the energy, transport and industrial sectors, comprise economic, agricultural, trade and financial reforms that have implications for developing countries’ economies. The latter could be confronted with the risk of losing competitiveness and access to developed countries’ markets and being side-lined from international supply chains if they do not reform their carbon-intensive economies rapidly enough. **That, in turn, could negatively affect their ability to invest in the green transition and climate change adaptation.**

**The European Green Deal (EGD), a package of EU policies aiming to achieve a ‘green transition’ and eventually reach ‘climate neutrality’ by 2050, is a major initiative contributing to those policy developments.** In 2020, EU leaders adopted the objectives of a reduction in net emissions of greenhouse gases of at least 55% by 2030 as compared to 1990, and net-zero emissions (or, climate neutrality) by 2050, for EU countries as a whole. These targets were then made legally binding through the European climate law, as part of the Fit for 55 package. To complement the EU emissions trading system (ETS), which applies to goods and services produced in EU countries, the EU plans on establishing a carbon border adjustment mechanism (CBAM) to prevent imports of GHG-intensive products<sup>41</sup> into the EU or the relocation of production outside the EU from offsetting emissions reductions in the EU. Other measures currently planned as part of the EGD, such as the inclusion of maritime shipping in the EU ETS, the FuelEU Maritime initiative aiming to reduce the GHG intensity of commercial ships and the circular economy action plan<sup>42</sup> will affect the EU’s trade relations with developing countries if they are enacted. Policymakers may at some point be confronted with contradictions, by wanting to implement structural economic reforms to ‘green’ the economies and trade of their countries, while at the same time intending to support economic growth, inclusion and resiliency in developing countries.

**Recent commitments at the level of the G7 to coordinate and strengthen carbon pricing policies and to set up a ‘climate club’ within the World Trade Organisation membership portend major changes in the global economy, which could give rise to tensions between international climate objectives on the one hand, and international development objectives on the other hand, especially for developing countries whose economies heavily depend on fossil fuels.**<sup>43, 44</sup> These policy changes are happening while some developing countries vulnerable to climate change such as Bangladesh are transitioning out of the LDC category, thereby losing trade preferences. Mitigating the possible negative spillover effects of advanced economies’ green transition policies on socio-economic dynamics in developing countries and exploiting potential synergies between structural reforms pursued in the ‘North’ and the ‘South’ will require careful assessments and management of the interlinkages between different objectives.<sup>45</sup>

---

<sup>41</sup> Sectors concerned include aluminium, cement, electricity, fertilisers, iron and steel. Countries exposed to regulatory risks include: Mozambique, Cameroon, Guinea and Sierra Leone, which export aluminium; Zimbabwe and Zambia, which export steel.

<sup>42</sup> In the context of its efforts to promote resource efficiency and circular economies, the EU has funded ‘Switch to Green’ regional programmes in Africa, Asia and the Mediterranean to encourage sustainable consumption and production policies and green business practices.

<sup>43</sup> See *Policy paper – G7 Presidency in the Finance Track*.

<sup>44</sup> See the BankTrack, Milieudéfense and Oil Change report authored by Geuskens and Butijn (2022).

<sup>45</sup> In the case of the Dutch and EU circular economy policies, see Ashraf and van Seters (2021) for a discussion of the implications for low- and middle-income countries.

---

## 2.5. Policies driving land use and the conservation of tropical forests

**International commerce and supply chains that rely intensively on the use of natural resources, forests and lands in particular, can have adverse consequences on climate outcomes.** The ‘health’ of forests, lands, soils and the ecosystems they support drives local and regional climate regulation as well as climate change mitigation and adaptation outcomes (Windisch, Davin and Seneviratne, 2021).<sup>46</sup> **Deforestation in equatorial and tropical regions is largely driven by the conversion of forestland into agricultural land for the production of food crops, animal feed, feedstock and fibres. This change in land use has been driven by rapidly expanding food economies and bio-industries.** In recent years, about 80% of deforestation in tropical regions has been linked to growth in palm oil, soybean and cattle production. In addition, logging, extractive industries, and the development of roads and other infrastructure have also contributed to deforestation and forest degradation. Deforestation, forest degradation and the development of economic activities on forestlands also affect the habitat and livelihoods of indigenous populations. Tropical deforestation takes place in Latin America (in the Amazon basin (Szabó, 2022) and the Maya Forest in Mexico and Guatemala); across sub-Saharan Africa, in Central Africa (especially in the Congo basin), West Africa (including in Liberia, Côte d’Ivoire and Ghana), and Eastern and Southern Africa (including in Madagascar); in Southeast Asia (in the Mekong Delta and Indonesia); and in Oceania (Pacheco *et al.*, 2021).

### 2.5.1. Policies related to the importation of agri-food and forestry products

A recent study (Rajão *et al.*, 2020) found that **about 20% of soy exports and at least 17% of beef exports from Brazil’s Amazon and Cerrado regions to the EU may be directly linked to illegal deforestation** (soy and cattle are the main agricultural commodities produced and exported by Brazil, which is the largest beef exporter in the world). In these two regions, more than half of the plausibly illegal deforestation is due to a small number of farm properties – the authors noted however that most of Brazil’s agricultural production is not directly linked to deforestation. Another study found that deforestation associated with soy production and cattle ranching in the southern Amazon basin subsided in the late 2000s and early 2010s, due to stringent regulations and strong law enforcement (Gandour, 2021), after a boom in deforestation – most likely linked to international market circumstances – that caused the destruction of vast areas of tropical rainforest (Macedo *et al.*, 2012). However, over the 2012–2019 period, the pace of deforestation increased again due to a rise in illegal forest clearings and multiple causes of forest degradation (Gandour, 2021). **Other countries besides the EU import soybean from South America, most notably China, which is the world’s largest soybean importer. China and other Asian countries also import beef from South America.** Deforestation linked to soybean and beef exports has also been seen in Paraguay and Argentina.

Soybeans and soy products imported from South America into the EU largely serve as animal feed (Karlsson *et al.*, 2020) in the European livestock dairy and meat sectors<sup>47</sup>. The EU has traditionally favoured imports of vegetal proteins over local production, although policy changes are underway. While the EU has criticised the Brazilian government for failing to enforce laws and regulations intended to protect the Amazon forest, the EU has negotiated a trade agreement with the four founding member countries (Argentina, Brazil, Paraguay and Uruguay) of Mercosur (the Common Market of the South), as part of a wider Association Agreement, and reached a political agreement in 2019. This agreement lowered import tariffs and expanded quotas for beef and veal from Mercosur countries. The environmental provisions in this agreement (including the obligation to the parties to implement the Paris Agreement) could help ensure that European agricultural imports do not contribute to the destruction of forests in Mercosur countries.<sup>48</sup> **These provisions notwithstanding, this EU trade policy may be incoherent with its climate policy and**

---

<sup>46</sup> On the role of land and the land use factor in the ecological transition, see Boccaletti (2022).

<sup>47</sup> See *EU animal feed imports and land dependency*.

<sup>48</sup> Since a decade ago, all EU free trade agreements (with South Korea, Canada, Singapore, Colombia, Peru, Ecuador, Central America, Vietnam, Japan and more recent trading partners) have included a ‘trade and sustainable development chapter’, including provisions on labour, the environment, and responsible business conduct. In free trade agreements with developing countries, the EU has provided trade-related development assistance for the implementation of sustainable development



---

**more generally the European Green Deal by indirectly causing tropical forest losses and forest fires and thus contributing to GHG emissions.** It may also have spillover effects on water utilisation and the allocation of water resources across regions (see 4.5). In part due to environmental concerns, this trade agreement has not yet been ratified by EU MS.

While soy production and cattle ranching have been the primary drivers of deforestation in Latin America, in Southeast Asia timber harvesting and palm oil plantations have been the main causes of it in the recent period.<sup>49</sup> **In both regions, feedstock production growth, following the rise in demand for biofuels (ITF, 2008), has contributed to land-use changes and deforestation.** In sub-Saharan Africa, agricultural land expansion due to low-productivity smallholder farming, including for cocoa and coffee, the emergence of large-scale, commercial farms, and timber harvesting for fuelwood and construction have been the main drivers of deforestation and forest degradation. **Across those three regions, growth in the production of cocoa, coffee, oil palms, rubber trees, maize and livestock, in response to an expanding demand in local, regional and international markets, has increasingly contributed to deforestation.** Informal, small-scale timber harvesting has also become a more important factor of deforestation. Deforestation, in turn, usually affects the resilience of rural communities in the face of climate change.

### 2.5.2. Policies related to the extraction of minerals and fossil fuels

The extraction of minerals and the exploitation of fossil fuel deposits have significantly contributed to deforestation and forest degradation in Latin America, Southeast Asia and sub-Saharan Africa. **The case of the Congo basin illustrates well different tensions amongst international climate objectives and other policies. The rainforest in this river basin is the second-largest carbon sink in the world after the Amazon rainforest, and so its conservation is critical for climate mitigation.** However, it has the largest deposits of coltan (columbite–tantalite) and large quantities of cobalt and lithium, which are crucial minerals for the manufacturing of batteries and other electrical and electronic equipment underpinning the transition to clean and efficient energy systems and also the digital transition. **Mining in the Congo basin not only has harmful social consequences, but also negative impacts on the natural environment and health<sup>50</sup>, as environmental laws and regulations are poorly enforced, allowing mining companies to discharge toxic waste in rivers and on lands.** In the Amazon, the exploitation of oil and potassium deposits (the latter is a raw material for fertiliser production) has required the construction of transport infrastructure, which caused environmental degradation.

### 2.5.3. Policy responses to deforestation

The EU has made progress on the regulation of timber and biofuel imports.<sup>51</sup> **For example, the EU-Ghana Voluntary Partnership Agreement (VPA), as part of the EU’s Forest Law Enforcement, Governance and Trade (FLEGT) initiative, aims at establishing a bilateral trade regime that is coherent with the EU’s development cooperation objectives and Ghana’s stated policy objectives to sustainably manage Ghanaian forests.** The FLEGT initiative intends to fight illegal logging and trade (which is a common problem for African tropical forests) by improving forest sector governance and promoting trade in legally-produced timber. **However, the EU-Ghana FLEGT VPA has not yet established a functional licensing system for Ghanaian timber exports to the EU, nor has it contributed to making the governance of the country’s forest sector significantly more inclusive.**

---

provisions. In the European Green Deal Communication of December 2019, the European Commission proposed to make future trade agreements compliant with the Paris climate agreement.

<sup>49</sup> On recent causes of deforestation in Southeast Asia, see Feng *et al.* (2021).

<sup>50</sup> For congenital malformations amongst other consequences for humans.

<sup>51</sup> Biofuel crops not only compete for land with food crops and use large amounts of water, but in some cases, they also cause deforestation and greenhouse gas emissions due to land conversion.

---

In 2021, in the framework of the new EU trade strategy and the Fit for 55 package and in relation to the EU forest strategy for 2030, **the European Commission proposed a new regulation on deforestation-free imported products**. The proposal aims to enhance the clarity of EU standards for imported products possibly linked to deforestation and forest degradation, prevent the marketing in the EU of imported products having caused deforestation, and support partner countries in managing forestry resources sustainably. An EU import ban on agricultural commodities produced on recently deforested land is currently being discussed at the European Parliament. This initiative will be particularly relevant to EU trade relations with South American, African and South-East Asian countries with tropical forests, for example, Indonesia and Malaysia where the expansion of oil palm plantations has exacerbated deforestation (IDH, 2020). Concerning Africa, the EU has also launched the NaturAfrica initiative to promote the conservation of nature and prevent the illegal exploitation of natural resources in Africa.<sup>52</sup>

**The private sector plays an important role in supply chains and international trade flows that contribute to deforestation.** The CDP Supply Chain Report 2017/2018 ‘Closing the Gap: Scaling Up Sustainable Supply Chains’ notably indicates that suppliers of some of the largest companies in the world have low levels of awareness of deforestation risks (CDP, 2018). **European countries – for example, Germany with its recent Supply Chain Act, the EU – with its recent supply chain due diligence legislative initiative, and other developed countries have begun to promote more forcefully responsible business practices with regard to tropical rainforests.**

## 2.6. Policies conditioning social adaptation and resilience to climate change

### 2.6.1. Policies shaping social and civil protection systems

The direct effects of climate change, particularly extreme weather events, not only cause damage to economic infrastructure and activities and stress on natural resources and ecosystems, but they also lead to diffused impacts on populations and societies (on their livelihoods, habitat, nutrition, health, geographic settlement, and so forth). The United in Science 2021 report led by the World Meteorological Organization (WMO), for example, anticipates that living conditions could deteriorate severely over the coming decade for more than 100 million people in Africa due to droughts, floods and extreme heat. **Social protection and socio-economic safety nets are critical for protecting the food and water security, health and well-being of vulnerable households from slow-onset environmental changes and natural disasters linked to climate change** (Kaur, 2019; Spano and Patrone, 2021).<sup>53</sup> Besides personal coping strategies and interpersonal solidarity within communities, social protection, which involves the transfer of financial resources or physical goods to people in need, can take multiple forms. It includes both formal social insurances provided by the state and informal social protection mechanisms provided by communities. Furthermore, active labour market policies may facilitate the social mobility of vulnerable people employed in regions and sectors adversely affected by the degradation of climatic conditions.

**Civil protection mechanisms have an increasingly important role to play in protecting people from the effects of extreme weather events and natural disasters linked to climate change such as floods, landslides, wildfires and cyclones.** Existing mechanisms have to adapt to new challenges, for example, the increasing exposure of the elderly and people with disabilities to heatwaves. Emergency assistance for ensuring access to safe drinking water, sanitation and hygiene is essential for maintaining a minimum level of well-being and safeguarding public health.

**Despite their importance for adapting and building resilience to climate change, the development of social and civil protection systems in developing countries has been neglected by international policies and financial flows.** International partners having provided little support to these systems, thus contributing to the social protection gap

---

<sup>52</sup> See *The Green Deal approach for EU support to biodiversity conservation in Africa*.

<sup>53</sup> On social protection in relation to climate change, see also: Bharadwaj *et al.* (2021a), Bharadwaj *et al.* (2021b), and Jordan *et al.* (2021).

---

observed in many developing countries.<sup>54</sup> Advanced countries' foreign policies have largely favoured economic and commercial objectives (through economic diplomacy, trade and investment promotion, and so forth) over social ones (social infrastructure and services, social cohesion, and more generally human development), although through development cooperation they have provided technical support and financing for the development of social insurance, food and nutrition assistance mechanisms and health systems. The modalities of development assistance supporting social policies may also lead to unintended adverse effects, especially when it supports political and economic elites who can use the resources from international aid to reinforce their powers instead of financing the provision of essential public goods and services.

### 2.6.2. Policies influencing stability, security and peace

Over time, changing climatic conditions and repeated climatic shocks have destabilising effects in vulnerable regions. Furthermore, instability and conflicts may negatively affect climate change adaptation processes, for example by undermining the protection of the natural environment (Legros, 2022). **External security policies that unintendedly undermine social stability or fuel conflicts can thus have adverse effects on climate adaptation, especially in fragile state contexts. Vulnerable populations' access to natural resources is essential for building resilience to shocks, including those due to climate change.** In the Sahelian region in Africa, the political exclusion of pastoralists and the deterioration of the conditions in which they access land and water resources has fuelled inter-communal conflicts and reduced the ability of different communities to withstand climate-related shocks (Cooper and Price, 2019).

Security concerns have become increasingly prominent in the relations between advanced countries and developing countries in recent years, for example, between European and African countries. Developed countries' policies in the security sector may undermine development objectives. The EU has promoted linkages between the security and development sectors by promoting conflict prevention and peacebuilding – which is referred to as the 'humanitarian-development-peace nexus' – and the search for political settlements in situations of state fragility, protracted crises and forced displacements.<sup>55</sup> The EU's approach to this nexus notably includes support for the protection of water resources and the security of sanitation workers and water infrastructure and advocacy for compliance with international humanitarian law, international human rights law and international labour rights. **This multi-sectoral approach, involving coordination amongst humanitarian, development and security actors, may play an increasingly important role in preventing and managing situations where the impacts of climate change compound state fragility and security crises.**

**The EU, which is the biggest provider of humanitarian assistance in the WASH sector<sup>56</sup>, has made efforts to enhance linkages between short-term humanitarian aid and longer-term development cooperation using the concept of resilience and human security.** The 2017 Council Conclusions on Operationalising the Humanitarian-Development Nexus encouraged EU institutions and Member States (MS) to seek synergies between humanitarian and development actions in pilot countries (including Chad, Iraq, Myanmar, Nigeria, Sudan and Uganda), by conducting joint analyses and planning exercises involving the two sectors.

---

<sup>54</sup> See for example Veron and Sergejeff (2021).

<sup>55</sup> Notably, in 2017, and as part of the reform of its external security policy, the EU adopted a 'capacity building for security and development' instrument to support security sector reforms in partner countries with a view to engaging partner country military actors in conflict prevention, peacebuilding, humanitarian assistance and development. Also, the 2017 European Consensus on Development intended to remedy state fragility by focusing, amongst other factors, on resilience, sustainability, poverty reduction, and crisis prevention and management.

<sup>56</sup> See EC – *Water, hygiene and sanitation (WASH)*.

---

## 2.7. Policies driving climate finance for developing countries

The international financial system, and the policies shaping it, is a major factor in climate action, both for mitigation and adaptation. **At the global level, over the past decade, climate finance has increased at a steady pace according to the Climate Policy Initiative (2021).** Climate financial flows reached USD 632 billion in 2019/2020. However, in recent years, the growth in these flows has tapered off, whereas current levels of climate finance are still far from the amounts needed for attaining climate objectives in 2030. **Financial flows for adaptation, while continuously growing and having attained USD 46 billion in 2019-2020, remain far below the needs to mitigate the risks due to existing and projected climate change.**

**According to the UN Environment Programme's Adaptation Gap Report 2021, adaptation costs in developing countries will be in a range of USD 140 billion to 300 billion annually by 2030, and USD 280 billion to 500 billion per year by 2050. This report mentions that international climate adaptation finance may decline in the coming years due to the COVID-19 pandemic.** For public decision-makers in developing countries, the challenge of financing climate action is daunting and fraught with policy dilemmas: the financial resources at their disposal are particularly scarce, with low tax receipts and limited access to capital markets; at the same time, while they need increasing amounts of energy to grow economically, their energy policy choices are confronted with many risks.

### 2.7.1. International public climate finance

**Ahead of COP26, the G7 committed to supporting action against climate change by making public financial flows compatible with the goals of the Paris Agreement.<sup>57</sup> At the level of the G20, finance ministers requested that the IMF expand the lending capacity of its Poverty Reduction and Growth Trust and establish the Resilience and Sustainability Trust<sup>58</sup> (RST) in partnership with the World Bank,** to support low-income, vulnerable countries in mobilising long-term financial resources for the net-zero emission transition and adaptation and in reducing balance-of-payment risks due to climate change amongst other factors. However, the current characteristics of the RST may undermine its effectiveness. It has been criticised for not being sensitive enough to vulnerability to the physical impacts of climate change and the energy transition, for the excessively high levels of interest rate and conditionalities it imposes, and for its small size (Ahmed, Bárcena and Titelman, 2021). Countries of the G20 also committed to phasing out international public support for unabated coal power generation. **However, the G20 did not commit to any other significant climate finance initiatives.**

**Developed countries have made progress in attaining their commitment of making available to developing countries USD 100 billion annually, by providing public finance and mobilising private finance.<sup>59</sup>** OECD Development Assistance Committee (DAC) data indicate that in 2019 developed countries provided and mobilised USD 79.6 billion of climate finance for developing countries, mainly through multilateral public climate finance and bilateral public climate finance (OECD, 2021c). This means that there is still a gap of USD 20 billion annually to meet the USD 100 billion commitment. International private climate finance mobilised by developed country governments has been rising modestly over the past decade. In 2019, the EU, its Member States (including the UK) and the European Investment Bank provided EUR 23.2 billion of public climate finance to developing countries (EUR 21.9 billion without the UK).<sup>60</sup> The EU has increasingly integrated climate finance objectives in its budget, the Multiannual Financial Framework, including for international and development cooperation. The importance of international climate adaptation finance, in absolute terms and as a share of total international climate finance, has risen over the past

---

<sup>57</sup> See *G7 Climate and Environment: Ministers' Communiqué, London, 21 May 2021 - GOV.UK*.

<sup>58</sup> The Resilience and Sustainability Trust is funded by reallocations of Special Drawing Rights, the IMF's reserve assets, from rich countries to low- and middle-income countries vulnerable to climate-related economic shocks.

<sup>59</sup> See *New G7 action to keep people safer from climate disasters - GOV.UK* and Timperley (2021).

<sup>60</sup> See *International climate finance*.

---

years, reaching USD 20.1 billion in 2019. **Yet, as of 2019, adaptation still represented a minor part, about a third, of total climate finance provided and mobilised for developing countries** (OECD, 2021c).

Adaptation finance comes largely from the public sector, notably through public development finance. Water-focused adaptation finance (Mason *et al.*, 2020) amounted to USD 11 billion in 2018 (for water and wastewater management), which represents a substantial share of total adaptation finance.<sup>61</sup> **Forests, which are severely affected by climate change, with rising temperature changes, pests, diseases and other factors, receive little adaptation finance (Einhorn, 2021).**<sup>62</sup> **As part of international climate finance, the shares of agriculture, forestry and fishing and water and sanitation have remained modest (8% for both in 2019 according to the OECD DAC data).**

**International climate-related disaster risk financing has an important role to play in strengthening climate-related disaster risk management.** Climate finance is not only important for long-term adaptation processes, but also for the mitigation of the macroeconomic impacts of climate-related shocks and for improving access to public transfers, private finance and insurance for vulnerable households and businesses in developing countries. In Bangladesh, for instance, the weaknesses of the state in the areas of domestic resources mobilisation, particularly tax revenue and administration, and deficiencies in the banking sector are such that public authorities are faced with the challenge of creating fiscal space for climate adaptation and risk mitigation investments as well as for emergency measures in the management of climate-related disasters (including social protection and economic safety nets).<sup>63</sup>

**Fiscal management plays a key role in climate-related disaster risk management, by anticipating possible budgetary impacts, providing for adequate financial capacity within the fiscal and budget framework, ensuring the government can disburse funds promptly in emergencies, and also financing the reconstruction of public assets and infrastructure.** When insurance markets are absent or unable to cover risks to people and assets, leaving governments with potentially large financial exposures, especially in low-income, vulnerable countries burdened with heavy debt servicing and repayment, international climate finance can support the resilience of states and societies.

With ODA levels stagnating, the scope for growth in international public climate finance is small. **In this context, blended finance modalities are increasingly used to mobilise additional resources from the private sector to finance socio-economic investments and climate action in developing countries.** Blended finance involves the deployment of public funds, or other types of concessional capital, to de-risk private capital investment. Development finance institutions routinely use blending modalities. The EU launched the External Investment Plan (EIP) in 2017 to encourage private investments in sectors contributing to sustainable development, including clean energy. Another example is the Climate Finance Partnership discussed earlier, which aims at financing climate-friendly infrastructure projects in developing countries and emerging countries. Multilateral and regional development banks in particular could make greater use of blending to finance climate adaptation investments in developing countries, for example in the water, sanitation and hygiene sectors where unmet financing needs are considerable. **Yet, blending also carries risks for developing countries' financial and sustainable development interests.**<sup>64</sup> For instance, in Bangladesh, development and climate financing is likely to increasingly rely on the blending of public and private financial resources (Rahman *et al.*, 2019), which can bring additional resources but may also create risks such as distortions in the domestic financial market and the sector of banking services, as well as balance-of-payment risks due to possible, sudden capital outflows. Appropriate regulations and corporate governance will be needed to mitigate these risks.

---

<sup>61</sup> Water-focused mitigation financial flows have been smaller (for instance, in 2018, climate mitigation finance for wastewater and waste combined amounted to USD 3 billion in 2018).

<sup>62</sup> Soil restoration and wetland conservation also receive little funding whereas they can play an important role in carbon sequestration.

<sup>63</sup> See *Bangladesh: 2019 Article IV Consultation-Press Release; Staff Report; and Statement by the Executive Director for Bangladesh*.

<sup>64</sup> For example, see Romero (2013).

---

### 2.7.2. International private finance and climate objectives in developing countries

**Fiscal policies, policies directed at the financial sector, and laws and regulations concerning financial corporations (company law, financial regulations, and so forth) allow and may even encourage private banks, insurers and asset managers operating internationally to provide considerable financing to the fossil-fuel sector, including in developing countries and tropical forest regions.** According to Geuskens and Butijn (2022), commercial banks channelled large amounts of finance to gas, oil and coal projects in sub-Saharan Africa between 2016 and 2021. The largest private financiers of fossil fuel projects in sub-Saharan Africa are based in the United States, Europe (the UK and France in particular), and Australia, the three largest ones in the world being US banks JP Morgan Chase, Citi and Bank of America (Gelles, 2021). Others are from China and Japan.

The financing needs of the polymer sector, which contributes to GHG emissions and pollution in developing countries, are fulfilled by about twenty banks and investors that hold more than USD 300 billion of assets invested in the parent companies of polymer manufacturers.<sup>65</sup> Petrochemical companies and their financiers do not incur any significant part of the costs associated with the disposal and recycling of plastic wastes, nor with the pollution that they cause. **Multinational banks and asset managers also provide financing to agribusinesses operating in soy, beef and palm supply chains that are linked to deforestation.**<sup>66</sup> Banks based in China, the US and Europe, notably the Industrial and Commercial Bank of China, JPMorgan Chase, HSBC, Bank of America and BNP Paribas, have provided sizable financing to companies sourcing and trading commodities from rainforest areas such as the Amazon. Bond and share issue underwriting agreements, bond holdings and lines of credit are the main modes of financing.

**Despite climate-related international agreements and commitments from both the public and private sectors in recent years, multinational banks have not cut the financing of the fossil fuel industry.** Asset managers (Mooney, 2021) also contribute to the financing of investments in the fossil-fuel sector, including in emerging markets, although some are adopting policies shifting investments away from fossil fuels. For instance, the Algemeen Burgerlijk Pensioenfonds (ABP) (Boffey, 2021), one of the largest pension funds in the world<sup>67</sup>, committed to no longer investing in the fossil-fuel sector, a decision that followed a lawsuit pursued by the climate action group Fossil Free.

**The G7 promotes change in the private financial sector to fulfil net-zero emission commitments. It supports mandatory disclosures based on the common framework of the Task Force on Climate-related Financial Disclosures (TCFD) and the works of several jurisdictions and organisations on sustainability standards, to provide investors with reliable and standardised information on climate risks facing companies.**<sup>68</sup> As of March 2022, eight jurisdictions have committed to using the TCFD framework for setting their climate reporting requirements, including Brazil, the EU, Hong Kong, Japan, New Zealand, Singapore, Switzerland and the UK. The EU Sustainable finance taxonomy and the Corporate Sustainability Financial Reporting Directive set advanced benchmarks for international actors. Due diligence, disclosure and financial sustainability standards<sup>69</sup> are likely to become increasingly important as an investment factor, although a number of obstacles have been identified.

---

<sup>65</sup> The sector of plastic manufacturing, in particular single-use plastics, is closely linked to that of oil and gas. Plastics are mostly made of these fossil fuels and plastic manufacturing (for packaging for example) produces a large amount of GHG emissions. The plastics sector not only contributes to the consumption of fossil fuels, it also contributes to the pollution of lands and waters (rivers and seas). Developed countries' companies exporting goods made of or packaged in plastic to developing countries, or investing in manufacturing plants producing or using plastics contribute to the pollution of these natural resources. The petrochemical companies that manufacture polymers, that is, the chemical building block of plastics, play an important role in the plastic value chains contributing to plastic pollution (see *Executive Summary | Plastic Waste Makers Index | The Minderoo Foundation*).

<sup>66</sup> See *BankTrack – Forests and Finance Bank Policy Assessment* and Hodgson and Morris (2021).

<sup>67</sup> See *Climate reports spurred Dutch pension fund to sell fossil fuel investments | IHS Markit*.

<sup>68</sup> See *G7 Finance Ministers and Central Bank Governors Communiqué - GOV.UK*. Updated 5 June 2021.

<sup>69</sup> See *Enhancing Disclosure and Due diligence for Climate-related Risks | OECD*.

---

**The many initiatives currently taken by different jurisdictions to promote sustainability in the private sector, particularly in the financial sector, if poorly coordinated and harmonised, may undermine the effectiveness of capital markets at channelling finance across borders and towards climate-friendly investments.** The proliferation of standards may create a risk of regulatory arbitrage and race to the bottom, with lower standards, more ‘greenwashing’ and less capital available for sustainable investments (Panetta, 2021). The recent establishment of the International Sustainability Standard Board (ISSB) is expected to support the harmonisation and effectiveness of sustainability criteria in corporate reporting.

Although G20 countries also support sustainability-related disclosures according to the framework of the ISSB, on the basis of the TCFD, **the G20 Sustainable Finance Roadmap essentially focuses on disclosing sustainability-related information pertaining to the creation of benefits by companies and does not explicitly encompass companies’ social and environmental spillover effects on external stakeholders, including cross-border impacts.** The recommendations of the roadmap are limited to a set of broad and voluntary principles for the development of taxonomies, instead of recommending a common framework.<sup>70</sup>

**Lastly, the adoption by developed countries of classifications of investments with high sustainability standards that are appropriate to their contexts but that might create barriers to desirable investments in the context of low-income and lower-middle-income countries.** Partial or incoherent approaches to promoting sustainable private investments<sup>71</sup> may deter international businesses and financial investors from allocating capital to developing countries, especially SMEs.

### **2.7.3. International tax policies and illicit financial flows**

**Illicit financial flows (IFFs) reduce the availability of domestic resources for governments to finance development and in particular investments for climate adaptation and mitigation.** Tax avoidance, tax evasion and IFFs are largely due to the mis-invoicing of commodity exports from developing countries and to tax havens. IFFs have notably undermined the mobilisation of domestic resources that are critical for financing social security (Mohiuddin, 2020) – despite the progress made in supporting social safety nets in recent years, international actors’ responses to climate-related disasters are still largely reliant on humanitarian aid (Watkins, 2021). More broadly, in the context of climate change, IFFs undermine efforts to build climate-related disaster risk financing capacity in developing countries. Some trade in fossil fuels (Porter and Anderson, 2021) and cross-border criminal activities causing environmental degradation such as illegal logging and timber trade rely on illicit finance and corruption.

Ongoing efforts of G20 and OECD countries to establish a global minimum tax on corporate profits and address other tax issues linked to globalisation and digitalisation could contribute to the financing of climate action in developing countries. Company-beneficial ownership registries can help regulatory and law enforcement agencies and other public authorities thwart the illegal financing of environmental crime. G7 countries have committed to making more information publicly available and to increase technical and financial assistance for a more effective and widespread implementation of Financial Action Task Force (FATF) Standards across the world, to fight money laundering, terrorism financing and the financing of arms proliferation (Mohiuddin, 2020).

---

<sup>70</sup> See also the Synthesis Report prepared by the Sustainable Finance Working Group (SFWG).

<sup>71</sup> In terms of a combination of public policies (agriculture, industry, trade, fiscal policy and so forth), public investments (infrastructure, research and innovation, and so forth), and economic and financial regulations.

---

## 3. Food security

### 3.1. Drivers, trends and preview of findings

**Food security is a multidimensional concept linked to malnourishment.** Food and nutrition research often focuses either on how to ensure food security for those people that are food insecure (reduce hunger and malnutrition) or on how to ensure food security and adequate nutrition for humanity as a whole (feed the world). Generally, chronic food insecurity, meaning being food insecure over a long period of time, is distinguished from acute food insecurity, which refers to such a severe lack of food that lives or livelihoods are in immediate danger. Food insecurity can lead to malnourishment, a term that groups together the state of undernourishment (low weight), undernutrition (lacking micronutrients) and overweight or obesity (excessive weight). When acute food insecurity and malnutrition rise sharply at local or national levels, a food crisis is occurring.

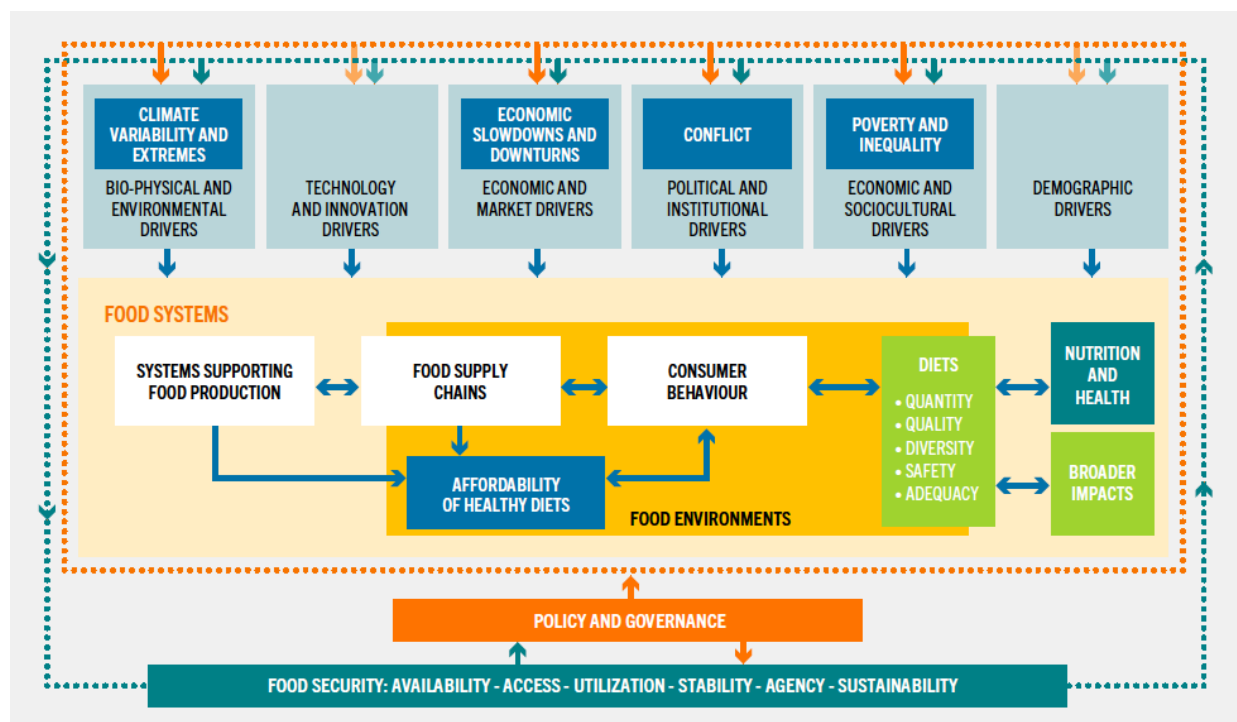
**‘Food systems’ is a broad concept that links food with environmental sustainability, social equity challenges or food security and nutrition outcomes.** It is increasingly recognised that the challenges of food security and nutrition, environmental sustainability and social equity are interlinked and can rarely be tackled in isolation (Springmann *et al.*, 2018). To understand the linkages among these issues with food and to act upon the resulting complexity, policymakers and researchers increasingly turn to the concept of food systems (Dekeyser *et al.*, 2020). A food system can be defined as ‘*All elements and activities that relate to production, processing, distribution, preparation, and consumption of food*’ (Willett *et al.*, 2019: 4). This includes the environment, people, inputs, processes, infrastructure, and institutions involved that take food from farm to mouth (IFPRI, 2016; Figure 3).

**The drivers of food security differ depending on where the focus lies:** on the food (in)security status of individuals, regions or countries, or on broader concepts such as food systems. The recent drivers of food insecurity – more specifically, expressed as hunger – are more frequent and intense conflict, climate variability and extremes, and economic slowdowns and downturns. Poverty and inequality are critical underlying structural factors that amplify the negative impact of the major drivers (FAO *et al.*, 2021). The COVID-19 pandemic exacerbated these major drivers, particularly in low- and middle-income countries (*ibid*). The World Food Programme projects that the Russia-Ukraine war and the subsequent rises in food and energy prices may lead to 33-47 million additional people suffering from acute hunger (WFP, 2022). For global food systems (Figure 3), the key drivers are economic and demographic growth and dietary changes that increase food demand, technological innovations, intensification of agricultural production, resource degradation (e.g., soil health), infrastructure, internationalisation of investments, trade policy, climate change, and concerns for food safety (Bene *et al.*, 2019; Maggio *et al.*, 2015). Undernutrition is caused by inadequate local diets, poor sanitation and hygiene, broken public health systems, and (HLPE, 2017). Overweight and obesity are driven by a nutrition transition, which is the shift in dietary patterns, consumption, and energy expenditure linked with economic development over time (WHO, 2017).

**Food security is one of the four Dutch development policy priorities since 2011** (IOB, 2017). Between 2012-16, Dutch food security policy objectives can be summarised as 1) increasing sustainable agricultural production; 2) improving access to nutritious food; and 3) improving the enabling business environment. The selection of activities at country level was partly determined by aligning food security objectives with private sector development ones. This alignment often resulted in more agricultural development than improving nutrition projects (*ibid*).



**Figure 3: Impacts of various drivers are transmitted through food systems, undermining food security and nutrition**



Source: FAO et al., 2021.

**Conflict, climate change, and economic slowdowns and downturns increase food insecurity globally.** More than 90% of undernourished people live in Asia and Africa. Between 2020-21, conflict-related food insecurity is mostly found in Asia and African countries, with the exception of Haiti, Colombia, Venezuela and Ukraine (FAO, 2021; WFP, 2020). Violent conflicts often result in forcibly displaced people, a group with a heightened risk of hunger and undernutrition, whose numbers reached a record in 2021 (FAO et al., 2017; UNHCR, 2021). The Russia-Ukraine war leads to more forcibly displaced people in Europe, but its impacts on food and energy prices could lead to more instability in other parts of the world as well (Knaepen and Dekeyser, 2022). Climate change increases air temperature and causes more frequent and intense extreme weather events, and has already slowed down agricultural productivity growth (Ortiz-Bobea et al., 2021). Unfettered climate change risks pushing one-third of global food production outside the safe climatic space that supported agricultural production (Kummu et al., 2021). Economic slowdowns (i.e., low growth) and downturns (i.e., decline) harm poorer countries, especially as nutritious foods become less affordable. COVID-19 and the unprecedented lockdowns globally negatively affected food security and nutrition, mostly because of lost incomes and lower economic growth (Laborde and Martin, 2020).

**Box 3: Preview of policy coherence hotspots affecting food security**

The supply-side policies of major agricultural producers and exporters affect small-scale food producers through international food trade. Agriculture receives massive public support, with the EU’s Common Agricultural Policy regarded as a scheme where such public support had strong trade-distortion effects. Recent studies point to a drastically improved coherence between the EU’s Common Agricultural Policy (CAP) and development. The impact of the CAP’s reform is visible in the EU’s trade with Africa. Non-EU spending on agriculture increased strongly, with trade-distorting effects.

Trade policies, both import- and export-oriented ones, have implications for food security and nutrition outcomes in

developing countries. Food trade is essential for global food security, but trade policies are by far the most common source of reported issues of policy coherence concerning food security. The EU largely determines the trade policies facilitating developing countries' access to the European market, with different preferential trade schemes applicable to developing countries. Non-tariff barriers to trade have an unclear impact on trade between the EU and developing countries. In this context, it is uncertain whether export-oriented value chains provide sufficient opportunities to poor, small-scale farmers and other vulnerable populations. The cocoa value chain shows the difficulty of export chain-led development and the negative environmental impacts of specialised agricultural export chains.

As trade agreements are legally binding, they can potentially undermine non-binding international agreements aiming to combat food insecurity and malnutrition, in particular overnutrition. More international trade is linked with more obesity, while trade agreements can lower the policy space to combat this.

Energy and biofuel policies have effects on food security. Biofuels are a source of renewable energy supported by the EU, for example, that are contested for their environmental benefits and competition with food production. The EU's bioeconomy and agro-food policies are broadly coherent. Still, first-generation biofuels seem to have negative effects on food security and the environment, with advanced biofuels in short supply.

Investment promotion policies have effects on land use and the development of agri-food value chains. Investment agreements can pave the way for investors to acquire (the rights or use of) resources abroad. Supporters of these investments argue that opportunities to invest in land can lead to benefits. Yet, many of the promises by investors of rural development, employment, and corporate social responsibility were not kept or did not materialise. On-the-ground impact of land investments varies considerably. Investors are diverse and truly global, originating from both the North and the South.

### 3.2. Supply-side policies affecting small-scale food producers through international trade

**Agriculture receives massive public support, with the EU's Common Agricultural Policy regarded as a scheme where such public support had strong trade-distortion effects.** Agriculture receives massive public support worth USD 540 billion annually. The bulk of these subsidies come from developed countries (FAO *et al.*, 2021). A well-known example is the EU's Common Agricultural Policy (CAP), which is one of the largest subsidy schemes in the world, worth EUR 270 billion for the funding cycle 2021-27 (Apuzzo and Gebrekidan, 2021). The CAP subsidies are very contentious on the global stage, as it is seen as subsidising quite well-off industrial farmers and food processing companies in EU countries. These farmers and companies then outcompete poor small-scale farmers and domestic processors in developing countries, where farming and the broader food economy often still form the bulk of livelihood opportunities, notably in the sectors of milk powder and chicken meat. The CAP has been criticised for lowering the price of food around the world and making European producers artificially more competitive internationally. In turn, critics claim these lowered international food prices can depress incomes and investments into productivity-enhancing agricultural and industrial assets in other countries. As such, the CAP has long been seen as the most spectacular example of policy incoherence for development. But much has improved in the CAP's coherence over the past 20 years (Bureau and Swinnen, 2018).

**Recent studies point to a drastically improved coherence between the EU's CAP and development,** as a result of successive CAP reforms since the 1990s. Especially the reform of 2013 and the removal of export subsidies eliminated the most trade-distorting measures. Correction and prevention of such trade distortion measures are even captured by a specific SDG indicator, namely SDGs 2b-c. Most of the CAP subsidies in 2020 went to direct income support and greening measures, which do not have strong trade-distorting effects. In an evaluation of the recent CAP's impact on developing countries, Matthews and Rossella (2019) asserted that the CAP did not have a distortive effect on the EU

---

agricultural products most exported to (vulnerable) developing countries, taking the examples of milk powder in West African markets (particularly milk importers Nigeria, Ghana, Senegal and Côte d'Ivoire), chicken meat in African and Asian markets, and tomato paste in African markets (especially Angola, Burkina Faso, Sudan, and South Africa).<sup>72</sup>

**The impact of the CAP's reform is visible in the EU's trade with Africa.**<sup>73</sup> The EU's share in African food imports is declining in favour of Asia, while the EU is exporting more to Asia instead. Key to understanding the reduced distortive impacts of the CAP is the rise of new exporters, like Brazil and China. A fall in EU exports could be filled up by these exporters, with similar pressures on local markets if the imported goods are in competition with domestic products. As Swinnen and Bureau (2018: 7) conclude: *'In brief, neither the EU agricultural policy nor the EU food aid policy have a considerable impact on world markets. And they no longer have significant negative consequences for food security. The recent reforms have largely reduced the negative consequences of the CAP for food security'*.

**Non-EU spending on agriculture increased strongly, with trade-distorting effects.** In 2020, the CAP represented 36% of all OECD agricultural subsidies. While the US and Japan publicly supported their agricultural sector strongly in 2020 as well, to the tune of EUR 97 billion and EUR 50 billion respectively, it is especially China that saw a huge increase in public agricultural support. In 2008, China spent EUR 52 billion on agriculture, but this ballooned to EUR 234 billion in 2020 (OECD, 2022). China outspends the EU and the United States in their support of agriculture by more than EUR 100 billion per year over the last seven years. Because Chinese subsidies support more production, its support is particularly trade-distorting (Hopewell, 2019). These impacts are felt in developing countries, mirroring previous discussions about trade-distorting subsidies by OECD countries. The case of the cotton markets and the West African cotton-producing countries – Mali, Chad, Benin and Burkina Faso – is illustrative of the impact of Chinese market-distortive agricultural subsidies and controls. The export of cotton is the most important agricultural export product of Mali, Benin and Burkina Faso, and the third-largest in Chad (OECD, 2022), providing livelihoods to millions of people. China is by far the most important market for cotton producers in Africa and around the world. China became the world's largest subsidiser of cotton and imposes heavy tariffs on cotton imports. As a result, the global cotton market is heavily impacted by Chinese government policy, which currently puts its cotton producers first at the expense of the West African producing countries (Hopewell, 2021). In Burkina Faso, declining world market prices were linked to the inability of cotton-producing households to move out of poverty (Vitale, 2018).

### 3.3. Trade policies impacting food security and malnutrition outcomes

#### 3.3.1. Trade policies impacting food security

**Food trade is essential for global food security, but trade is by far the most common area amongst reported issues of policy coherence for development (PCD).**<sup>74</sup> In general, international trade is beneficial for food security (Gurria and Graziano da Silva, 2019), especially as less than one-third of the world population can be fed from local sources. This makes trade crucial for fulfilling food demand (Kinnunen *et al.*, 2020). For example, even under optimistic scenarios, sub-Saharan Africa is projected to rely much more on international trade to fulfil its food needs in 2050, mainly due to population growth and dietary change (van Ittersum *et al.*, 2016). Trade can also be a major source of income for vulnerable farmers. This makes the facilitation of international food trade, at regional and global levels, important for

---

<sup>72</sup> The largest EU exporters of tomato paste to Africa are Italy, Spain and Portugal, while the Netherlands, Belgium and France are the largest exporters of milk powder. For chicken meat, the Netherlands, Belgium and Poland are the largest exporters to Africa (FAO, 2022).

<sup>73</sup> The EU has also contributed to the establishment and maintenance of a rule-based international trade regime under the World Trade Organisation, while helping to mitigate international food commodity market shocks through its contribution to international trade (Bureau and Swinnen, 2018). Poor net-food-importing countries are particularly at risk from the effects of export restrictions (Lein *et al.*, 2014). These export restrictions contributed to the 2008 food price crisis and other major food commodity market shocks in the following years, with lessons learned and ignored for the COVID-19 pandemic and the Russia-Ukraine war (Laborde and Martin, 2020; Glauber *et al.*, 2022).

<sup>74</sup> E.g., at the EU level (EC, 2017).

---

the realisation of SDG 2.1., namely the universal access to safe and nutritious food. But trade-related policy coherence issues often concern food security and agricultural development. International trade plays an especially important role as a transmission pathway to channelling the impacts of domestic policies of developed countries and emerging economies to developing countries. Through international trade, domestic policies of developed countries can contribute to positive or negative spillover effects on developing countries.

**The European Union largely determines the trade policies facilitating developing countries' access to the European market, with different preferential trade schemes applicable to developing countries.** Although historically the EU has protected the internal markets from agri-food imports, for some time developing countries have been benefiting from preferential trade schemes. With the Generalised System of Preferences (GSP), the EU charges lower tariffs for imports from developing countries than for imports from other suppliers. Besides the standard GSP scheme, the EU offers the GSP+ scheme to vulnerable developing countries and the Everything But Arms scheme to least-developed countries. Most countries participating in the GSP benefit from the Everything But Arms scheme, meaning that their exports to the EU are duty-free and without quotas and they have some kind of flexibility to impose unilateral protection (Lein *et al.*, 2014). Generally, the lowering of trade barriers through preferential agreements has provided export opportunities and contributed to higher incomes, especially for the least developed countries (Aghajanzadeh-Darzi *et al.*, 2015), which can strengthen access to food. Under the GSP, EU trade with (sub-Saharan) African, Caribbean and Pacific countries increased by 50% over 2008-2018 (EC, 2018). Agricultural trade with sub-Saharan Africa increased slightly, with a positive trade balance for sub-Saharan Africa (EC, 2021a).

**Non-tariff barriers to trade have an unclear impact on trade between the EU and developing countries.** With most tariff barriers to trade considerably lowered or removed, recent criticism has centred around the rise of both public regulations and private norms that may act as non-tariff barriers to trade for developing countries' exports, especially for agri-food products. Public regulations include sanitary and phytosanitary rules, while private standards and labels may include various social and environmental norms. Both public and private standards are mostly driven by consumer interests and introduced to protect consumers (Bureau and Swinnen, 2018; Matthews and Rossella, 2019). It is not clear if, and for whom, these standards have acted as trade barriers. Interestingly, agri-food import growth has been highest for those sectors with the most stringent standards, pointing to the limited effect of these standards in hampering exports of developing countries. Alternatively, the standards could be a reaction to the rise of these imports because of pressures by domestic producers to protect their markets. Continued market access for developing country products is then due to exporters and donors carrying mostly the compliance costs with standards (Bureau and Swinnen, 2018).

**In this context, it is uncertain whether export-oriented value chains provide sufficient opportunities to poor, small-scale farmers and other vulnerable populations.** Trade opportunities for agri-food enterprises at either the local, regional or international level, depend on many factors, such as enterprise size, the ability to innovate, and access to finance and markets. Export-oriented value chains seem to have mixed effects on development: on the one hand, smaller enterprises in poorer countries have less advantageous conditions for accessing international markets, which can be more profitable than local and regional markets. Limited opportunities for small-scale farmers to join export value chains can thus increase inequality within the food sector. Historically, some countries focused on promoting exports of raw agricultural goods but then paid insufficient attention to opportunities for the development of local and regional value chains (Tondel *et al.*, 2017). On the other hand, export value chains can create employment opportunities beyond the farm, especially in labour-intensive processing in larger enterprises, which could be a boon for the landless poor.

**The cocoa value chain shows the difficulty of export chain-led development and the negative environmental impacts of specialised agricultural export chains.** Besides more inequalities among agri-food producers, the increased production and specialisation due to liberalising trade agreements can have negative impacts on the natural

---

environment of the exporting country, especially related to deforestation due to agricultural land conversion (Abman and Lundberg, 2019). An example of international food trade causing deforestation is cocoa production for the export market, including the EU. Ghana and Côte d'Ivoire produce about 60% of the world's cocoa supply, the production of which causes deforestation (Asare, 2019). Its producers are often poor or extremely poor, and they have few livelihood alternatives to cocoa farming (Kiewisch and Waarts, 2020). This shows how producing for international value chains, even with a commodity that is only produced in a handful of countries, does not enable Ghanaian and Ivorian producers to escape poverty and preserve the environment. Two recent initiatives try to tackle the poverty and deforestation issues in these cocoa-producing countries: the Living Income Differential and the EU's proposal for a regulation on deforestation-free products. In 2018, Ghana and Côte d'Ivoire agreed to cooperate on providing a premium to their farmers. While providing a premium in 2020, cocoa prices went down in 2021 due to declining demand for cocoa following COVID-19, with some blaming chocolate companies for not propping up farmers' incomes (CNBC, 2021). Regarding deforestation, the EU proposed to ban products from high-risk deforestation zones, which would include cocoa-producing areas. To help with the transition, the EU envisages EUR 1 billion to aid Côte d'Ivoire's cocoa sector (Euractiv, 2021).

### 3.3.2. Trade policies driving overnutrition

**Trade agreements are legally binding, which can potentially undermine efforts of non-binding international agreements to combat food insecurity and malnutrition** (Friel *et al.*, 2020). Recent free trade agreements do not only remove traditional trade restrictions but go much further by determining regulatory standards, health and safety rules, investments, banking and financial regulations, intellectual property rights, labour rights, environmental regulations and much more (Rodrik, 2018). Trade agreements can affect food security by not only increasing the availability of imported goods and expanding export opportunities, but also by facilitating foreign investment in domestic production and distribution of food, and influencing the regulatory policy space (Friel *et al.*, 2020). Thus, trade agreements can have consequences on nutrition and health (Matthews, 2021). An example of international companies trying to control the space of policy-makers is the complaints filed by food companies on the mandatory front-of-pack nutrition labelling scheme and restriction on advertisement of unhealthy food products in Chile. The lawfulness of these measures has been questioned in the context of the World Trade Organization's Technical Barriers to Trade Committee (Garde and Zrilič, 2020). However, relatively few claims in connection to the food sector have been filed under investment agreements. Previous disputes included import restrictions (to prevent the spread of mad cow disease); prohibitions against the use of certain pesticides to protect human health; redistribution of private farmlands; and modification to agricultural subsidy regimes, among others (Thow and McGrady, 2014).

**More international trade is linked with more obesity, while trade agreements can lower the policy space to combat this.** International trade is linked to the spread of ultra-processed foods in developing countries, which contribute to the rise in obesity worldwide (Cordova *et al.*, 2021). Openness to trade is positively associated with more obesity, a relationship that is stronger in developing countries (An *et al.*, 2019). Trade agreements do not only facilitate the import of these foodstuffs by reducing trade barriers for obesogenic foods but can also limit the policy space to address malnutrition out of fear of litigation related to perceived discriminatory practices (Friel *et al.*, 2020). As such, this can undercut SDG 2.2, which includes under 5 years of age obesity.

**The Netherlands has development cooperation relations with African countries with rising obesity.** In African countries where the Netherlands has a development cooperation relationship that includes the themes of food security and nutrition, namely Benin and Burkina Faso, overweight has increased strongly between 1990-2016. In 1990, Benin and Burkina Faso had 11% and 16% of adults overweight, which grew to almost 30% and 23% by 2016 respectively (World Bank, 2021). Some blame the rise of obesity in sub-Saharan countries mostly on imported 'junk foods' (The New York Times, 2018). The accessibility of ultra-processed foods was favoured by FDIs by the economic liberalisation policies followed by many sub-Saharan governments in the 1990s. FDIs in food processing sectors like

---

breweries, distilleries, sugar, soft drinks and confectionery products represent 22% of agri-food FDIs, twice as many FDIs in farms and plantations (Reardon *et al.*, 2021; Husmann and Kubik, 2019).

### 3.4. Energy and biofuel policies impacting food security

**Biofuels are a source of renewable energy supported by the EU that is contested for its environmental benefits and competition with food production.** The EU wants to address its dependence on non-renewable resources and manage natural resources sustainably and food security by shifting towards a bioeconomy.<sup>75</sup> Launched in 2012, the EU's Bioeconomy Strategy included biofuel targets,<sup>76</sup> which the EU aims to use as a renewable alternative to fossil fuels, to reduce greenhouse gas emissions, provide opportunities for employment and regional development, and reduce Europe's dependency on fuel imports (Wesseler and Drabik, 2016). While the EU had already been promoting biofuels since 2009 through its Renewable Energy Directive (RED), the Bioeconomy Strategy aims to increase the coherence amongst bioeconomy policies and contribute to the achievement of the EU's Green Deal.

By 2030, the EU aims to have a minimum of 14% of transport fuels in every EU country come from renewable sources, which can include biofuels (RED II target). Only biofuels that meet all sustainability criteria will receive EU support and can contribute to the targets. The biofuel targets received much criticism, which centres on the competition between biofuels with food production (named *food or fuel*), its possibly higher greenhouse gas emissions once indirect land-use change is factored in, land grabbing, and its effects on food prices and volatility (Lein *et al.*, 2014; Michalopoulos, 2017b; Tomei and Helliwell, 2016). For instance, some claim that the EU's biofuel policies, amongst other OECD actors, contributed to the food price crisis of the late 2000s (Boddiger, 2007; Sihvonen, 2017), but this is contested by others (Ajanovic, 2011). In light of the Russia-Ukraine war, the EU's biofuel mandate is again in the spotlight for possibly pushing food prices up (New Scientist, 2022).

**The EU's bioeconomy and agro-food policies are broadly coherent.** Two recent studies concluded that the EU's bioeconomy strategy is broadly coherent with the bioeconomy-related SDGs and agri-food policies (Muscat *et al.*, 2021; Ronzon and Sanjuán, 2020). According to Ronzon and Sanjuán, the EU's Strategy is mostly synergistic with SDG2 in Europe (2020). However, some tension between bioenergy, on the one hand, and food security and agro-biodiversity goals exist: the energy domain (e.g., including biofuels) has the most trade-offs with agro-food policy and the least synergies. Yet, biofuels are singled out as having negative effects on deforestation, as EU biofuel policy has been linked with the deforestation of an area the size of the Netherlands for the production of soy, palm and other oil crops (Reuters, 2021).

**Still, first-generation biofuels seem to have negative effects on food security and the environment, with advanced biofuels in short supply.** At the moment, EU biofuel comes from local and imported sources. About 60% of EU biodiesel is made with imported feedstock, and almost half of imported palm oil is burned in car engines (Buffet, 2017). Palm oil specifically has been scrutinised for its contribution to deforestation in Southeast Asia. The EU has recently sharpened through RED II the sustainability criteria for its biofuel targets (EC, 2019). An example is incorporating indirect land-use change in the criteria, meaning that farmers growing biofuels rather than food face penalties, or the banning of palm oil – linked to widespread deforestation – as a fuel. Instead, the EU wants to increasingly support advanced biofuels, which are made from waste or non-edible products. Even so, these advanced biofuels might still compete with other uses, such as animal feed (Michalopoulos, 2017a). The criteria might be so strict as to hamper supply (Goulding Carroll, 2021). Still, soy is currently not banned, which means that the pressure on forests from oil crops shifts from Southeast Asia to Latin America. More than 93% of the EU's soy usage is imported, which is mostly used for animal feed but biofuels as well. This amounts to 34 million metric tons of imported soy in

---

<sup>75</sup> The bioeconomy means using renewable biological resources from land and sea, like crops, forests, fish, animals and micro-organisms to produce food, materials and energy (EC, 2022a).

<sup>76</sup> Biofuels are liquid or gaseous transport fuels such as biodiesel and bioethanol which are made from biomass.

---

2018, mostly from Brazil (40%) and the USA (25%). The EU (embedded) soy exports are small at 2.8 million metric tons. While soy is a highly efficient crop in terms of protein yield per hectare, its greatly expanded production over the last ten years is a leading cause of tropical deforestation, especially in the Amazon rainforest (Ritchie and Roser, 2021). The Brazilian Cerrado ecoregion is impacted by soy production as well. Only 19% of the EU's imported soy is certified deforestation-free, but there is a large variation among EU member states: Norway and the Netherlands import almost 100% certified deforestation-free soy, while Spain and Poland almost none. However, 77% of all soy imports are from low deforestation risk areas (IDH, 2020). Recently, the conversion of tropical forests to soy production has slowed down, but soy production is still a driver of (in)direct land use change. While there are foreign investments – not necessarily from EU origin – in soy production abroad, it is dwarfed by investments in palm oil, sugar cane, cacao and corn (Lay *et al.*, 2021). As part of its ambition to support the shift toward sustainable food systems and be less dependent on imports in the wake of the Russia-Ukraine war, the EU calls for fewer imports of protein crops like soy and more production within the EU (EC, 2022b). It is unclear if pushing for more protein crop production would impact the EU's biodiversity goals, which aim for more land to be set aside for nature rather than agricultural production (EC, 2021b).

### 3.5. Investment promotion policies driving land use and shaping agri-food value chains

**Investment agreements can pave the way for investors to acquire (the rights or use of) resources abroad**, which can have positive and/or negative socio-economic and environmental impacts. Large-scale land investments (often termed 'land grabs') in developing countries by investors from developed and emerging countries are a particularly contentious form of foreign investments due to alleged negative impacts on nearby, almost always poor, communities. Investors may acquire land, but the rights of access to water that are often tied to land transfers become increasingly important as well, which prompts concerns over 'water grabbing'. Since 2008, a perceived 'wave' of large land investments has received widespread attention in popular media (The Guardian, 2008, 2009). Even though the wave of land investments was not as large as initially depicted (Kaag and Zoomers, 2014), the topic still receives plentiful attention in the academic literature and regularly resurfaces in popular media (Dekeyser, 2019a). Within the wave of land investments, land rights for over 42.2 million ha worldwide were transferred between 2000-2016 (Nolte *et al.*, 2016), which is a much higher rate of land transfer than was evident in past decades (Deininger, 2011). Even as the transfer of land rights in Eurasia increases (Land Matrix, 2017), Africa is the largest recipient of large land investments with 10 million ha in concluded deals that are mainly focused on food crops and agricultural feedstock for biofuels (Cotula, 2013; Dekeyser, 2019a).

**Supporters of these investments argue that opportunities to invest in land can lead to benefits**, namely greater access to capital, technology, knowledge and markets for local communities, thus contributing to rural development, while investments can contribute to GDP growth and government revenue at the national level (Deininger and Xia, 2016). For local governments, a land tax derived from large land investment projects can be a great source of revenue. Land investment projects can provide public goods and social services to local communities through corporate social responsibility, such as roads and other basic infrastructure, health facilities, or schools (De Schutter, 2011). The World Bank suggests that large land investment projects can reduce poverty through wage employment, out-growers or contract schemes, and payment for leasing or buying land. When large land investments produce food, they can contribute to a growing population's food security (Dekeyser, 2019a; Deininger and Byerlee, 2011). When these investments promise employment opportunities or out-growers and contract schemes, the local communities can be eager to welcome the investors, especially those without access to land (Hall *et al.*, 2015). Where rural areas often have limited off-farm opportunities, the employment generated by these investments can diversify the livelihood choices. As small-scale farmers in most land investment-recipient countries only use a quarter of their production potential, spillovers from the investments can contribute to a decrease in the high yield gap of African farmers (Deininger, 2011).

---

**Yet, many of the promises by investors of rural development, employment, and corporate social responsibility were not kept or did not materialise.** In the first place, many large land investment projects failed implementation. Second, governments found it difficult to enforce agreements when the land was already transferred (Deininger, 2011). The employment generation depends on the type of farming operations, while many of the investors prefer capital-intensive plantations that require fewer labourers rather than labour-intensive out-grower schemes. Even then, low wages can be a source of contention (Lanari *et al.*, 2016). The replacement of small-scale farmers with capital-intensive crops can diminish employment by 75% (Nolte *et al.*, 2016). Furthermore, the amount of proclaimed ‘available’ or ‘free’ land in Africa might be much lower than assumed or promoted (Deininger, 2011). The loss of land for local communities can impact their food security while the large land investment projects can undermine local businesses and cause environmental damage (Cotula *et al.*, 2009). The farmers displaced by the investments can open new spaces for agricultural production which pushes the agricultural frontier into forest lands or lands marginally suited to agriculture. The investors and local communities frequently compete for access to the same resources that are already under increased pressure from either population growth or environmental degradation (Laye *et al.*, 2021; Dekeyser, 2019b).

**On-the-ground impact of land investments varies considerably.** Ten years after the wave of large land investments that followed the 2008 financial, economic and food crisis, the Land Matrix - a database of large land investments - provides clues about its outcomes (Lay *et al.*, 2021). Not many contracts were concluded or land was put in production after 2013. Positive or negative impact depends on a host of factors, like investment type, the occurrence of land dispossession and displacement, the number of jobs created, or the strength of jurisdictional and political institutions (Dekeyser, 2019a; 2019b). Generally, the investments have not delivered on their promises for rural development: the non-consensual and uncompensated loss of land often comes with little employment, productivity spillovers, or infrastructure benefits. While there are international guidelines, compliance with the principle of responsible business conduct is rare (Laye *et al.*, 2021). Lots of contracted land - between 27 and 70% - was not put in production, but people living or working on the non-productive land could still have been expelled. But where no land possession takes place, investments can create much-needed jobs, especially for those without access to land (Dekeyser, 2019a). In sum, the impacts of large land investments depend on several factors but generally did not live up to their promises in terms of rural development. Some cases are broadly positive, showing the need for well-managed projects.

**Investors are diverse and truly global, originating from both the North and the South.**<sup>77</sup> Besides, many land investors operate through investment hubs, many of them tax havens, thus obscuring their ‘real’ origin. This explains why the top-10 investor origins include countries such as Cyprus (in fourth place), Singapore (seventh place), the British Virgin Islands (eighth place) and Hong Kong (ninth place). Other top investor countries are developing countries with competitive agricultural sectors, like Brazil and Malaysia, and high-income countries such as Great Britain, the Netherlands, and the United States. One of the investors originating from the Netherlands is the Dutch-registered company Elva Nederland Ltd, which has signed 2,500 ha in Ethiopia to produce biofuels (Land Matrix, 2022). China also features, having climbed up the ladder to third place. Contrary to what is often depicted, sub-Saharan Africa is not primarily targeted by Chinese investors, who are more active in its neighbouring countries – Cambodia, Laos, and Myanmar (Lay *et al.*, 2021).

---

<sup>77</sup> Top five of investor countries for concluded deals are USA, Malaysia, China, Cyprus and Brazil (Land Matrix, 2021).



---

## 4. Water

### 4.1. Drivers, trends and preview of findings

**Water security as a concept has evolved over time: from a narrow, human-centric view in the 1990s to a broader notion that incorporates ecological dimensions and increasingly recognises the interlinkages of water resources management with other sectors** (see Figure 4; Nepal et al., 2019; UN Water, 2013; Cook and Bakker, 2012).<sup>78</sup> Essentially, water security relates to three main challenges: water scarcity (too little water), water pollution (dirty water) and flood risk (too much water; PBL, 2018). As such, achieving water security entails ensuring the sustainable use and protection of water systems; mitigating water-related hazards (such as floods, droughts and pollution); and addressing the conflicts that can arise from competition over shared resources (Mishra *et al.*, 2021).

**Water security is already at risk in many parts of the world and it is expected to worsen in the next few decades** (Boretti and Rosa, 2019). Currently, almost half of the global population (i.e., 3.6 billion people) live in areas that face water scarcity at least one month every year and two billion people still lack safely managed drinking water services (UN Water, 2021). Unsafe drinking water and lack of adequate sanitation, in turn, lead to approximately 800,000 deaths each year from diarrhoea and cholera in low- and middle-income countries, with Africa being disproportionately affected, followed by Southeast Asia (PBL, 2018). The Covid-19 pandemic has only stressed the need for adequate water, sanitation and hygiene (WASH) for public health outcomes. Moreover, flood risks and long-term vulnerabilities are rising for communities living in rapidly growing cities, particularly in coastal areas and deltas. At the same time, water scarcity in dryland areas is increasingly putting pressure on food production and local livelihoods. Water-related disasters such as drought and flooding are already affecting around 160 million people every year, with flooding causing the largest impact and economic damage (PBL, 2018).

Recent UN projections state that, as population grows and weather extremes become more common, the strain on the water system will increase and nearly 6 billion people will suffer from water scarcity by 2050. The situation is worsened by the unequal distribution of demographic growth, with most of it being concentrated in African and Asian countries where water scarcity is already a major challenge (UNESCO, 2021). As such, local and regional challenges will be more severe than global ones (Boretti and Rosa, 2019).

**Key drivers of water insecurity include climate change, population growth, urbanisation, economic growth, conflict, migration, and poor water management and misuse.** All of these factors put unprecedented pressure on water resources. First, a changing climate makes water availability less predictable and increases the frequency and intensity of droughts and floods.<sup>79</sup> Water-related disasters, in turn, can destroy or contaminate water and sanitation facilities. Rising sea levels can lead to freshwater resources' contamination and increase the vulnerability of coastal communities. Also, unpredictable rainfall patterns lead to reduced rain-fed growing periods in agriculture, causing farmers to rely more heavily on groundwater for irrigation (UNICEF, 2021; Mishra *et al.*, 2021).

Secondly, population growth, urbanisation and economic growth contribute to a growing demand for water, leading to increased competition amongst a range of sectors (notably agriculture, industry, and energy) and over-extraction of groundwater resources (UNICEF, 2021). Changing dietary patterns, particularly the increasing rate of meat consumption, and growing incomes also fuel a rising demand for water (CTA, 2011). Land cover change,

---

<sup>78</sup> A commonly used definition of water security is 'the capacity of a population to safeguard sustainable access to adequate quantities of water with acceptable quality for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against waterborne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability. Water insecurity occurs when any or all of these needs cannot be met.' (UN Water, 2013).

<sup>79</sup> Generally, the combined impact of changing temperature, precipitation patterns and evaporation entails that dry areas will become dryer and wet areas wetter (PBL, 2018).

industrialisation and engineering schemes such as reservoirs and irrigation facilities are also direct stressors (Vörösmarty *et al.*, 2010).

Third, water scarcity can be both a driver and a result of conflict and migration: water and sanitation services are often heavily interrupted in periods of conflict, as infrastructure is destroyed or damaged; at the same time, when water resources are scarce, competition can increase tensions and lead to conflict and migration.

Lastly, poor water management and misuse occur when water users lack incentives to use water more efficiently; when investment in water supply services is low; or if the institutional capacity to manage such services and water resources is limited (UNICEF, 2012; WaterAid, 2012). As such, improving the efficiency of water use by domestic users plays an important role in addressing current and future water scarcity and can be stimulated by demand management incentives. Also, when countries have shared water resources, poor management and inequitable use can increase water insecurity, particularly for countries downstream (UNICEF, 2021).

**Figure 4: Key drivers of water insecurity**



Source: Nepal *et al.* (2019).

**Improving water security requires a coherent approach between water policies and other sectoral policies.** In the next sections, we review the main policy coherence hotspots that can impact water security and its drivers. These are summarised in Box 4 below.

**Box 4: Preview of policy coherence hotspots affecting water outcomes**

Multiple policies can impact, positively or negatively, water security objectives in developing countries. Our analysis identified five main coherence hotspots. First, infrastructure policies supporting the development of large-size dams in major river basins can contribute to energy development but also increase water insecurity for local and downstream communities. This happens through negative impacts on the distribution of water resources, erosion of ecosystem services and biodiversity, and population displacement.

Second, policies that support investments in irrigation infrastructure can contribute to improving agricultural production and food and nutrition security, but also lead to overuse and misuse of water resources and pollution. Irrigation also increasingly competes with other water uses and faces climate-related risks such as droughts. When not well-designed and managed, irrigation schemes also risk marginalising smallholder farmers from water and fertile land.

Third, policies shaping spatial development and driving urbanisation in developing countries may put excessive pressure on water systems leading to unsustainable water use, water pollution and reduced or inequitable access to drinking water and sanitation. In urban deltas and coastal areas, they may also increase pre-existing vulnerabilities to climate change.

Fourth, trade and investment policies that promote the importation of (agri-food or manufactured) water-intensive commodities from developing countries to developed countries and emerging economies may lead to water depletion or pollution in producing regions. These externalities are not accounted for in the price paid by consumers in importing countries.

Lastly, the interplay of policies driving regional cooperation and development assistance with diplomatic and political interests often leads to inefficient management of transboundary river basins and persistent under-implementation of water cooperation agreements. This may contribute to higher food and water security risks in downstream countries, inadequate adaptation to climate change and exacerbate regional conflicts.

## 4.2. Infrastructure policies driving dam and hydropower investments

**Water is critical for the production, distribution and use of energy** (OECD, 2013).<sup>80</sup> As such, the projected increase in global energy demand will raise pressure on water resources and increase competition with other water uses. Water-reliant infrastructure and services intended to improve water and energy security can also have adverse environmental and social effects. Notably, the expansion of hydropower (a major source of renewable energy worldwide) can provide low-carbon electricity, increase freshwater supply for human settlements and improve flood and drought risk management. However, it can also have adverse social and environmental effects, particularly on the distribution of water resources (Lindberg and Leflaive, 2015).

Developing nations display an increasing trend of hydroelectric dam construction, which responds to their low electrification rates and high development needs (Moran *et al.*, 2018).<sup>81</sup> Besides the existing 8600 large dams primarily designed for hydropower, 3700 new dams are planned, each with more than 1 megawatt (MW) capacity. Over 500 of them are under construction as of 2018 (PBL, 2018). **Hydropower development targets some of the most highly biodiverse river basins in the world, including the Amazon, Congo and Mekong basins**, given their large potential for energy production. Over 300 dams are planned in the Amazon, 65 of which in Brazil<sup>82</sup> (which is also investing in developing hydropower in neighbouring Bolivia and Peru). Several dams are also planned in the Mekong basin (72 in Laos, 10 in Sarawak Malaysia and over 50 in Cambodia), making it one of the top investment regions for hydropower dams, mostly financed by China (Moran *et al.*, 2018). In the Congo basin, 35 future dams are expected to produce an additional 44 gigawatt (GW). Notably, a massive dam is planned on the Inga waterfalls, which should produce up to

---

<sup>80</sup> For example, power plants (both fossil fuel and nuclear) use large volumes of water for their cooling processes, and renewable energy production (such as hydropower and biofuel crops) can impact water resources.

<sup>81</sup> While hydropower dams have played an important role in the energy development of North America and Europe since the 1920s, starting from the 1970s the hydropower industry has stopped building large dams in developed countries and moved to the developing world. This shift was due to a lack of new suitable sites for the development of dams, increasing costs and, especially, growing environmental and social concerns, which made dam removal in the US and Europe more common than construction.

<sup>82</sup> Three main river basins in Brazil account for around 80% of the Amazon basin potential (Moran *et al.*, 2018).

---

40,000 MW of electricity and has received large support from the donor community, including European partners.<sup>83</sup> Another proposed dam, the Sombwe dam, would be located inside the Upemba National Park, one of the oldest parks in DRC (Global witness, 2021). Other river basins in South and East Asia targeted by hydropower dam construction include the Yangtze basin, in China, characterised by a large number of existing dams, and the Ganges-Brahmaputra-Meghna basin, where 396 future dams are planned, for a total capacity of 41 GW (Zarfl *et al.*, 2019).

**The construction of large dams threatens these socio-ecological regions** by causing river disruptions, changes in hydrology and sediment transport, deforestation, fragmentation of fish migration pathways, erosion of ecosystem service, loss of aquatic and terrestrial biodiversity, and displacing thousands of people while affecting the food and water security of local and downstream communities (Moran *et al.*, 2018; Zarfl *et al.*, 2019).<sup>84</sup> Large reservoirs can also be significant sources of GHG emissions (particularly methane), especially when they are built in tropical forests (Leslie, 2021; Global Witness, 2021; Beaulieu, DelSontro, and Downing, 2019).<sup>85</sup> As documented by the World Commission on Dams and other recent studies, **these social and environmental costs of dam construction are routinely underestimated by environmental and social impact assessments** (often carried out by the same firms engaged in constructing the dam). At the same time, benefit-sharing mechanisms, such as compensations to the affected communities, have been lacking and the use of repression and violence against activists has been common (Ansar *et al.*, 2014; Flyvbjerg and Bester, 2021).

**These negative socio-environmental effects**, particularly the displacement of large numbers of people, **may also increase tensions between riparian countries**, especially when international or regional treaties are absent or not adequately enforced (see also section 4.6). A case in point is the Blue Nile river basin, where a decade of unfruitful negotiations and the lack of a water-sharing arrangement regarding the construction and filling of the Grand Ethiopian Renaissance Dam, with an installed capacity of 6.45 GW, threatens the availability of water in downstream countries (Sudan and Egypt) thus increasing tensions in the Horn of Africa (Borrel, 2020; Mbaku, 2020).<sup>86</sup> Dam construction and the subsequent diversion of river flows is a source of controversy also in the Ganges-Brahmaputra-Meghna basin, where downstream countries like Bangladesh are highly vulnerable to water pressures upstreams. Notably, recent hydropower development plans in India (on the river Meghna) and China (on the Brahmaputra) threaten to reduce water availability for fishing and agriculture as well as increase salinity levels in Bangladesh (Asaduzzaman and Rahman, 2015; Tharuk, 2020, Financial Express, 2021). The Chinese plan, in particular, targets a contested border between China and India, thus linking water management concerns with geopolitical tensions (Pasricha, 2021).

**There is also a lack of attention to the impacts of climate change**, such as projected future water shortages, in hydropower development projects. As the intensity and frequency of droughts is expected to intensify in several regions, especially in a scenario of high GHGs, dams may see a decline in water levels which could challenge the reliability of energy production. For instance, several recent dams in Brazil (such as the Jirau and Santo Antonio dams on the Madeira River and the Belo Monte dam on the Xingu River) are already expected to produce much less

---

<sup>83</sup> The Grand Inga dam, if completed, would be the largest dam project in the world and responds to a dream to develop a power grid across Africa. However, rather than providing for the needs of the local population, the energy produced would be exported to supply mining companies in South Africa, which is currently the principal buyer of Inga's electricity (Warner *et al.*, 2019). The African Development Bank (AfDB) and European Investment Bank (EIB) are potential contributors to the project, and several consortia including companies from China and Spain have bid for selection as developers of the dam (International Rivers, 2018).

<sup>84</sup> For instance, the fish population and dynamics of Amazon rivers (amongst the most biodiverse worldwide) have been severely affected by dam projects: at the Tucuruí dam, in Brazil, the fish catch has declined by 60% and the loss of fisheries and other natural resources affected more than 100,000 people living downstream. Similarly, at the Belo Monte dam, on the Xingu River, 16.2 tons of fish died in 2016, as they were unable to get past the recently-built dam (Moran *et al.*, 2018).

<sup>85</sup> For example, the Sombwe dam in Congo could increase overall emissions equivalent to 1.3 million tonnes of carbon dioxide by the end of this century – more than the emissions produced by burning 3 million barrels of oil – by permanently flooding large sections of the Miobo forest (Global Witness, 2021).

<sup>86</sup> This dam is expected to cost more than 5 billion US dollars and, except for a 1 billion US dollars loan from China, it has been financed entirely by Ethiopia, since Western lenders decided to not get involved (Huckstep and Moore, 2022).

---

electricity than projected due to climate variability and a limited storage capacity. This is particularly challenging in a country that is highly dependent on electricity production from hydropower. However, rather than diversifying the energy mix and investing in other sources of renewable energy, the Brazilian government has responded by accelerating hydropower development, often without following international laws of public consultation with local and indigenous people (Moran *et al.*, 2018; Almeida *et al.*, 2021). Frequent droughts have also affected Southern Africa, causing an 11% fall of capacity at the Kariba Dam, on the Zambezi River basin (between Zambia and Zimbabwe) in 2019, causing electricity shortages and price increases (Leslie, 2021). Similarly, the effects of land-use change, particularly deforestation, on the energy generation potential of dams are not considered in dam construction projects (Moran *et al.*, 2018).<sup>87</sup>

**Current and future hydropower plans need to better assess and strive to reduce environmental and social costs.**

This means that national governments and donors need to regulate companies and financiers in a much more rigorous way, ensuring that projects incorporate international best practices and due diligence norms for environmental and social risks (such as the Hydropower Sustainability Assessment Protocol and the International Finance Corporation's performance standards).<sup>88</sup> Assessments showing adverse impacts should also be able to stop dams from being built (Future Dams, 2021; Markkanen *et al.*, 2020; Moran *et al.*, 2018). This is critical, considering that the funding landscape for hydropower projects increasingly relies on public-private partnerships (PPPs) involving a complex mix of investors, lenders, public finance and guarantees (Markkanen *et al.*, 2020).

Moreover, **project planning and monitoring requires the participation of different sectors and interest groups**, including communities affected by dams (McCartney and Kleinschroth, 2019). Those harmed by new dams also need to be adequately compensated for their losses (through monetary and non-monetary mechanisms) and the ensuing benefits of hydropower development should be shared with local populations, for example through the provision of accessible and affordable electricity (Global Witness, 2021; Markkanen *et al.*, 2020).

While hydropower will continue to be an important part of the renewable energy portfolio for many countries, with climate change increasing uncertainty about the future performance of hydropower projects, investments in costly fixed assets like dams must be accompanied by investments in innovative and more flexible technologies that do not require damming rivers and resettling communities (for example instream turbines) as well as in other sources of renewable energy, including solar and wind (Moran *et al.*, 2018).

### 4.3. Policies driving agricultural water management, irrigation technology and infrastructure

**The agricultural sector is the largest water user globally, accounting for about 70% of total global freshwater demand, most of which is used for irrigation.**<sup>89</sup> FAO projections suggest that, with current water use patterns and productivity, the water demand for agricultural production will increase by 70 to 90% by 2050, far beyond the predicted level of water availability (FAO, 2018). Besides population growth, dietary transition (leading to higher demand for livestock products and oils) is a primary driver of increased water demand in agriculture (FAO, 2020b). Agriculture is also a major water polluter, mainly through organic matter and nutrient runoffs from agricultural inputs (Boretti and Rosa, 2019; Ritchie and Roser, 2017). Thus, in many regions of the world, intensive irrigation practices,

---

<sup>87</sup> Deforestation can reduce rainfall and soil moisture in tropical moist forest regions thus constraining energy generation. This is particularly relevant in the Amazon basin: for example, power generation at the Belo Monte dam is estimated to drop substantially due to predicted deforestation (Moran *et al.*, 2018).

<sup>88</sup> This is also in line with recent pledges to reduce emissions and halt deforestation and biodiversity loss made at the COP26 climate summit in the UK and the UN Biodiversity Conference in China.

<sup>89</sup> There are, however, large variations geographically and by income level. Agricultural water withdrawal accounts for 90% in low-income countries, 79% for middle income countries, and only 41% for high-income countries. A number of countries across South Asia, Africa and Latin America use more than 90% of water withdrawals for agriculture.

---

erosion and pollution associated with farming activities are putting increased pressure on surface and groundwater resources.<sup>90</sup> As such, irrigation infrastructure and technology, agricultural policies and farm management practices (e.g., intensity of input use) are important determinants of water use efficiency and water quality (Gruère and Shigemitsu, 2021; OECD, 2016a).<sup>91</sup>

**Irrigation plays a vital role in agriculture**, particularly in arid and semi-arid areas, **as it reduces farmers' dependence on rainfalls and can improve crop yields. Thus, it can contribute to improving agricultural production and food and nutrition security.** With climate change expected to increase rainfall variability, irrigation will become increasingly important in many regions of the world (FAO, 2019). **However, irrigation competes with other water uses and is increasingly facing climate-related risks, notably droughts.** Intensive irrigation leads to overuse and misuse of water resources, pollution, soil salinisation, environmental degradation and groundwater depletion, thus putting pressure on other water users and aquatic ecosystems. This is particularly true in countries heavily dependent on agriculture and with scarce water resources (Gruère and Shigemitsu, 2021).

Irrigated agriculture currently represents 20% of the total global arable land and contributes 40% of the total food produced worldwide (World Bank, 2020). Irrigation is particularly prevalent across South and East Asia and the Middle East, while in sub-Saharan Africa irrigation levels have increased but remain lower compared to other regions (Ritchie and Roser, 2017). The development of irrigation and its progressive modernisation has been financed mainly by governments, multilateral banking institutions and private entities.<sup>92</sup> **In recent years, development programs and loans (most of which originating from multilateral agencies as well as developed countries) supported irrigation projects in a number of Asian and African countries** (OECD, 2022).<sup>93</sup> For instance, in sub-Saharan Africa, several irrigation schemes have been constructed or expanded with support from the World Bank and other agencies (such as JICA, Kuwait Fund, Millennium Challenge Corporation, and others). Examples include Bura and Mwea in Kenya, the Shire Valley Transformation Program in Malawi, and various projects in Nigeria, Niger and other West African countries (Merrey, 2020). North African and Middle Eastern countries have also seen an increased interest in irrigation, marked by an increase in projects financed through PPPs (Houdret and Bonnet, 2016). Private actors, including water sector companies, are also important financing actors in agriculture water management, although data in this regard is difficult to track (Ashley and Gruère, 2021).

**Yet, the design of irrigation projects has been marked by a lack of adequate water assessments at the river basin or watershed level, limited adoption of innovations and inclusion of climate change considerations, and overly optimistic economic and financial analyses that do not sufficiently include negative environmental and social externalities** (FAO, 2019). Project designs have also lacked attention to local contexts and agricultural systems (Mdee, 2020). **Irrigation projects have also suffered from poor operations and management** as a result of the unclear designation of responsibilities among stakeholders, and have lacked proper MandE systems. As such, a substantial part of current investment needs is represented by investments in rehabilitating or improving existing obsolete infrastructure (Ashley and Gruère, 2021). This is particularly true for large-scale irrigation schemes, whose

---

<sup>90</sup> Agriculture and water policy challenges are highly interconnected. While farming activities impact water resources' availability and quality, water balance and water stress affect yields and the quality of agricultural production, and water-related disasters and competition with other sectors for water use can increase agricultural and food security risks (Gruère and Shigemitsu, 2021). Moreover, both agriculture and water are increasingly vulnerable to climate change (Lindberg and Leflaive, 2015).

<sup>91</sup> For instance, policies that incentivise the use of water (notably groundwater) in dry areas or that encourage the use of potentially polluting inputs, can harm water resources. Conversely, agricultural policies that promote alternative sources of water, such as the reuse of treated wastewater, contribute to mitigating water scarcity.

<sup>92</sup> Investments in irrigation were highest in the 1970s and 1980s and then declined until the mid-2000s. During this period, investments in irrigation represented half of the agricultural budget of some Asian governments and a large share of the World Bank's agriculture lending to these countries (Ashley and Gruère, 2021). After the food price crisis in 2008, support for irrigation development increased again, but its scale is still far below the demand (FAO, 2019).

<sup>93</sup> Between 2014 and 2018, about USD 1 billion per year of ODA and other official flows were spent on agricultural irrigation and related infrastructure (Ashley and Gruère, 2021).

---

management and governance have often led to underperformance and repeated cycles of ‘build-neglect-rebuild’ (Langford *et al.*, 2016). Nonetheless, the mounting evidence on the poor performance of irrigated schemes developed between the late 1970s and the early 2000s<sup>94</sup> has had little impact on the way governments and financiers approach these projects (Bjornlund, Bjornlund, and van Rooyen, 2020; Higginbottom *et al.*, 2021).

**The focus on medium and large-scale schemes, often with an export orientation, has also led to not adequately considering the needs of smallholder farmers** (FAO, 2019), who in some cases have experienced increased marginalisation from water and fertile land as a result of irrigation projects (Houdret and Bonnet, 2016; Veldwisch, Beekman, and Bolding, 2013).<sup>95</sup> Few agencies have focused on farmer-led irrigation as a cheaper and often more efficient alternative to large-scale irrigation (Mdee, 2020). Also, investment and innovation to support small-scale farmers in rain-fed areas (e.g., through community-based watershed management approaches, small-scale irrigation technologies, water harvesting and better soil management practices) have received less attention, despite being often less costly (IOB, 2017).

As such, while recent studies point to the need for substantial additional investment in irrigation,<sup>96</sup> notably in Africa (OECD, 2022; FAO, 2018), they also call for ‘*better policies and responsible and targeted financing efforts customised to local contexts*’ to ensure irrigation projects lead to sustainable outcomes (Ashley and Gruère, 2021:2). Future irrigation projects will require sound design and more systematic monitoring and accounting of performance, cost-benefit sharing mechanisms, and environmental impacts (FAO, 2018). **Investment in irrigation infrastructure will also need to be accompanied by significant changes in governance, policy, and institutional frameworks** – including water governance and land tenure – **as well as by innovations in practices and technologies to support improved agricultural water management** (FAO, 2020b). Notably, engineering facilities and management strategies will need to better take into account the projected impacts of climate change (FAO, 2018). To realise its potential contribution to sustainable livelihoods, irrigation will also need to be better integrated with agricultural and rural development programs supporting farmers’ access to extension services, finance, input and output markets (Houdret, Brüntrup, and Scheumann, 2020). In particular, more efforts will need to be deployed to ensure smallholders’ land and water rights, include their voice in design, operation and maintenance of irrigation projects, and ‘*design simplified, low-cost but technically and economically sound small systems tailored to their special needs*’ (FAO, 2018).

#### 4.4. Policies driving spatial development, urbanisation and access to water and sanitation

Current projections show that 70% of the world’s population will live in cities by 2050. Urban growth will be particularly fast in developing countries in Asia and sub-Saharan Africa, which, together, are expected to comprise 60% of the global urban population by 2050. As a result of population growth and rapid urbanisation, domestic global water demand (currently accounting for 10% of the total) is expected to increase significantly over the period 2010–2050, with the largest increase taking place in Sub-Saharan Africa and Asia, followed by Central and South America (Boretti and Rosa, 2019). **The increased withdrawal of water for domestic purposes and public services** (i.e., water used for drinking, cleaning, washing, and cooking), combined with water withdrawals for other purposes (industry, energy), **may lead to unsustainable water use, particularly groundwater depletion, and increase water scarcity in urban areas**. Projections suggest that rapidly growing cities in South and East Asia, parts of Africa and Central and

---

<sup>94</sup> A recent study found that irrigation schemes developed between the 1940s and 2010 deliver on average only 18% of the irrigated production area they originally proposed, with many schemes being completely inactive (some only a few years after construction). Scheme performance has improved little over more than 60 years (Bjornlund, Bjornlund, and van Rooyen, 2020).

<sup>95</sup> A case in point is the El Guerdane project in Morocco. Implemented in 2008, this scheme irrigates 10,000 ha of citrus fruit plantation. While international development banks presented the project results as a success story, the PPP also led to adverse impacts on the livelihoods and socio-economic development of smallholder farmers (Houdret and Bonnet, 2016).

<sup>96</sup> According to FAO (2020), more than 275 million ha of irrigated cropland worldwide would benefit from improved water management, of which 171 million ha are under high to very high-water stress and require urgent action, including by rehabilitating and modernising existing infrastructure and adopting innovative technologies (FAO, 2020b).

---

Latin America will also become important sources of nutrient (nitrogen and phosphorus) emissions to surface waters such as rivers, lakes and coastal seas, which in turn negatively impact water and ecological quality and may hinder economic activities, such as aquaculture, fisheries and tourism (PBL, 2018).

**Unplanned urban growth, poor territorial planning, and increased residential and infrastructural construction also encroach on water resources and natural assets, posing further pressures on the water system.** Such rapid outward expansion poses the greatest challenges in lower-income cities that have weak planning and land governance (Mahendra and Seto, 2019). These problems are exemplified by the experience of Dhaka, Bangladesh's largest urban centre, with over 20 million people in 2020. The city, surrounded by four rivers and with an internal system of canals, ponds, lakes and water reservoirs, is experiencing fast urban growth, also as a result of rural-urban migration (including climate-induced displacement). The unplanned residential and infrastructural construction are increasingly encroaching on low lying areas, water channels, filling floodplains and water retention areas, and leading to water logging during the rainy season (Hossain and Rahman, 2011). At the same time, high levels of water usage and increasing pollution of surface water (caused by untreated domestic sewage and uncontrolled industrial discharges) lead to an incremental depletion and over-extraction of groundwater. This, in turn, not only drives up the cost of extraction and reduces the operational lifespan of pumps, but may also lead to land subsidence (Islam, 2019).

**In developing countries' urban deltas and estuaries,** concentrating two-thirds of the world's population, **unsustainable water use also increases pre-existing vulnerabilities to climate change, weather extremes and natural disasters.** Many of the fastest-growing cities are found in riparian and coastal areas and in deltas, which increases the number of people potentially exposed to flooding and the risks of large economic damages (see also 2.3; PBL, 2018; Mahendra and Seto, 2019). A case in point is the city of Jakarta, in Indonesia, which is suffering from very high rates of land subsidence as a result of excessive groundwater depletion to supply households and the growing commercial and touristic infrastructure, increasingly financed with the contribution of large foreign investors (Irwin-Hunt, 2019). With around 10 million inhabitants, Jakarta is sinking by an average of 1 to 15 cm a year, with almost half of the urban centre now lying below sea level, thus being increasingly exposed to coastal flooding. This problem is compounded by the destruction of mangrove ecosystems – a natural buffer of the coastline – caused by infrastructure development and plastic waste, which reduces the overall resilience of the urban population in the face of sea-level rise (Aldrian, 2021; Mei Lin and Hidayat, 2018).

The pressure of the urban environment on water resources is only one of the challenges facing cities. In many countries in Asia and sub-Saharan Africa, **fast-paced urban growth and poor spatial planning exacerbate the challenge of adequate drinking water and sanitation in urban settlements** (PBL, 2018). In Dhaka's periphery, for example, newly created informal settlements of lower-middle-income classes often face acute water shortages, with water pipes going dry for weeks and residents queuing to collect safe water from mobile tanks (Financial Express, 2021). When residents resort to short-term coping strategies such as self-provision of groundwater through unregulated wells, this can further exacerbate over-extraction (Singh *et al.*, 2020). Across Sub-Saharan Africa, where almost 63% of urban areas lack access to basic water and sanitation, the number of water-insecure urban residents is also on the rise. Not only many households are not connected to the piped network, but several of those who benefit from a connection experience reliability problems of supply (Du *et al.*, 2019). Generally, the service gap between the provision of piped water and the growing urban population in developing countries is widening, with the fastest-growing cities in Africa and South Asia displaying the widest gap in water provision (van der Berg *et al.*, 2021).

This widening gap is not only linked to a physical shortage problem (Du *et al.*, 2019). It is also **a result of policies** (underpinned by financial and commercial interests) **that influence the pattern of spatial development and infrastructural construction. These policies may create an excess concentration of economic activities and territorial**



---

**imbalances** (Mahendra and Seto, 2019).<sup>97</sup> They can also exacerbate inequality in access to water services, with wealthier elites often disproportionately benefitting from better water management in areas with higher land and property values. Moreover, as water management in cities – with a concentration of real estate, economic activities and transport infrastructure – may offer more interesting commercial opportunities, without having to adapt readily-available technologies, external actors may pay less attention to the broader, rural environment in which they are located (IOB, 2017). That may contribute to disparities between large urban areas, on the one hand, and rural areas and small towns, on the other hand, which may contribute to internal migration and the concentration of poor people around urban centres, thus putting excessive pressure on water resources.

**These factors are compounded by a general underinvestment in water infrastructure, both from the private sector and multilateral development banks** (OECD, 2022), which results in an inadequate expansion or improvement of the piped water network in many developing countries' cities (Du *et al.*, 2019). Moreover, the attempts to privatise or corporatise water utilities in many developing countries over the past decades (often with the support of international development agencies) have not led to improved access, due to a lack of attention to issues of affordability and reliability of service provision (Mitlin *et al.*, 2019). Lastly, technological transfers may also play a role, as developed countries' technological paradigm has seldom been adapted to developing countries' physical and social urban environments (Nilsson, 2016).

**To tackle issues of water supply and quality in cities and ensure future water resilience, urban planning needs to take into account water risks and better regulate city expansion** to avoid encroaching on natural assets and areas important for flood control. Land-use plans also need to be better enforced to avoid indiscriminate infrastructural development. Also, combining investments in traditional 'grey' infrastructure (like pipes and treatment plants) with green infrastructure (like wetlands and healthy watersheds) can build greater resilience to water-related disasters (see also 2.3; van der Berg *et al.*, 2021; Hofste, Reig and Schleifer, 2019).

Lastly, improving water access in cities will require action in several areas, such as extending the formal piped water network; addressing context-specific causes of intermittent water service; and supporting informal settlement upgrading with a priority on improving water and sanitation infrastructure. Affordability concerns for low-income communities also need to be addressed (Du *et al.*, 2019). For that, the identification of the size and location of informal settlements, e.g., through satellite imagery, is key to addressing the needs of low-income and vulnerable populations. As informal settlements often expand in areas vulnerable to natural hazards, their identification can also support adaptation plans for resilience to climate change risks (Mahendra and Seto, 2019).

#### 4.5. Trade and investment policies driving water-intensive international value chains

**Although little water is traded per se, it is embedded in many traded goods** (Hoekstra, 2003).<sup>98</sup> By trading commodities, producing (or exporting) areas *virtually* transfer water to consumption (or importing) areas (Graham *et al.*, 2020). Thus, for water-scarce countries, a strategic increase in imports of water-intensive products could relieve the pressure on domestic water resources.<sup>99</sup> Viceversa, this virtual water trade takes water away in the exporting countries that can no longer be used for domestic purposes. Moreover, social and environmental costs associated

---

<sup>97</sup> These include, for example, land-use policies and regulations (often prioritising land speculation over spatial equality) and housing policies (causing peripheral expansion without paying attention to the location of new housing infrastructure and leading to a limited provision of service; Mahendra and Seto, 2019).

<sup>98</sup> An assessment of virtual water levels takes into account the *quantity* of traded goods and the commodity's *water footprint* (i.e., the volume of freshwater used to produce it, measured in m<sup>3</sup> per unit of mass of product; Alexoaei, Cojanu and Coman, 2021).

<sup>99</sup> However, the idea of water saving is rarely a driving force of trade. Other factors like availability of land, labour, knowledge and capital; competitiveness; subsidies; and trade barriers largely determine trade patterns globally (Chapagain and Hoekstra, 2008).

---

with water use remain in the producing regions, as they are not accounted for in the price paid by consumers in importing countries (Hoekstra, 2010).<sup>100</sup>

**Many OECD countries import large amounts of water in virtual form.** Globally, the major gross virtual water importers are the US, Japan, Germany, China, Italy, Mexico, France, the UK and the Netherlands.<sup>101</sup> For Europe as a whole, up to 40% of the water footprint lies outside its borders.<sup>102</sup> In the Netherlands this percentage reaches 95% (Water FootPrint Network data).<sup>103</sup> As such, **these countries externalise their water footprint without considering potential negative impacts (such as water depletion or pollution) in the producing countries.** This creates a blind spot in terms of the sustainability impacts of trade and investment policies and national consumption patterns.

Better accounting for the water footprint of different products traded internationally could improve global water management, reduce businesses' water footprint in developing countries and help offset the negative impacts of water-intensive production and trading systems. This requires increased supply chain transparency, responsible business conduct and due diligence norms in water-intensive international value chains. Stronger public scrutiny from policymakers, NGOs, academia and consumers, and open engagement in private-public-civil society partnerships, could also help address power imbalances and reduce water risks and vulnerabilities.

Various energy and manufacturing sectors producing internationally traded goods are intensive in water or cause water pollution. These include, for example, the agricultural commodity trading, food and beverage sectors, textiles and garments, the petrochemical industry, industries producing construction materials, and even the automotive industry. In what follows, we focus on the policy drivers of virtual international water transfers in the agricultural and food sectors and the textiles and garment industries.

#### 4.5.1. Agri-food value chains

Agricultural and food products are among the most water-intensive sectors. Animal products tend to have a larger water footprint relative to crops, with meat production being responsible for almost a third of the overall water footprint of total agricultural production in the world. Beef demands the most water, followed by lamb, pork, goat, poultry, eggs, and cheese (Ritchie and Roser, 2018). Other highly water-intensive crops include nuts, pulses, oil crops, and cereals, particularly rice, wheat, and maize. Water consumption also largely depends on the region of origin, due to differences in climates, the efficiency of irrigation and production practices, as well as the amount of water available. As such, some developing countries have a relatively large water footprint because of low agricultural yields and associated large footprint per unit of harvested crop (Water-to-Food data<sup>104</sup>).

**In the EU, imports of agri-food products account for the highest share of the region's total external water utilisation** (Ercin, Chico and Chapagain, 2019; 2016). Notably, imports of soybeans account for almost a third of the EU's total imports of green virtual water (i.e.,rainwater required for production),<sup>105</sup> followed by cocoa, coffee, palm oil, animal products, and, to a lesser extent, olives and maize. **More than 90% of these virtual water imports are from South America** (Brazil, Argentina), **West Africa** (Côte d'Ivoire, Ghana) **and Southeast Asia** (Indonesia and Malaysia). Imports of soybeans and cocoa beans are also highly concentrated in very few countries of origin: for soybeans, the US and

---

<sup>100</sup> Water footprint studies in the past few years have become more common. However, most countries do not have clear and long-term frameworks in place to efficiently use and protect their water resources (Alexoaei, Cojanu and Coman, 2021).

<sup>101</sup> The US, France and Germany are also major gross virtual water exporters (like China, India, Brazil, Argentina, and Indonesia).

<sup>102</sup> While the water footprint of *production* is the amount of local water resources used to produce goods and services within a country, the water footprint of *consumption* is calculated for all the goods and services that are consumed by the people living in the country. Thus, the latter lies partly inside and partly outside of its borders (including locally produced and imported products).

<sup>103</sup> See the *Water Footprint Assessment Tool* of Water Footprint Implementation.

<sup>104</sup> See *Water To Food*, a website of the 'Coping with water scarcity in a globalized world (CWASI)' project.

<sup>105</sup> This includes water that is stored in the soil and evaporated, transpired or incorporated by plants. Around 90% of the EU's total external water demand from agriculture is attributed to green water use, whose availability is highly vulnerable to droughts.

---

Brazil together account for 75% of the EU's imports, while for cocoa beans, Côte d'Ivoire and Ghana make up 63%. Similarly, for palm oil products, the largest virtual water imports originate from a few countries, namely Indonesia, Malaysia, and Papua New Guinea, while for olives, almost 90% originate in Tunisia. As for the EU's blue water footprint (i.e., the volume of groundwater or surface water consumed), rice, sugarcane, cotton, almonds, pistachios, and grapes, together account for the largest share (54%). The largest blue virtual water exporters to the EU are the US (mainly for almonds), India (rice), Pakistan (sugarcane), Turkey (cotton), Egypt (rice), Iran (pistachios) and South Africa (grapes).

As such, **a significant part of EU agri-food imports comes from regions where water is scarce or groundwater is being depleted** (Dalin et al., 2017). Agricultural products imported into the EU also contribute to the pollution of freshwater bodies in the exporting regions (Mekonnen and Hoekstra, 2015). This can lead to increased competition over scarce water resources that often favours large-scale export-oriented agribusiness over small-scale production for local food security (Knaepen, 2021). Moreover, the EU's high reliance on agri-food imports from a few water-scarce countries creates potential vulnerabilities to the food security and economic stability of the importing countries, especially considering that climate change is leading to increased water scarcity and droughts. For example, a disruption in the soybean production (on which the EU is highly dependent for animal feed; see also 2.4.1) would pose a significant risk to the EU meat and dairy industry (Ercin, Chico and Chapagain, 2016; 2019).

**Companies from OECD countries and emerging economies have made large investments in agricultural and livestock-meat value chains in developing countries.** Those investments are sometimes associated with negative socio-economic or environmental impacts (including land grabs, disruption of livelihoods, ecosystem degradation, and so forth, see also 3.5). Due to the concentration of international trade in agri-food products amongst a relatively small number of large agribusiness corporations,<sup>106</sup> these actors play an important role in supporting trade in virtual water and can influence the regulatory frameworks for production and trade and the way virtual water flows are managed globally (Sojamo and Larson, 2012). While these food and agribusiness corporations are increasingly engaging in multi-stakeholder initiatives and partnerships to improve global water management, for endogenous and exogenous reasons (particularly social pressures from shareholders or consumer activist groups),<sup>107</sup> the water security impacts of their work are still debatable. Generally, the increasing corporate social accountability discourse on water is not matched by significant changes in the companies' operations. The actions taken are often limited to decreasing the water footprint in their processing facilities, but they do not sufficiently address wider water-related risks in their supply chains, in spite of their large structural and bargaining power. Moreover, the increasingly prominent role of some corporations in framing discourses on water and setting agendas risks sidelining the voices of less powerful stakeholders who share water risks in the basins where these companies operate (Sojamo, 2016).

**Some strategies and trade-policy actions may reduce developed countries' water footprint abroad** (and related vulnerabilities at home). For example, water sustainability aspects could be better integrated in the EU's bilateral trade agreements, as well as addressed, on a sectoral basis, in EU-wide strategies such as the Climate Adaptation Strategy and the EU agricultural trade policy. Also, market access and trade facilitation instruments could be improved through a combination of incentive-based and compliance-based measures, thus supporting European businesses towards a better integration of water-related vulnerabilities and risks in their supply chain strategies (Alexoaei, Cojanu

---

<sup>106</sup> Examples of large agribusiness conglomerates with significant power over the water-intensive global agri-food value chains (both in terms of market share and horizontal and vertical integration) are Archer Daniels Midland (ADM), Bunge, Cargill and Louis Dreyfus. These actors also have close ties to political and economic elites in the main agricultural production regions of the world. In some cases, they also benefited from public support (e.g., particularly in the US, in the form of subsidies; Sojamo, 2016).

<sup>107</sup> An example of this is the company Nestlé, one of the largest branded food companies worldwide, which in recent years has responded to stakeholder pressures over sustainability, especially on water, by adopting a leading role in corporate water accountability and positioning itself among the key actors possessing solutions to the water crisis. For example, Nestlé is an active member of 2030 Water Resources Group, Sustainable Agriculture Initiative (SAI), Water Footprint Network and signatory to the UN Global Compact CEO Water Mandate. Through these forums, the company has taken a prominent role in its agenda setting.

---

and Coman, 2021; Ercin, Chico and Chapagain, 2016). Promoting the consumption of seasonal, regional foods, facilitating investments in irrigation efficiency and subsidising technology transfer to smallholder farmers could also decrease the pressure on irrigation worldwide (Dolganova *et al.*, 2019). Moreover, investments such as increasing drought resilience and strengthening water governance in regions of strategic importance (such as Southeast Asia, South America, or SSA) can reduce the vulnerability of the EU's economy to potential supply chain disruptions. The EU could also consider such vulnerabilities in the bilateral relations with its trading partners (e.g., integrating sustainability impact assessments in ongoing trade negotiations), thus acting as a lever to support a sustainable usage of water resources (Ercin, Chico and Chapagain, 2019).

#### 4.5.2. Textile and garment value chains

Globally, the textiles and garment industries are amongst the most water-intensive sectors, using up to 93 billion cubic metres of water each year (Desmonceaux, 2019). Water is necessary in all stages of production, from cotton production to the application of dyes and other chemical treatments. Creating a single pair of jeans requires close to 7500 litres of water. The industry is also a huge polluter, with textiles treatments and dyeing responsible for one-fifth of worldwide industrial water pollution (Aldabahi *et al.*, 2021).

**Clothing consumption is on the rise globally, with the US, Japan and European countries (Germany, France, the UK, Italy, Spain and the Netherlands notably) being among the major advanced country importers of garments** (Global Edge, 2019). The vast majority of imported garments are produced in developing countries and emerging economies. For instance, in 2019 the EU imported 109 billion euros of textiles and clothing, with over 80 billion euros of clothes coming from China, Bangladesh and Turkey (EC, 2019). Vietnam is also a large exporter of garments. Industry delocalisation, lower prices, fast-fashion strategies, and little recycling are among the factors contributing to this trend. As such, **textiles goods produced for advanced and emerging markets contribute directly to environmental impacts in textiles-producing regions** (Desmonceaux, 2019; Solidaridad, 2012).

In Bangladesh, for example, the textiles industry, which dominates the country's exports (largely driven by European demand), has huge impacts on water resources. The industry consumes large quantities of freshwater (especially for dyeing and washing processes), the majority of which is extracted from the ground without any charge (Solidaridad, 2012). The sector is a major polluter. Notably, untreated effluents containing heavy metals are released into rivers from nearby factories. This polluted water is used for irrigation in paddy and vegetable production and, through the food chain, it affects the health of people living around industrial areas and beyond, causing skin disease, diarrhoea, food poisoning, and respiratory problems (Abdelsalam, 2019).

**Developed countries, notably in Europe, have formulated policies to address the sustainability challenges associated with trade in textile products**, including in production stages that take place abroad. Notably, some EU countries have put in place guidelines for responsible business conduct, relying either on voluntary multi-stakeholder initiatives (like the Netherlands and Germany<sup>108</sup>) or on legislation (like France and the UK). Many of these initiatives have focused mostly on reducing workers' rights violations and improving transparency regarding factory safety (after the catastrophic fall of the Rana Plaza in Bangladesh),<sup>109</sup> and only recently started devoting more attention to the textile value chain's environmental impacts (Ashraf and van Seters, 2019). Moreover, significant challenges to compliance persist, such as a lack of traceability and transparency among businesses with complex supply chains, a lack of trust, a multiplicity of standards and a lack of harmonisation. The sectors and types of value chain actors covered by those initiatives may also be too limited to ensure their effectiveness (Karkare and van Seters, 2019). As a

---

<sup>108</sup> Examples include the German partnership for sustainable textiles and the Dutch Agreement on Sustainable Garments and Textile, which are based on OECD due diligence guidance rules and include industry members, trade unions, NGOs, and national governments.

<sup>109</sup> Examples include the Accord on Fire and Building Safety in Bangladesh; the Alliance for Bangladesh Worker Safety; the RMG Sustainability Council; and the Bangladesh Sustainability Compact.

---

patchwork of national due diligence legislation has emerged, the support for an EU legislation to level the playing field and rationalise requirements for companies operating in two or more member states has increased. While the public sector plays a critical role to put in place appropriate regulatory frameworks, long-term engagement with textile-producing countries (focused on capacity building and technological transfer, rather than compliance only) and business-led coalitions (such as the Fashion Pact<sup>110</sup> or the IFC's Partnership for Cleaner textiles<sup>111</sup>) can reinforce legislative efforts.

#### 4.6. Foreign and international cooperation policies driving the management of transboundary river basins

Cross-border rivers are important natural resources shared among neighbouring countries.<sup>112</sup> With increasing water stress in many regions, the way these shared resources are managed is crucial for contributing to peace and international cooperation for sustainable development. Overexploitation and pollution of transnational water resources can affect the reliability and sustainability of water supplies, jeopardise vital ecosystems, cause social unrest, and spark international tensions and conflicts. As such, transboundary water cooperation is essential for addressing a variety of issues such as flood prevention and management, pollution, navigation and water resource allocation, particularly in areas vulnerable to droughts and climate change. Those issues entail a need for cooperation at the regional level, especially in water-intensive sectors such as agriculture, industry, energy, and water supply and sanitation (UN Water, n.d.; WWAP, 2012).

However, **the literature on transboundary water cooperation shows a mixed record of the performance of international river management institutions and river basin organisations (RBOs)**. While there has been progress in building institutional arrangements for the management of transboundary rivers (international agreements exist in almost 40% and RBOs in 60% of international river basins), their effectiveness and impacts in actual problem-solving and goal attainment (for issues such as water pollution, flood protection and river restoration) has remained limited (Renner, Meijerink, and van der Zaag, 2021). This is also because, in transboundary water governance, **political interests and economic stakes often prevail over technical and scientific approaches to efficient resource allocation** (Medinilla and Ronceray, 2019b; Byiers *et al.*, 2021).

A case in point is the recent experience of African river basins, where persistent implementation gaps have riddled cooperation agreements. In Africa, many river basins hold large unrealised water development potential (in terms of hydroelectric power and agriculture) but are also highly vulnerable to climate change. Integrated resource management across sectors and borders is thus an important priority. **Many international actors have supported African regional organisations and RBOs in adopting integrated approaches to water resource management** (Medinilla, 2021). These include the EU<sup>113</sup> and EU member states, multilateral development banks (especially the World Bank<sup>114</sup> and the African Development Bank), and knowledge institutes (the International Union for Conservation

---

<sup>110</sup> The Fashion Pact is a global coalition of companies in the fashion and textiles industry, including their suppliers and distributors, who are committed to key environmental goals, i.e., stopping global warming, restoring biodiversity and protecting the oceans.

<sup>111</sup> Sponsored by HandM, Inditex, and CandA, supports the textiles sector in Bangladesh in adopting cleaner production practices and focuses on reducing its environmental impact and resource consumption.

<sup>112</sup> There are 263 transboundary lake and river basins covering almost half the Earth's surface. 145 States have territory in these basins, and 30 countries lie entirely within them (UN Water, n.d.).

<sup>113</sup> The EU Council Conclusions (2021) have recently reaffirmed the EU's diplomatic engagement on transboundary water cooperation '*as a tool for peace, security and stability*'. They also called for higher synergies between water, climate and energy diplomacy with biodiversity and food and nutrition security, and advocated to bring water issues higher on the EU's external action and in the UN agendas (Council of the EU, 2021).

<sup>114</sup> The World Bank, for instance, implements a programme on Cooperation in International Waters in Africa that funds governments, RBOs, regional economic communities, civil society organisations, and African regional and national institutions in addressing transboundary water management. It receives funding from Sweden, Norway, the Netherlands, Denmark and the EU.

---

of Nature and the Global Water Partnership<sup>115</sup>). Notably, transboundary basins in the Western Sahel (such as the Senegal and Niger ones) have been a critical priority for European and other international actors because of their high-risk contexts in terms of extreme climate variability, water stress, political instability, violent conflict and food security and humanitarian crises.

The EU and EU member states' support to transboundary water management has largely been based on a normative approach that revolves around the principles of integrated water resources management (IWRM) and, increasingly, the WEF nexus. However, this principled and comprehensive 'best practices' approach has achieved limited results. **An insufficient understanding of the local and national politics around water and the failure to take into account the complex interplay of political, developmental, and environmental concerns involved in cross-border cooperation are key factors explaining persistent under-implementation.**<sup>116</sup> This is compounded by a lack of coordination and complementarity between different partners (including between the EU and EU member states). Moreover, while non-western financiers such as China are increasingly involved in the development of regional water infrastructure, particularly in Africa, they are often not part of formal coordination mechanisms set up by Western donors and operate mostly bilaterally (Medinilla and Sergejeff, 2021).

As transboundary challenges are highly context-specific, diplomatic initiatives and support programmes could achieve better results by brokering greater collaboration at the sub-basin level and focusing on specific cross-border problems and opportunities where change is feasible. They should also be more realistic about the power of regional organisations – often constrained by the interests of their member states. Reducing fragmentation and promoting synergies, particularly between regional and national programming and between development cooperation and diplomacy, can also enable more effective action. This entails recognising that there are interconnections between external actors' development policy interests and economic and political interests, both driving transboundary water cooperation; and that their short-term interests might conflict with long-term goals.<sup>117</sup> Programmes supporting transboundary governance also need to be designed with sufficient flexibility (in objectives and measures but also funding mechanisms) to be quickly adapted to changing circumstances.

**Effective engagement of the international community is also critical to increase efforts to advance adaptation measures in river basins where climate change is aggravating existing water-related vulnerabilities.** For instance, in the Euphrates-Tigris basin – shared by Iran, Iraq, Syria and Turkey – a failure to mitigate climate-related water risks (such as decreasing river flows and increasing droughts) may exacerbate water shortages and water quality problems. This, in turn, would contribute to increased poverty, food insecurity, and unemployment in rural farming communities, and potentially lead to displacement and internal migration. Moreover, increased competition over water resources could raise local violence, while the increase in poverty and unemployment may aggravate existing grievances towards political authorities and fuel social turmoil. While the riparian states have started to explore adaptation options that would increase the resilience of water-dependent sectors, various economic, political, security and institutional challenges currently constrain their implementation. Also, unilateral adaptation measures, such as the construction

---

<sup>115</sup> The partnership promotes transboundary cooperation in Africa, Latin America, the Mediterranean, and Europe. It is supported by the EU, Austria, Denmark, France, Germany, the Netherlands, Norway, Spain, Sweden, Switzerland and the UK.

<sup>116</sup> An illustration of the diversity of water-related interests and incentives and their influence on cross-border water management is provided by the case of Mali. A landlocked and water-stressed country, Mali is part of two major river basins but plays very different roles in the respective RBOs. Malian decision-makers display a genuine interest in supporting the Organisation for the Development of the Senegal River to promote further development of hydro-electric infrastructure—as it allows them to maintain an affordable energy supply, particularly in Bamako. Conversely, in the Niger basin, Mali's bilateral relations remain predominant, hindering transboundary cooperation and limiting the role of the Niger Basin Authority (Medinilla and Ronceray, 2019a).

<sup>117</sup> These lessons are highly relevant also to the Netherlands. First, contributing to improved water management in transboundary river basins is a key objective of Dutch development cooperation. Secondly, a recent evaluation of Dutch efforts in this sphere found that Dutch-supported interventions had limited results and did not always 'get the [political] sensitivities right' (IOB, 2017).

---

of dams or flood protection infrastructure, often have negative effects on neighbouring countries and exacerbate tensions in the region (see also 4.2).<sup>118</sup>

In this context, the international community can support riparian countries in several ways: for instance, it can promote the inclusion of sustainable water resources management in climate adaptation strategies and projects. It can also assist riparian governments in accessing climate finance and support the coordination of adaptation measures at the river-basin level.<sup>119</sup> The global community can also help put in place the conditions that enable advancements in cross-border water cooperation, e.g., by supporting knowledge creation and sharing, improving stakeholder participation in multilateral processes, and mediating inter-state conflicts. Moreover, given the challenges involved in advancing multilateral cooperation in the short term, individual countries could also be supported in reforming the management of water-intensive sectors to make the best use of available water and reduce negative cross-border impacts. Efforts can also be made to strengthen environmental and water legislation and ensure more systematic enforcement. Lastly, the international community can consider different approaches to development assistance, for example by supporting decentralised governance and the empowerment of civil society and the private sector (Mueller *et al.*, 2021).

## 5. Overview of hotspots and interlinkages between the climate, food and water sectors

### 5.1. Primary policy drivers

So far, we have investigated the effects of various external policies on the climate-related, food and water sectors separately. In each sector, we have seen that **policy-driven human activities have contributed, more or less directly, to dramatic impacts on the natural environment and resources that these sectors rely on.** Many policies of developed and emerging countries having an influence on the economic, social, environmental and political environment have had spillover effects on these sectors in low- and lower-middle-income countries, in many cases exacerbating the pressures on natural resources due to domestic factors. For each of these three sectors, we have summarised the policies causing hotspots in the three sectors in Boxes 2, 3 and 4.

**Policy coherence hotspots are rarely due to a single policy of a developed or emerging country.** In many cases, it is a combination of policies, with internally-oriented policies, be they about the economy, the environment or security, acting in concert with externally-oriented ones, that cause unintended consequences and policy coherence hotspots. International trade, international financial flows, movement of people, technological transfers and diplomatic relations contribute to the transmission or origination of those hotspots from advanced countries to developing countries. Trade policy is a major factor in the transmission of effects. For example, sizable imports of soybean, beef and other commodities by several developed countries and emerging economies contribute to deforestation in the Amazon basin. In the case of the EU, agricultural policy is partly responsible for soybean imports that are used as feed, the livestock sector being large and supported by agricultural and industrial policies and other policies that have shaped animal product consumption patterns. The trade policies of European soybean importers have also played a part. Brazilian policies are also responsible for this hotspot. Tropical deforestation fronts are mainly found in countries where there are governance issues and where regulations regarding natural resources and economic sectors are weak

---

<sup>118</sup> For example, the construction of a large dam, the Güneypođu Anadolu Projesi in south-eastern Anatolia, has been a source of tensions between Turkey, Syria and Iraq.

<sup>119</sup> Since in some cases the best adaptation options for an individual country may lie outside its borders (for example in basin-wide information and monitoring systems, in upstream infrastructure investments, or operations in a neighbouring riparian country), adaptation financing should look beyond single-country solutions to generate public goods and promote cooperative transboundary solutions (Sadoff and Muller, 2009).

---

or unstable. **Policies shaping investment flows that underpin global value chains have played an increasingly important role in causing hotspots.** Often, development aid also plays a role in generating policy coherence hotspots. **Furthermore, there are usually several developed and emerging countries involved in causing policy coherence hotspots.** Yet, national policies in countries affected by policy coherence hotspots play a major role in causing them, as we have seen in the case of Bangladesh.

**To better understand and synthesise the factors of the hotspots we have identified in the three sectors, we now regroup them according to the primary policy area(s) from which they originate.** For example, we have seen that energy policies have contributed to several hotspots. International public support for fossil-fuel-based energy projects in developing countries affects the attainment of climate objectives. Energy transition policies in advanced countries, by stimulating growth in the extraction and importation from developing countries of minerals entering the production of clean-energy technologies, have contributed to the degradation of forests in developing countries. Biofuel policies have encouraged the importation of feedstock and biofuels, thereby adding pressure on agricultural land in low-income and middle-income countries. International policy factors have also contributed to the construction of large dams and hydropower plants, although in this case, the major factor does not appear to reside in the energy policies of advanced countries, but rather interests in infrastructure and foreign direct investment.

Starting from the three sectoral areas above, we regrouped hotspots in the following categories on the basis of the primary policy drivers of hotspots:

- A. Energy and climate policies, in combination with trade and investment policies;
- B. Infrastructure policies, combined with trade and investments policies;
- C. Agricultural and industrial policies (including the food industry), combined with trade and investment policies;
- D. Foreign, international security and humanitarian policies;
- E. Financial and tax policies.

The synthesis of the policy coherence hotspots identified in the first part is presented in Annex 3.

## 5.2. Cross-sectoral spillover effects

**For each cluster of external policy drivers, we look at their effects across the three sectors of the climate-food-water nexus.** As discussed earlier, those three sectors are so closely linked that the spillover effect of a policy on one of them is likely to also have a direct effect or a knock-on effect on another one. This is what we observe as, when considering all policy areas, cases where the spillover effects of policies affect several sectors of the nexus are frequent.

For example, in the ‘energy’ category, policies promoting the production and utilisation of biofuels in developed and emerging countries increase the demand for different types of biomasses. This may contribute to deforestation and forest degradation, causing GHG emissions, losses of natural carbon storage capacity, oxygen sources and regional weather regulation. It may also affect food security by increasing competition for land with food and feed crops locally and for agricultural commodity supplies in international markets. Moreover, biofuel crops that are intensive in water add pressure on water resources, although alternative sources of biomass, less water-intensive, have been developed.

Another example, from the ‘infrastructure’ category, involves policies supporting the development of large dams and hydropower projects in major river basins. International public and private support for this type of infrastructure contributes to increasing the supply of hydroelectric power, a relatively clean source of energy. This, in turn, supports economic growth, including in the food economy, and improves access to water for some communities. However, a large dam may also have negative impacts on climate, food and water objectives, by causing deforestation and methane-generating eutrophication, displacing rural populations and disrupting their livelihoods, and lowering the supply of water and affecting its quality for downstream communities.



---

As a last example, in the ‘agriculture and industry’ category, producer support in developed countries and increasingly in emerging countries may affect international food commodity markets and trade and thus have implications for developing countries. This may cause distortions in international markets and trade, which may in turn negatively affect domestic farmers and processors by lowering prices, undermine the local sector by discouraging investments into productivity-enhancing agricultural and industrial assets, and entail livelihood losses. This negative effect on economic development could leave local communities more vulnerable to climate change. On the other hand, if local climate-related production risks are relatively high, access to imports from countries subsidising production may stabilise domestic markets and support food system resilience. The importation of water-intensive agricultural and food products saves local water supplies.

**It can be seen that the policies under consideration may affect climate, food and water outcomes positively or negatively. The direction of the effects depends on various contextual factors.** While rigorously analysing these factors and specifying assumptions underlying the effects ascribed to policy drivers is beyond the scope of this study, we describe both the positive and negative effects that are likely to occur. The qualitative assessment of these effects is informative as regards the likely trade-offs or synergies between sectors. Within categories and across hotspots, one can see the trade-offs or synergies between different policies for a given sector – for example, one can compare the effects on water systems of fossil fuel subsidies and those of biofuel policies. This type of information is useful for formulating or assessing an energy policy as part of efforts to promote sustainability in the nexus and climate action.

### 5.3. Major policy coherence hotspots

**After categorising the hotspots, we attempt to grade them and identify the most important ones.** We first assign to them a level of strength, distinguishing strong effects from weak ones. Our appraisal is based on several types of information and evidence. It takes into account the degree to which the policies concerned have definite effects on climate-related, food and water sectors; the measure of their influence on these sectors globally and locally, taking into consideration the breadth of countries, sub-sectors, populations and ecosystems affected. Then, we assess the level of confidence in the information and the evidence underpinning our identification and characterisation of hotspots. To do this, we take into qualitative indicators such as the variety of sources of factual information and evidence about the policies at issue (from academic articles to articles published by the press and reputable online media), the abundance of research and analysis done on the relevant effects of those policies, and the extent to which evidence converges over time from different sources. While this appraisal of the strength of the effects of policies and the level of confidence in the information about them aims to be objective, given the scope of this study and its constraints, it is also based on expert judgement.

In Table A3.1 in Annex 3, policy coherence hotspots with negative effects are marked with a red shading; the ones with positive effects, with a green shading; weak effects are marked with a light shade; strong ones, with a dark shade. When policies were not found to have any significant effects on either climate, food or water objectives, or when their effects were found to be highly ambiguous, they are marked in grey. From across these categories, on the basis of the strength of spillover effects of policies and the level of confidence in the available information and evidence, we picked out the major hotspots, some of which are interlinked with others. These major hotspots were presented in the introductory section in Box 1.

If one focuses on hotspots with negative effects, it appears that in the category based primarily on energy policies, the strong effects are primarily in the area of climate, as could be expected, with water also being affected significantly. The infrastructure-based category has strong negative effects first and foremost on the water sector, and also on climate change. The agricultural and industrial category has strong effects not only on food security, unsurprisingly, but also on water systems. The category of foreign and international security policies has had less

---

direct and often more diffused effects on the climate-food-water nexus, but these effects seem important. The finance and tax category has some strong effects across all three thematic areas.

## 6. Concluding remarks

In these concluding paragraphs, we briefly recapitulate the main findings from our exploration of ‘policy coherence hotspots’ concerning climate action, food security, and water in developing countries and we make some propositions to resolve key policy incoherencies.

While the broad range of public policy areas investigated in this study did not allow us to conduct a rigorous assessment of each of them, the information and evidence gathered from a variety of sources point to a number of hotspots that are cause for concern. **By shaping international economic, energy, infrastructure and financial systems, the policies of major developed countries and emerging economies contribute to outcomes across the climate, energy, food, agriculture and water sectors in developing countries.**

**Policies providing subsidies for investment projects in the fossil-fuel sector in developing countries represent a major issue of policy coherence.** Also, in many developed countries and emerging economies, the regulatory and tax environment still incentivises or permits international flows of private finance to this sector in developing countries.

**Policies underpinning international production and trading systems** – which currently heavily rely on the combustion of fossil fuels – **present strong trade-offs that affect the climate, food and water sectors.** Advanced and emerging economies’ trade and investment interests in accessing raw materials (agricultural products and minerals) and markets for their manufactured goods and technologies have often been synergistic with the growth policies of developing economies and their integration into the global economy. Yet, they have influenced the energy intensity of their economies and their use of natural resources. Thus, they also have knock-on effects on climate action, food security, and the management of water resources in developing countries.

**The agricultural and industrial policies of developed countries and emerging economies also have effects on climate-related, food and water outcomes in developing countries.** For key commodities, agricultural producer subsidies in large exporting countries – notably the emerging economies who have gained influence in international markets in recent decades – are a source of trade distortions, which affect domestic markets, farmers and processors in developing countries. Similarly, the policies of advanced and emerging economies that support the exportation of clean energy technologies to developing countries, while contributing to their diffusion and availability in these countries, may also exert a competitive pressure that is detrimental to domestic technology developers and suppliers. In both cases, the policies of major economies, in conjunction with national policies, may discourage investments in domestic value chains.

**The policies and accompanying financial flows that support infrastructure development constitute another major source of trade-offs.** Infrastructure – for transportation, energy production and distribution, telecommunication, factories, commerce and so forth – is critical for economic growth, food and water systems, and public services in developing countries. Yet, infrastructure development leads to the emission of considerable amounts of greenhouse gases, and the modification of the natural environment in ways that often limit access to natural resources or create climate-related vulnerabilities for some communities.

**These policy interlinkages are conditioned by structural factors and path dependencies in the international system.** Trade patterns are still largely characterised by the exportation of raw materials (agricultural commodities, timber, extractive resources, and so forth) from developing countries to developed countries, and by the exportation of

---

manufactured goods (including processed foods) and technologies in the other direction. The globalisation phase that started in the 1980s, stimulated by declining international transportation and communication costs, led to a wave of economic deregulation and trade liberalisation that enabled the economic convergence of many developing countries towards developed countries. Yet, besides its contrasted social consequences, this globalisation process certainly contributed to the rising pressure on natural resources over the past decades. Emerging economies, which have increasingly sourced raw materials from developing countries, particularly in South America and sub-Saharan Africa, have contributed to this trend.

**The heavy reliance of most economies on fossil energy sources contribute to this pattern of economic relations. Many developed countries and emerging economies depend to a considerable extent on imports of oil and gas from developing countries.** Developing countries, whose energy needs are growing rapidly, rely on technologies, services and capital from advanced economies to exploit their oil and gas reserves. At the time of writing, the war in Ukraine is forcing European countries to bring down their imports of oil and gas from Russia and turn to alternative suppliers, notably in Africa. While increased trade in fossil fuels between African countries and Europe may be mutually beneficial from an economic standpoint, it may also lead to further contradictions for European policy-makers who support climate action and renewable energies and ostensibly aim to support governance improvements in African countries. This war also accentuates the interlinkages between security policies and the climate and energy sectors.

**Furthermore, illicit financial flows, which are partly due to permissive laws and regulations, continue to deprive developing countries of sizable resources and thus affect their governments' ability to finance climate-related disaster risk financing, social protection, and climate-resilient food and water systems.** IFFs are largely linked to the exportation of commodities from developing countries to developed countries and emerging economies – including energy commodities and products linked to deforestation.

**In the context of the climate and ecological crisis, significant efforts have been made to advance structural energy, economic and financial reforms across developed countries and emerging countries.** For example, the European Green Deal of the EU shows an intent to carry out a comprehensive package of reforms to tackle climate change. European policymakers notably envisage to tighten sustainability provisions in trade agreements and condition the importation of goods in the EU on the purchase of emission permits if the exporting countries do not have equivalent GHG emission pricing rules.

**Most of these reform plans still have to be implemented and they remain too limited in comparison to the magnitude of the problems. Yet, they also present some risks of undesirable spillover effects for developing countries.** More stringent trade rules could leave developing countries on the sidelines of the international trading system, given the considerable resources needed to upgrade productive and regulatory capabilities according to the emerging environmental norms. To ensure a fair green transition and strengthen climate resilience in developing countries, developed countries will have to provide them with adequate support for investments in research and innovation systems so that they can succeed in adapting and developing technologies corresponding to their needs and resources.

**A general reorientation of international financial flows is also required to enable developing countries to attain the sustainable development goals in the domains of climate change, energy, food and water.** Major economies and developing countries need to cooperate more closely to repurpose subsidies in the energy, agricultural and food sectors. They must also take measures to redirect private finance away from economic activities that harm the attainment of these goals and towards those that contribute to sustainability. The international agreement on a minimum taxation of multinational corporations at the OECD level in 2021 may contribute to the mobilisation of financial resources for these sustainable development goals.

---

**While the role of major economies in inducing unsustainable consumption was beyond the scope of this study, this factor requires more attention.** In developed countries and emerging economies, consumer habits are a major driver of the trade flows and supply chains that have spillover effects on energy, food and water systems in developing countries. Reducing wasteful consumption, promoting more sustainable consumer habits in developed and emerging economies, and developing circular economies constitute important levers for alleviating the pressure on land and water resources and reducing GHG emissions. **Another critical lever to consider is demography.** Limiting population growth is a way to contribute to the sustainable management of natural resources and limit the degradation of the natural environment, as underscored by the Dasgupta Review (Dasgupta, 2021).

**A better understanding of the interlinkages between the policies of major economies and those of developing countries that affect climate-related, food and water outcomes can help identify measures and interventions to reduce negative spillover effects and better exploit synergies between policy areas.** In this perspective, policy planning and assessment in developed and emerging countries should be based on a more holistic analysis encompassing climate, energy, food and water systems. This approach also requires enhancing links between science and policy and the development of appropriate metrics and monitoring frameworks to assess the impacts of policies. It may also help find ways of making development assistance better targeted and more efficient, reducing developing countries' reliance on it and promoting innovative forms of cooperation beyond development aid.

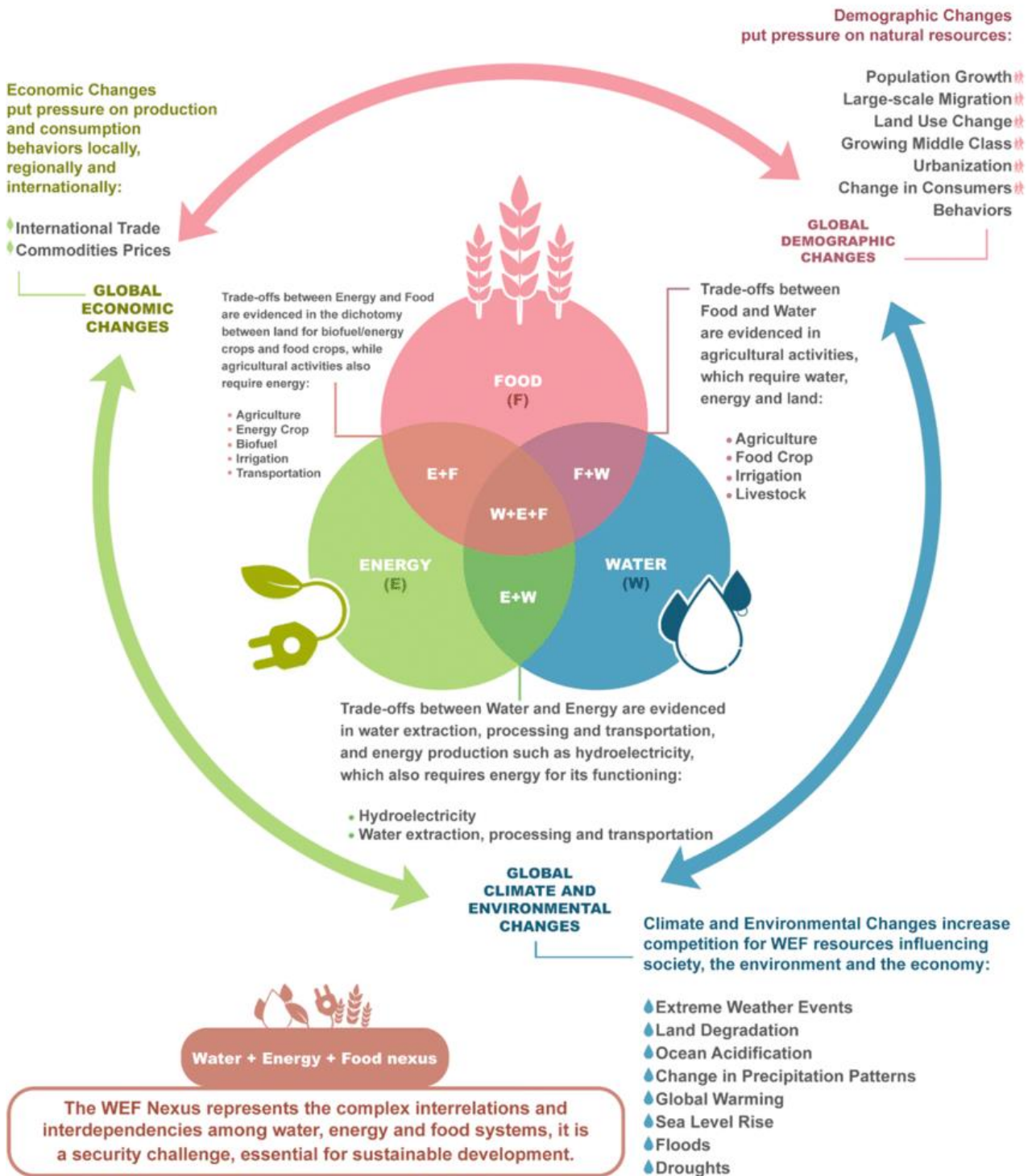
**Given the increasingly important role of private economic, financial and technological actors in international supply chains and data flows, the policies of advanced economies should take into account the interests of these actors in the management of the trade-offs affecting the climate, energy, food and water sectors.** These interconnections could inform the elaboration of norms for due diligence in supply chains and corporate sustainability reporting.

**Lastly, the foreign policies of developed countries and emerging economies have a key role to play to create a more enabling environment for low-income, vulnerable countries to attain the climate, energy, food and water goals by reducing their footprints abroad.** In the past decades, the major economies' foreign policies have largely served economic interests. These policies should put greater emphasis on supporting institutions and long-term strategies that protect essential natural resources and promote climate-resilient development. They should also support the provision of public goods, notably at the regional level. Regional cooperation, in particular, is essential for building resilience in food systems, managing trade-offs in the use of water resources and conflictual situations in cross-border river basins, and protecting tropical rainforest ecosystems.

**When it comes to managing the spillover effects of their economic and security policies on climate-related, food and water outcomes in developing countries, the reach of developed countries will be limited if they do not cooperate with other major economies.** The emerging economies – the BRICS and the Arab oil-exporting countries in particular – nowadays have considerable impacts on international markets and international development outcomes. While continuing to promote action at the multilateral level, European countries in particular should strive to engage and exchange experiences with emerging economies as well as other OECD members on these issues. Diplomacy and international political dialogue are thus crucial instruments to promote more coherent and effective policies for climate action, food security and the sustainable management of water resources.

# Annex 1: The water-energy-food nexus

Figure A1.1: Interlinkages amongst the food, water and energy sectors



Source: de Andrade Guerra et al., 2021.

## Annex 2: Thematic Dutch development cooperation objectives and SDGs

**Table A2.1:** Dutch development cooperation objectives and SDGs

Netherlands Foreign Trade and Development Cooperation (IGG)	United Nations 2030 Agenda for Sustainable Development
<p><b>Food security</b></p> <ul style="list-style-type: none"> <li>● Eliminate hunger and malnutrition in 2030 (SDG 2.1 and 2.2)</li> <li>● Doubling productivity and income of smallholder food producers in 2030 (SDG 2.3)</li> <li>● Ecologically sustainable food production systems in 2030 (SDG 2.4) and maintenance agro-biodiversity in 2020 (SDG 2.5)</li> <li>● Knowledge and capacity building for food security</li> </ul>	<p><b>Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture</b></p> <ol style="list-style-type: none"> <li>2.1. By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round</li> <li>2.2. By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons</li> <li>2.3. By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment</li> <li>2.4. By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality</li> <li>2.5. By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed</li> <li>2.a. Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries</li> <li>2.b. Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round</li> <li>2.c. Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility</li> </ol>
<p><b>Water</b></p> <ul style="list-style-type: none"> <li>● Improved access to drinking water (30 million people in 2030), sanitation (50 million people in 2030) and hygiene (WASH) (SDG 6.1, 6.2)</li> </ul>	<p><b>Goal 6: Ensure availability and sustainable management of water and sanitation for all</b></p> <ol style="list-style-type: none"> <li>6.1. By 2030, achieve universal and equitable access to safe and affordable drinking water for all</li> <li>6.2. By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations</li> <li>6.3. By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and</li> </ol>

- Improved water productivity in agriculture (+25% in 2030) (SDG 6.4)
- Improved management of (transboundary) river catchments and safe deltas<sup>120</sup> (SDG 6.6)

- materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
- 6.4. By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
  - 6.5. By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
  - 6.6. By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
  - 6.a. By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies
  - 6.b. Support and strengthen the participation of local communities in improving water and sanitation management

#### Climate

- Access to renewable energy (50 million people in 2030) (SDG 7)
- Reduced deforestation and sustainable land use (SDG 12, 15)
- Adaptation in food security and water management
- Increased international climate action, through negotiations
- A Dutch fair share of the USD 100 billion per year collective commitment for climate action in developing countries

#### Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all

- 7.1. By 2030, ensure universal access to affordable, reliable and modern energy services
- 7.2. By 2030, increase substantially the share of renewable energy in the global energy mix
- 7.3. By 2030, double the global rate of improvement in energy efficiency
- 7.a. By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology
- 7.b. By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support

#### Goal 12: Ensure sustainable consumption and production patterns

- 12.1. Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries
- 12.2. By 2030, achieve the sustainable management and efficient use of natural resources
- 12.3. By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses
- 12.4. By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimise their adverse impacts on human health and the environment
- 12.5. By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse
- 12.6. Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability

<sup>120</sup> The Dutch policy focuses on improved water management in international transboundary river basins in Africa, Asia and the Middle East, including the Brahmaputra, Incomati, Mekong, Niger, Nile, Senegal, West Bank Aquifer and Zambezi basins.

information into their reporting cycle

- 12.7. Promote public procurement practices that are sustainable, in accordance with national policies and priorities
- 12.8. By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature
- 12.a. Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production
- 12.b. Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products
- 12.c. Rationalise inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimising the possible adverse impacts on their development in a manner that protects the poor and the affected communities

**Goal 13: Take urgent action to combat climate change and its impacts**

- 13.1. Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
- 13.2. Integrate climate change measures into national policies, strategies and planning
- 13.3. Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
- 13.a. Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilising jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible
- 13.b. Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalised communities

**Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss**

- 15.1. By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements
- 15.2. By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally
- 15.3. By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world
- 15.4. By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development



- 15.5. Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species
- 15.6. Promote fair and equitable sharing of the benefits arising from the utilisation of genetic resources and promote appropriate access to such resources, as internationally agreed
- 15.7. Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products
- 15.8. By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species
- 15.9. By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts
- 15.a. Mobilise and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems
- 15.b. Mobilise significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation
- 15.c. Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities

## Annex 3: Overview of policy coherence hotspots

**Table A3.1:** Overview of policy coherence hotspots for climate action, food security and water

Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
<b>A. Energy, climate, trade and investment policies</b>					
Public support, such as export credit subsidies, for fossil exploration and production in developing countries (see 2.2.1)	China, Japan, Korea notably; other OECD countries, including EU MS  Multilateral development banks	Africa (e.g., Nigeria), Middle East and Asia	Developing countries' climate mitigation commitments are undermined, at least in the short term, with the risks of having stranded assets in the future**	Possible positive economic effects, at least in the short term, that improve food security**	Possible positive economic effects, at least in the short term, that improve water security*
				Improvements in agricultural productivity due to lower fertiliser and energy costs*	
				Reliance on rents from the fossil-fuel sector lowers political incentives for public investment in the agricultural sector**	Pollution of water resources**
				Displaced rural communities; excessive use of chemical fertilisers*	

Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
Policies encouraging the energy transition and supporting the importation of minerals for the manufacturing of electrical and electronic products underpinning clean and efficient energy systems (see 2.2, 2.4.1, 2.5.2)	US, China, Japan, EU countries, and UK notably	Congo basin (Democratic Republic of Congo) notably; Countries in Southern Africa with major mining areas	Deforestation and forest degradation causing GHG emissions and losses of natural carbon storage capacity and biodiversity losses, which may create vulnerabilities to climate change**	Positive effects from higher incomes and greater access to food markets for workers and households benefiting from mining activities*	Possible pollution of water resources**
				Deforestation, competition for land, ecosystem degradation, conflicts related to mining, and agricultural labour shortages can undermine agricultural productivity, livelihoods, food security and health, especially for indigenous populations*	
Policies promoting the exportation of clean and efficient energies, including via technology transfers, that have an influence on energy policy choices and public investments in developing countries where the socio-economic conditions are different than those in richer	OECD countries, emerging economies;  WTO rules	E.g., Ghana	Improved availability of clean, efficient and affordable energy technologies contributes to climate mitigation**	Greater availability of clean, efficient and affordable energy technologies improves the performance of agri-food value chains and food utilisation*	–
			The mercantilist policies of advanced and emerging economies cause unfair	Inadequate access to clean energy technologies in rural areas, especially amongst	–

Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
and more industrialised countries (see 2.2.2, 2.4.1)			competition for local innovators and suppliers in developing countries, which undermines the development and diffusion of clean energy solutions affordable by all*	poor households and small-scale producers, is an obstacle to preserving trees and soils and improving food security*	
Policies promoting the production and utilisation of biofuels in developed and emerging countries that increase the demand for different types of biomasses (see 3.4)	EU and EU MS, US, emerging countries, including Brazil and Indonesia – some of these countries import both biofuels and feedstocks (sugar, palm oil, soybean and others) from emerging and developing countries	Tropical forests and other ecosystems in South America (Brazil) and South-eastern Asia (Indonesia)	Deforestation and forest degradation, causing GHG emissions, losses of natural carbon storage capacity, oxygen sources and regional weather regulation*  Losses of terrestrial and arboreal biodiversity, which may affect vulnerabilities to climate change*	Competition for land with food and feed crops locally and for agricultural commodity supplies in international markets**	Pressure on water resources as biofuel crops are demanding in water, although alternative sources of biomass, less water-intensive, are increasingly used*
<b>B. Infrastructure, trade and investment policies</b>					
Public policies supporting infrastructure development in developing and emerging countries (transport, energy, telecoms, buildings, etc.) that	International public and private financial flows from OECD countries and emerging economies	Developing countries in general  Africa, in particular fast-growing sub-Saharan African	A large part of GHG emissions and environmental degradation is linked to infrastructure (transport infrastructure, buildings and	Growing urban markets and improving transport and logistics infrastructure create opportunities for commercially-oriented	In general, investments in drinking water and sanitation infrastructure generally improves water security for some segments of the

Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
play an important role in energy utilisation, GHG emission patterns and climate-related vulnerabilities (see 2.3.1, 4.4)	Inadequate policies and regulations, especially for environmental impact assessments, at the levels of DFIs, MDBs, the OECD, commercial banks, and corporations in the infrastructure sector	countries (e.g., Kenya, Nigeria and Senegal)	power plants construction and operation), going against climate mitigation commitments of developing countries.  Infrastructure development often undermines adaptation by affecting biodiversity and removing natural protection (e.g., wetlands and mangrove forests) for vulnerable communities (e.g., coastal areas exposed to sea level rise and storm surges)**  WASH-related infrastructure often does not adequately take into account risks posed by climate change*	farmers and food companies**	population**
		Middle East  Central, South and South East Asia (e.g., Bangladesh, Indonesia)		A bias in public investments in favour of linkages between primary urban areas and international markets often leaves rural hinterlands, smallholder farmers and local enterprises with poor access to national markets*	Urban growth and poor spatial planning may cause excessive pressures on water resources and water pollution in and around large urban areas with informal settlements, which in turn affects the reliability and quality of WASH service delivery, as well as agriculture, aquaculture, and fisheries*  A bias in public investments in favour of more affluent populations may increase inequality in access to WASH services*
Policies supporting the development of large dams and hydropower projects in major river basins (see 4.2)	International public and private support involving partnerships with national development finance	Amazon, Congo and Mekong basins notably; also Zambezi (Zambia and Zimbabwe), Nile (Ethiopia, Egypt and Sudan),	Hydroelectric power contributes to clean energy supply**	Contribution to economic growth, including in the food economy**	Increased freshwater supply for upstream communities*  Improved flood and drought

Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
	institutions, multilateral development banks, commercial banks, investors and guarantors from Asia, Europe, North America and other emerging countries (including but not limited to China, France, Germany, the Netherlands, the EIB, the US, Brazil, South Africa, the AfDB, the WB)	Yangtze (China) and Ganges-Brahmaputra-Meghna (India, Bangladesh)	Possible improvements in access to electricity for underserved populations**		risk management*
			Deforestation and forest degradation; eutrophication causing methane emissions from artificial lakes**  Hydropower projects are increasingly vulnerable to the effects of climate change on water availability, which threatens their power generation potential and economic sustainability**	Displaced populations and livelihood losses, especially when dam projects inadequately implement ESG norms and assessments and provide compensation to negatively affected populations**  Disruption and redistribution of fisheries along rivers and loss of aquatic biodiversity**	Disruption of river flow, degradation of water quality and water supply losses for downstream communities**
Policies promoting investments in large-scale and technologically complex agricultural irrigation schemes, including via exports of technology and construction services, that have an influence on irrigation policy choices and	Multilateral development banks notably, including but not limited to the World Bank, recently also through public-private partnerships; but also private actors, including water sector companies	Sub-Saharan Africa (e.g., Kenya, Malawi, Niger, Nigeria) and Middle-East and North Africa (e.g., Maroc, Jordan, Egypt, Tunisia) notably	Irrigation schemes can contribute to climate adaptation by reducing vulnerability linked to water stress and to climate mitigation through increased yields**	Investments in irrigation schemes can contribute to economic development, poverty reduction, agricultural productivity and food security**	Irrigation infrastructure may lead to overuse and misuse of water resources (notably groundwater) and pollution; it may also create competition for water resources (especially in countries heavily dependent on agriculture and with

Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
public investments in developing countries (see 4.3)			<p>Irrigation schemes are in many cases increasingly vulnerable to the effects of climate change, notably drought.*</p> <p>Irrigation schemes can encroach into natural ecosystems and cause biodiversity losses, affecting adaptation, as a result of induced agricultural land expansion. This in turn may affect local and regional weather and climate*</p>	Investments in irrigation schemes may favour large-scale, export-oriented crops and undermine local-oriented small-scale farmers' access to land and water*	scarce water resources) and put excessive pressure on them, notably groundwater, imperil aquatic ecosystems, and contribute to shortages for other critical water uses**
Policies driving investments in flood protection infrastructure (e.g., canals, drains, levees, reservoirs, dykes), including via exports of technology and construction services, that contribute to reducing or creating vulnerabilities amongst populations exposed	EU and EU MS (Netherlands, France and Germany), other OECD countries, emerging economies	E.g., Bangladesh	Flood protection infrastructure may mitigate current flood risk but not adequately take into account future risks related to climate change; it may also be developed at the expense of nature-based solutions, especially in contexts where regulatory systems to	Investing in physical protection of farmland, e.g., through land reclamation, flood control, and drainage, can improve agricultural productivity and improve food security for vulnerable regions and populations*	Flood protection infrastructure may create inequities between richer and poorer communities, whereby areas with higher land and property values receive disproportionately large investments*

Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
to floods (see 2.3.2)			<p>ensuring their integrity, functionality and operability and public awareness of risks have weaknesses**</p> <p>Given the large share of adaptation expenditures being devoted to water infrastructure, there are risks of unintended effects on wetlands, mangroves and other aquatic ecosystems, and in turn on climate adaptation objectives**</p>		
<b>C. Agricultural, industrial (incl. food), trade and investment policies</b>					
Policies of developed and emerging countries facilitating imports of soy (largely for animal feed), beef, palm kernel or oil, rubber, cocoa, coffee and timber from tropical forest regions in developing and emerging countries (see	China, EU, USA, Canada, other Asian importers, and other developed and emerging countries	<p>Brazil and other South American countries (e.g., Paraguay and Argentina) for soybeans and beef</p> <p>Borneo rainforest (Indonesia) for palm oil</p> <p>Côte d'Ivoire and Ghana for</p>	Land use change (e.g., deforestation) linked to agricultural land expansion, causing GHG emissions, losses of natural carbon storage capacity, oxygen source and regional weather regulation – and terrestrial and arboreal biodiversity	<p>Export-oriented value chains provide economic opportunities and lower food prices, improving accessibility to nutrient-rich animal-based foods**</p> <p>Missed development opportunities due to</p>	<p>Disruption in water cycle in and around major tropical forest basins (Amazon basin and beyond in South America, Congo basin and beyond in sub-Saharan Africa)**</p> <p>Imports of agricultural goods intensive in water entail</p>



Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
2.4.1, 3.3.1, 4.5)		cocoa beans	losses, which may affect vulnerability to climate change**	obstacles to the inclusion of weaker producers into export-oriented value chains*  Disrupted livelihoods of poorer farmers and herders due to rising land prices around urban areas and 'land grabbing' by domestic and foreign investors*	virtual water transfers, which may increase water stress in developing countries**
Policies facilitating the production of agricultural commodities (sugar, fruits, nuts, vegetables, cotton) in water-stressed regions in developing countries for exportation to developed and emerging countries (see 3.3.1, 4.5)	Canada, European countries (incl. EU and UK), Japan, USA, China, India	Low-income and lower-middle-income Sub-Saharan African countries (e.g., Burkina Faso, Mali, Ethiopia, Kenya); some Asian countries; and other least developed countries	Contribution to GHG emissions via increased international trade*	Improved economic opportunities and incomes for farmers and workers in export-oriented agricultural sub-sectors and adoption of higher agricultural sustainability standards**  Low diversification in the agri-food system, poorly developed regional food value chains and exposure of low-income, smallholder farmers to fluctuating	Imports of agricultural goods highly intensive in water by advanced and emerging countries entail virtual transfers of water, which may cause stress in developing countries (for example, sugarcane, cotton, almonds, pistachios and grapes are largely imported from areas with significant or severe levels of water scarcity)**

Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
				<p>international markets may contribute to vulnerability in terms of food security**</p> <p>Domestic and foreign direct investments related to export-oriented value chains may exert pressure on land resources, reduce access to land for local communities, and lead to an intensive use of agro-chemicals (fertilisers, pesticides)*</p>	
<p>Policies promoting the production of manufactured goods highly water-intensive (e.g., textiles and garments) in developing countries for exportation to developed and emerging countries (see 4.5)</p>	<p>US, Japan, Germany, China, Italy, Mexico, France, UK and Netherlands are major virtual water importers</p>	<p>China, Bangladesh, Vietnam and Turkey (for garments)</p>	<p>Contribution to GHG emissions via increased international trade*</p> <p>Increased vulnerability to climate change, particularly in drought-prone regions whose economies rely on water-intensive sectors*</p>	<p>Improved economic opportunities and incomes for workers in export-oriented industrial sub-sectors**</p>	<p>Imports of manufactured goods highly water-intensive by advanced and emerging countries cause virtual transfers of water, which contribute to water depletion and pollution in producing regions – which is not accounted for in the price paid by consumers in importing countries**</p>

Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
Producer support in developed countries and increasingly in emerging countries that affects international food commodity markets and trade (see 3.2)	China and US (producer support and import protection for cotton); Asian countries (public support for rice production and storage); EU (milk powder and poultry meat)	For cotton, West and Central Africa (Benin, Burkina Faso, Mali, Chad); for rice, West African countries and Eastern Africa (Tanzania)	–	If local climate-related production risks are relatively high, access to imports from countries subsidising production may stabilise domestic markets and support food system resilience*	The importation of water-intensive agricultural and food products saves local water supplies*
			Low productivity growth in the agricultural and food sectors could leave local communities more vulnerable to climate change*	Producer support may distort international markets and trade, which may in turn negatively affect domestic farmers and processors by lowering prices, undermine the local sector by discouraging investments into productivity-enhancing agricultural and industrial assets, and entail livelihood losses**	–
Trade and investment agreements that facilitate the exportation or the production	Developed and emerging countries	Developing countries and emerging countries (e.g., Egypt)	–	Economic opportunities in the wholesale and retail sectors*	–

Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
and distribution in developing countries of ultra-processed foods (see 3.3.1)			-	Greater availability, accessibility and marketing of ultra-processed foods and sugar-sweetened beverages cause a shift in food habits and diets that contribute to obesity and other non-communicable diseases**  Trade agreements may restrict the scope for product market regulation and taxation for obesogenic foods*	-
<b>D. Foreign, international security and humanitarian policies</b>					
Foreign policies of influential developed and emerging countries that contribute to shaping political and economic incentives in developing countries – in recent decades they have favoured economic, trade and security objectives, at the	Developed and emerging countries  IFIs, MDBs	Developing countries	Weak social and civil protection systems*  Educational, research and health systems with weaknesses, negatively affecting socio-economic resilience*	Inadequate safety nets and healthcare for vulnerable populations in terms of food security and nutrition*	Inadequate capabilities to provide emergency assistance for ensuring access to safe drinking water, sanitation and hygiene*

Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
expense of social, environmental and governance ones (see 2.6.1, 2.6.2)					
Foreign policies of developed and emerging countries that interact with development assistance for cross-border river basins <sup>121</sup> management and national policies driving regional cooperation (see 4.6)	EU and EU MS (Denmark, Netherlands, Slovenia, Sweden), Norway, UK	River basins of Euphrates-Tigris basin (Turkey, Syria, Iraq); Nile; Niger River basin; Senegal River basin; Ganges-Brahmaputra-Meghna (India, Bangladesh) river basin	Inadequate adaptation planning and implementation in river basins vulnerable to climate change, in a context where development assistance to regional organisations tends to be technical, based on international norms and 'best practices' and to neglect political and economic incentives**	Food security risks due to lower access to water resources in downstream countries, especially in the absence of international or regional treaties or when existing ones are not properly enforced*	Water security risks in downstream countries, especially in the absence of international or regional treaties or when existing ones are not properly enforced**  Poor implementation of transboundary water agreements and cross-border river basin management negatively affecting water flow stability, water allocation fairness among riparian states, water quality and flood management to the detriment of downstream countries**

<sup>121</sup> River basins, where upstream and downstream actors have opposing interests, exemplify the challenge of cooperating when externalities are one-way.

Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
International security and humanitarian policies that play a role in social stability, climate adaptation, resilience-building and development policy effectiveness (see 2.6.3)	E.g., the EU is making efforts to enhance linkages between humanitarian aid and development assistance, and also to exploit synergies with conflict prevention and peacebuilding, notably in the central and eastern Sahel	E.g., Nigeria, Chad, Sudan; Iraq; Myanmar	Potential synergies amongst the security, humanitarian and development cooperation sectors remain not adequately exploited, which hinders resilience building*	Highly-context-dependent effects: security and humanitarian policies may either improve food security, particularly acute forms, or destabilise land access, agri-food market systems and livelihoods and thereby undermine long-term food security gains*	Highly-context-dependent effects: security and humanitarian policies may either improve water security or disrupt access to water resources and water distribution and sanitation systems*  The EU's approach includes support to the safety and security of water systems and personnel*
<b>E. Financial and tax policies</b>					
Tax policies, laws and regulations (company law, financial regulations, etc.) conditioning the activities of private banks, insurers and asset managers that operate internationally and finance the fossil-fuel sector (see 2.7.3)	developed and emerging countries (US, UK, France and others; China and others)	Developing countries and emerging economies, in particular in Africa (e.g., Ghana and Mozambique) and the Middle East	Financing of investments in fossil fuel projects in developing and emerging countries undermines climate mitigation objectives**  Financing by some banks contributes to the loss of tropical forests*	Cheaper energy and fossil-fuel-based inputs contribute positively to the productivity of the agricultural and food sectors*  Positive effects on food security, at least in the short run*	Energy-intensive water systems benefit from lower costs and households may have greater access to drinking water and sanitation services*

Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
				<p>Reliance on rents from the fossil-fuel sector lowers political incentives for public investment in the agricultural sector**</p> <p>Displaced rural communities; excessive use of chemical fertilisers*</p>	Pollution of water resources**
<p>As part of climate finance, international public and private financial flows directed at climate adaptation in developing countries are critical for adaptation policy effectiveness (see 2.7.1 and 2.7.2)</p>	<p>developed and emerging countries (G20 countries notably)</p> <p>IFIs, MDBs</p>	<p>Sub-Saharan African countries (e.g., South Sudan), Middle Eastern countries (e.g., Yemen)</p>	<p>While international adaptation finance has grown in recent years, it remains far below current and future needs**</p> <p>Forests, which contribute to both climate mitigation and adaptation, receive a small share of climate adaptation finance*</p> <p>Developed countries' policy-makers have not yet adequately responded to the needs for the compensation</p>	<p>Insufficient climate finance for agriculture and food security hampers adaptation*</p>	<p>Water-related sectors receive substantial financing, but not enough to respond to adaptation needs*</p>

Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
			of loss and damage**		
Increasing reliance of international development and climate action on blended finance – in a context where tied development aid is becoming more common and public budget support’s share of total ODA is declining (see 2.7.1)	E.g., EU External Investment Plan, International Finance Corporation	Developing countries, in particular countries transitioning from the LDC status to the middle-income country (MIC) category (e.g, Bangladesh)	Contribution of private finance to filling the climate adaptation financing gap*	Blending may bring capital to Small and Medium-sized Enterprises (SMEs) in agri-food value chains*	Private finance may contribute to the development of climate-change-proof drinking water and sanitation systems in rapidly growing urban areas*
			In sub-Saharan Africa, few blended finance projects benefit directly social sectors (health, education and other sectors), which are essential for building resilience to climate change*	In sub-Saharan African LDCs in particular, few blending projects have benefitted smallholder farmers and small-scale food companies*	Blended finance may favour the privatisation of water systems in urban and rural areas*
			Blending may give rise to capital-market-distortion and balance-of-payment risks*		



Driving sector(s) and policy area(s)	Developed and emerging countries	Developing countries	Effects on policy objectives in developing countries		
			Climate change	Food security	Water security
Tax avoidance, evasion and illicit financial flows from developing countries are key factors in domestic resources mobilisation in developing countries, which in turn conditions the capacity of states to finance social protection and environmental policies (see 2.7.3)	Advanced countries and emerging economies, notably countries providing for tax havens and banking secrecy	Sub-Saharan African, North African and Middle Eastern, and Asian developing countries (e.g., Nigeria, Mozambique, Zambia, Namibia, Tunisia, Bangladesh)	IFFs undermine developing countries' ability to finance adaptation, resilience-building and energy transition measures and investments*	IFFs reduce developing countries' ability invest in agricultural development and fund food and nutrition assistance programmes*	Lack of financial resources for investing in drinking water and sanitation infrastructure and services*

Notes.

	Weak positive effect
	Strong positive effect
	Neutral effect
	Weak negative effect
	Strong negative effect

\* Indicates a low level of confidence given the research conducted for this study; \*\* indicates a high level of confidence

---

## References

- Aaditya, M. & Arvind, S. (2013). *Four Changes to Trade Rules to Facilitate Climate Change Action*. CGD Policy Paper 021. Washington DC: Center for Global Development.
- Abdelsalam, S. M. M. (2019). *Water Management of Textile Sector in Bangladesh: Analysis of Partnership for Cleaner Textile Project in Bangladesh*. Master of Environmental and Energy Management Program. University of Twente.
- Abman, R., & Lundberg, C. (2020). Does Free Trade Increase Deforestation? The Effects of Regional Trade Agreements. *Journal of the Association of Environmental and Resource Economists*, 7(1), 35–72.
- ADB. (n.d.). *Sector Overview. Bangladesh. Industrial Energy Efficiency Finance Program*. Mandaluyong: ADB. Retrieved from: <https://www.adb.org/sites/default/files/linked-documents/45916-01-ban-oth-01.pdf>.
- Aghajanzadeh-Darzi, P., Bellora, C., Bureau, J.-C., & Doburdhun, A. (2015). *Assessing EU trade preferences for developing countries' development and food security*. Wageningen: FOODSECURE.
- Ahmed, M. (2021). *COP26 and Beyond: CGD's Work on Coherence and Effectiveness in Climate Finance and Policy*. Center for Global Development | Ideas to Action. <https://www.cgdev.org/blog/cop26-and-beyond-cgds-work-coherence-and-effectiveness-climate-finance-and-policy>.
- Ahmed, S.J., A. Bárcena & D. Titelman. (2021). *The IMF's Misstep on Climate Finance*. Project Syndicate, December 13, 2021.
- Aizawa, M., & Schuelein, W. (2016). *Search of Policy Coherence: Aligning OECD Infrastructure Advice with Sustainable Development*. Institute for human rights and business and heinrich böll foundation.
- Ajanovic, A. (2011). Biofuels versus food production: Does biofuels production increase food prices? *Energy*, 36(4), 2070–2076.
- Aldalbahi, A., El-Naggar, M., El-Newehy, M., Rahaman, M., Hatshan, M., & Khattab, T. (2021). Effects of Technical Textiles and Synthetic Nanofibers on Environmental Pollution. *Polymers*, 13(1), 155. MDPI AG.
- Aldrian, E. (2021). *Jakarta is sinking. Here's how to stop this*. The Jakarta post. <https://www.thejakartapost.com/opinion/2021/11/15/jakarta-is-sinking-heres-how-to-stop-this.html>.
- Alexoaei, A.P.; Cojanu, V.; & Coman, C.I. (2021). On Sustainable Consumption: The Implications of Trade in Virtual Water for the EU's Food Security. *Sustainability* 2021, 13, 11952.
- Almeida, R.M., Fleischmann, A.S., Brêda, J.P.F., Cardoso, D.S., Angarita, H., Collischonn, W., Forsberg, B., García-Villacorta, R., Hamilton, S.K., Hannam, P., Paiva, R., LeRoy Poff, N., Sethi, S.A., Shi, Q., Gomes, C.P., & Flecker, A.S. (2021). Climate change may impair electricity generation and economic viability of future Amazon hydropower, *Global Environmental Change*, Volume 71, 102383, ISSN 0959-3780.
- Alogna, I. (2021). *Corporate Due Diligence and Climate Change*. Nova Centre on Business, Human Rights and the Environment Blog, 31st May 2021.
- Amato, G. et al. (2015). Meteorological conditions, climate change, new emerging factors, and asthma and related allergic disorders. A statement of the World Allergy Organization. *World Allergy Organ J.* 2015; 8(1): 25.
- An, R., Guan, C., Liu, J., Chen, N., & Clarke, C. (2019). Trade openness and the obesity epidemic: a cross-national study of 175 countries during 1975–2016. *Annals of Epidemiology*, 37, 31–36.
- Ansar A, Flyvbjerg B, Budzier A, & Lunn D (2014) Should we build more large dams? The actual costs of hydropower megaproject development. *Energy Policy* 69:43–56.
- Apuzzo, M., & Gebrekidan, S. (2021). Who Keeps Europe's Farm Billions Flowing? Often, Those Who Benefit. *The New York Times*. <https://www.nytimes.com/2019/12/11/world/europe/eu-farm-subsidy-lobbying.html>.

- 
- Asaduzzaman, M., & Rahman, M. M. (2016). Impacts of Tipaimukh Dam on the Down-stream Region in Bangladesh: A Study on Probable EIA. *Journal of Science Foundation*, 13(1):3.
- Asare, R. (2019). The nexus between cocoa production and deforestation. *Grain De Sel*, n. 78.
- Ashley, C. & G. Gruère (2021). *Background paper for the 7th OECD-FAO Roundtable on Financing Agricultural Water: The case for action on financing agricultural water*. Paris: OECD.
- Ashraf, N. & van Seters, J. (2019). *Sewing the pieces together: towards an EU strategy for fair and sustainable textiles*. ECDPM Discussion Paper No. 264. Maastricht: ECDPM.
- Ashraf, N. & van Seters, J. (2021). *The role of low- and middle-income countries in the circular economy transition of the Netherlands and the EU*. ECDPM Briefing Note No. 142. Maastricht: ECDPM.
- Beaulieu, J.J., DelSontro, T. & Downing, J.A. (2019). Eutrophication will increase methane emissions from lakes and impoundments during the 21st century. *Nat Commun* 10, 1375.
- Béné, C., Prager, S. D., Achicanoy, H. A. E., Toro, P. A., Lamotte, L., Cedrez, C. B., & Mapes, B. R. (2019). Understanding food systems drivers: A critical review of the literature. *Global Food Security*, 23(April), 149–159.
- Bilal, S., Medinilla, A., Karkare, P., Tondel, F., Ahairwe, P. E., & Sherriff, A. (2021). *The EU's Global Gateway: Groundbreaking initiative or smart rebranding?*. Maastricht: ECDPM. <https://ecdpm.org/talking-points/eu-global-gateway-groundbreaking-initiative-smart-rebranding/>.
- Bharadwaj, R., Chakravarti, D., Karthikeyan, N., & Kaur, D. (2021a). *Comparative analysis of the efficiency of different social protection delivery mechanisms in the context of climate resilience*. London: IIED. <https://pubs.iied.org/20466iied>.
- Bharadwaj, R., Hazra, S., Reddy, M., Das, S., & Kaur, D. (2021b). *Connecting the dots: climate change, migration and social protection*. London: IIED. <https://pubs.iied.org/20591iied>.
- Bjornlund, V., Bjornlund, H. & van Rooyen, A. F. (2020). Exploring the factors causing the poor performance of most irrigation schemes in post-independence sub-Saharan Africa. *International Journal of Water Resources Development*. Vol: 36: supplement1, S54-S101.
- Boccaletti, G. (2022). Climate change requires a new land economy. *Project Syndicate*, February 2022.
- Boddiger, D. (2007). Boosting biofuel crops could threaten food security. *The Lancet*, 370(9591), 923–924.
- Boffey, D. (2021). One of world's biggest pension funds to stop investing in fossil fuels. *The Guardian*. <https://www.theguardian.com/environment/2021/oct/26/abp-pension-fund-to-stop-investing-in-fossil-fuels-amid-climate-fears>.
- Boretti, A., & Rosa, L. (2019). Reassessing the projections of the World Water Development Report. *npj Clean Water* 2, 15 (2019).
- Borrel, J. (2020). *The Nile and beyond: geopolitics of water*. Brussels: European Union External Action Service.
- Bronstein, K. (2021). The Good, Bad, and Ugly about Renewable Energy in Developing Countries. *RTI*. <https://www.rti.org/insights/renewable-energy-developing-countries>.
- Browder, G., Ozment, S., Rehberger Bescos, I., Gartner, T., & Lange, G. M. (2019). *Integrating Green and Gray: Creating Next Generation Infrastructure*. World Resources Institute.
- Brutschin, E & Fleig, A. (2016). Innovation in the energy sector – The role of fossil fuels and developing economies. *Energy Policy*, Volume 97: 27-38.
- Buffet, L. (2017). *Around half of EU production of crop biodiesel is based on imports, not crops grown by EU farmers – new analysis*. <https://www.transportenvironment.org/discover/around-half-eu-production-crop-biodiesel-based-imports-not-crops-grown-eu-farmers-new-analysis/>.
- Bureau, J.C., & Swinnen, J. (2018). EU policies and global food security. *Global Food Security*, 16, 106–115.

- 
- Byiers B, Cazals A, Medinilla A., & de Melo J. (2021). *African regional integration: A problem-driven approach to delivering regional public goods*. FERDI Document de travail P290, mai 2021.
- CDP. (2018). *Closing the Gap: Scaling Up Sustainable Supply Chains*. Supply Chain Report 2017/2018. <https://www.cdp.net/en/research/global-reports/global-supply-chain-report-2018>.
- Chapagain, A.K., & Hoekstra, A.Y. (2008). Water International The global component of freshwater demand and supply: an assessment of virtual water flows between nations as a result of trade in agricultural and industrial products. *Water International* Vol. 33, No. 1, March 2008, 19–32.
- Chen, J., & Mueller, V. (2018). Coastal climate change, soil salinity and human migration in Bangladesh. *Nature Clim Change* 8, 981–985 (2018).
- Chinery, N., & George-Ikoli, T. (2022). *Ending Nigeria's Oil Dependency: Not If, But When and How*. Natural Resource Governance Institute. <https://www.resourcegovernance.org/blog/ending-nigeria-oil-dependency-not-if-but-when-and-how>.
- Clements, B., S. Gupta, & Liu, J. (2021). *Who's Responsible for Climate Change? New Evidence Based on Country-level Estimates of Climate Debt*. CGD Policy Paper 242. Washington, DC: Center for Global Development.
- Climate Policy Initiative. (2021). *Global Landscape of Climate Finance 2021*.
- Coady, D. et al. (2019). *Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates*. IMF Working Paper No. 2019/089. <https://www.imf.org/en/Publications/WP/Issues/2019/05/02/Global-Fossil-Fuel-Subsidies-Remain-Large-An-Update-Based-on-Country-Level-Estimates-46509>.
- Cook, C., & Bakker, K. (2012). Water security: Debating an emerging paradigm. *Global Environmental Change*, 22(1), 94–102.
- Cooper, R. & Price, R.A. (2019). Unmet needs and opportunities for climate change adaptation and mitigation in the G5 Sahel region. K4D Emerging Issues Report. Brighton, UK: Institute of Development Studies.
- Cordova, R., Kliemann, N., Huybrechts, I., Rauber, F., Vamos, E. P., Levy, R. B., ... Freisling, H. (2021). Consumption of ultra-processed foods associated with weight gain and obesity in adults: A multi-national cohort study. *Clinical Nutrition*, 40(9), 5079–5088.
- Cotula, L. (2013). The Great African Land Grab? Agricultural investments and the global food system.
- Council of the EU (2021). Council conclusions on water in the EU's external action. Brussels: Council of the EU.
- Crentsil, A., Fenny, A., Ackah, C., Asuman, D., & Otioku, E. (2020). *Ensuring access to affordable, sustainable and clean household energy for all in Ghana. Global State of the SDGs: Three layers of critical action*. (Occasional Paper Series No. 62). Southern Voice. <http://southernvoice.org/ensuring-access-to-affordable-sustainable-and-clean-household-energy-for-all-in-ghana/>.
- CTA. (2011). *The water we eat - tackling scarcity in ACP countries*. Wageningen: CTA Policy Brief.
- Dalin, C., Wada, Y., Kastner, T., & Puma, M. J. (2017). Groundwater depletion embedded in international food trade. *Nature*, 543(7647), 700–704.
- Dasgupta, P. (2021). *The Economics of Biodiversity: The Dasgupta Review*. Abridged Version. (London: HM Treasury).
- De Schutter, O. (2011). How not to think of land-grabbing: three critiques of large-scale investments in farmland. *Journal of Peasant Studies*, 38(2), 249–279.
- Deininger, K. (2011). Challenges posed by the new wave of farmland investment. *The Journal of Peasant Studies*, 38(2), 217–247.
- Deininger, K. & Byerlee, D. (2011). *Rising Global Interest in Farmland*.
- Deininger, K. & Xia, F. (2016). Quantifying Spillover Effects from Large Land-based Investment: The Case of Mozambique. *World Development*, 87, 227–241.

- 
- Dekeyser, K. (2019a). *Food systems change under large agricultural investments in Kenya and Mozambique* (Doctoral thesis). Pretoria: University of Pretoria.
- Dekeyser, K. (2019b). Land Investments, Food Systems Change and Democracy in Kenya and Mozambique. *Politics and Governance*, 7(4), 178.
- Dekeyser, K., Rampa, F., D'Alessandro, C., & Bizotto Molina, P. (2020). *The food systems approach in practice: Our guide for sustainable transformation*. Maastricht: ECDPM.
- Desmonceaux, J. (2019). CO2, eau, microplastique : la mode est l'une des industries les plus polluantes du monde: En marge du G7, trente-deux groupes du textiles se sont engagés à réduire l'impact du secteur de l'habillement. *Le Monde*. Retrieved from <https://www.lemonde.fr/>.
- Dipa, D. D., Abedin, K., Khan, M. M., & Hasan, M. M. (2015). Impacts of Energy Subsidy in Bangladesh: An Analysis ABC *Journal of Advanced Research*, 4: 39-56.
- Dolganova, I., Mikosch, N., Berger, M., Núñez, M., Müller-Frank, A., & Finkbeiner, M. (2019). The Water Footprint of European Agricultural Imports: Hotspots in the Context of Water Scarcity. *Resources*, 8(3), 141. MDPI AG.
- Du, J., Mitlin, D., Beard, V. D. & Satterthwaite, D. (2019). *We're Grossly Underestimating the World's Water Access Crisis*. WRI commentary. Washington D.C.: World Resources Institute.
- EC (2019). *Textiles and clothing industry: international trade*. Brussels, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs. [https://ec.europa.eu/growth/index\\_en](https://ec.europa.eu/growth/index_en).
- EC. (2018). *Overview of the EU's agricultural trade with African, Caribbean and Pacific countries (ACP), including trade agreements and agri-food trade statistics*. Retrieved December 21, 2021. [https://ec.europa.eu/info/food-farming-fisheries/trade/agricultural-international-trade/bilateral-agreements/acp\\_en](https://ec.europa.eu/info/food-farming-fisheries/trade/agricultural-international-trade/bilateral-agreements/acp_en).
- EC. (2021a). *Agri-Food Trade Statistical Factsheet: European Union - Sub-Saharan Africa*. Brussels: European Commission.
- EC. (2021b). *EU Biodiversity Strategy for 2030: Bringing nature back into our lives*. Communication from The Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Brussels: European Commission.
- EC. (2022a). *Bioeconomy*. Retrieved from [https://ec.europa.eu/info/research-and-innovation/research-area/environment/bioeconomy\\_en](https://ec.europa.eu/info/research-and-innovation/research-area/environment/bioeconomy_en).
- EC. (2022b). *Safeguarding food security and reinforcing the resilience of food systems*. Communication From The Commission To The European Parliament, The European Council, The Council, The European Economic And Social Committee And The Committee Of The Regions. Brussels: European Commission.
- Einhorn, C. (2021). How the COP26 Deforestation Pledge Measures Up. *The New York Times*. <https://www.nytimes.com/2021/11/02/world/europe/deforestation-climate-change.html>.
- Ercin A.E, Chico D. & Chapagain A K. (2016). *Dependencies of Europe's economy on other parts of the world in terms of water resources*. Horizon2020 - IMPREX project, Technical Report D12.1, Water Footprint Network.
- Ercin, E., Chico, D., & Chapagain, A. K. (2019). Vulnerabilities of the European Union's Economy to Hydrological Extremes Outside its Borders. *Atmosphere*, 10(10), 593. MDPI AG.
- Euractiv. (2021). *EU envisages €1 billion aid to Ivory Coast to meet sustainable cocoa laws*. <https://www.euractiv.com/section/development-policy/news/eu-envisages-e1-billion-aid-to-ivory-coast-to-meet-sustainable-cocoa-laws/>
- European Commission. (2019). *EU report on Policy Coherence for Development. Commission Staff Working Document*. Brussels, 28.1.2019 SWD (2019) 20 final.
- European Environment Agency. (2019). *The European environment — state and outlook 2020*. EEA.

- 
- FAO, IFAD, UNICEF, WFP, & WHO. (2017). *The State of Food Security and Nutrition in the World: Building resilience for peace and food security*. Rome: FAO.
- FAO, IFAD, UNICEF, WFP, & WHO. (2021). *The State of Food Security and Nutrition in the World 2021*. Rome: FAO.
- FAO, UNDP & UNEP. (2021). *A multi-billion-dollar opportunity – Repurposing agricultural support to transform food systems*. FAO, UNDP, and UNEP.
- FAO. (2018). *Guidelines on irrigation investment projects*. Rome: FAO.
- FAO. (2020b). *The State of Food and Agriculture 2020. Overcoming water challenges in agriculture*. Rome: FAO.
- FAO. (2021). *FAO in emergencies*. Retrieved December 22, 2021. from <https://www.fao.org/emergencies/appeals/2021/appeals/en/>.
- FAO. (2022). *FAOSTAT statistical database*. Retrieved from <http://www.fao.org/faostat/en/>.
- Feng, Yu, Ziegler, A.D., Elsen, P.R., Liu, Y., He X., Spracklen D.V., Holden, J., Jiang, X., Zheng, C., & Zeng, Z. (2021). Upward expansion and acceleration of forest clearance in the mountains of Southeast Asia. *Nature Sustainability*, *Nature*, vol. 4(10), pages 892-899, October.
- Ferris, N. (2021). Wealthy governments still subsidising fossil fuels in developing nations. *Energy Monitor*. <https://www.energymonitor.ai/finance/sustainable-finance/how-wealthy-governments-continue-to-subsidise-fossil-fuels-in-developing-nations>.
- Financial Express (2021b). *Dhaka's water crisis returns*. Retrieved from <https://thefinancialexpress.com.bd/>.
- Financial Express. (2021a). *Dhaka concerned over Brahmaputra dams by China, India*. Retrieved from <https://thefinancialexpress.com.bd/>.
- Flyvbjerg, B., & Bester, D. (2021). The Cost-Benefit Fallacy: Why Cost-Benefit Analysis Is Broken and How to Fix It. *Journal of Benefit-Cost Analysis*, 12(3), 395-419.
- Friel, S., Schram, A., & Townsend, B. (2020). The nexus between international trade, food systems, malnutrition and climate change. *Nature Food*, 1(1), 51–58.
- Future Dams (2021). *The World Commission on Dams: then and now. UK Research and Innovation Economic and Social Research Council*. Retrieved from <https://www.futuredams.org/>.
- Gandour, C. 2021. *Public Policies for the Protection of the Amazon forest: What Works and How to Improve*. Climate Policy Initiative and Pontifical Catholic University of Rio de Janeiro.
- GED, Bangladesh Planning Commission. (2018). *Bangladesh Delta Plan. Abridged version*. GED.
- Gelles, D. (2021). With Climate Pledges, Some Wall Street Chiefs Warn of Rising Prices. *The New York Times*. <https://www.nytimes.com/2021/11/04/business/cop26-wall-street-pledges-fossil-fuels.html>.
- Gettleman, J. (2018). In Kenya, and Across Africa, an Unexpected Epidemic: Obesity. *The New York Times*. <https://www.nytimes.com/2018/01/27/world/africa/kenya-obesity-diabetes.html>.
- Geuskens, I., & H. Butijn. (2022). *Locked Out of A Just Transition: Fossil Fuel Financing in Africa*. BankTrack, Milieudefensie, and Oil Change.
- Glauber, J., Laborde, D. & Mamun, A. (2022). *From bad to worse: How Russia-Ukraine war-related export restrictions exacerbate global food insecurity*. <https://www.ifpri.org/blog/bad-worse-how-export-restrictions-exacerbate-global-food-security>.
- Global Edge (2019). *Clothing and Textiles: Trade Statistics*. International Business Centre, Michigan State University. Retrieved from <https://globaledge.msu.edu/>.
- Global witness (2021). *Before the flood. How an 'illegal' dam project could destroy forests and biodiversity in one of Congo's oldest national parks*.

- 
- Goulding Carroll, S. (2021). EU's strict green criteria for biofuels will hinder supply, MEPs warn. *EURACTIV*. <https://www.euractiv.com/section/biofuels/news/eus-strict-green-criteria-for-biofuels-will-hinder-supply-meps-warn/>.
- Graham, N.T., Hejazi, M.I., Kim, S.H. et al. (2020). Future changes in the trading of virtual water. *Nat Commun* 11, 3632.
- Gruère, G. & Shigemitsu, M. (2021). *Measuring progress in agricultural water management: challenges and practical options*. OECD Food, Agriculture and fisheries paper, n°162.gsp-plus-1612190630.
- Gurria, A. & Graziano da Silva, J. (2019). *Food security rests on trade*. Retrieved December 21, 2021, from <https://www.oecd.org/agriculture/food-security-rests-on-trade/>.
- Hall, R., Edelman, M., Borrás, S. M., Scoones, I., White, B. & Wolford, W. (2015). Resistance, acquiescence or incorporation? An introduction to land grabbing and political reactions 'from below.' *The Journal of Peasant Studies*, 42(3–4), 467–488.
- Higginbottom, T.P., Adhikari, R., Dimova, R., Redicker, S. & Foster, T. (2021). Performance of large-scale irrigation projects in sub-Saharan Africa. *Nature Sustainability* 4, 501–508 (2021).
- Hildyard, N. & Hildyard, X. (2017). *How Infrastructure is Shaping the World. A Critical Introduction to Infrastructure. Mega-Corridors*. Counter Balance. <https://counter-balance.org/uploads/files/Reports/Flagship-Reports-Files/2017-Mega-Corridors.pdf>.
- HLPE. (2017). *Nutrition and food systems*. Rome: High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security.
- Hodgson, C., & Morris, S. (2021). Global finance industry sinks \$119bn into companies linked to deforestation. *Financial Times*. <https://www.ft.com/content/ff1eccc8-645a-497b-a02d-6eb38efe6219>.
- Hoekstra, A. Y. (2003). *Virtual water trade: proceedings of the international expert meeting on virtual water trade*. IHE Delft Value of Water Research Report Series No. 12. OCLC 66727970. Den Haag: IHE Delft.
- Hoekstra, A. Y. (2010). *The relation between international trade and freshwater scarcity*. Staff working paper, World Trade Organization Economic Research and Statistics Division.
- Hofste, R.W., Reig, P. & Schleifer, L. (2019). *17 Countries, Home to One-Quarter of the World's Population, Face Extremely High Water Stress*. WRI commentary. Washington D.C.: World Resources Institute.
- Hopewell, K. (2019). The WTO just ruled against China's agricultural subsidies. Will this translate into a big U.S. win? *The Washington Post*. <https://www.washingtonpost.com/politics/2019/03/04/wto-just-ruled-against-chinas-agricultural-subsidies-will-this-translate-big-us-win/>.
- Hopewell, K. (2022). Heroes of the developing world? Emerging powers in WTO agriculture negotiations and dispute settlement. *The Journal of Peasant Studies*, 49(3), 561–584.
- Hossain, A.M.M. & Rahman, S. (2011). *Hydrography of Dhaka City Catchment and Impact of Urbanisation on Water Flows: A Review*. University of Dhaka.
- Houdret, A. & Bonnet, S. (2016). *Le premier partenariat public-privé pour l'irrigation au Maroc : durable pour tous ?* EDP Science.
- Houdret, A., Brüntrup, M. & Scheumann W. (2020). Public-private partnerships in irrigation: how can smallholders benefit? *Rural* 21 54 (1).
- Huckstep, S. & Moore, W.G. (2022). *The Ukraine Crisis Threatens to Worsen a Dangerous Dispute in Northeast Africa*. Washington D.C.: Center for Global Development. Retrieved from <https://www.cgdev.org/>.
- Hume, N. (2021). Power generation from coal set to hit record level. *Financial Times*. <https://www.ft.com/content/ab8933bc-84f3-43dc-b5ef-cd259ef77a11>.

- 
- Hundermark, C. (2020). *German Investors Interested in Funding DRC's Inga III Dam. Energy, capital and power.* Retrieved from <https://energycapitalpower.com/>.
- Husmann, C. & Zaneta, K. (2019). Foreign direct investment in the African food and agriculture sector: trends, determinants and impacts. *Discussion Papers on Development Policy* No. 274. Bonn: ZEF.
- IDH. (2020). *The urgency of action to tackle tropical deforestation.* February 2020. Prepared for IDH by FACTS Consulting, COWI A/S and AlphaBeta Singapore. IDH: Utrecht, the Netherlands.
- IDH. (2020). *European Soy Monitor: Insights on European responsible and deforestation-free soy consumption in 2018.* Utrecht: IDH.
- IEA. (2021). *Greenhouse Gas Emissions from Energy: Overview.* Paris: IEA. <https://www.iea.org/reports/greenhouse-gas-emissions-from-energy-overview>.
- IFPRI. (2016). *Global Nutrition Report 2016 From Promise to Impact Ending Malnutrition by 2030.* Washington, D.C.: IFPRI: Washington, D.C.: IFPRI.
- ILO. (1996). *Globalization of the footwear, textiles and clothing industries. Report for discussion at the Tripartite Meeting on the Globalization of the Footwear, Textiles and Clothing Industries: Effects on Employment and Working Conditions.* Geneva: International Labour Office.
- International Renewable Energy Agency & Climate Policy Initiative. (2018). *Global landscape of renewable energy finance.* Abu Dhabi: IRENA. <https://www.irena.org/publications/2018/Jan/Global-Landscape-of-Renewable-Energy-Finance>.
- International Rivers. (2018). *Grand Inga Dam, DR Congo.* Retrieved from <https://archive.internationalrivers.org/>
- IOB. (2017). *Food for thought: Review of Dutch food security policy 2012-2016.* The Hague: Ministry of Foreign Affairs of the Netherlands Policy and Operations Evaluation Department (IOB).
- IOB. (2017). *Tackling major water challenges. Policy review of Dutch development aid policy for improved water management, 2006-2016.* IOB Evaluation no. 418. Den Haag: Policy and Operations Evaluation Department (IOB), Ministry of Foreign Affairs, the Netherlands.
- IPCC, 2022: Summary for Policymakers [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. In Press.
- IRENA. (2021). *Bangladesh Energy profile.* United Arab Emirates: IRENA. [https://www.irena.org/IRENADocuments/Statistical\\_Profiles/Asia/Bangladesh\\_Asia\\_RE\\_SP.pdf](https://www.irena.org/IRENADocuments/Statistical_Profiles/Asia/Bangladesh_Asia_RE_SP.pdf).
- Irwin-Hunt, A. (2019). *Indonesia takes PPP route to infrastructure FDI.* FDI Intelligence. Retrieved from <https://www.fdiintelligence.com/>.
- Islam, M. S. (2019). *Understanding Dhaka's water crisis: What can we do to sustain our water usage?* Dhaka Tribune. Retrieved from <https://archive.dhakatribune.com/>.
- Islam, S. (2021a). AIIB accused of backing Bangladeshi fossil fuels instead of renewables. *Pv Magazine International.* <https://www.pv-magazine.com/2021/10/18/aiib-accused-of-backing-bangladeshi-fossil-fuels-instead-of-renewables/>.
- Islam, S. (2021b). Bangladesh: New development plan targets 'aggressive efforts' in RE generation. *Pv Magazine International.* <https://www.pv-magazine.com/2021/02/08/bangladesh-new-development-plan-targets-aggressive-efforts-in-re-generation/>.
- ITF. (2008). *Biofuels: Linking Support to Performance.* ITF Round Tables, No. 138. OECD Publishing, Paris.



- 
- Jordan, J., Abhilashi, R., & Shaheen, A. (2021). *Gender sensitive social protection in the face of climate risk. A study in Uttar Pradesh, Rajasthan, and Madhya Pradesh, India*. London: IIED. <https://pubs.iied.org/20456iied>.
- JRC. (2019). *Renewable Energy – Recast to 2030 (RED II)*. [https://joint-research-centre.ec.europa.eu/welcome-jec-website/reference-regulatory-framework/renewable-energy-recast-2030-red-ii\\_en](https://joint-research-centre.ec.europa.eu/welcome-jec-website/reference-regulatory-framework/renewable-energy-recast-2030-red-ii_en).
- Kaag, M. & Zoomers, A. (2014). *The Global Land Grab: Beyond the Hype*. London: Zed Books Ltd.
- Karkare, P. & van Seters, J. (2019). *A smart mix for responsible business conduct: due diligence legislation and multi-stakeholder initiatives*. ECDPM Briefing Note No. 108. Maastricht: ECDPM.
- Karlsson, J. O., Parodi, A., van Zanten, H. H. E., Hansson, P. A., & Rös, E. (2020). Halting European Union soybean feed imports favours ruminants over pigs and poultry. *Nature Food*, 2(1): 38–46.
- Kaur, N. et al. (2019). *Building resilience to climate change through social protection: lessons from MGNREGS, India*. IIED Working Paper, London: IIED. <http://pubs.iied.org/10197IIED>.
- Kenny, C. (2021). *For Richer Countries, Climate Mitigation Should Begin at Home*. Blog. Center for Global Development.
- Kiewisch, M. & Waarts, Y. (2020). *No silver bullets: Closing the \$10 billion income gap in cocoa calls for cross-sector action*. Wageningen: WUR.
- Kinnunen, P., Guillaume, J. H. A., Taka, M., D’Odorico, P., Siebert, S., Puma, M. J., ... Kumm, 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. (2021). *Climate risks in Tunisia Challenges to adaptation in the agri-food system*. CASCADES research paper.
- Knaepen, H. & Dekeyser, K. (2022). *Russia's invasion leaves North Africa with a food crisis - What can Europe do?* Retrieved 15 June 2022 from <https://ecdpm.org/talking-points/russias-invasion-leaves-north-africa-with-food-crisis-what-can-europe-do>.
- Kulsum, U., Timmermans, J., Haasnoot, M., Shah Alam Khan, M., & Thissen, W. (2021). Why uncertainty in community livelihood adaptation is important for adaptive delta management: A case study in polders of Southwest Bangladesh. *Environmental Science and Policy*, 119, 54–65.
- Kumleben, N. (2021). South African Coal Deal Is New Model for Climate Progress. *Foreign Policy*. <https://foreignpolicy.com/2021/11/12/coal-climate-south-africa-cop26-agreement/>.
- Kumm, M., Heino, M., Taka, M., Varis, O. & Viroli, D. (2021). Climate change risks pushing one-third of global food production outside the safe climatic space. *One Earth*, 4(5), 720–729.
- Laborde, D., & Martin, W. (2020). *Poverty and food insecurity could grow dramatically as COVID-19 spreads*. Washington D.C.: IFPRI.
- Lanari, N., Liniger, H. H. & Kiteme, B. B. (2016). Commercial Horticulture in Kenya: Adapting to Water Scarcity. In *CDE Policy Brief (Vol. 8)*.
- Land Matrix. (2022). *Database*. Retrieved from <https://landmatrix.org>.
- Langford, B.A., Makin, I., Mathews, N., Noble, A., McCornick, P.G. & Shah, T. (2016). A compact to revitalize large-scale irrigation systems using a leadership-partnership-ownership ‘theory of change’. *Water Alternatives* 9:1–32.
- Lay, J., Anseeuw, W., Eckert, S., Flachsbarth, I., Kubitz, C., Nolte, K. & Giger, M. (n.d.). *Taking stock of the global land rush: Few development benefits, many human and environmental risks*. Analytical Report III. Bern, Montpellier, Hamburg, Pretoria: Centre for Development and Environment, University of Bern; Centre de coopération internationale en recherche agronomique pour le développement; German Institute for Global and Area Studies; University of Pretoria.

- 
- Le Page, M. (2022). Cutting biofuels can help avoid global food shock from Ukraine war. *New Scientist*. <https://www.newscientist.com/article/2312151-cutting-biofuels-can-help-avoid-global-food-shock-from-ukraine-war/>.
- Lein, B., de Roquefeuil, Q., & van Seters, J. (2014). *Strengthening Policy Coherence for Development in Switzerland: The case of Food Security*. Maastricht: ECDPM.
- Legros, C. (2022). Le coût écologique exorbitant des guerres, un impensé politique. *Le Monde.fr*. [https://www.lemonde.fr/idees/article/2022/06/10/le-cout-ecologique-exorbitant-des-guerres-un-impense-politique\\_6129644\\_3232.html](https://www.lemonde.fr/idees/article/2022/06/10/le-cout-ecologique-exorbitant-des-guerres-un-impense-politique_6129644_3232.html).
- Leslie, J. (2021). *As Warming and Drought Increase, A New Case for Ending Big Dams*. Yale School of Environment. Retrieved from <https://environment.yale.edu/>.
- Lindberg, C. & Leflaive, X. (2015). *The water-energy-food-nexus: The imperative of policy coherence for sustainable development*. Issue 6. Paris: OECD.
- Maggio, A., Van Criekinge, T., & Malingreau, J. P. (2015). *Global Food Security 2030: Assessing trends with a view to guiding future EU policies*. Luxembourg: European Union.
- Mahendra & Seto (2019). *Upward and Outward Growth: Managing Urban Expansion for More Equitable Cities in the Global South*. WRI commentary. Washington D.C.: World Resources Institute.
- Manley, D., & Mihalyi, D. (2021). *Stuck in the Past: Lessons on Emissions for Developing Oil Producers*. Natural Resource Governance Institute. <https://resourcegovernance.org/analysis-tools/publications/stuck-past-lessons-emissions-developing-oil-producers>.
- Marcia N. Macedo, Ruth S. DeFries, Douglas C. Morton, Claudia M. Stickler, Gillian L. Galford, & Yosio E. Shimabukuro. (2012). Decoupling of deforestation and soy production in the southern Amazon during the late 2000s. *PNAS*, January 24, 2012 109 (4) 1341-1346.
- Markkanen, S., Braeckman, J.P., & Souvannaseng, P. (2021). Mapping the evolving complexity of large hydropower project finance in low and lower-middle income countries. *Green Finance*, 2020, 2(2): 151-172.
- Mason, N., Pickard, S., Watson, C., Klanten, B. & Calow R. (2020). *Just add water: a landscape analysis of climate finance for water*. WaterAid. Retrieved from <https://washmatters.wateraid.org/sites/g/files/jkxoof256/files/just-add-water-a-landscape-analysis-of-climate-finance-for-water.pdf>.
- Matthews, A. (2008). The European Union's Common Agricultural Policy and Developing Countries: the Struggle for Coherence. *Journal of European Integration*, 30(3), 381–399.
- Matthews, A. (2021). Trade agreements have health consequences. *Nature Food*, 2(7), 458–458.
- Matthews, A., & Rossella, S. (2019). *Evaluation of the impact of the current CAP on the agriculture of developing countries*. Brussels: European Union.
- Mbaku, J.M. (2020). *The controversy over the Grand Ethiopian Renaissance Dam*. 18 August 2020. Brookings. Retrieved from <https://www.brookings.edu/>
- McCartney, M. & Kleinschroth, F. (2019). *Dams can mimic the free flow of rivers, but risks must be managed*. Thrive blog. CGIAR Research Program on Water, Land and Ecosystems (WLE). Retrieved from <https://wle.cgiar.org/thrive>.
- Mdee, A. (2020). *Why water policies in Africa need to change*. University of Leeds. Retrieved from <https://medium.com/>.
- Medinilla, A. (2021). *An adaptive and context-driven approach to the water, energy and food nexus*. ECDPM Briefing note. Maastricht: ECDPM.
- Medinilla, A. & Ronceray, M. (2019a). *Entre coopération et contestation: les intérêts maliens dans la gestion des fleuves transfrontaliers du Sahel*. ECDPM Discussion paper No. 247. Maastricht: ECDPM.

- 
- Medinilla, A. & Ronceray, M. (2019b). *Getting to grips with the regional politics of water in Africa*. ECDPM Commentary. Maastricht: ECDPM.
- Medinilla, A. & Sergejeff, K. (2021). *Supporting transboundary water cooperation: learning from water-stressed basins in West Africa*. ECDPM Discussion Paper No. 309. Maastricht: ECDPM.
- Medinilla, A., K. Sergejeff & E. Domingo. 2022. *The geopolitics of African renewable energy*. ECDPM Discussion Paper No. 316. Maastricht: ECDPM.
- Mei Lin, M. & Hidayat, R. (2018). Jakarta, the fastest-sinking city in the world. *BBC news*. Retrieved from <https://www.bbc.com/>.
- Mekonnen, M. M., & Hoekstra, A. Y. (2015). Global gray water footprint and water pollution levels related to anthropogenic nitrogen loads to fresh water. *Environmental Science and Technology*, 49(21), 12860–12868.
- Merrey, D. (2020). *Large scale irrigation investments in Sub-Saharan Africa: Is big beautiful?* Water Alternatives.
- Michalopoulos, S. (2017a). FAO official: Food-based biofuels not necessarily bad. *EURACTIV*. <https://www.euractiv.com/section/biofuels/news/fao-official-food-based-biofuels-not-necessarily-bad/>.
- Michalopoulos, S. (2017b). New study relaunched controversy about biofuels and food prices. *EURACTIV*. <https://www.euractiv.com/section/agriculture-food/news/new-study-relaunched-controversy-about-biofuels-and-food-prices/>.
- Mishra, B.K., Kumar, P., Saraswat, C., Chakraborty, S., & Gautam, A. (2021). Water Security in a Changing Environment: Concept, Challenges and Solutions. *Water*, 2021 (13), 490.
- Mitlin, D., V.A. Beard, D. Satterthwaite, & J. Du. (2019). *Unaffordable and Undrinkable: Rethinking Urban Water Access in the Global South*. Working Paper. Washington, DC: World Resources Institute.
- Moazzem, K. G., & Khandker, A. (2021). Can Bangladesh get prepared for EU's GSP-plus? *The Financial Express*. <https://www.thefinancialexpress.com.bd/views/views/can-bangladesh-get-prepared-for-eus->
- Mohiuddin, F. (2020). Social protection rights for women vs fear of alienating private interests at the UN. *Tax Justice Network*. <https://taxjustice.net/2019/03/28/social-protection-rights-for-women-vs-fear-of-alienating-private-interests-at-the-un/>.
- Mohtar, R., Lawford, R.G. & Engel-Cox, J.A. (2020). Editorial: Achieving Water-Energy-Food Nexus Sustainability: A Science and Data Need or a Need for Integrated Public Policy? *Front. Environ. Sci.* 8:132.
- Molden, D. (2007). *Water for food water for life. A Comprehensive Assessment of Water Management in Agriculture*. International water management institute.
- Mooney, A. (2021). Stay or sell? The \$110tn investment industry gets tougher on climate. *Financial Times*. <https://www.ft.com/content/ee08d61d-4c98-4398-9971-93036d67e91e>.
- Moran, E.F., Lopez, M.C., Moore, N., Müller, N., & Hyndman, D.W. (2018). Sustainable hydropower in the 21st century. *PNAS*, 2018 (115), 47.
- Moss, T., & Gyude Moore, W. (2021). *How Congress Is Turning DFC into an Agency Serving Poland and Israel but not Senegal or Ghana*. Center for Global Development | Ideas to Action. <https://www.cgdev.org/blog/how-congress-turning-dfc-agency-serving-poland-and-israel-not-senegal-or-ghana>.
- Mueller, A., Detges, A., Pohl, B., Reuter, M. H., Rochowski, L., Volkholz, J. & Woertz, E. (2021). *Climate change, water and future cooperation and development in the Euphrates-Tigris basin*. CASCADES report.
- Mujeri M. K., Chowdhury T. T., & Shahana S. (2013). *Energy Subsidies in Bangladesh: A profile of groups vulnerable to reform*. The International Institute for Sustainable Development. [https://www.iisd.org/gsi/sites/default/files/ffs\\_stakeholders\\_bangladesh.pdf](https://www.iisd.org/gsi/sites/default/files/ffs_stakeholders_bangladesh.pdf).

- 
- Muscat, A., de Olde, E. M., Kovacic, Z., de Boer, I. J., & Ripoll-Bosch, R. (2021). Food, energy or biomaterials? Policy coherence across agro-food and bioeconomy policy domains in the EU. *Environmental Science and Policy*, 123, 21–30.
- Mushtaq Khan Mitchell Watkins Salahuddin Aminuzzaman Sumaiya Khair Muhammad Zakir Hossain Khan. (2020). *Climate change investments in Bangladesh: leveraging dual-use characteristics as an anti-corruption tool*. Working Paper 33. ACE Strategies: Aligning Incentives Designing for Differences. SOAS.
- Nepal, S., Neupane, N., Belbase, D., Prasad Pandey, V. & Mukherji, A. (2019). Achieving water security in Nepal through unravelling the water- energy-agriculture nexus, *International Journal of Water Resources Development*.
- Neslen, A. (2021). EU biofuels goals seen behind deforested area as big as the Netherlands. *Reuters*. <https://www.reuters.com/article/us-biofuels-deforestation-europe-idUSKCN2EB0B9>.
- Nolte, K., Chamberlain, W., Giger, M. & Wilson, D. (2016). *International Land Deals for Agriculture: Fresh insights from the Land Matrix: Analytical Report II*.
- ODI, ECDPM & DIE. (2013). *European Report on Development, Post-2015: Global Action for an Inclusive and Sustainable Future*. London, Maastricht and Bonn: ODI, ECDPM and DIE.
- ODI, ECDPM & DIE. (2012). *European Report on Development, Confronting Scarcity: Managing Water, Energy and Land for inclusive and sustainable growth*. London, Maastricht and Bonn: ODI, ECDPM and DIE.
- OEC. (2021). *The Observatory of Economic Complexity*. Retrieved December 21, 2021, from <https://oec.world/en>.
- OECD. (2016a). *OECD Council Recommendations on Water*. Paris: OECD Publishing.
- OECD. (2016b). *The Carbon Footprint of Global Trade Tackling Emissions from International Freight Transport*. International Transport Forum. Paris: OECD. <https://www.itf-oecd.org/sites/default/files/docs/cop-pdf-06.pdf>.
- OECD. (2021c). *Climate Finance Provided and Mobilised by Developed Countries: Aggregate trends updated with 2019 data, Climate Finance and the USD 100 Billion Goal*. OECD Publishing, Paris.
- OECD. (2002). *Foreign Direct Investment for Development: Maximising benefits, minimising costs*. Paris: OECD. [https://www.oecd-ilibrary.org/finance-and-investment/foreign-direct-investment-for-development\\_9789264199286-en](https://www.oecd-ilibrary.org/finance-and-investment/foreign-direct-investment-for-development_9789264199286-en).
- OECD. (2013). *Water security for better lives. A summary for policy-makers*. Paris: OECD Publishing.
- OECD. (2021a). *Inventory of Support Measures for Fossil Fuels*. <https://www.oecd.org/fossil-fuels/>.
- OECD. (2021b). *OECD DAC Declaration on a new approach to align development co-operation with the goals of the Paris Agreement on Climate Change*. Paris: OECD Publishing.
- OECD. (2022). *Data: Agricultural support*. Retrieved from <https://data.oecd.org/agrpolicy/agricultural-support.htm>
- OECD. (2022). *Financing a Water Secure Future*. Paris: OECD Publishing.
- OECD & IEA. (2020). *The Netherlands' Effort to Phase Out and Rationalise its Fossil-Fuel Subsidies*. Paris: OECD.
- Ortiz-Bobea, A., Ault, T. R., Carrillo, C. M., Chambers, R. G., & Lobell, D. B. (2021). Anthropogenic climate change has slowed global agricultural productivity growth. *Nature Climate Change*, 11(4), 306–312.
- Pacheco, P., Mo, K., Dudley, N., Shapiro, A., Aguilar-Amuchastegui, N., Ling, P.Y., Anderson, C. & Marx, A. (2021). *Deforestation fronts: Drivers and responses in a changing world*. WWF, Gland, Switzerland.
- Panetta, F. (2021). A Global Accord for Sustainable Finance. *Project Syndicate*, May 11, 2021. <https://www.project-syndicate.org/commentary/sustainable-finance-global-taxonomy-agreement-by-fabio-panetta-2021-05>.
- Pasricha, A. (2021). Planned Chinese Dam Along South Asian River Triggers Concerns in India, Bangladesh. *Voa news*. Retrieved from <https://www.voanews.com/>.
- PBL. (2018). Water, migration and conflict in *The Geography of future Water Challenges*. The Hague: PBL Netherlands Environmental Assessment Agency.

- 
- Porter, D. & C. Anderson (2021). *Illicit financial flows in oil and gas commodity trade: Experience, lessons and proposal.*, OECD Publishing, Paris.
- PWC. (2020). The global forces shaping the future of infrastructure. Global infrastructure trends. PWC. <https://www.pwc.com/gx/en/capital-projects-infrastructure/pdf/global-infrastructure-trends.pdf>.
- Rahman, M., Khan, T. I., & Farin, S. M. (2019). *Blended finance in Bangladesh: A scoping paper*. Southern Voice. <http://southernvoice.org/blended-finance-in-bangladesh-a-scoping-paper/>.
- Rahman, S. M., Rahman, S. M., & Islam, M. B. (2021). Coastal Dynamics and Polder Management in the Context of Climate Change in the Southern Part of Bangladesh. *Handbook of Climate Change Management*, 2889–2910.
- Rajão, R., Soares-Filho, B., Nunes, F., Börner, J., Machado, L., Assis, D., ... Figueira, D. (2020). The rotten apples of Brazil's agribusiness. *Science*, 369(6501), 246–248.
- Ramachandran, V. (2021). *Climate Colonialism Update: More Proposed Bans on Financing of Fossil Fuels (Only for the Poor)*. Center for Global Development | Ideas to Action. <https://www.cgdev.org/blog/climate-colonialism-update-more-proposed-bans-financing-fossil-fuels-only-poor>.
- Reardon, T., Tschirley, D., Liverpool-Tasie, L. S. O., Awokuse, T., Fanzo, J., Minten, B., Vos, R., Dolislager, M., Sauer, C., Dhar, R., Vargas, C., Lartey, A., Raza, A. & Popkin, B. M. (2021). The processed food revolution in African food systems and the double burden of malnutrition. *Global Food Security*, 28, 100466.
- Renner, T, Meijerink, S. & van der Zaag, P. (2018). Progress beyond policy making? Assessing the performance of Dutch-German cross-border cooperation in Deltarhine. *Water International*, 43:7, 996-1015.
- Carroll, S. G. (2021). EU's strict green criteria for biofuels will hinder supply, MEPs warn. *Euractiv*. <https://www.euractiv.com/section/biofuels/news/eus-strict-green-criteria-for-biofuels-will-hinder-supply-meps-warn/>.
- Ritchie, H. & Roser, M. (2018). *Water Use and Stress*. Our World In Data. <https://ourworldindata.org/water-use-stress>.
- Ritchie, H. & Roser, M. (2021). *Drivers of Deforestation*. Our World In Data. <https://ourworldindata.org/drivers-of-deforestation>.
- Rodrik, D. (2018). What Do Trade Agreements Really Do? *Journal of Economic Perspectives*, 32(2), 73–90.
- Romero, M.J. (2013). *A dangerous blend? The EU's agenda to 'blend' public development finance with private finance*. European Network on Debt and Development. Brussels: Eurodad.
- Ronzon, T. & Sanjuán, A. I. (2020). Friends or foes? A compatibility assessment of bioeconomy-related Sustainable Development Goals for European policy coherence. *Journal of Cleaner Production*, 254, 119832.
- Ruiz-Nuñez, F. & Wei, Z. (2015). *Infrastructure Investment Demands in Emerging Markets and Developing Economies*. Policy Research Working Paper 7414. Washington: World Bank Group. <https://documents1.worldbank.org/curated/en/141021468190774181/pdf/WPS7414.pdf>.
- Sadoff, C. & Muller, M. (2009). *Water Management, Water Security and Climate Change Adaptation: Early Impacts and Essential Response*. TEC Background Papers No. 14. Stockholm: Global Water Partnership.
- SDSN & IEEP. (2019). *The 2019 Europe Sustainable Development Report*. Sustainable Development Solutions Network and Institute for European Environmental Policy: Paris and Brussels.
- Sihvonen, J. (2017). *Biofuels policies drive up food prices, say over 100 studies*. <https://www.transportenvironment.org/discover/biofuels-policies-drive-food-prices-say-over-100-studies/>.
- Singh, S., Tanvir Hassan, S. M.; Hassan, M.; & Bharti, N. (2020). Urbanisation and water insecurity in the Hindu Kush Himalaya: Insights from Bangladesh, India, Nepal and Pakistan. *Water Policy* (2020) 22 (S1): 9–32.

- 
- Sojamo, S. (2016). *Water-using corporations as agents of water security, management and governance. Exploring cases from stewardship initiatives in South Africa to global networks of power*. Doctoral Dissertation, Aalto University.
- Sojamo, S. & Larson, E.A. (2012). Investigating food and agribusiness corporations as global water security, management and governance agents: The case of Nestlé, Bunge and Cargill. *Water Alternatives* 5(3): 619-635.
- Solidaridad (2012). *Final report: Reducing the environmental impact of garments consumed in The Netherlands*. Utrecht: Solidaridad.
- Southern Voice. (2020). *Global State of the SDGs: Three layers of critical action (Report 2019)*. Southern Voice.
- Spano, F., & Patrone, C. (2021). *Social protection and climate change*. Rome: FAO. <https://www.fao.org/documents/card/en/c/cb3527en>.
- Springmann, M., Clark, M., Mason-D'Croz, D., Wiebe, K., Bodirsky, B. L., Lassaletta, L., ... Willett, W. (2018). Options for keeping the food system within environmental limits. *Nature*, 562(7728), 519–525.
- Szabó, I. (2022). *Where Humanity's Future Will Be Decided*. Project Syndicate. [https://www.project-syndicate.org/onpoint/amazon-deforestation-threat-to-climate-commitments-by-ilona-szabo-2021-07?a\\_la=englishanda\\_d=60e6e29d890e0ff9198e2531anda\\_m=anda\\_a=clickanda\\_s=anda\\_p=%2Farchiveanda\\_li=amazon-deforestation-threat-to-climate-commitments-by-ilona-szabo-2021-07anda\\_pa=archive-resultsanda\\_ps=anda\\_ms=anda\\_r=andbarrier=accesspaylog](https://www.project-syndicate.org/onpoint/amazon-deforestation-threat-to-climate-commitments-by-ilona-szabo-2021-07?a_la=englishanda_d=60e6e29d890e0ff9198e2531anda_m=anda_a=clickanda_s=anda_p=%2Farchiveanda_li=amazon-deforestation-threat-to-climate-commitments-by-ilona-szabo-2021-07anda_pa=archive-resultsanda_ps=anda_ms=anda_r=andbarrier=accesspaylog).
- Tankersley, J., & Friedman, L. (2021). Even as Biden Pushes Clean Energy, He Seeks More Oil Production. *The New York Times*. <https://www.nytimes.com/2021/11/01/climate/biden-oil-gas-cop26.html>.
- Taylor, C. (2021). It's difficult to feed our families': Volatile cocoa prices are pushing West African farmers further into poverty. *CNBC*. <https://www.cnbc.com/2021/11/02/volatile-cocoa-prices-are-pushing-african-farmers-further-into-poverty.html>.
- Thacker S, Adshead D, Fantini C, Palmer R, Ghosal R, Adeoti T, Morgan G, & Stratton-Short S. 2021. *Infrastructure for climate action*. UNOPS, Copenhagen, Denmark.
- Tharuk, J. (2020). *India-Bangladesh Trans-Boundary River Management: Understanding the Tipaimukh Dam Controversy*. ORF Issue Brief No. 334. Observer Research Foundation.
- The Guardian. (2008). Rich countries launch great land grab to safeguard food supply. *The Guardian*. <https://www.theguardian.com/environment/2008/nov/22/food-biofuels-land-grab>.
- The Guardian. (2009). Fears for the world's poor countries as the rich grab land to grow food. *The Guardian*. <https://www.theguardian.com/environment/2009/jul/03/land-grabbing-food-environment>.
- Thow, A. M. & McGrady, B. (2014). *Protecting policy space for public health nutrition in an era of international investment agreements*. Bulletin of the World Health Organization, 92(2), 139–145.
- Timilsina, G. R., & Pargal, S. (2020). Economics of energy subsidy reforms in Bangladesh. *Energy Policy*, Elsevier, vol. 142(C).
- Timperley, J. (2021). The broken \$100-billion promise of climate finance — and how to fix it. *Nature* 598, 400-402.
- Timperley, J. (2021b). Why fossil fuel subsidies are so hard to kill. *Nature*. [https://www.nature.com/articles/d41586-021-02847-2?error=cookies\\_not\\_supportedandcode=7f8a902e-5263-47a1-886f-b603ab5f2e95](https://www.nature.com/articles/d41586-021-02847-2?error=cookies_not_supportedandcode=7f8a902e-5263-47a1-886f-b603ab5f2e95).
- Tomei, J. & Helliwell, R. (2016). Food versus fuel? Going beyond biofuels. *Land Use Policy*, 56, 320–326.
- Tondel, F., Torres, C., Ouédraogo, S. (et al.). (2017). *Étude sur la cohérence des politiques pour le développement agricole et la sécurité alimentaire : le cas de l'agriculture et du commerce au Burkina Faso*. (Document de réflexion 215). Maastricht: ECDPM.
- UN Water (2021). *Summary Progress Update 2021: SDG 6 — water and sanitation for all*. Geneva: UN Water

- 
- UN Water. (2013). *Water Security and the Global Water Agenda. A UN-Water Analytical Brief*. Hamilton: Institute for Water, Environment and Health.
- UN Water. (n.d.) *Water facts: Transboundary Waters*. Retrieved from <https://www.unwater.org/>.
- UNESCO. (2021). *The United Nations World Water Development Report 2021: Valuing Water*. UNESCO, Paris.
- UNHCR. (2021). *Refugee Data Finder*. Retrieved December 22, 2021, from <https://www.unhcr.org/refugee-statistics/>.
- UNICEF. (2021). *Reimagining WASH. Water security for all*. New York: United Nations Children’s Fund.
- United Nations Environment Programme. (2021). *Adaptation Gap Report 2021: The gathering storm – Adapting to climate change in a post-pandemic world*. Nairobi.
- van der Berg, R., Otto, B. & Fikresilassie, A. (2021). *As Cities Grow Across Africa, They Must Plan for Water Security. WRI commentary*. Washington D.C.: World Resources Institute.
- van Geuns, L., A. Hof, H. Hummels & C. Shakya. (2018). *Towards an assessment framework for policy coherence of Dutch support to oil and gas development in developing countries*. The Netherlands Commission for Environmental Assessment.
- van Ittersum, M. K., van Bussel, L. G. J., Wolf, J., Grassini, P., van Wart, J., Guilpart, N., ... Cassman, K. G. (2016). Can sub-Saharan Africa feed itself? *Proceedings of the National Academy of Sciences*, 113(52), 14964–14969.
- Veldwisch, G.J.; Beekman, W. & Bolding, A. (2013). Smallholder irrigators, water rights and investments in agriculture: Three cases from rural Mozambique. *Water Alternatives* 6(1): 125-141.
- Veron, P. & K. Sergejeff. (2021). *Reinvigorating human development in EU external action*. ECDPM Discussion Paper No. 296. Maastricht: ECDPM.
- vitale, J. (2017). *Economic importance of cotton in Burkina Faso*. Rome: FAO.
- Vörösmarty, C. J., McIntyre, P. B., Gessner, M. O., Dudgeon, D., Prusevich, A., Green, P., Glidden, S., Bunn, S.E., Sullivan, C.A., Reidy Liermann, C. & Davies, P.M. (2010). Global threats to human water security and river biodiversity. *Nature*, 467 (7315), 555-561.
- Warner, J., Jomantas, S., Jones, E., Ansari, M.S., & de Vries, L. (2019). The Fantasy of the Grand Inga Hydroelectric Project on the River Congo. *Water*, 11, 407.
- Water Footprint Network (n.d.). *Virtual water trade*. Retrieved from <https://waterfootprint.org/en/>.
- Water Footprint Network & Water footprint implementation (n.d.). *Water Footprint Assessment Tool*. Retrieved from World Bank (2020). Water in Agriculture. <https://www.worldbank.org/en/topic/water-in-agriculture#1>.
- WaterAid. (2012). *Water security framework*. London: WaterAid.
- Watkins, K. (2021). Climate safety nets for all. *Project-Syndicate*, 2 April, 2021.
- Wesseler, J., & Drabik, D. (2016). Prices matter: Analysis of food and energy competition relative to land resources in the European Union. *NJAS: Wageningen Journal of Life Sciences*, 77(1), 19–24.
- WFP. (2020). *WFP Global hotspots: Potential flashpoints in 2020*. Rome: World Food Programme.
- WFP. (2022). *Projected increase in acute food insecurity due to war in Ukraine*. Rome: World Food Programme.
- White, M. (2020). French financial institutions have most robust coal policies in place. *Global Trade Review (GTR)*. <https://www.gtreview.com/news/sustainability/french-financial-institutions-have-most-robust-coal-policies-in-place/>.
- WHO. (2017). *The double burden of malnutrition*. Policy brief. Geneva: World Health Organization.
- Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., ... Murray, C. J. L. L. (2019). Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet*, 393(10170), 447–492.

- 
- Windisch, M.G., Davin, E.L. & Seneviratne, S.I. Prioritizing forestation based on biogeochemical and local biogeophysical impacts. *Nat. Clim. Chang.* 11, 867–871 (2021).
- World Bank. (2020). *Water sector diagnostic [in Bangladesh]: priorities for the new decade*. World Bank Group.
- World Bank. (2021). *Open Data*. Retrieved from <https://data.worldbank.org/>.
- World Bank. (2018). *Global Investment Competitiveness Report 2017/2018: Foreign Investor Perspectives and Policy Implications*. Washington, DC: World Bank.
- WWAP. (2012). *The United Nations World Water Development Report 4: Managing Water under Uncertainty and Risk*. Paris, UNESCO.
- Zarfl, C., Berlekamp, J., He, F. et al. (2019). Future large hydropower dams impact global freshwater megafauna. *Sci Rep* 9, 18531.
- Zhang, F. (2018). *Bangladesh. In the Dark: How Much Do Power Sector Distortions Cost South Asia?*. 71–110.



## **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](http://www.ecdpm.org)***

In addition to structural support by ECDPM’s institutional partners, The Netherlands, Belgium, Estonia, Finland, Ireland, Luxembourg, Sweden, Denmark and Austria, this publication was funded by the Dutch Government through the Policy and Operations Evaluation Department of the Ministry of Foreign Affairs of the Netherlands (IOB).

ISSN1571-7577

***ecdpm***

Making policies work

**HEAD OFFICE**  
**SIÈGE**  
Onze Lieve Vrouweplein 21  
6211 HE Maastricht  
The Netherlands *Pays Bas*  
Tel +31 (0)43 350 29 00  
Fax +31 (0)43 350 29 02

**BRUSSELS OFFICE**  
**BUREAU DE BRUXELLES**  
*Rue Archimède 5*  
1000 Brussels *Bruxelles*  
Belgium *Belgique*  
Tel +32 (0)2 237 43 10  
Fax +32 (0)2 237 43 19

[info@ecdpm.org](mailto:info@ecdpm.org)  
[www.ecdpm.org](http://www.ecdpm.org)  
KvK 41077447