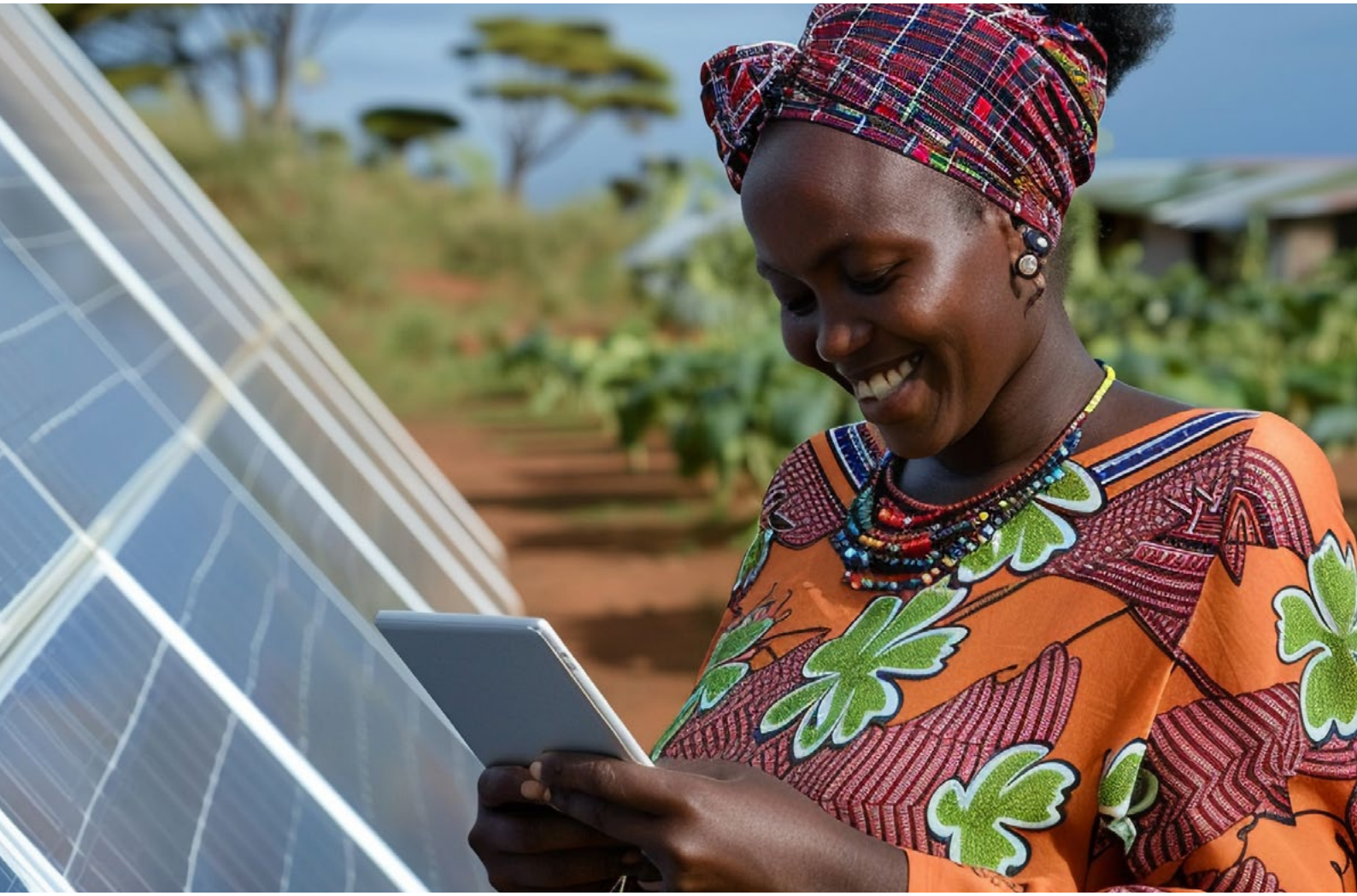
UNIVERSITY
OF SUSSEX



Synergy Drivers for Accelerating the Sustainable Development Goals

Sussex Sustainability Research Programme,
University of Sussex

This report has been produced by the Sussex Sustainability Research Programme (SSRP) at the University of Sussex.

It was funded by UK International Development from the UK government; however, the views expressed do not necessarily reflect the UK government's official policies.

Report authors: Joseph Alcamo, John Thompson, Paula Camargo Paez, Sephora Imomoh

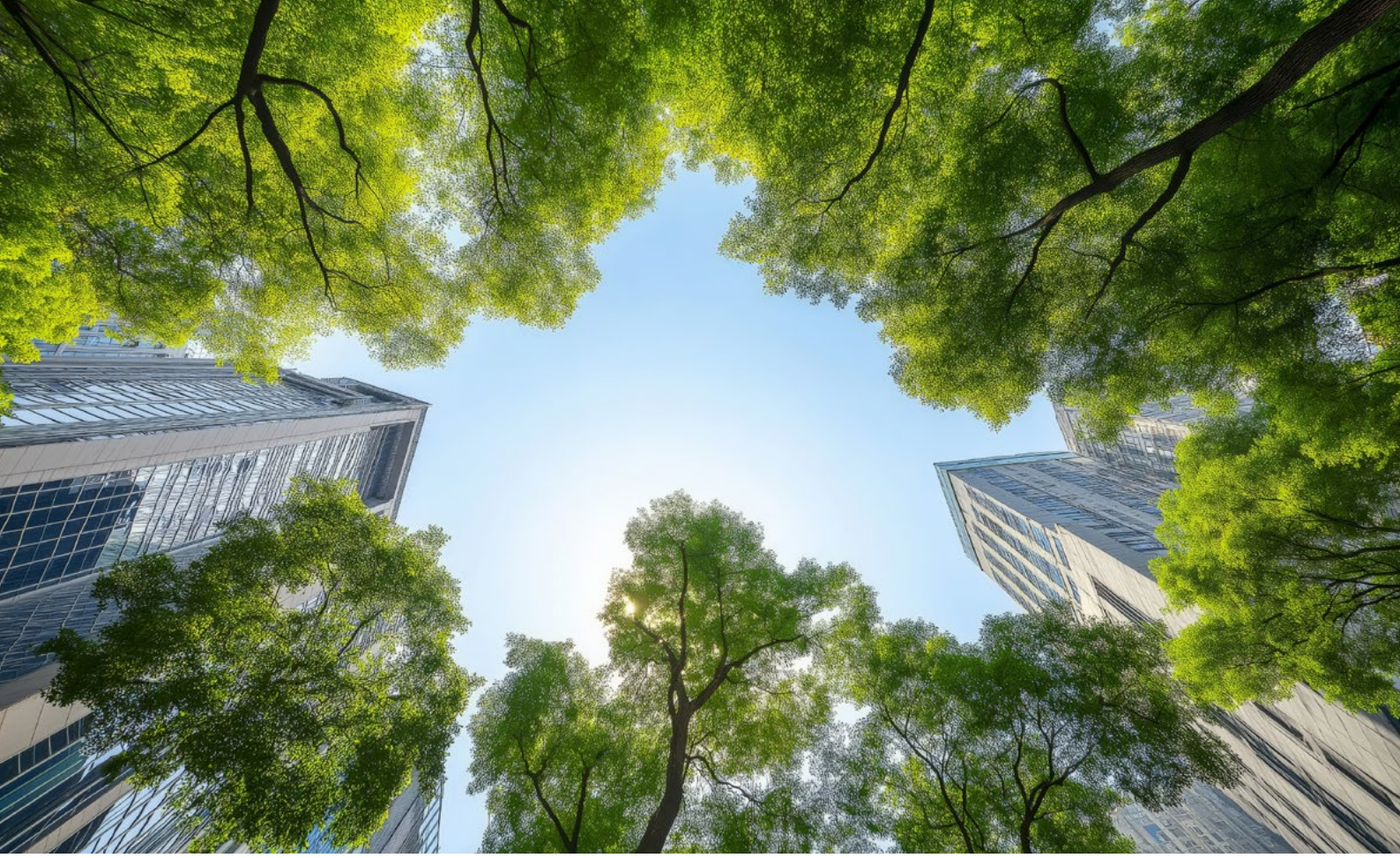
Acknowledgements: Edwin Gilson provided essential editorial support. Anthony Alexander and Shova Thapa Karki contributed substantive input. Some of the text under "Minimising Trade-offs and Inequities" in the Conclusions section was taken from text written by Ruth Segal in an earlier publication. Some text in the chapter on Integrated Nature Conservation and Public Health Programmes was taken from publications of Jo Middleton.

Image credits: A man makes an announcement about weather in Kerala, India; Filippo Osella. The Wanang health clinic in Papua New Guinea; Jo Middleton. A woman embraces solar energy cooking in rural India; Dmitri Prudnik. A Peruvian farmer holds a cocoa crop affected by Carmenta blight; Anthony Alexander. An example of greening in cities; Htet Wai Phyo.

An electric bus providing sustainable urban public transport; Adobe Stock. Solar energy installation in Syria; Mirela Barbu. A humanitarian aid worker; Adobe Stock. Food waste; Adobe Stock.

Cover photo:
A woman uses a digital tablet to manage solar panels in rural Africa;
Creative.Bringer stock.adobe.com.

Recommended Citation: Alcamo, J., Thompson, J., Camargo Paez, P., Imomoh, S. 2025. Synergy drivers for accelerating the Sustainable Development Goals. University of Sussex, UK. DOI 10.20919/YRIV3028.



Preface

Universities have a unique and vital role to play in advancing sustainable development through research, education, and the engagement of our staff and students in driving innovation and positive change. Since our inception in 1961, the University of Sussex has worked across national borders in advancing knowledge and understanding to support the economic, social and technological development of communities around the world.

Our strong commitment to sustainable development is signalled by our nine consecutive years as the highest ranked university globally in Development Studies (QS World University Rankings 2025).

Our new University strategy, Sussex 2035: Creating Progressive Futures – flourishing, sustainability and progress for the whole world, reinforces this commitment with its three transformational themes: environmental sustainability, human flourishing, and digital and data futures. But meanwhile, the fast train for promoting sustainable development worldwide, the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs), has been nearly derailed. Limited progress in the early years of SDG implementation has been worsened by the protracted COVID-19 pandemic, recent political and economic shocks, multiple regional conflicts from Africa and the Middle East to Ukraine, the accelerating impacts of climate change, and the fracturing of political consensus about the urgency of the challenges facing the planet and its peoples. These intersecting crises make the spirit of international cooperation and compassion embodied by the SDGs more important than ever.

For this reason, we are delighted to be working with the UK Foreign, Commonwealth and Development Office (FCDO) and the Institute of Development Studies (IDS), to advance the concept of 'synergy drivers' – policies and measures that achieve two or more SDGs at the same time. These synergy drivers offer the prospect of accelerating action on the SDGs at scale, and at a time of severe resource constraints and political, social, and environmental uncertainty. This is an evidence-based policy approach geared for current times. It shows that we are determined to realise Agenda 2030, but also ready to think differently, and to adapt our approach, in the context of shrinking resources.

This report offers much needed hope in these troubled times.

Professor Sasha Roseneil
Vice-Chancellor and President
University of Sussex

Synergy Drivers and their SDGs

People-centred Early Warning Systems

Alerting specific communities to extreme weather events

Integrated Nature Conservation and Public Health Programmes

Combining ecosystem conservation and health provision services

Clean Cookstove Programmes

Reducing exposure to indoor pollution with energy efficient cookstoves

Sustainable Supply Chains to Prevent Deforestation Linked to Trade

Tackling the destruction of forests and exploitation of forest communities

Urban Greening Projects

Expanding the greenness of cities, enhancing biodiversity alongside health and well-being

Decarbonising Urban Transport

Expanding low- and zero emissions transport infrastructure

Decentralised Solar Energy Systems

Generating cost-effective off-grid electricity at small scale

Green Energy Businesses for Women

Supporting women to prosper in the green energy sector

Social Protection Measures

Combatting poverty and strengthening resilience of vulnerable populations

Reducing Food Waste and Post-harvest Losses

Sustainable production and consumption that limits waste, saving agricultural land

Contents

Introduction

The world experienced a hopeful moment in 2015 with the launch of the landmark "2030 Agenda for Sustainable Development" and its 17 Sustainable Development Goals (SDGs). Never before had the 193 Member States of the United Nations committed themselves to such wide-ranging ambitions to support development and protect the planet.

But as we approach the SDGs' target date of 2030, the balance sheet is mixed at best. On one hand, substantial progress has been made in some key areas. For example, between 2015 and 2022, 687 million people gained access to safe drinking water and 911 million to safely managed sanitation services. [1] These figures translate into a genuine improvement in well-being for these millions of people. On the other hand, a UN assessment of 135 SDG targets showed that only 17 percent of these targets are on track, with nearly half progressing too slowly, and more than another third stalled or going in the wrong direction.[2]

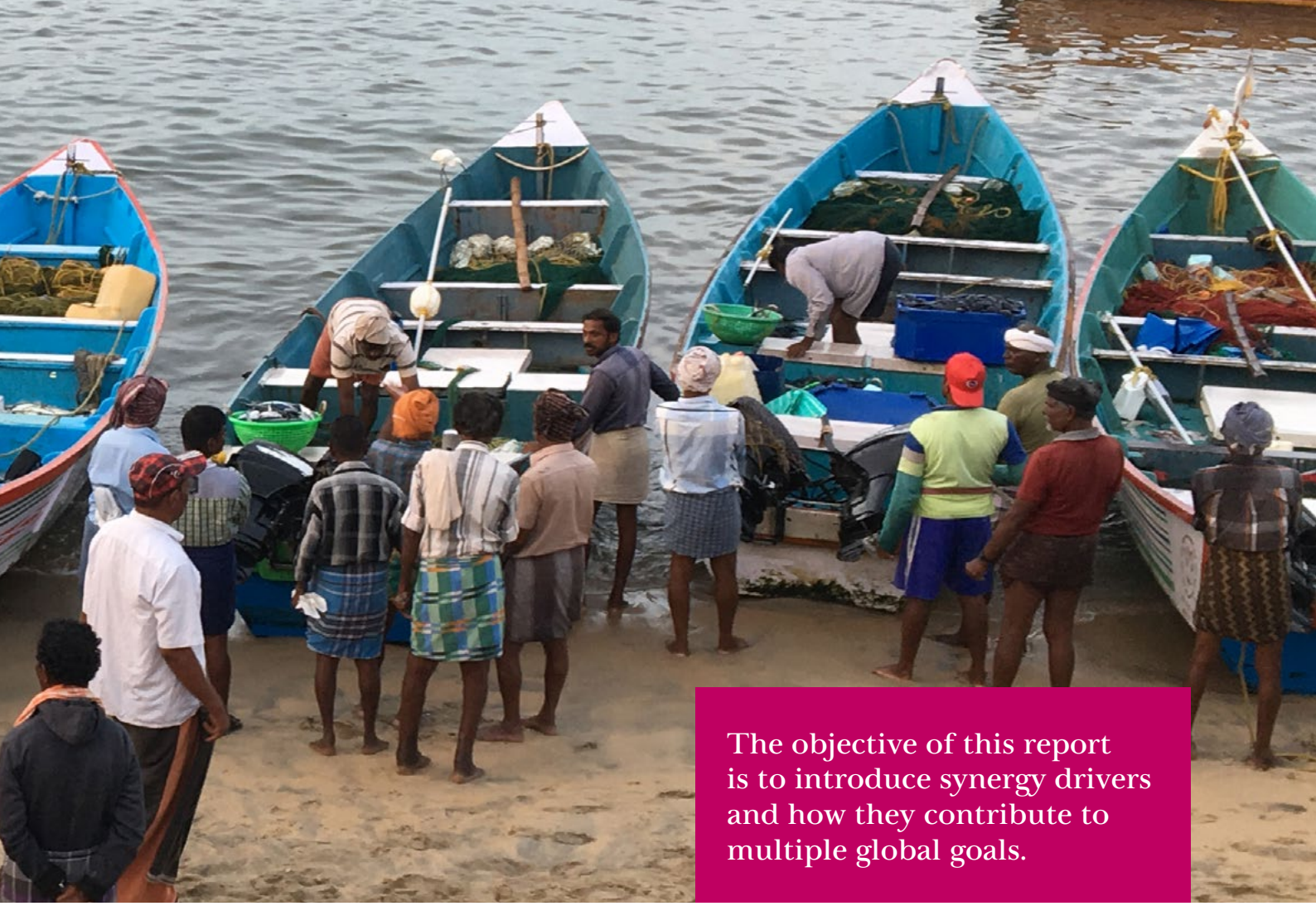
What then are the options for accelerating the pace for reaching the Goals? Some compelling ideas were collectedby the UN and presented at "SDG Acceleration Day" in September 2023. Twelve of these were called "High Impact Initiatives", and included "Energy Compacts", "Food Systems Transformation", and the "SDG Stimulus", amongst other topics.[3]

Although these are all sensible and worthwhile measures, another approach was highlighted at an international Policy Forum at Wilton Park in 2024.[4] This is an option which complements the others and takes advantage of the strong and reinforcing inter-connections among the SDGs:

"There are multiple opportunities to leverage the inherent synergies between the Goals. There must be a strong focus on evidence-based policies with a multiplier effect – those which accelerate progress across multiple Goals at once. This is partly about prioritising how resources are invested, but more fundamentally, it is about drawing upon a range of levers … finding ways to maximise co-benefits …" [5]

While many studies have articulated the numerous synergies and trade-offs among the SDGs [6,7,8], knowing about them is one thing, but taking advantage of them is another. To derive tangible benefits from these synergies a new concept was developed– *"synergy drivers" – policies and measures that advance two or more SDGs at the same time.*[9]

The idea is that there are specific actions that can successfully exploit the symbiosis among multiple goals, while minimising trade-offs. This is an appealing approach because it implies that taking action on one SDG also advances one or more other goals, and that multiple goals can be achieved at reduced cost and over shorter time periods. In a time of shrinking resources and imminent deadlines for delivering the SDGs, these are very important benefits.



The objective of this report is to introduce synergy drivers and how they contribute to multiple global goals.

The objective of this report is to introduce synergy drivers and how they contribute to multiple global goals. The main part of the report is a brief survey of ten synergy driver examples. The chosen cases are not meant to be comprehensive of all possible synergy drivers or to cover all goals and targets. They were selected by the authors at the Sussex Sustainability Research Programme in consultation with FCDO advisors as illustrative examples because they cover a wide variety of SDGs and scales, from the household to global. This set was also chosen because of the availability of concrete evidence that they substantively advance multiple SDG targets. However, because of the brevity of the report we only present a snapshot of the evidence rather than a comprehensive review.

Several of the examples (clean cookstoves, decarbonising urban transport, decentralised solar energy systems) not only address multiple SDGs but also have the potential to make a major contribution to achieving Net Zero and other climate policies. Others have the capacity to enhance economic growth (sustainable supply chains, green energy businesses) while also advancing equity, justice and sustainability commitments. Still others highlight unusual pairings of action areas that are sometimes portrayed as being in conflict (nature conservation and public health) but which in reality have synergistic potential.

The focus of the report is on explaining how synergy drivers advance several SDGs at the same time, rather than describing the policies and measures themselves.

With this in mind, we begin each chapter with a brief description of the synergy driver, and then explain which problems it addresses, the multiple SDGs it advances, the evidence of its performance, and its global potential. This is followed by a section called “What to Watch Out For” which briefly describes the quality of the evidence and some of the barriers and trade-offs that must be dealt with to implement the policy.

Finally, “Further Information” points readers towards a few key references for learning more about the synergy driver itself. It is worth noting that synergy drivers are not necessarily complicated or costly actions. Instead, we show how relatively straightforward policies and measures – such as replacing smoky traditional cookstoves with cleaner varieties – can substantively contribute to multiple SDGs.

While useful as an introduction to the subject, it is outside the scope of this report to assess the application of specific policies and measures in specific locations. Nonetheless, enough information is included here so that readers can see the tangible benefits of a synergy driver approach at a time of significant resource and capacity constraints. Given the pressing need to accelerate action at scale on the SDGs, it is an approach worth considering.

People-centred Early Warning Systems

SDGs Advanced by People-Centred Early Warning Systems

People-centred early warning systems for extreme weather events are national warning systems tailored to the needs of specific communities and locations. The intention of these systems is to warn communities about impending droughts, floods, heat waves, wildfires, storms, and other extremes of weather. They consist of a technical forecasting system, usually based at a national meteorological service, together with a delivery system for the warnings that considers local livelihoods and other socio-economic factors. They require a co-designing effort between local communities and meteorological experts. These systems should be seen as a first line of defence against weather extremes, rather than the ultimate solution for coping with them. They are part of larger and urgent efforts at disaster risk reduction, climate adaptation, and enhancing resilience.

The Problem

Extreme weather events such as heat waves, floods, wildfires, droughts, and storms, have led to $4.3 trillion in economic losses and caused more than 2 million deaths (90% in developing countries) between 1970 and 2021[10]. The IPCC estimates that even a small increase in global warming will lead to statistically significant changes in the frequency of extreme weather events.[11]

Since warning people about impending weather hazards can save lives, UN Secretary-General Antonio Guterres has set out a goal to ensure that everyone has access to an early warning system by 2027. Yet research has shown that sophisticated warning systems are not enough. They are often developed without consulting potential users and produce warnings that are too vague or obtuse for vulnerable social groups or fail to reach these groups at all.[12,13] That is why *people-centred early warning systems*, tailored to the needs of local communities, are needed. Such systems are especially relevant to low-income communities such as fishers and pastoral farmers.

Which SDGs are Accelerated?

SDG 1: No Poverty

People-centred early warning systems contribute specifically to Target 1.5: *reduce … the vulnerability [of the poor] to climate-related extreme events …*

SDG 2: Zero Hunger

Early warning of droughts, storms, and other extreme events are vital for protecting farmers, fishers, and their agricultural systems. Therefore, early warning helps achieve key food security targets such as Target 2.2: *ensure access by all people to .. sufficient food all year round,* and Target 2.3: *double the agricultural productivity … [of] family farmers, pastoralists and fishers.* Early warning also contributes to Target 2.4: *implement resilient agricultural practices that… strengthen the capacity [of food production systems] to climate change, extreme weather, drought…*

SDG 3: Good Health and Well-being

Early warning of heat waves, floods, and other extreme events can be vital to protecting the public's health. Consequently, they advance Target 3.4: … *reduce by one third premature mortality from non-communicable diseases through prevention…*

SDG 13: Climate Action and Paris Climate Agreement Goals

Early warning systems directly support Target 13.3: *Improve … human and institutional capacity on climate change … adaptation, impact reduction and early warning,* and the international climate adaptation goals in Article 2 of the Paris Climate Agreement*: Increasing the ability to adapt to the adverse impacts of climate change … in a manner that does not threaten food production.*

Evidence

In the South Indian province of Kerala, a warning system for extreme weather events, run by the national meteorological service, has been modified to make it more useful to the local fishing community. This is an example of a people-centred system.

Among other changes, the resolution and target area of warnings have been altered, and new local warning mechanisms introduced. Focus group interviews indicated that the fishers indeed use the weather warnings to help decide whether to fish, but they also balance weather risks against the possibility of a good fish catch.[14,15] To date, the benefits and costs of the system have not been evaluated.

In Kenya, a drought early warning system has been modified using satellite-based indicators to better address the needs of pastoral farmers.[16] This helps safeguard their primary sources of income, thereby reducing the economic impact of drought hazards on these communities and enhancing their food security. For example, the "new forecasts enabled earlier warning, with forecasts for Oct-Dec 2020 issued as early as July 2020, giving stakeholders ample time to initiate drought preparedness actions." [17]

An evaluation of 23 peer-reviewed studies of the effectiveness of heat wave warning systems[18] (people-centred systems, and not) concluded that many systems have helped avoid deaths and illnesses, but others have had an inconclusive impact. Nevertheless, the evaluation of cost-benefit studies concluded that these warning systems are a "no-, or low-regret" option.

The Global Commission on Adaptation estimates that all types of early warning systems save lives and assets worth at least ten times their cost, and that a 24-hour warning of a coming storm or heat wave can reduce ensuing damages by 30 percent.[19]

A review of research[20] has identified many examples worldwide in which incorporation of local and Indigenous knowledge has enriched early warning of extreme weather events: In Cambodia and Malawi, flood forecasts rely on direct observation of water systems, and in southern Ethiopia traditional forecasting methods have strengthened adaptation to climatic hazards.[21]

Potential

World Bank estimates that about 4.5 billion people, or more than half the global population, are at high risk from extreme weather events.[22] 2.7 billion of these are poor or extremely poor,[23] and therefore especially vulnerable. These billions can potentially benefit from people-centred early warning systems.

People-centred early warning systems present a tailored, cost-effective opportunity to reduce the impacts of climate-related disasters in regions where poverty persists. The Global Commission on Adaptation asserts that spending $800 million on early warning systems in developing countries would avoid losses of $3–16 billion per year.[24]

What to Watch Out For

The evidence base for early warning systems for extreme weather events is large, with the United Nations Environment Programme, for example, saying unequivocally that "Early Warning Systems (EWS) are a proven cost-effective disaster risk reduction and climate change adaptation measure which has been demonstrated to save lives, livelihoods and ecosystems in the face of climate-related hazards."[25] But the evidence base for people-centred warning systems specifically is not as large because this is a relatively new approach.

Several evaluations of heat wave warning systems have been carried out in OECD countries but many fewer in South American, African and many Asian countries.[26]

There are many challenges involved with tailoring a highly technical early warning system to local communities, especially since needs differ from place to place. A strong commitment on behalf of both providers and users is needed to create "people-centred" systems. Engaging local actors whom communities trust, such as traditional leaders, is crucial for mainstreaming these systems.

Early warning systems get people out of the way of danger and so serve as a sensible first line of defence against climate hazards. But they are not the ultimate solution. More fundamentally, we need to prevent climate hazards from getting worse by slowing down climate change and building up the resilience of people and communities.

Further Information

Barrett, A., Duivenvoorden, S., Salakpi, E.,. Muthoka, J., Mwangi, J., Oliver, S., Rowhani, P. 2020. Forecasting vegetation condition for drought early warning systems in pastoral communities in Kenya, Remote Sensing of Environment, Volume 248, 111886.

Golding, B. (ed.), 2022. Towards the "perfect" weather warning: Bridging disciplinary gaps through partnership and communication. pp. 270. WMO, UNDRR, Springer Nature.

Martin, M., Osella, F. 2019. Forecasting with fishers to save lives at sea. Sussex Sustainability Research Programme, University of Sussex and IDS, Brighton, UK Policy Brief 2. Available at: https://www.sussex.ac.uk/ssrp/documents/ssrp-policy-brief-forecasting-for-fishers.pdf Accessed February 2025.

International Federation of Red Cross and Red Crescent Societies, 2020. People-centred early warning systems. Available at: https://www.ifrc.org/sites/default/files/2022-03/220111_CREWS-IFRC_People-centred%20EWS_report_designed.pdf. Accessed February 2025.

Integrated Nature Conservation and Public Health Programmes

SDGs Advanced by Integrated Nature Conservation and Public Health Programmes

Initiatives to integrate nature conservation and public health in Papua New Guinea, Borneo, and elsewhere have successfully combined conservation of forests and other ecosystems with the provision of health services and have achieved goals for both.

These programmes take a variety of forms. Some consist of basic health interventions added on to pre-existing conservation programmes. Others are complex schemes driven by dual priorities for public health provision and conservation. The programmes are steered by local communities with input from universities, NGOs, and other entities.

The Problem

Indigenous communities are disproportionately affected by limited access to medical care and treatments due to their geographic remoteness.

At the same time their homelands are under threat, with around 10 million hectares of forest being lost to development each year.[27] This deforestation has a global impact: In addition to being a major cause of biodiversity loss, deforestation (together with forest degradation) produces more than 8 Gt CO2 equivalent of greenhouse gases each year.[28] (Equal to more than two and a half times the total emissions from the European Union in 2023 [29]).

We now know that these two huge challenges – poor health care of Indigenous people and deforestation of the territories on which they live – can be addressed in an integrated fashion by programmes that combine nature conservation and health care. Although a new idea, there are already many successful examples of locally led initiatives integrating health care and conservation.[30]

Which SDGs are Accelerated?

Programmes that integrate nature conservation and public health can advance multiple SDGs:

SDG 3: Good Health and Well-being

The provision of health services to Indigenous People helps achieve many of the basic health-care targets of SDG 3, including Target 3.8: *Achieve universal health coverage… [and] access to quality essential health-care services and access to safe … and affordable essential medicines …*

SDG 5: Gender Equality

Introducing health services supports gender-related targets of the SDGs. They help ensure universal access to sexual and reproductive health-care services and contribute to reducing maternal mortality. In this manner they advance Target 5.6: *Ensure universal access to sexual and reproductive health and reproductive rights…*, as well as Targets 3.1: *Reduce global maternal mortality,* and 3.7: *Ensure universal access to sexual and reproductive health-care services, including for family planning, information and education.*

SDG 15: Life on Land

Collaborating with Indigenous People to conserve forests helps achieve Targets 15.1: ensure the conservation … and sustainable use of forests …, 15.2: *promote … sustainable management of … forests [and] halt deforestation …*, 15.5: *take … action to reduce degradation of natural habitats and halt the loss of biodiversity …*, and 15.9: *integrate biodiversity values into … local planning.*

Evidence

A forest-public health programme in the Wanang forest in Papua New Guinea established a clinic for medically neglected Indigenous communities and provided them with access to health services not previously available locally.[31] The programme also achieved an expansion of 50% of forest conservation area, protecting 150 km² of biodiverse rainforest (with an estimated sequestration of >1.5 million tonnes of carbon).[32]

Between 2007 and 2017, a coupled health care – logging reduction programme on Borneo in Indonesia has treated nearly 70,000 patients and achieved stabilisation in primary forest loss.[33] The programme also makes available training for alternative livelihoods for people who want to stop logging.

In 2007 the organisation Conservation Through Public Health (CTPH)[34] launched a programme in a mountainous region of Uganda to both enhance health care of local communities and protect the forest habitat and health of gorillas (who were endangered by a human-transmitted disease). The programme was later expanded to DR Congo. CTPH trained village health and conservation teams who went on to effectively promote family planning, health, and conservation in local communities. Reported results were a three-fold increase in family-planning users, reduced incidence of gorilla disease, and greater community support for conservation. Also, women become more involved in conservation and men become more involved in family planning.

43 integrated nature conservation – public health projects from 22 countries have been mapped.[35] Thirty-two of the projects are forest-based. The most represented regions were Sub-Saharan Africa (27), Southeast Asia (five), and South Asia (five). Information from about half of these have not yet appeared in the open literature.

Potential

More than 400 million rural people reside in or near forests.[36] Among them are about 70 million Indigenous people.[37] At least 36% of all intact forest lands, vital to global forest conservation efforts, are within Indigenous Peoples' lands.[38] Anecdotal information from around the world indicates that access of these Indigenous people to health care is very inadequate.[39] Hence, there is both a large vulnerable population and a large, forested area that can potentially benefit from integrated nature conservation – health care initiatives.

What to Watch Out For

Up to now there have been few evaluations of integrated nature conservation and public health programmes.[40] One exception has been the comprehensive analysis of the programme in Borneo referred to above. Such evaluations are needed to build up the evidence base on the effectiveness of these programmes.

A common factor in successful programmes has been a commitment to a long-term collaboration between local communities and outside experts. For example, participants in the successful programme in the Wanang forest in Papua New Guinea consider a factor in its success to be the 22 year-long collaboration between local Indigenous people and ecologists and public health specialists from outside the forest.[41]

A common criticism of conservation programmes that aid local communities and improve economic welfare is that they promote immigration and increase population growth near the protected area.[42] Therefore, it is important to carefully consider the long-term effects of such initiatives.

It is crucial to develop culturally sensitive solutions for healthcare access and to engage all stakeholders in a constructive manner.

Further Information

Middleton, J., Cassell, J.A., Colthart, G., Dem, F., Fairhead, J., Head, M.G., Inacio, J., Jimbudo, M., Laman, M., Novotny, V. and Peck, M., 2020. Rationale, experience and ethical considerations underpinning integrated actions to further global goals for health and land biodiversity in Papua New Guinea. Sustainability Science, 15, pp.1653-1664.

Jones, I.J., MacDonald, A.J., Hopkins, S.R., Lund, A.J., Liu, Z.Y.C., Fawzi, N.I., Purba, M.P., Fankhauser, K., Chamberlin, A.J., Nirmala, M. and Blundell, A.G., 2020. Improving rural health care reduces illegal logging and conserves carbon in a tropical forest. Proceedings of the National Academy of Sciences, 117(45), pp.28515-28524.

Clean Cookstove Programmes

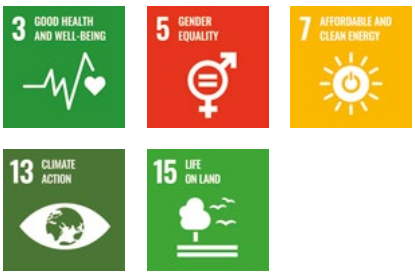
Clean cookstove programmes provide support to low-income people so that they can replace their traditional smoky cookstoves with energy efficient and clean varieties. In so doing they aim to reduce dangerous exposure to indoor air pollution, enhance access to modern energy technology, and lessen the non-sustainable harvesting of wood fuel.

These programmes can take the form of subsidies to stimulate a clean cookstove market, loans to make the stoves affordable, or free distribution of stoves.

The Problem

The health of billions of people, mostly women and children, is at risk because of their exposure to smoke from traditional cooking stoves. The International Energy Agency finds that indoor air pollution caused by smoke from traditional cookstoves contributes to 3.7 million premature deaths annually, mostly women and children.[43] Traditional stoves are also a major source of black carbon particles which find their way into the atmosphere and make a substantial contribution to global warming. Moreover, traditional stoves stimulate deforestation because they are often fueled with wood that is harvested non-sustainably from surrounding woodlands.

SDGs Advanced by Clean Cookstove Programmes



Which SDGs are Accelerated?

SDG 3: Good Health & Well-being

Replacing traditional stoves with cleaner varieties provides critically important health benefits[44], and makes a major contribution to achieving Target 3.9: *to substantially reduce the number of deaths and illnesses from … air pollution.*

SDG 5: Gender Equality

Traditional cookstoves often rely on the harvest of wood fuel from surrounding woodlands, a task which traditionally falls to women and girls. Replacing wood-burning stoves with clean cookstoves saves women from this wood gathering task and helps advance targets for gender equality, particularly Target 5.1: *End all forms of discrimination against all women and girls,* and Target 5.b: *Enhance the use of enabling technology…to promote the empowerment of women.*

SDG 7: Affordable and Clean Energy

The improved efficiency of clean cookstoves makes a substantial contribution to Target 7.1: *universal access to … modern energy services,* and Target 7.3: *to double the global rate of improvement in energy efficiency.*

SDG 13: Climate Action

As compared to traditional types, clean cookstoves emit far fewer black carbon particles. Subsequently, clean cookstoves help achieve international climate targets and SDG 13.[45,46]

SDG 15: Life on Land

Clean cookstoves burn biomass more efficiently or not at all and therefore reduce the amount of biomass harvested by communities from surrounding woodlands. This makes a direct contribution to Target 15.2: *to promote the implementation of sustainable management of all types of forests, halt deforestation, [and] restore degraded forests …*

Evidence

Between 2010 and 2022 clean cookstove programmes in China, India and Indonesia successfully decreased by half the number of people without clean cooking access.[47]

A clean cookstove programme in China led to a 37% decrease of premature deaths related to residential air pollution emissions.[48]

A study of 55 households in Kenya, in which traditional stoves were partly replaced by efficient biomass stoves, showed that women spent on average one hour less each day cooking (the new stoves cooked more quickly and required less clean-up); their time spent collecting fuel dropped from 12 to 5 hours each week.[49]

A study in India[50] projected the consequences of replacing traditional stoves with improved stoves in 111 million households using wood and 45 million relying on agricultural residues.

It was found that emissions of particulate matter would be significantly reduced and thereby also the health risk of indoor air pollution. The reduction of emissions of black carbon, methane and other substances, would reduce greenhouse gas emissions by 70-80 million tons of CO2-eq per year. (For comparison, this amount is greater than Greece's annual emissions[51]).

Potential

This measure has great potential to advance multiple SDGs because about 2.3 billion people, mostly in Africa, but also millions elsewhere, still use traditional inefficient stoves fired by wood, dung or other smoke-producing fuels.[52] The scope for upgrading stoves is therefore great.

A study of 74 countries found that unsustainable fuelwood harvesting for cookstoves and other purposes accounts for around 30% of forest degradation emissions, equal to more than 600 million tons of CO2 annual emissions.[53] (About the size of annual emissions from Turkey.[54]) By enhancing cooking efficiency and reducing reliance on firewood, energy-efficient cookstoves can considerably reduce these global emissions.

A study focusing on sub-Saharan Africa estimated that a major shift from traditional stoves to LPG and electrical varieties would reduce indoor air pollution and consequently avert 463,000 deaths per year and reduce health costs by US$66 billion.[55]

What to Watch Out For

The evidence base strongly supports the notion that women are exposed to higher levels of particulate matter emissions than men. It is also likely that current household air pollution data underestimate the full health impacts of cooking with un-processed fuels and low-quality stoves.[56] However, the Clean Cookstove Alliance asserted that there was overall (as of 2021) an historic lack of robust evidence on the impacts of cookstove interventions.[57]

Uptake of clean cookstoves has been much slower in Africa than in Asia.[58] Empirical evidence shows that after initial uptake, the abandonment rate is sometimes high.[59,60] Surveys also show that many households continue to use their old traditional stoves.[61] Therefore, it is fundamental to address key barriers to long-term adoption, such as affordability, cultural preferences, and maintenance. Additionally, engaging local communities in the design and implementation process is essential.

Researchers have raised concerns about the effectiveness of cookstove programmes and their ability to achieve intended benefits because of insufficient stakeholder involvement[62], gender considerations[63], and other socioeconomic factors[64].

Although clean cookstoves provide clear health benefits by effectively removing smoke, these benefits could be tempered by other factors. Firstly, they emit other air pollutants such as carbon monoxide and nitrogen oxides[65], and, secondly, while residents in urban areas benefit from lower levels of indoor air pollution, they may still suffer health impacts from high levels of outdoor air pollution.[66]

The implementation of cookstove programmes do not always translate into social and economic benefits, especially for poor people. In the case of a clean cookstove programme in Kenya, poor women who purchased the new cookstoves did not fully share in the financial benefits coming from carbon credits associated with the programme.[67] Hence, a special effort must be made to ensure that programmes are just and equitable.

Further Information

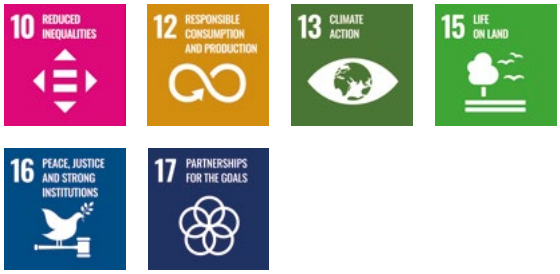
Clean Cooking Alliance, 2023. Clean Cooking as a Catalyst for Sustainable Food Systems. Available at: https://cleancooking.org/wp-content/uploads/2023/11/CCA_Clean-Cooking-as-a-Catalyst-for-Sustainable-Food-Systems.pdf. Accessed February 2025.

Sustainable Energy for All, 2020. Integrating Clean Cooking into National Energy Access Planning. Available at: https://www.seforall.org/publications/integrating-clean-cooking-into-national-energy-access-planning Accessed February 2025.

UNDP (United Nations Development Programme). 2025. No time to waste: Pathways to deliver clean cooking for all. A UNDP approach and policy guide. Available at: https://www.undp.org/publications/no-time-waste-pathways-deliver-clean-cooking-all-undp-approach-and-policy-guide Accessed February 2025.

Sustainable Supply Chains to Prevent Deforestation Linked to Trade

SDGs Advanced by Sustainable Supply Chains to Prevent Deforestation Linked to Trade



Sustainable supply chain policies, and regulations that delink trade in commodities from deforestation, help tackle the destruction of forests and exploitation of forest communities. Actions include: (i) increasing transparency and traceability across supply chain networks and fostering corporate accountability; (ii) encouraging governments, civil society and businesses to adopt sustainable forest protection measures; and (iii) strengthening the capacity of smallholder producers to improve their climate resilience, which enhances their livelihood security and increases their bargaining power with other supply chain actors.

The Problem

Deforestation is the conversion of natural forest cover to new, non-forest land uses. The demand for commodities, and its transmission through domestic, regional and global supply chains, is a major driver of deforestation, leading to biodiversity loss, greenhouse gas emissions, inequality and corruption. Approximately 40% of deforestation is driven by demand for commodities such as beef, soy, palm oil, pulp and paper, energy and minerals, which typically have long supply chains.[68] Responding to this challenge, governments of both producing and consuming countries are striving to reconcile economic activities with conservation and equitable development. To do so, they are promoting sustainable supply chain policies and regulations for delinking trade and deforestation.

Which SDGs are Accelerated?

Sustainable supply chain policies for delinking trade in commodities and deforestation advance multiple SDGs:

SDG 10: Reduced Inequalities

By actively supporting capacity-building initiatives in agroforestry and conservation-based agricultural practices, policies that delink trade and deforestation strengthen the resilience of local communities and enhance their inclusion, specifically advancing Target 10.2: … *empower and promote social, economic and political inclusion…*

SDG 12: Responsible Consumption and Production

Effective deforestation policies promote sustainable and transparent procurement practices that aim to minimise environmental impacts, addressing Target 12.2: … *achieve the sustainable management and efficient use of natural resources,* and Target 12.7: … *promote public procurement practices that are sustainable.*

SDG 13 Climate Action and Climate Goals of the Paris Agreement

By reducing deforestation, sustainable supply chain policies reduce the associated greenhouse gas emissions and help achieve Target 13.1: *integrate climate change measures into national policies, strategies and planning;* and Target 13.3: … *improve institutional capacity on climate change mitigation. They also advance the net zero emission goals of the Paris Agreement.*

SDG 15: Life on Land

Sustainable supply chain policies directly contribute to halting conversion of forests into agricultural land and preserving habitats. In so doing they advance Target 15.2: …*promote the implementation of sustainable management of … forests … [and] halt deforestation…*

SDG 16: Peace, Justice, and Strong Institutions

Strengthening regulatory frameworks builds trust and addresses Targets 16.4: … *combat all forms of organized crime,* and 16.6: *… develop effective, accountable and transparent institutions at all levels.*

SDG 17: Partnerships for the Goals

The global reforms needed to realise and manage sustainable supply chains strongly advance Target 17.10: *Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system …*

Evidence

There are many successful examples of sustainable supply chains. For instance, governments and companies in SE Asia have collaborated under the Palm Oil Traceability Programme to implement block-chain-based tracing systems, allowing real-time monitoring of supply chains.[69] This has reduced illegal deforestation by 30% and fostered trust among stakeholders, while public-private partnerships invested $50 million in capacity building initiatives.[70]

The Cocoa & Forest Initiative in Ghana is reducing deforestation by promoting sustainable cocoa farming practices and agroforestry. This initiative has successfully reduced deforestation rates in cocoa-producing areas leading to a reduction of over 3.5 Mt CO2 eq. emissions.[71] Multi-cropping systems have been introduced to improve soil fertility and facilitate long-term ecological restoration.[72]

World Resources Institute (WRI) conducted a global review of success factors for improving traceability and transparency in supply chains to reduce forest loss. They concluded that to achieve a sector-wide transformation, governments need to raise the bar with respect to traceability, reporting, and disclosure requirements in supply chains as well as supporting information flows.[73]

The UK Forest Risk Commodity Regulation and EU Deforestation Regulation have mandated due diligence and transparency for importing commodities linked to deforestation. These new initiatives aim to hold companies accountable for deforestation-free commodities, creating market-driven incentives to protect forests.[74,75]

Potential

As noted previously, roughly 40% of deforestation is driven by production of major commodities having long supply chains. These important international drivers of deforestation can be tackled by sustainable supply chain policies that delink global trade from deforestation.

About 10 million hectares of forest are lost to development each year[76], most of which occurs in landscapes where agriculture is the dominant driver.[77] Sustainable supply chain policies have the potential to substantially reduce this huge loss.

What to Watch Out For

Consistent enforcement of policies and regulations across regions is crucial for ensuring compliance. Yet, this remains a challenge due to weak local governance and institutional limitations. Some regulations are still in the early stages of development or implementation, and their potential positive impact remains uncertain. A key reason for this is the continued lack of traceability and transparency mechanisms within some supply chains.[78]

Market demand for low-cost commodities can also conflict with sustainability goals, leading to non-compliance by stakeholders seeking short-term gains.

Smallholders often face difficulties in complying with anti-deforestation policies because of insecure land rights, limited financial resources, lack of access to information, and low levels of organisation. These factors limit their willingness and ability to invest in sustainability practices that would reduce deforestation.

Implementing consistent sustainable supply chain policies across regions can provide added socio-economic value. These policies help create a clear and unified framework that encourages compliance, provides incentives for sustainable land use practices, and reduces the uncertainties that smallholders face.

Further Information

Alexander, A., Walker, H. & Delabre, I., 2022. A decision theory perspective on wicked problems, SDGs and stakeholders: The case of deforestation. Journal of Business Ethics, 180(4), pp. 975-995.

Fripp, E., Gorman, J., Schneider, T., Smith, S., et al., 2023. Traceability and Transparency in Supply Chains for Agricultural and Forest Commodities. Washington, DC: World Resources Institute.

Urban Greening Projects

SDGs Advanced by Urban Greening Projects

Urban greening projects aim to expand the greenness of cities and thereby enhance the physical and mental well-being of people who live there. Greener cities provide habitat for birds and pollinators and other flora and fauna, help improve air quality and provide a nature-based solution for combatting climate change. Urban greening projects cover a wide range of initiatives from introducing new parkland area, to planting mini forests, adding green roofs and walls, increasing tree cover along streets, and establishing new gardens. Greening is part of the bigger movement to make cities more ecological and sustainable.

The Problem

The typical city tends to have much less vegetation cover than nearby non-urban areas and much greater sealed surface. This has many consequences: Rainfall accumulates in low-lying areas and causes flooding or runs off quickly and creates downstream floods. Built-up surfaces absorb and re-radiate heat, intensifying the impact of heat waves. Sparse vegetation means fewer possibilities for recreation and relaxation and the well-being associated with parks and other green areas. Climate mitigation and air quality is much lower than it could be because of the lack of trees and other vegetation that would take up carbon dioxide and filter air pollutants.

Although some cities have generously sized green areas, most others are far from being as green as they could be and stand to benefit greatly from projects that introduce new parkland area, mini-forests, green roofs and walls, tree cover along streets, gardens, and other "green infrastructure."

Which SDGs are Accelerated?

By increasing the greenness and biomass on city surfaces, urban greening projects advance multiple SDGs:

SDG 3: Good Health and Well-Being

Trees and other vegetation improve air quality by absorbing and converting pollutant gases and retaining particulate matter on their foliage. As a result, it is well documented that greening can markedly improve air quality in cities and substantially advance health targets of the SDGs, especially Target 3.9: … *reduce the number of deaths and illnesses from … air pollution.* Besides these environmental effects, studies show that greenness and nature in cities increases the sense of well-being and enhances mental health, thereby helping to achieve Target 3.4: … *promote mental health and well-being*. Trees, where abundant, cool city surfaces through their shading and other cooling effects. In this way they help urban dwellers to cope with heat waves and thereby also support Target 3.4: … *reduce …mortality from non-communicable diseases.*

SDG 11: Sustainable Cities and Communities

Urban greening is an essential step for achieving the overall goal of SDG 11, and in particular Targets 11.6: *reduce the … environmental impact of cities* …, and 11.7: *provide … access to … safe, … green and public spaces*.

SDG 13: Climate Action and Paris Climate Agreement Goals

If new green areas are large enough, they will markedly enhance the absorption of rainfall and effectively mitigate flooding. It has already been mentioned that the cooling effect of trees helps city residents cope with heat waves. These two effects contribute substantially to achieving Target 13.1: *Strengthen resilience and adaptive capacity to climate-related hazards.*

The trees and other perennial vegetation introduced by greening projects also sequester carbon dioxide from the atmosphere and, in this way, provide a nature-based solution for mitigating climate change.

Together these beneficial effects help realise the goals of the Paris Climate Agreement, especially, *Increasing the ability to adapt to adverse impacts of climate change, and … achieve a balance between … sources and removals by sinks of greenhouse gases.*

SDG 15 Life on Land

Trees and other vegetation introduced by urban greening projects provide habitat for a wide variety of plants and animals and in this way contribute to the conservation targets of the SDGs, especially Targets 15.1: … *ensure the … restoration and sustainable use of terrestrial … ecosystems,* 15.3: … *restore degraded land and soil, and* 15.5: … *reduce the degradation of natural habitats….*

Evidence

A review of 89 studies from a range of climatic and geographic regions found a typical maximum cooling effect of parks to be 1.5 °C to 3.5 °C.[79] Another review of data of different sized parks at different locations and climates found a maximum cooling effect of about 1.0 to 6.9 °C.[80]

Research indicates that green roofs can reduce ambient temperatures by 0.3–3°C at the city level[81], while green facades can lower exterior surface temperatures of buildings by 1.7 - 16°C in different climates.[82]

Increasing tree canopy coverage to 30% in 93 European cities would significantly cool urban surfaces and avoid more than 2000 deaths from heat stress and other ailments due to heat waves.[83]

Urban trees now sequester about 217million tonnes of carbon each year.[84] (About equivalent to the annual greenhouse gas emissions of Saudi Arabia).[85]

A wide range of studies, in countries from low to high income, consistently show a positive association between urban green spaces and improved mental health and well-being.[86,87,88] Some authors believe that access to green spaces contributed to positive mental health during the Covid-19 pandemic.[89]

An extensive review of worldwide studies of urban nature shows, as expected, that biodiversity is usually more limited in cities than surrounding natural areas. However, it was also found that cities support a high level of variability among animal groups and that bird abundances in cities are often larger than in rural or natural habitats.[90]

Potential

About 48% of total global urban area is neither impervious nor already covered by trees.[91] Much of this land may be suitable for planting trees or other vegetation, thus providing a large potential for new urban greening projects.

If all available space in world cities was to be planted with trees, the global carbon storage of cities would nearly triple.[92]

Because of the cooling effects of trees, a programme of maximum possible street tree planting in 245 world cities could reduce residential electricity use for cooling by about 0.9 – 4.8% annually.[93] Reducing electricity would also reduce emissions from fossil-fuel powered electricity generation.

As the global urban population increases by 40 percent by 2050[94] and global warming continues, urban greening will become increasingly relevant to a large population for coping with more frequent and severe heat waves.

What to Watch Out For

A literature review[95] concluded that the larger part of the considerable evidence base on impacts of greening cities focuses on SDGs 3, 11 and 13. Relatively few studies have addressed SDG 15 or other SDGs. There is a general lack of evidence from low- and middle-income countries, except China.

The type of implementation of green infrastructure influences whether air pollution benefits will be achieved or not. For example, tall trees can sometimes increase ground-level air pollution levels by inhibiting the dispersion of air pollutants.[96]

Green city planning may conflict with planning for housing, commercial development, or other land uses. Therefore, greening initiatives should be co-designed with different sectors and stakeholders, ensuring that the diverse needs of the community, environment, and economy are effectively addressed.

Further Information

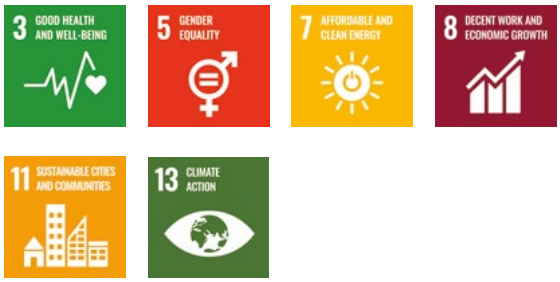
UN-Habitat & UN Environment. 2025. Greener Cities Part-nership. Available at: https://unhabitat.org/greener-cities-partnership. Accessed January 2025.

Pinter, L. 2025. Urban Nature Atlas – Urban Greening. Available at: https://una.city/?search_api_fulltext=urban+greening+ Accessed April 2025.

Ward Thompson, C. and Silveirinha de Oliveira, E.M., 2016. Evidence on health benefits of urban green spaces. In: A. Egorov, P. Mudu, M. Braubach, eds. Urban Green Spaces and Health: A Review of Evidence. World Health Organisation Regional Office Europe, Copenhagen, pp. 3-20.

Decarbonising Urban Transport

SDGs Advanced by Decarbonising Urban Transport



Policies for decarbonising urban transport in low- and medium-income countries (LMIC) aim to reduce greenhouse gas emissions while decreasing urban air pollution, improve mobility, support equity, and foster economic opportunities. Measures include enhancing the safety and convenience of walking, expanding opportunities for bicycling, improving the offer of public transportation, and expanding access and mobility through land use planning. The ASI framework (Avoid, Shift, Improve) provides an overall framework for action.[97] As with urban greening (see previous section) decarbonising urban transport is part of larger effort to build ecological and sustainable cities.

The Problem

Transport and mobility in LMIC cities have a critical influence on their vitality and liveability. Fossil-fueled vehicles are major contributors to outdoor air pollution which caused 4.2 million deaths globally in 2019.[98] The lack of adequate transport infrastructure and affordable mobility causes congestion and noise which are major sources of stress in everyday life and hinder economic activity. Inadequate levels of urban road safety contribute to many of the 1.2 million annual traffic deaths worldwide.[99]

Urban transport also has a significant impact on global climate change, accounting for a large portion of the 8% that cities contribute to global CO2 emissions.[100] While transport emissions are growing slowly in OECD countries, they are growing much faster in LMIC countries.[101] In the absence of interventions, these emissions will continue to rise rapidly as urban population grows by 40 percent by 2050, with 90 percent of this growth in Asia and Africa.[102]

Hence, there is a compelling case for policies and measures that decarbonise urban transport in LMIC and other cities while providing benefits of improved and safer mobility and reduced air pollution. No synergy driver is timelier since the UN Decade of Sustainable Transport commences in 2026.[103]

Which SDGs are Accelerated?

Policies and measures to decarbonise urban transport will substantially advance many SDGs:

SDG 3: Good Health and Well-being

Decarbonising policies make a significant contribution to protecting the health of urban residents. Firstly, they drastically reducing air pollution and, in this manner, help to achieve Target 3.9: *substantially reduce the number of deaths and illnesses from … air pollution*. Secondly, they lower road traffic accidents and advance Target 3.6: *halve the number of global deaths and injuries from road traffic accidents*. Finally, by encouraging healthful exercise such as walking and bicycling they help achieve Target 3.4: … *reduce … premature mortality from non-communicable diseases.*

SDG 5: Gender Equality

Surveys of women in Cairo, Beirut, and other cities confirm that the lack of safe and suitable transport to work is a barrier to their full engagement in the work force.[104] Hence, decarbonising urban transport is an enabling technology that promotes the empowerment of women (Target 5.b) with safe, accessible, and affordable transportation options. It increases their participation in economic activities and is therefore part of the reforms to give women equal rights to economic resources (Target 5.a).

SDG 7: Affordable and Clean Energy

Measures to decarbonise urban transport help integrate electric vehicles and alternative fuel technologies into the transport system. In so doing they advance Target 7.b: … *expand infrastructure … for supplying modern and sustainable energy services … in developing countries.*

SDG 8: Decent Work and Economic Growth

Decarbonising transport helps achieve Targets 8.2 and 8.3 by enhancing productivity and job market integration through improved accessibility and reduced travel costs, fostering economic resilience.

SDG 11: Sustainable Cities and Communities

Decarbonising policies play an essential role in achieving SDG 11 by enhancing public transit, reducing congestion, and improving air quality. Therefore, they directly support Targets 11.2: *provide safe, affordable, accessible and sustainable transport systems, … [and improve] road safety … by expanding public transport,* and 11.6: *… reduce the adverse per capita environmental impact of cities.*

SDG 13 Climate Action and Climate Goals of the Paris Agreement

Decarbonising urban transport directly supports mitigation of climate change by reducing transport-related emissions through electrification, fuel efficiency, and clean energy adoption. It contributes to Net Zero goals in every country.

Evidence

A scenario study investigated the impact of decarbonising urban transport between 2010 and 2040 in four European cities (Barcelona, Malmo, Sofia and Freiburg). By 2040 (relative to 2010) major decreases were estimated for greenhouse gas emissions (up to 80%), air pollution (up to 73%), and transport-associated accidents (up to 50 percent). These were accomplished through EU regulations and other policies.[105]

As compared to a business-as-usual scenario to 2050, low carbon transport policies in India reduced carbon dioxide emissions by about 70%, and emissions of particulate matter by about 40%.[106]

A scenario study found that applying a package of decarbonisation policies in 120 cities would reduce transport-related emissions by an aver-age of 31% over 15 years, relative to a baseline scenario.[107]

The adoption of electric rickshaws in Ahmedabad has lessened dependence on fossil fuels while improving last-mile connectivity. This policy contributes to cleaner energy use and reduced greenhouse gas emissions, aligning with climate goals and energy transition objectives.[108] Bogotá's Bus Rapid Transit system, "Trans-Milenio" has significantly reduced urban congestion and emissions by offering an efficient and affordable public transport alternative. It has decreased travel times, improved air quality, and demonstrated how sustainable transport can drive climate action and urban sustainability.[109]

In a study of 19 major cities, it was found that women were more likely to walk than men, and usually more likely to use public transport.[110]

In low- and middle-income countries[111,112], women's perceptions about violence and their actual safety in public spaces affects their physical mobility and economic choices. These results highlight the importance of a gendered approach to transport policies.

Potential

Although the number of low carbon vehicles is increasing worldwide, 96.1% of energy in transport is still based on fossil fuels (as of 2021)[113]. Furthermore, urban transport accounts for more than 40% of all transport-related greenhouse gas emissions.[114] Hence there is enormous potential to decarbonise transport globally.

What to Watch Out For

With regards to the evidence base, a review of international decarbonising initiatives[115] indicated that the most frequently implemented policies were actions to improve surface transport. Few initiatives were identified that tried to reduce or avoid the need to travel.

While the benefits of decarbonising urban transport systems in LMICs are clear, several impediments remain, including deficiencies in financial resources, institutional capacity and political will. One way to improve the financial and political attractiveness of initiatives would be to ensure robust project preparation and design. Furthermore, community engagement in the planning process will be essential for mainstreaming policies.

Transportation emissions, and the efficiency of policies to mitigate them, are strongly dependent on local characteristics of cities, especially their urban forms.[116] Therefore, packages of measures should be tailored to a particular setting to win the greatest synergistic effect.[117,118] Likewise, policies should be shaped to the needs of local residents.

Further Information

Bianchi Alves, B., Bou Mjahed, L. and Moody, J., 2023. Decarbonizing urban transport for development. Mobility and Transport Connectivity Series. Washington, DC: World Bank. Available at: https://openknowledge.worldbank.org/entities/publication/006565c0-c51b-4614-a1a2-35c29ece447b Accessed February 2025.

Rojas, J., Gómez, P. & Pérez, M., 2022. Decarbonizing urban transport in low- and middle-income countries: A systematic review of potential strategies and impacts. Environmental Science & Policy, 123, pp. 19-31.

García, C. & Morales, J.M., 2020. Decarbonizing transport in developing countries: The case of urban mobility in Latin America. Environmental Science & Policy, 110, pp. 85-98.

Decentralised Solar Energy Systems

SDGs Advanced by Decentralised Solar Energy Systems

Decentralised solar energy systems are cost-effective photovoltaic (PV) networks that generate off-grid electricity through multiple small-scale sources. They include household, farm and community-level installations. The main goal of these systems is to improve access to clean, safe, reliable and low-cost energy while reducing dependency on traditional sources such as wood and coal, which are harmful to health and the environment. This bottom-up approach also aims to enhance energy security and contribute to poverty reduction by empowering communities with sustainable, locally sourced power.

The Problem

According to the United Nations, 685 million people currently live without electricity, which significantly limits their development potential. Additionally, 2.3 billion people continue to live without access to clean energy cooking.[119] The reliance on harmful cooking fuels contributes to severe global health issues such as household air pollution[120] (see the Clean Cookstoves synergy driver). Lack of access to reliable energy sources also limits provision of health and educational services. Decentralised or distributed solar energy systems, applied in the rural areas of low- and medium-income countries, successfully address these and other challenges.

Which SDGs are Accelerated?

By ensuring access to cost-effective, reliable and modern energy sources decentralised solar energy (DSE) programmes accelerate several SDGs:

SDG 1: No Poverty

By reducing energy costs and providing a foundation for economic activities, DSE systems contribute to poverty alleviation, contributing specifically to Target 1.2: … *reduce at least by half the proportion of men, women and children … living in poverty.*

SDG 2: Zero Hunger

By providing low-cost energy to support water pumping, DSE systems increase irrigation capacity and agricultural productivity, advancing Targets 2.3: …*double the agricultural productivity and incomes of small-scale food producers…* and 2.4: …*ensure sustainable food production systems and implement resilient agricultural practices.*

SDG 3: Good Health and Well-being

DSE systems reduce reliance on harmful cooking fuels, thereby improving household air quality and promoting better health outcomes, advancing Target 3.9: … *reduce the number of deaths and illnesses from … air pollution.*

SDG 7: Affordable and Clean Energy

DSE directly improves access to clean, reliable, and affordable energy, particularly in rural and off-grid communities, where traditional grid extensions are often infeasible. This furthers Targets 7.1: …*ensure universal access to affordable, reliable and modern energy services,* and 7.2: … *increase substantially the share of renewable energy in the global energy mix.*

SDG 8: Decent Work and Economic Growth

DSE supports local economies by enhancing affordable and sustainable rural industrialisation, advancing Target 8.3: *Promote development-oriented policies that support productive activities, decent job creation,… and growth of micro-, small- and medium-sized enterprises.*

SDG 9: Industry, Innovation, Infrastructure

DSE advances Target 9.a: *Facilitate sustainable … infrastructure … in developing countries.*

SDG 13: Climate Action and Goals of Paris Climate Agreement

DSE systems contribute to climate change mitigation and adaptation by enhancing the resilience of rural communities and avoiding greenhouse gas emissions. These benefits support Target 13.2: *Integrate climate change measures into national policies, strategies and planning, as well as the net zero emissions goal of the Paris Climate Agreement.*

Evidence

The "Off-Grid Solar Access Project" in Kenya provides affordable 'pay-as-you-go' solar systems to off-grid households. The project has mobilised 120 mini-grids and provided 150,000 clean cooking solutions for almost 20% of the country's underserved population.[121] These actions have contributed to poverty alleviation, provided women with access to reliable lighting and energy and reduced their burden of fuelwood gathering, and enabled better conditions for education and entrepreneurship.

The "Solar Irrigation for Agricultural Resilience" (SoLAR) programme in South Asia has been shown to increase the capabilities of farmers by providing solar irrigation pumps that increase access to water.[122] In Bangladesh, the project has reduced irrigation costs by 20–30%. These technologies also empower women farmers by making additional time available for other income-generating activities.[123]

The Sierra Leone Hospital Electrification Project delivered innovative solar plus battery storage micro-grid solutions that positively enhanced healthcare delivery to over 8.7 million people.[124] The solar micro-grids provide round-the-clock renewable power to 43 general hospitals and health centres, improving the quality of healthcare services and producing better health outcomes across Sierra Leone.[125]

Potential

Off-grid solar has the potential to be the most cost-effective way to power people globally who are still living without energy access.

UN projections indicate that by 2030, off-grid solutions could provide affordable access to 464 million people in sub-Saharan Africa, where over 80% of the world's population without electricity resides.[126]

Women represent over 36% of the agri-food work force.[127] Improving the accessibility to solar powered technologies could empower millions of women agricultural producers and processors, especially those from the poorest and most marginalised households. (See Green Energy Businesses for Women synergy driver). Integrating decentralised solar with policies focused on economic diversification and climate resilience would enable countries to accelerate their transition to a low-carbon economy.[128]

What to Watch Out For

Recent research in Africa found that the high costs of on-grid electricity directly contributed to rapidly increasing demand for decentralised solar systems.[129] Nonetheless, the region still under-performs with respect to the spread of DSE considering its resource potential and electrification needs.[130] This is because of the remaining barriers to its uptake. For example, the upfront costs of solar systems, despite decreasing, remain high in many low-income regions. Furthermore, outdated or restrictive regulations can inhibit private sector investment. Lack of technical expertise and infrastructure to maintain solar systems in rural areas can affect their performance and sustainability.[131] Political instability can also disrupt investments and inhibit development of regulatory frameworks and public-private partnerships that otherwise would boost the scale-up of DSEs.

Widespread adoption of solar irrigation pumps may lead to groundwater depletion if appropriate governance arrangements are not introduced.[132] This highlights the necessity of creating 'self-sustaining' DSE systems where all stakeholders are involved.

Overcoming these challenges will require focused investments, supportive policies and capacity-building efforts tailored to local needs. It is therefore important to address affordability challenges for enhancing access for remote rural communities. It is also vital to address the structural barriers that could hinder the successful implementation of these initiatives at scale.

Further Information

IEA (International Energy Agency), IRENA (International Renewable Energy Agency), UNSD (United Nations Statistics Division), World Bank, WHO (World Health Organization), 2024. Tracking SDG 7: The Energy Progress Report. World Bank, Washington DC. Available at: https://trackingsdg7.esmap.org/data/files/download-documents/sdg7-report2024-0611-v9-highresforweb.pdf Accessed February 2025.

IRENA (International Renewable Energy Agency), 2024. Decentralised Solar PV: A Gender Perspective. Abu Dhabi: International Renewable Energy Agency. Available at: https://www.irena.org/Publications/2024/Oct/Decentralised-Solar-PV-Gender-Perspective-2024 Accessed January 2025.

Green Energy Businesses for Women

SDGs Advanced by Green Energy Businesses for Women

Green energy businesses for women are a practical way to achieve female economic empowerment and facilitate access to reliable and modern energy services. Women working in this sector develop technical skills that increase their engagement in education, lowering their exposure to gender-based violence and reducing inequalities. At the same time, increased use of green energy appliances and utilities in the communities served by these businesses contributes to a global increase in renewable energy use and a reduction in emissions of greenhouse gases.

The Problem

Women in rural communities have the dual challenge of unreliable power supply and low economic engagement. Women in these communities often have limited education and work prospects, and there is a dependence on harmful fuels for energy, with health and environmental risks. Research[133] shows a direct link between renewable energy access and female economic empowerment.[134]

Providing these women with training and technical education in the green energy business sector has a massive positive impact on their economic empowerment, simultaneously leading to an increase in global renewable energy use.

Which SDGs are Accelerated?

Training women in the assembly, maintenance, sale and distribution of green energy products advances several SDGs.

SDG 4: Quality Education

Women employed in the sector develop technical competencies and business acumen. This contributes to their overall education and is directly linked to SDG Targets 4.3 and 4.4: *ensure equal access … to affordable technical and vocational education and increase the number of youth and adults who have relevant skills for … entrepreneurship.* Empowering women also ensures more children attend school. This supports Target 4.6: *ensure that all youth … achieve literacy and numeracy.*

SDG 5: Gender Equality

Increasing the economic engagement of women through their participation in green energy businesses advances Target 5.a: *give women equal rights to economic resources … as well as access to … [property] ownership … and financial services.* It directly advances Target 5.b: enhance the use of technology … *to promote the empowerment of women.*[135,136] Also, women are less likely to be exposed to gender-based violence, contributing to Target 5.2: *Eliminate all forms of violence against all women and girls…*

SDG 7: Affordable and Clean Energy

The very nature of these businesses, whether based on solar, wind or bioenergy, makes a direct positive impact on the environment by providing communities with affordable and clean energy. Several Targets under SDG 7 are addressed including Target 7.2: *increase … the share of renewable energy in the global energy mix,* and Target 7.1: *ensure universal access to affordable, reliable and modern energy services.* Accelerating the participation of women in green energy businesses will overall advance SDG 7, fast-tracking sustainable growth and building engaged communities.

SDG 8: Decent Work and Economic Growth

Supporting women to establish and operate green energy businesses not only accelerates the energy transition, but also directly advances Targets 8.3: *support…decent job creation, entrepreneurship, …and growth of micro-, small- and medium-sized enterprises;* and 8.5: *achieve…productive employment and decent work for all women and men.*

Evidence

Research on women's empowerment through renewable energy is predominantly from the development sector, with scientific research demonstrating the impact of economic engagement on women's empowerment. Many studies also highlight the impact of low-carbon technologies on women.[137]

In Africa, organisations like Solar Sister are supporting women to bring clean energy to off-grid communities. Solar Sister has recruited, trained, and supported over 9,400 female entrepreneurs, who have expanded access to clean energy for more than 4.3 million people across Nigeria, Tanzania, and Kenya, advancing both environmental sustainability and economic empowerment.[138]

A multi-state solar lamp initiative in India[139] provided rural women with technical and entrepreneurial training to assemble, sell, and repair solar lamps, encouraging them to eventually start their own green energy enterprises. This ongoing engagement enhanced their assertiveness and decision-making.

Female entrepreneurs empower other women; 60% of the workforce at SPCG, a female-owned solar company in Thailand, is female.[140] And in the USA, Sunrun, a female-led provider of residential solar, storage and energy service, employs over 25% women across its workforce, with 50% on the senior leadership team and 38% on the board of directors.

The Women's Economic Empowerment (WEE)[141] programme, run by the International Network on Gender and Sustainable Energy (ENERGIA), reported that 70% of the female entrepreneurs receiving training and support had positive profit margins. Financial literacy[142] and technical training significantly increases women's economic outputs and financial solvency.

A study[143] found that women's entrepreneurship contributes to the development of social capital because it has positive effects on the likelihood of women owning assets and participating in decision making.

The nexus between business ownership and economic empowerment for women is well documented with its associated impact on social capital[144], and quality of life. A new nexus is emerging linking women-led renewable energy businesses with the aforementioned impacts, and this connection should be further explored.

Potential

Globally, just under 47%[145] of the labour force is made up of women, and women comprise only 32% of the global renewable energy workforce.[146] Women's lack of economic engagement can have negative consequences. The WHO[147] estimates that 30% of women aged 15 and over globally have been exposed to gender-based violence (GBV). Also, the participation of women in the field of technology continues to lag behind men. Data provided by UNESCO shows that women make up just 35% of STEM graduates and less than 25% of the global STEM workforce.

The training and development opportunities provided to women taking up green energy businesses has the potential to close the above-mentioned employment gaps, providing thousands of women globally with technical and business skills, increasing their labour force participation, while increasing renewable energy use. By empowering women, they also help reduce the large proportion of women subjected to gender-based violence.

What to Watch Out For

Solar is the main option for green energy businesses featured in this report and comes with many positive impacts. However, it is important to note that although solar-powered appliances have low greenhouse gas emissions and minimal local environmental impacts, they are often equipped with lithium-ion batteries for storage. These batteries cause various supply chain problems. In particular, the mining of lithium poses many risks to Indigenous and other communities that live near mines. The batteries also contribute to the growing problem of electronic waste disposal, particularly in developing countries.

Training programmes supporting the entry of women into the green energy business sector are not always successful. A USAID[148] funded project in Bangladesh faced challenges in integrating women into the value chain, with less than 3% of the trained women gaining employment.

Funding can be a major barrier to entry, depending on the model of initiating a green energy business for women in rural areas. In some areas, NGOs and charities (like Solar Sister) use philanthropic funding to provide training, equipment and start-up capital for beneficiaries. Significant investment is required for this model, thus limiting its reach and potential impact. In other models, women secure loans to start their businesses, but these often do not go far enough to cover the initial costs. Sustained funding will be required to ensure the delivery of this synergy driver.

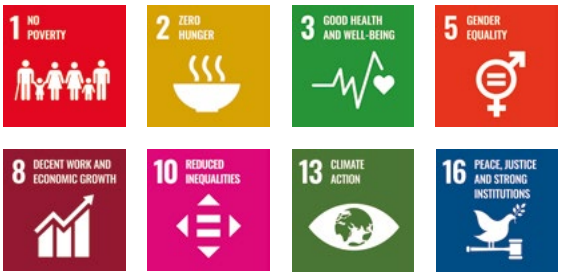
Further Information

Li, X., An, L., Zhang, D., Lee, C., Yu, C., 2024. Energy access and female labour force participation in developing countries. Renewable and Sustainable Energy Reviews. 199

IRENA, 2024. Decentralised Solar PV: A Gender Perspective, International Renewable Energy Agency, Abu Dhabi.

Social Protection Measures

SDGs Advanced by Social Protection Measures



Social protection refers to a comprehensive approach that aims to combat poverty and strengthen resilience of vulnerable populations. It often aligns with national and international programmes for disaster risk reduction and climate change adaptation. This approach covers many different measures including cash transfers, food assistance, social insurance and public works programmes. These measures contribute to accelerated action on multiple SDGs by strengthening the resilience of climate-vulnerable communities. They do so by helping them to prepare for, cope with, and adapt to the impacts of interconnected crises.

The Problem

Poverty and inequality have deepened over the past decade because of interlocking global crises including climate change and political disruptions, leaving millions without adequate access to basic needs. This has created a persistent cycle of vulnerability for large segments of the global population, which has been further exacerbated by fragmented and unequal access to effective social protection. Indeed, the International Labour Organization (ILO) estimates that 4.1 billion people lack any social protection benefits (excluding healthcare and sickness benefits)[149], leaving many of the world's most vulnerable groups even more at risk. Consequently, there is a pressing need for an adaptive, inclusive and responsive approach to social protection.

Which SDGs are Accelerated?

Social protection measures are aimed at addressing interlinked structural vulnerabilities, which directly accelerate several SDGs:

SDG 1: No Poverty

Social protection measures make a direct contribution to achieving targets for combating poverty and building resilience of the poor, contributing to Target 1.3: *Implement nationally appropriate social protection systems and measures for all…*

SDG 2: Zero Hunger

Some social protection programmes combine food and cash transfers to vulnerable households during periods of food insecurity which advances Target 2.1: *… end hunger and ensure access by all people to… sufficient food all year round,* as well as Target 2.2: *… end all forms of malnutrition…*

SDG 3: Good Health and Well-Being

Flexible measures such as social assistance and healthcare, are effective tools for meeting basic needs and expanding the reach of aid, contributing directly to Target 3.8: *Achieve universal health coverage…*

SDG 5: Gender Equality

Social protection that includes a gender-sensitive approach supports Target 5.c: *Adopt and strengthen sound policies… for the promotion of gender equality and the empowerment of all women and girls…*, and Target 5.4: *Recognize and value unpaid care and domestic work through the provision of social protection policies…*

SDG 8: Decent Work and Economic Growth

Measures that build resilience by enhancing access to employment in formal economies, while offering backup income support, contribute to Target 8.5: … *Achieve full and productive employment and decent work for all…*

SDG 10: Reduce Inequality

Social protection can reduce both within- and between-country inequality, advancing Target 10.1: *Progressively achieve and sustain income growth of the bottom 40% of the population…*, and 10.4: *Adopt… social protection policies, and progressively achieve greater equality.*

SDG 13: Climate Action

By aligning social protection programmes with national climate adaptation plans, governments can address both immediate and long-term climate-related risks. This helps achieve Targets 13.1: *Strengthen resilience and adaptive capacity to climate-related hazards…*, and 13.2: *Integrate climate change measures into national policies and strategies…*

SDG 16: Peace, Justice and Strong Institutions

Social protection measures contribute directly to Target 16.6: *Develop effective, accountable and transparent institutions at all levels.*

Evidence

A review of evidence from 165 studies of cash transfer programmes in low- and medium-income countries found positive outcomes for poverty reduction, education, health and nutrition, savings, investment, production, work, and empowerment.[150]

Ethiopia's Productive Safety Net Programme (PSNP) provides regular cash transfers to poor households, enabling them to meet basic needs and invest in productive assets. This double benefit has reduced poverty while narrowing income gaps within rural communities. Similarly, urban PSNP initiatives enabled women to participate in climate- and gender-sensitive public works and business development. Some 60% of beneficiaries involved in PSNP-supported schemes in 84 cities are women.[151] Studies have found that the programme lifted 1.5 million people out of extreme poverty over five years.[152]

India's Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) provides income through inclusive infrastructure projects. It provided employment to over 90 million households in 2022, significantly reducing poverty and offering stable income opportunities for marginalised groups.[153]

Brazil's Emergency Aid (Auxílio Emergencial) was a cash transfer programme that prevented 24 million people from falling below the poverty line during the COVID-19 emergency. The programme provided a safety net for those most affected by the pandemic, thereby increasing their resilience and access to safe and affordable medicines.[154]

The ILO presents data that show a strong inverse relationship between a country's vulnerability to climate change and its investment in social protection.[155] The greater the social protection coverage, the lower the country's exposure and sensitivity to climate change. This evidence suggests that strengthening social protection is an important climate change adaptation strategy, and that these systems address the root causes of vulnerability by reducing poverty and inequality.

Potential

The International Labour Organization estimates that integrating social protection with climate adaptation initiatives could lower the climate vulnerability index of at-risk populations by 25%, helping to reduce both climate-related vulnerabilities and poverty, while addressing inequality.[156]

The World Food Programme reported that approximately 733 million people faced hunger in 2023, which represents one in eleven people globally and one in five in Africa.[157] Given these alarming figures, introducing social protection measures in highly vulnerable settings is a necessity not only to foster resilience but also to progress towards zero hunger since these programmes tend to increase average household food expenditure by 13%.[158]

What to Watch Out For

Challenges to operationalising integrated and adaptive social protection programmes include insufficient funding, lack of institutional capacity and fragmented policy frameworks.

To overcome these barriers, governments must prioritise domestic resource mobilisation, foster international partnerships, and leverage digital tools to enhance delivery and monitoring systems.

Context-specific design and early stakeholder engagement are essential to ensure social protection measures reach the most vulnerable populations and bring the largest number of benefits.

Further Information

ILO (International Labour Organization). 2024. World Social Protection Report 2024–26. Geneva: International Labour Organization. Available at: https://www.social-protection.org/gimi/RessourceDownload.action?id=2 Accessed 23 February 2025.

Devereux, S., Lind, J., Roelen, K. and Sabates-Wheeler, R. (eds.), 2024. Reimagining Social Protection. IDS Bulletin, 55(2).

Reducing Food Waste And Post-Harvest Losses

SDGs Advanced by Reducing Food Waste and Post-Harvest Losses

Many practical steps can be taken to reduce food waste and post-harvest losses of food. Public education and better retail management reduces waste in the consumer and market sectors; improving food storage facilities and transport infrastructure are effective in lowering post-harvest losses. Collectively, these measures have the potential to save agricultural land and inputs, resulting in fewer negative impacts of agricultural production on the environment and more successful achievement of sustainability goals.

The Problem

To provide enough food for a growing and wealthier world population, agricultural land has expanded by 7.6% between 1961 and 2020 and now occupies one-third of global land area[159]. During that time there was also a rapid increase in the inputs to agriculture, such as irrigation water, machinery, and fertilisers. For example, the annual use of synthetic nitrogen fertilizers grew from 12 to 112 million metric tons.[160]

Although the increase in food production was welcome, the larger agricultural area and bigger inputs have also magnified negative impacts. These include an unwelcome increase in agriculture-related greenhouse gas emissions, now liable for one quarter of all global emissions. Other consequences have been an increase in water pollution from farmland runoff, and greater habitat loss and decline of species. These impacts are interfering with the achievement of several SDGs. One substantive way to mitigate these impacts would be to reduce food waste and loss, which, in principle, allows for the same production of food, but with much lower land and other requirements, and lower resulting impacts.

Food losses in the global supply chain amount to about one-third of all food produced globally[161]. There are two main components of these losses: “Food waste”, which means losses in the retail and consumer part of the food chain (19% of food available to consumers)[162], and “post-harvest losses” which refer to losses in the production and processing part of the food chain due to inadequate crop storage facilities and deficiencies in transporting crops to market (13% loss in the supply chain up to the retail sector)[163].

Which SDGs are Accelerated?

Reducing food waste and post-harvest losses will have a substantial impact on several SDGs:

SDG 6: Clean Water and Sanitation

Reducing food loss will likely lead to lower demand for irrigation and other water uses for agriculture. This will make available a much greater water supply for households and other users and make it easier to reach Target 6.1: *achieve universal … access to safe and affordable drinking water …* It will also reduce the volume of polluting agricultural runoff[164] and thereby help advance Target 6.3: *improve water quality by reducing pollution …*

SDG 12: Responsible Consumption and Production

The aim to reduce food losses is explicitly included in the SDGs as Target 12.3: … *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.*

SDG 13: Climate Action and Paris Climate Agreement Goals

Measures to reduce food waste and losses will logically reduce the unit amount of agricultural land and inputs needed to produce a unit amount of food, all else remaining constant. Even if food production increases, the amount of agricultural land needed to produce this food will be much smaller than otherwise. Saving land and other inputs to farming will result in lower emissions of the greenhouse gases associated with fertiliser application, livestock emissions, the decomposition of organic material in soils, and other agricultural processes.[165] Cutting emissions directly helps achieve Paris Agreement climate goals and SDG 13: *Take urgent action to combat climate change and its impacts.*

SDG 15: Life on Land

Reducing the amount of land needed per unit food also reduces the pressure of agricultural expansion onto forests and thereby helps achieve Targets 15.2: *halt deforestation …,* and 15.5: *Take urgent … action to reduce the degradation of natural habitats.*

Evidence

The EU carried out an evaluation of 74 interventions at different scales aiming to reduce consumer food waste. Most of these interventions were found to be successful in either reducing food waste quantities or changing behaviour. The study concluded that deploying well-designed and monitored actions can lead to substantial reductions in food waste on a large scale.[166]

A study of documented food waste reduction projects indicated an achievable reduction of food waste of up to 28 to 57%, depending on the type of intervention.[167] A modelling study estimated that cutting global food waste and post-harvest losses by one-half could reduce the global area of cropland by about 14% and agriculture-related greenhouse gas emissions by 22-28% (~ 4.5 GtCO2-eq/yr.) relative to a baseline scenario up to 2050.[168] As a benchmark, this is equivalent to more than a third of emissions from the European Union in 2023.[169]

A review of 334 studies covering 22 crops across 57 countries of Sub-Saharan Africa and South Asia identified several different interventions effective at reducing post harvest losses.[170]

The IPCC estimated that a programme to reduce post-harvest losses of crops can contribute substantially to mitigating and adapting to climate change while contributing to the food security of more than 100 million people.[171]

A scenario analysis assuming a global reduction of food waste and loss by one-half found that blue water consumption (mostly irrigation uses) and green water consumption (water use of plants) would both decline by 12%, making a substantial volume of water available for other uses.[172]

Based on an extensive review of the literature it was estimated that food losses account for 215 km^3/year of freshwater resources, and that eliminating this loss could benefit 320-400 million people affected by high water stress.[173]

Potential

In a recent compilation of worldwide data, UNEP found that the median amount of household food waste globally was 79 kg per person per year, with high values in virtually every country providing data.[174] Hence, measures to reduce food losses have the potential to make significant gains worldwide, and could have a large impact on the amount of agricultural land and inputs needed to provide food in many countries.

What to Watch Out For

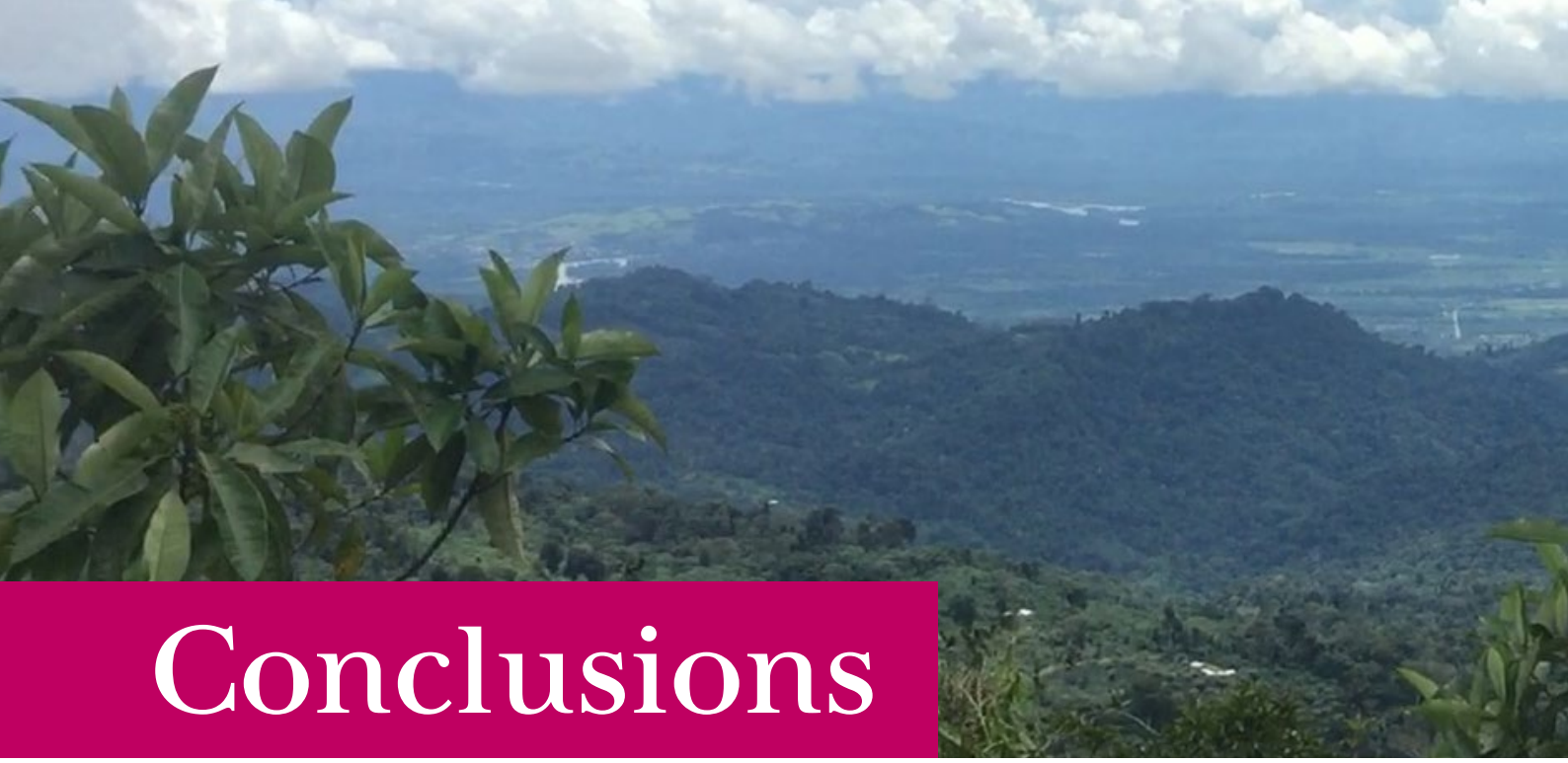
After an extensive review of the literature, researchers concluded that there was an urgent need for a systematic assessment of interventions to reduce post harvest losses that covered the entire value chain and multiple seasons and sites.[175]

Actions to improve resource efficiency sometimes have an unintended "rebound" effect that can actually lead to higher consumption of resources and negate the benefits of efficiency improvements. For example, it has long been known that improving auto fuel efficiency in the USA has contributed to increased auto usage (because fuel costs per mile became cheaper) which partly offsets the benefits of fuel efficiency programmes.[176] Similar results have been found in cases of improved irrigation water use efficiency.[177] It is conceivable that a similar rebound effect could lessen the benefits of reducing food waste and loss. It will be important to study this issue and assess strategies to counter this effect if it occurs.

Further Information

Reynolds, C., Goucher, L., Quested, T., Bromley, S., Gillick, S., Wells, V.K., Evans, D., Koh, L., Kanyama, A.C., Katzeff, C. and Svenfelt, Å., 2019. Consumption-stage food waste reduction interventions – What works and how to design better interventions. Food Policy, 83, pp. 7–27.

Swannell, R. et al.., 2023. Evaluation of consumer food waste prevention interventions, Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/224541, JRC133003 Available at: https://www.matvett.no/uploads/documents/JRC-Evaluation-of-Consumer-interventions-2023.pdf Accessed March, 2025.



Conclusions

Understanding Synergy Drivers

This report introduces "synergy drivers" as a concept with potential to accelerate action on the UN Sustainable Development Goals at scale. We have provided a set of ten diverse cases covering a wide range of sectors and sustainable development challenges. Each synergy driver case has information about the core issues it addresses, the goals and targets it advances, evidence documenting its successful application in different contexts, the potential for further scaling in other settings, and notes on potential barriers to its implementation.

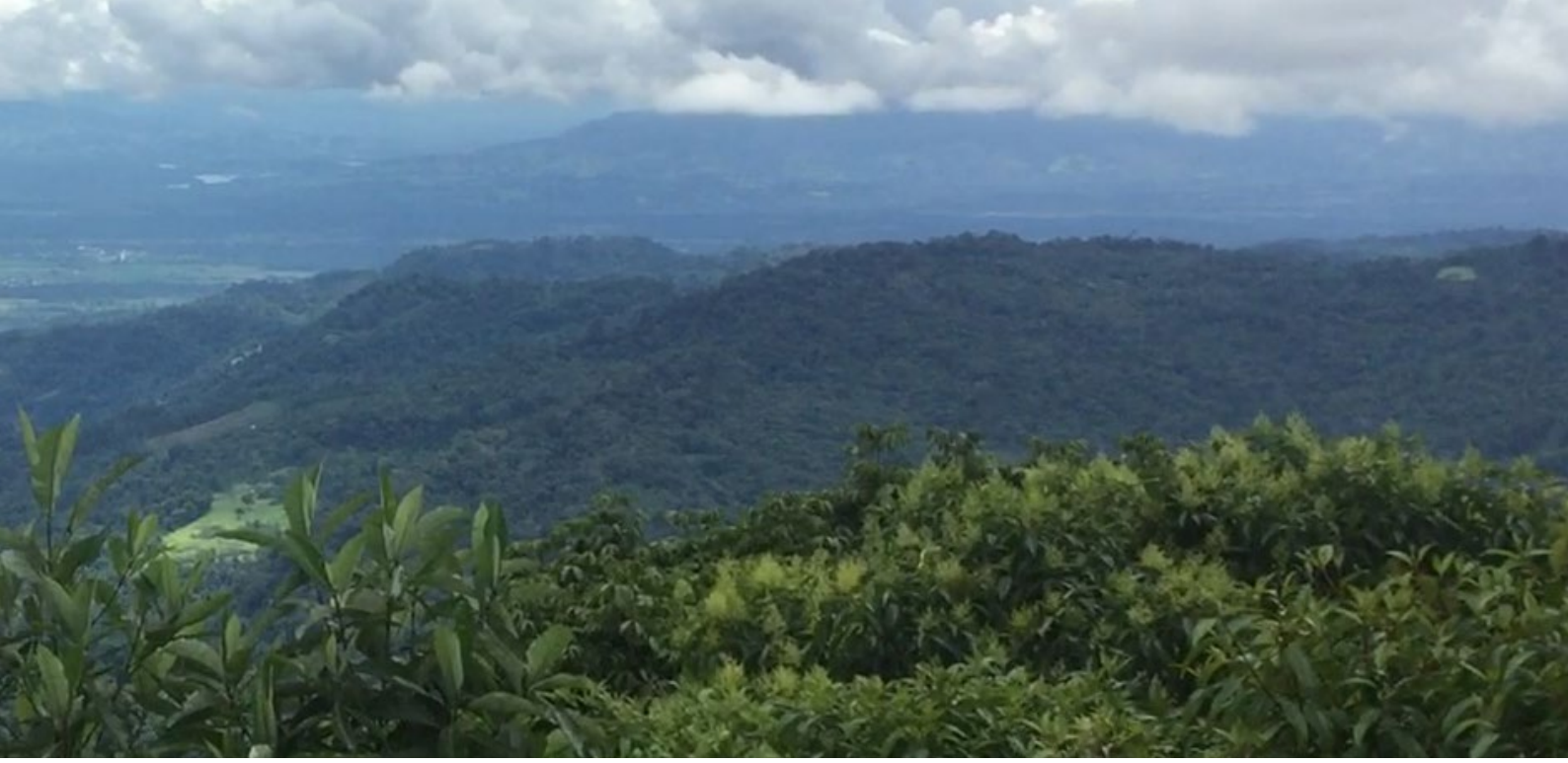
Table 1 shows the wide range of SDGs advanced by the ten examples. Each synergy driver in this sample contribute to at least three SDGs, and several contribute to six or more. Together, a total of 16 out of 17 SDGs are covered by the ten cases. (with only SDG 14 missing[178]).

Some particular goals are advanced by several of the synergy driver examples. The SDGs for health, gender and land, for instance, are advanced by half or more of the ten policy examples. The global goal most often progressed is SDG 13, Climate Action. This shows the opportunities for advancing both the climate and SDG agendas at the same time. The idea of aligning SDG and climate policies is an ongoing theme at the United Nations and has been addressed in several major conferences and publications where the potential for scaling up has been pointed out.[179] This idea has also been featured in a joint report to COP 26 from the UK's All Party Parliamentary Group on the Sustainable Development Goals and the University of Sussex.[180]

How Policy Makers and Programme Designers can Identify and Analyse Synergy Drivers

The examples presented in this report were selected because they illustrate the wide variety of synergy drivers available. But how can an interested party find the right synergy drivers for a specific country or context? What's "right" for a particular country will depend on a range of factors, including its policy frameworks and institutions, its social, economic and environmental priorities, and related to this, on which SDGs it wishes to focus.

When looking for the most appropriate synergy drivers at the national level, it is important to first consult with various public, private and civil society actors involved in SDG implementation to identify priority SDG goals and targets. Then, using this list of priorities, an appropriate institution could compile a searchable databank of documents covering all policies and measures that advance these priorities. The databank would include not only information on the policies themselves, but also the type of information sketched out in this report – the problems the policy addresses, a description of how the policy helps achieve specific SDG targets, the caveats in applying it, etc. As a next step, the programme designers or a designated expert group would search this data bank and compile a list of the most appropriate policies and measures (synergy drivers) that have potential to advance two or more of the country's priority SDG targets. Drawing from this list, the experts would then compile a list of candidate synergy drivers, together with analysis, for presentation and consideration by policy makers. A similar process could be followed at the international level except that the databank would draw on international data sources such as policy reviews of the UN, project descriptions from international NGOs, and international academic studies of policies and measures.



The searches at both the national and international level would be greatly facilitated by a readily accessible 'international databank of synergy drivers'. Since this doesn't exist it would have to be invented. The aim would be to create an interactive and user-friendly tool for searching and identifying the synergy drivers that fit with specified national priority SDGs. Many of these data could be harvested from online documentation using intelligent search algorithms.

Once compiled, these records would be peer-reviewed, catalogued and streamlined for a large audience using AI-facilitated analysis. Important partners in facilitating this SDG synergy driver approach would be UN entities, such as the Division for Sustainable Development Goals (DSDG) in the UN Department of Economic and Social Affairs (UNDESA), which currently acts as the Secretariat of the SDGs, or a broad-based platform such as the "SDG Synthesis Coalition", recently launched and involving 40 UN entities. These or other institutions may wish to consider taking on compiling such an international databank, if it complements their current activities.

	Sustainable Development Goals																
Synergy Drivers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Early Warning Systems	■	■	■										■				
Forest & Public Health			■		■										■		
Cookstoves			■		■		■						■		■		
Sustainable Supply Chains										■		■	■		■	■	■
Urban Greening			■								■		■		■		
Decarbonising Urban Transport			■		■		■	■			■		■				
Decentralising Solar	■	■	■				■	■	■				■				
Green Energy Business				■	■		■	■									
Social Protection	■	■	■		■			■		■			■			■	
Food Waste						■						■	■		■		

Table 1. SDG coverage of synergy driver examples in this report

‘Synergy drivers can help us achieve what we want, with what we have’

Minimising Trade-offs and Inequities

Although synergy drivers are meant to increase the well-being of people and planet, experience has shown that even such well-intentioned policies and measures sometimes instigate important trade-offs, including inequities and injustices. For example, a coastal afforestation scheme in Bangladesh was intended to provide greater protection for coastal communities against increasingly frequent storm surges while providing benefits for biodiversity. But the scheme also prevented local villagers from cultivating new forest areas to protect seedlings which led to a loss of livelihoods and displacement of communities.[181] Another example is the Great Green Wall in the Sahel, planned as a 15 km wide wall of vegetation extending from Dijbouti to Senegal, with the intention to restore degraded land, create jobs and sequester carbon. But the enclosure of new vegetation areas has led to the displacement of pastoralists from their traditional grazing territories, undermining local livelihood strategies.[182] From these and other cases[183,184,185] we have learned that without vigilance a particular policy or measure aimed at one or more SDGs can lead to significant unintended consequences. Without taking special actions to minimise these trade-offs, there is the risk of undermining the policy’s many potential benefits.

We do not have to look far to find guidance on how to ensure just and equitable policies. The international community has rallied around the many equity principles featured in documents of the 2030 Sustainable Development Agenda[186], the Paris Climate Agreement[187], and the REDD+ mechanism (Reducing Emissions from Deforestation and Forest Degradation)[188]; as well as from the Intergovernmental Panel on Climate Change[189].

In an earlier report, the UK All-Party Parliamentary Group on Sustainable Development, together with the University of Sussex, drew on these documents and proposed a set of guidelines for ensuring the equity of policies that advance both climate goals and SDGs[190] (Box 1).

They provide, in effect, a checklist for how to minimise inequities. Since there is a strong overlap between combined SDG-climate policies and the policies discussed in this report, we recommend that these same guidelines be used to help ensure that synergy drivers are just and equitable. The guidelines are clustered into three groups according to the different types of equity they aim to address:

The first cluster, “distributive equity”, consists of actions to ensure that different costs and benefits of a policy are distributed fairly among affected groups. These actions include assessing the likely impact of policies on vulnerable groups and on nature.

The second cluster of guidelines, “procedural equity” is meant to ensure the fairness of processes for deciding on policies. This involves, among other things, the integration of safe-guards for transparency and accountability into laws and regulations.

The last group of guidelines, under the label “contextual equity” complements the other two. It consists of guidelines for ensuring that even marginalised and disadvantaged stakeholders have the capabilities for negotiating for a fair share of benefits and for avoiding any unfair costs of policies.

Although it is a challenge to fully assess the consequences of all policies and measures, following these guidelines will improve the chances that they are just and equitable.

Summing up, synergy drivers are not the ultimate solution to achieving the SDGs but they can play an important part in accelerating the last phase of goal implementation. At a time of increasing global challenges – stagnating growth, stalling poverty reduction, changing climate – as well as impending SDG deadlines – synergy drivers are an option for more efficiently using scarce resources and increasing the effectiveness of single policies and measures. They can help us achieve what we want, with what we have.

Box 1.
Summary of guidelines to help ensure equity and justice of climate-SDG policies and measures.
Source: All-Party Parliamentary Group on the UN Goals for Sustainable Development (UK). For details see APPG.[191]

I. Distributive equity:

Ensure fairness in the distribution or allocation of costs, contributions, risks and benefits among stakeholders.

At all levels:

- Assess potential negative impacts of policies and measures on other SDGs and climate goals.
- Consider the impact of actions on vulnerable and marginalised groups.
- Protect livelihoods, especially of the poorest.
- Respect and protect Indigenous rights.
- Consider the impact of actions on nature.
- For funding organisations … provide predictable and accessible funding across scales.

At the national level:

- Take responsibility for improving conditions in global commodity supply chains.

II. Procedural equity:

Ensure fairness in the political processes that facilitate decision-making, allocation of resources and dispute resolution.

At all levels:

- Recognise roles, responsibilities and rights of stakeholders at different scales. This includes gender rights, tenure rights and prior consent.
- Recognise and protect rights of all affected stakeholders
- Ensure flexibility in approaches and avoid “one size fits all” solutions.
- Enact strong policy coherence.
- Build inclusive and transparent governance structures.

At the national and international levels:

Set clear standards, protocols and accountability mechanisms.
- Integrate transparency and accountability safeguards into laws and regulations.
- Put in place mechanisms to enable access to justice.

III. Contextual equity:

Enhance the capability of stakeholders to hold a fair position in negotiations about resources, taking into consideration their pre-existing political, economic and social conditions.

At all levels:

- Create enabling environments.
- Target actions where measures will have the biggest impact on goals.

At national and international levels:

- Establish effective laws and regulations to uphold human rights.
- Enact effective laws and regulations to hold corporate actors to account.
- Agree on international mechanisms that support countries in implementing policies justly and equitably.
- Take global action to ensure coherence across finance, investment and aid contributions.

References

[1] UN (United Nations). 2023. The Sustainable Development Goals Report 2023. Available at: https://unstats.un.org/sdgs/report/2023/The-Sustainable-Development-Goals-Report-2023.pdf. Accessed February 2025.

[2] UN (United Nations). 2024 The Sustainable Development Goals Report 2024. Available at: https://unstats.un.org/sdgs/report/2024/The-Sustainable-Development-Goals-Report-2024.pdf. Accessed May 2025.

[3] UN (United Nations). 2023. The SDG Stimulus: Scaling up long-term affordable financing for the SDGs. Available at: https://hlpf.un.org/sites/default/files/2023-09/SDG%20Stimulus%20Brochure_0.pdf. Accessed: February 2025

[4] Wilton Park (in association with UK Foreign, Commonwealth and Development Office). 2024. Towards 2030: Transformative actions and partnerships to deliver the SDGs. Available at: https://www.wiltonpark.org.uk/app/uploads/2024/05/WP3380-Final-Report.pdf. Accessed February 2025

[5] Wilton Park, 2024. Op cit.

[6] Scharlemann, J.P.W., Brock, R.C., Balfour, N., Brown, C., Burgess, N.D., Guth, M.K., Ingram, D.J., Lane, R., Martin, J.G.C., Wicander, S. and Kapos, V. 2020. Towards understanding interactions between Sustainable Development Goals: the role of environment–human linkages. Sustainability Science. 15, pp. 1573–1584.

[7] Alcamo, J., 2019. Water quality and its interlinkages with the Sustainable Development Goals. Current Opinion in Environmental Sustainability, 36, pp. 126–140.

[8] ICSU (International Council for Science). 2017. A guide to SDG interactions: from science to implementation. International Council for Science (ICSU), Paris.

[9] Alcamo, J., Thompson, J., Alexander, A., Antoniades, A., Delabre, I., Dolley, J., Marshall, F., Menton, M., Middleton, J., Scharlemann, J. 2020. Analysing interactions among the sustainable development goals: findings and emerging issues from local and global studies. Sustainability Science 15: 1561–1572.

[10] WMO (World Meteorological Organisation). 2023. Atlas of Mortality and Economic Losses from Weather, Climate and Water-related Hazards. Available at: https://wmo.int/publication-series/atlas-of-mortality-and-economic-losses-from-weather-climate-and-water-related-hazards-1970-2021. Accessed February 2025.

[11] Intergovernmental Panel on Climate Change (IPCC). 2023. Weather and Climate Extreme Events in a Changing Climate, in Climate Change 2021 – The Physical Science Basis: Working Group I Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press, pp. 1513–1766.

[12] Basher, R., 2006. Global early warning systems for natural hazards: systematic and people centred. Philosophical transactions of the royal society a: mathematical, physical and engineering sciences, 364(1845), pp.2167-2182.

[13] Bhardwaj, J., Kuleshov, Y., Watkins, A.B., Aitkenhead, I. and Asghari, A., 2021. Building capacity for a user-centred Integrated Early Warning System (I-EWS) for drought in the Northern Murray-Darling Basin. Natural Hazards, 107, pp.97-122.

[14] Martin, M., Abhilash, S., Pattathil, V., Harikumar, R., Niyas, N.T., Nair, T.B., Grover, Y. and Osella, F., 2022. Should I stay or should I go? South Indian artisanal fishers' precarious livelihoods and their engagement with categorical ocean forecasts. Weather, Climate, and Society, 14(1), pp.113-129.

[15] Martin, M. and Osella, F. 2019. Forecasting with fishers to save lives at sea. SSRP (Sussex Sustainability Research Programme), University of Sussex and Institute of Development Studies, Brighton, UK. Policy Brief 2. Available at: https://www.sussex.ac.uk/ssrp/documents/ssrp-policy-briefforecasting-for-fishers.pdf. Accessed February 2025.

[16] Barrett, A., Duivenvoorden, S., Salakpi, E., Muthoka, J., Mwangi, J., Oliver, S., Rowhani, P. 2020. Forecasting vegetation condition for drought early warning systems in pastoral communities in Kenya, Remote Sensing of Environment, 248, p. 111886

[17] Todd, M., Rowhani, P., Kniveton, D., Oliver S. et al. 2023 Building climate resilience in Africa by enhancing anticipatory risk management. University of Sussex. UK Research Excellence Framework Impact Case Study Database. Available at: https://results2021.ref.ac.uk/impact/ea4d50c3-bb5e-4079-a19f-8759b64df3b3?page=1. Accessed March 2025.

[18] Rao, S., Chaudhary, P., Budin-Ljøsne, I., Sitoula, S., Aunan, K., Chersich, M., de'Donato, F. and Kazmierczak, A., 2025. Evaluating the socioeconomic benefits of heat-health warning systems. European Journal of Public Health, 35(1), pp. 178-186.

[19] Global Commission on Adaptation. 2019. Adapt now: a global call for leadership on climate resilience. Available at: https://gca.org/wp-content/uploads/2019/09/GlobalCommission_Report_FINAL.pdf. Accessed March 2025.

[20] Hadlos, A., Opdyke, A. and Hadigheh, S.A., 2022. Where does local and Indigenous knowledge in disaster risk reduction go from here? A systematic literature review. International journal of disaster risk reduction, 79, p.103160.

[21] Iticha, B. and Husen, A. 2018. Adaptation to climate change using Indigenous weather forecasting systems in Borana pastoralists of southern Ethiopia, Climate and Development, 11(7), pp. 564–573.

[22] World Bank. 2005. Climate Shocks: Estimates of People Exposed, Vulnerable, and at High Risk. Available at: https://www.worldbank.org/en/topic/poverty/publication/people-exposed-to-vulnerable-to-and-at-high-risk-from-weathershocks#:~:text=More%20than%20half%20the%20global%20population%20%E2%80%93,$2.15%20per%20day)%2C%20according%20to%202020%20data. Accessed February 2025.

[23] Doan, M.K., Hill, R., Hallegatte, S., Corral, P., Brunckhorst, B., Nguyen, M., Freije-Rodriguez, S. and Naikal, E. 2023. Counting people exposed to, vulnerable to, or at high risk from climate shocks. Policy Research Working Paper 10619. Available at: https://documents1.worldbank.org/curated/en/099602511292336760/pdf/IDU07639ca570f3cb048db09bf60fc2cc82df22d.pdf Accessed February 2025

[24] Global Commission on Adaptation. 2019. Op cit.

[25] UNEP 2025. Climate Information and Early Warning Systems. Available at: https://www.unep.org/topics/climate-action/climate-transparency/climate-information-and-early-warning-systems. Retrieved March 2025.

[26] Rao, 2025, Op cit.

[27] FAO (Food and Agriculture Organization of the United Nations. 2020. Global Forest Resources Assessment 2020: Main Report. Rome: UN Food and Agriculture Organization.

[28] Pearson, T.R., Brown, S., Murray, L. and Sidman, G., 2017. Greenhouse gas emissions from tropical forest degradation: an underestimated source. Carbon balance and management, 12, pp.1-11.

[29] Crippa, M., Guizzardi, D., Pagani, F., Banja, M., Muntean, M., Schaaf, E., Monforti-Ferrario, F., Becker, W.E., Quadrelli, R., Risquez Martin, A.,Taghavi-Moharamli, P., Köykkä, J., Grassi, G., Rossi, S., Melo, J., Oom, D., Branco, A., San-Miguel, J., Manca, G., Pisoni, E., Vignati, E. and Pekar, F., 2024. GHG emissions of all world countries. Publications Office of the European Union, Luxembourg. Available at: https://edgar.jrc.ec.europa.eu/report_2024#emissions_table. Accessed February 2025.

[30] Middleton, J., Hazell, R., Kalema-Zikusoka, G., Jennings, J., Cassell, J., Colthart, G., Fairhead, J., Head, M.G., Inacio, J., Laman, M., Macgregor, H., Novotny, V., Peck, M., Stewart, A. and others, 2022. Integration of medical service provision and nature conservation worldwide 1980–2022: collaborative evidence mapping of 43 projects across 22 countries (Version 1). University of Sussex. Available at: https://hdl.handle.net/10779/uos.23492456.v1. Accessed January 2025.

[31] Middleton, J., Cassell, J.A., Colthart, G., Dem, F., Fairhead, J., Head, M.G., Inacio, J., Jimbudo, M., Laman, M., Novotny, V. and Peck, M., 2020. Rationale, experience and ethical considerations underpinning integrated actions to further global goals for health and land biodiversity in Papua New Guinea. Sustainability Science, 15, pp.1653-1664.

[32] Anon. 2025. Integrating action and policy on health, biodiversity, and climate in Papua New Guinea (PNG). Available at: https://www.sussex.ac.uk/research/centres/sussex-sustainability-research-programme/research/planetary-health/papanewguinea1. Accessed January 2025.

[33] Webb, K., Jennings, J. and Minovi, D., 2018. A community-based approach integrating conservation, livelihoods, and health care in Indonesian Borneo. Lancet Planetary Health, 2, p. S26.

[34] Kalema-Zikusoka, G. and Byonanebye, J., 2019. Scaling up a one-health model of conservation through public health: Experiences in Uganda and the Democratic Republic of Congo. The Lancet Global Health, 7, p. S34.

[35] Middleton, J., 2022. Op cit.

[36] UN-REDD (United Nations - Reducing Emissions from Deforestation and forest Degradation). 2022. Recognizing and empowering Indigenous peoples and Local Communities as critical partners in forest solutions to the climate emergency. Available at: https://www.un-redd.org/sites/default/files/2022-03/Final%20IP%20Brief.pdf. Accessed January 2025.

[37] UN-REDD, 2022. Op cit.

[38] Fa, J.E., Watson, J.E., Leiper, I., Potapov, P., Evans, T.D., Burgess, N.D., Molnár, Z., Fernández-Llamazares, Á., Duncan, T., Wang, S. and Austin, B.J., 2020. Importance of Indigenous Peoples' lands for the conservation of Intact Forest Landscapes. Frontiers in Ecology and the Environment,18(3), pp.135-140

[39] UN (United Nations). 2016. State of the World's Indigenous Peoples: Indigenous Peoples' Access to Health Services. Available at: https://www.un.org/esa/socdev/unpfii/documents/2016/Docs-updates/SOWIP_Health.pdf. Accessed January 2025.

[40] Middleton, J., 2020. Op cit.

[41] Anon. n.d. Surfaces: an interdisciplinary approach to enhancing health in a vulnerable rainforest setting. Available at: https://www.sussex.ac.uk/research/centres/sussex-sustainability-research-programme/research/enhancing-health-in-vulnerable-rainforest-setting#anchor2. Accessed January 2025.

[42] Chapman, C.A., van Bavel, B., Boodman, C., Ghai, R.R., Gogarten, J.F., Hartter, J., Mechak, L.E., Omeja, P.A., Poonawala, S., Tuli, D. and Goldberg, T.L., 2015. Providing health care to improve community perceptions of protected areas. Oryx, 49(4), pp. 636–642.

[43] IEA (International Energy Agency). 2023. A Vision for Clean Cooking Access for All – A Special Report of the World Energy Outlook. Available at: https://iea.blob.core.windows.net/assets/180b8bee-3d30-4436-abe0-9e93ca56b0bd/AVisionforCleanCookingAccessforAll.pdf Accessed January 2025.

[44] UNEP (United Nations Environment Programme). 2011. Near-term climate protection and clean air benefits: actions for controlling short-lived climate forcers. United Nations Environment Programme (UNEP), Nairobi, Kenya, pp. 78.

[45] Shindell, D., Borgford-Parnell, N., Brauer, M., Haines, A., Kuylenstierna, J.C.I., Leonard, S.A., Ramanathan, V., Ravishankara, A., Amann, M. and Srivastava, L., 2017. A climate policy pathway for near- and long-term benefits. Science, 356(6337), pp. 493–494.

[46] Note that clean cookstoves also require fuels that produce greenhouse gases. However, depending on the scenario, the global warming potential of clean, efficient cookstoves could be lower than the traditional stoves they replace.

[47] IEA, 2023. Op cit.

[48] Meng, W., Shen, G., Shen, H., Chen, Y., Yun, X., Li, J., Ma, J., Liu, J., Cheng, H., Hu, J. and Wan, Y., 2021. Synergistic health benefits of household stove upgrading and energy switching in rural China. Environmental Science & Technology, 55(21), pp. 14567–14575.

[49] Jagoe, K., Rossanese, M., Charron, D., Rouse, J., Waweru, F., Waruguru, M., Delapena, S., Piedrahita, R., Livingston, K. and Ipe, J., 2020. Sharing the burden: Shifts in family time use, agency and gender dynamics after introduction of new cookstoves in rural Kenya. Energy Research & Social Science, 64, p. 101413.

[50] Sharma, M. and Dasappa, S., 2017. Emission reduction potentials of improved cookstoves and their issues in adoption: An Indian outlook. Journal of Environmental Management, 204(1), pp. 442–453.

[51] Crippa, M. et al., 2024. Op Cit.

[52] IEA, 2023. Op cit.

[53] Pearson, et al., 2017. Op cit.

[54] Crippa et al., 2024. Op cit.

[55] Khavari, B., Ramirez, C., Jeuland, M. and Fuso Nerini, F., 2023. A geospatial approach to understanding clean cooking challenges in sub-Saharan Africa. Nature Sustainability, 6(4), pp. 447–457.

[56] World Bank. 2020. The State of Access to Modern Energy Cooking Services. World Bank: Washington, DC. Available at: https://cleancooking.org/wp-content/uploads/2021/07/598-1.pdf. Accessed March 2025

[57] Clean Cooking Alliance, 2023. Clean Cooking as a Catalyst for Sustainable Food Systems. Available at: https://cleancooking.org/wp-content/uploads/2023/11/CCA_Clean-Cooking-as-a-Catalyst-for-Sustainable-Food-Systems.pdf Accessed February 2025.

[58] IEA, 2023. Op cit.

[59] Boudewijns, E.A., Trucchi, M., van der Kleij, R.M.J.J., Vermond, D., Hoffman, C.M., Chavannes, N.H., van Schayck, O.C.P., Kirenga, B. and Brakema, E.A., 2022. Facilitators and barriers to the implementation of improved solid fuel cookstoves and clean fuels in low-income and middle-income countries: an umbrella review. The Lancet Planetary Health, 6(7), pp. e601–e612.

[60] Gill-Wiehl, A. and Ray, I., 2023. Affording a clean stack: Evidence from cookstoves in urban Kenya. Energy Research & Social Science, 105, p. 103275.

[61] Wright, C., Sathre, R. and Buluswar, S., 2020. The global challenge of clean cooking systems. Food Security, 12(6), pp.1219-1240.

[62] Lindgren, S.A., 2020. Clean cooking for all? A critical review of behavior, stakeholder engagement, and adoption for the global diffusion of improved cookstoves. Energy Research & Social Science, 68, p.101539. Available at: https://doi.org/10.1016/j.erss.2020.101539

[63] Khandelwal, M., Hill, M.E., Greenough, P., Anthony, J., Quill, M., Linderman, M. & Udaykumar, H.S., 2017. Why have improved cook-stove initiatives in India failed? World Development, 92, pp. 13-27. https://doi.org/10.1016/j.worlddev.2016.11.006.

[64] Brakema, E. A., van der Kleij, R. M., Vermond, D., van Gemert, F. A., Kirenga, B., Chavannes, N. H., (2020). Let's stop dumping cookstoves in local communities. It's time to get implementation right. NPJ primary care respiratory medicine, 30(1), 3. https://doi.org/10.1038/s41533-019-0160-8.

[65] Seltenrich, N., 2024. Clearing the air: Gas stove emissions and direct health effects. Environmental Health Perspectives, 132(2), p. 022001. Erratum in: Environmental Health Perspectives, 132(4), p. 49001.

[66] Berkouwer, S. and Dean, J., 2023. Improved cookstoves halve air pollution peaks but ambient exposure dampens health benefits. Kleinman Center for Energy Policy, University of Pennsylvania. Available at: https://kleinmanenergy.upenn.edu/wp-content/uploads/2023/09/KCEP-Digest-58-Improved-Cookstoves.pdf. Accessed February 2025.

[67] Yang, Y. and Corson, C., 2014. The making of a 'charismatic' carbon credit: clean cookstoves and 'uncooperative' women in western Kenya. Environment and Planning A, 46, pp. 1578-1595.

[68] Global Forest Watch, 2025. Topics: Commodities. Available at: https://www.globalforestwatch.org/topics/commodities/ Accessed February 2025.

[69] Par Pareira, S.P., 2023. Achieving Indonesian palm oil farm-to-table traceability through ISPO-RSPO harmonization. Policy Paper, No. 56. Centre for Indonesian Policy Studies (CIPS), Jakarta. Available at: https://www.econstor.eu/bitstream/10419/298477/1/1841050075.pdf Accessed February 2025.

[70] Bakhtary, H., Matson, E., Mikulcak, F., Streck, C. and Thomson, A., 2020. Company progress in engaging smallholders to implement zero-deforestation commitments in cocoa and oil palm. Bangor: Amsterdam: Climate Focus. Available at: https://climatefocus.com/wp-content/uploads/2022/06/20200312-Smallholder-Cocoa-Palm-Report-Edited_FINAL_0.pdf. Accessed February 2025.

[71] World Cocoa Foundation 2023. Cocoa Forest Initiative Ghana Annual Report 2023. Available at: https://worldcocoafoundation.org/storage/files/cfi-ghana-annual-report-2023.pdf Accessed February 2025.

[72] Ansah, E.O., Kaplowitz, M.D., Lupi, F. and Kerr, J., 2019. Smallholder participation and procedural compliance with sustainable cocoa certification programs. Agroecology and Sustainable Food Systems, 44(1), pp. 54-87.

[73] Fripp, E., J. Gorman, T. Schneider, S. Smith, J. Paul, T. Neeff, F. Marietti, L. Vary,
A. Zosel-Harper. 2023. Traceability and Transparency in Supply Chains for Agricultural and Forest Commodities: A Review of Success Factors and Enabling Conditions to Improve Resource Use and Reduce Forest Loss. Washington, DC: World Resources Institute. Available at: https://doi.org/10.46830/wrirpt.22.00156. Accessed February 2025.

[74] UK Parliament. 2023. Introduction of Forest Risk Commodities regulations. Available at: https://questions-statements.parliament.uk/written-statements/detail/2023-12-12/hcws117. Accessed May 2025.

[75] Agricultural Industries Confederation. 2024. UKFRC & EU Deforestation Regulations. Available at: https://tinyurl.com/aicukdreudrfaqs. Accessed February 2025.

[76] FAO, 2020. Op cit.

[77] Pendrill, et al. 2022. Disentangling the numbers behind agriculture-driven tropical deforestation. Science 377 (6611), eabm9267.

[78] Fripp, E., et al., 2023. Traceability and Transparency in Supply Chains for Agricultural and Forest Commodities. Washington, DC: World Resources Institute.

[79] Saaroni, H., Amorim, J.H., Hiemstra, J.A. and Pearlmutter, D., 2018. Urban green infrastructure as a tool for urban heat mitigation: Survey of research methodologies and findings across different climatic regions. Urban Climate, 24, pp. 94-110.

[80] Aram, F., Higueras García, E., Solgi, E. and Mansournia, S., 2019. Urban green space cooling effect in cities. Heliyon, 5(4), e01339.

[81] Santamouris, M., 2014. Cooling the cities – A review of reflective and green roof mitigation technologies to fight heat island and improve comfort in urban environments. Solar Energy, 103, pp. 682-703.

[82] Pérez, G., Coma, J., Martorell, I. and Cabeza, L.F., 2014. Vertical greenery systems (VGS) for energy saving in buildings: A review. Renewable and Sustainable Energy Reviews, 39, pp. 139-165.

[83] Iungman, T., Cirach, M., Marando, F., Barboza, E.P., Khomenko, S., Masselot, P., Quijal-Zamorano, M., Mueller, N., Gasparrini, A., Urquiza, J. and Heris, M., 2023. Cooling cities through urban green infrastructure: a health impact assessment of European cities. The Lancet, 401(10376), pp. 577–589.

[84] Lwasa, S., Seto, K.C., Bai, X., Blanco, H., Gurney, K.R., Kılkış, Ş., Lucon, O., Murakami, J., Pan, J., Sharifi, A., Yamagata, Y., 2022. Urban systems and other settlements. In: IPCC, 2022. Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.). Cambridge University Press, Cambridge, UK and New York, NY, USA.

[85] Crippa et al., 2024. Op cit.

[86] Nutsford, D., Pearson, A.L. and Kingham, S., 2013. An ecological study investigating the association between access to urban green space and mental health. Public health, 127(11), pp.1005-1011.

[87] White, M.P., Alcock, I., Grellier, J., Wheeler, B.W., Hartig, T., Warber, S.L., Bone, A., Depledge, M.H. and Fleming, L.E., 2019. Spending at least 120 minutes a week in nature is associated with good health and well-being. Scientific Reports, 9, p. 7730.

[88] Shuvo, F.K., Feng, X., Akaraci, S. and Astell-Burt, T., 2020. Urban green space and health in low and middle-income countries: A critical review. Urban Forestry & Urban Greening, 52, p. 126662.

[89] Noszczyk, T., Gorzelany, J., Kukulska-Kozieł, A. and Hernik, J., 2022. The impact of the COVID-19 pandemic on the importance of urban green spaces to the public. Land use policy, 113, p.105925.

[90] Faeth, S.H., Bang, C. and Saari, S., 2011. Urban biodiversity: patterns and mechanisms. Annals of the New York Academy of Sciences, 1223(1), pp. 69-81.

[91] See data in Table 5. Nowak, D.J. and Greenfield, E.J., 2020. The increase of impervious cover and decrease of tree cover within urban areas globally (2012–2017). Urban Forestry & Urban Greening, 49, p.126638.

[92] Lwasa, S., et. al., 2022. Op cit.

[93] Nowak, D.J., Appleton, N., Ellis, A. and Greenfield, E., 2017. Residential building energy conservation and avoided power plant emissions by urban and community trees in the United States. Urban Forestry & Urban Greening, 21, pp. 158-165.

[94] Bianchi Alves, B., Bou Mjahed, L. and Moody, J., 2023. Decarbonizing urban transport for development. Mobility and Transport Connectivity Series. Washington, DC: World Bank. Available at: https://openknowledge.worldbank.org/entities/publication/006565c0-c51b-4614-a1a2-35c29ece447b Accessed February 2025.

[95] Tate, C., Wang, R., Akaraci, S., Burns, C., Garcia, L., Clarke, M., & Hunter, R. (2024). The contribution of urban green and blue spaces to the United Nation's Sustainable Development Goals: An evidence gap map. Cities, 145, 104706.
https://doiorg/10.1016/j.cities.2023.104706

[96] Kumar, P., Druckman, A., Gallagher, J., Gatersleben, B., Allison, S., Eisenman, T.S., Hoang, U., Hama, S., Tiwari, A., Sharma, A. and Abhijith, K.V., 2019. The nexus between air pollution, green infrastructure and human health. Environment International, 133, p. 105181.

[97] Bianchi Alves, B., et al., 2023. Op cit.

[98] WHO (World Health Organisation). 2024. Ambient (outdoor) air pollution. Key facts. Available at: https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health. Accessed February 2025.

[99] WHO (World Health Organisation). 2023. Global status report on road safety 2023. Geneva: World Health Organization. Available at https://iris.who.int/bitstream/handle/10665/375016/9789240086517-eng.pdf?sequence=1. Accessed February 2025.

[100] Jaramillo, P., Kahn Ribeiro, S., Newman, P., Dhar, S., Diemuodeke, O.E., Kajino, T., Lee, D.S., Nugroho, S.B., Ou, X., Hammer Strømman, A., Whitehead, J., 2022. Transport. In: IPCC, 2022. Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D.McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley (eds.). Cambridge University Press, Cambridge, UK and New York, NY, USA.

[101] Jaramillo, P., et.al, 2022. Op cit.

[102] Bianchi Alves, B., et.al, 2023. Op cit.

[103] UN Department of Economic and Social Affairs, 2025. UN Decade of sustainable transport. Available at: https://sdgs.un.org/un-decade-sustainable-transport-2026-2035 Accessed April 2025.

[104] Bianchi Alves, B., et.al, 2023. Op cit.

[105] Creutzig, F., Muehlhoff, R. and Roemer, J., 2012. Decarbonizing urban transport in European cities: four cases show possibly high co-benefits. Environmental Research Letters, 7(4), pp.044042.

[106] Dhar, S. and Shukla, P.R., 2015. Low carbon scenarios for transport in India:
Co-benefits analysis. Energy Policy, 81, pp.186-198.

[107] Liotta, C., Viguié, V. and Creutzig, F., 2023. Environmental and welfare gains via urban transport policy portfolios across 120 cities. Nature Sustainability, 6, pp.1067–1076.

[108] Bakker, S., Haq, G., Peet, K., Gota, S., Medimorec, N., Yiu, A., Jennings, G. and Rogers, J., 2019. Low-carbon quick wins: Integrating short-term sustainable transport options in climate policy in low-income countries. Sustainability, 11(16), p.4369.

[109] World Bank. Public-Private Infrastructure Advisory Facility. 2025. TransMilenio Bus Rapid Transit. Available at: https://inclusiveinfra.github.org/case-studies/transmilenio-bus-rapid-transit-colombia/. Accessed May 2025.

[110] Goel, R., Oyebode, O., Foley, L., Tatah, L., Millett, C. and Woodcock, J., 2023. Gender differences in active travel in major cities across the world. Transportation, 50, pp.733–749.

[111] Borker, G., 2024. Understanding the constraints to women's use of urban public transport in developing countries. World Development, 180, pp.106589.

[112] Martínez, P., González, A. and Sánchez, M., 2020. Perception of violence and public transport use in urban areas: A study of commuter behavior in Latin American cities. Transportation Research Part F: Traffic Psychology and Behaviour, 72, pp.115-127.

[113] IRENA (International Renewable Energy Agency), 2024. Renewables 2024 Global Status Report: Renewables in Energy Demand. Available at: https://www.ren21.net/gsr-2024/modules/energy_demand/03_renewables_in_transport/ Accessed February 2025.

[114] IEA (International Energy Agency), 2021. Empowering cities for a net zero future: Unlocking resilient, smart, sustainable urban energy systems. Available at: https://iea.blob.core.windows.net/assets/4d5c939d-9c37-490b-bb53-2c0d23f2cf3d/G20EmpoweringCitiesforaNetZeroFuture.pdf Accessed April 2025.

[115] Wales Centre for Public Policy. 2024. Net zero 2035: Lessons from international initiatives to decarbonise transport. Available from: https://www.wcpp.org.uk/wp-content/uploads/2024/03/NZ-2035-Lessons-from-international-initiatives-to-decarbonise-transport.pdf. Accessed March, 2025.

[116] Liotta, C. et.al, 2023. Op cit.

[117] Creutzig, F., et.al, 2012. Op cit.

[118] Zhang, R. and Hanaoka, T., 2022. Cross-cutting scenarios and strategies for designing decarbonization pathways in the transport sector toward carbon neutrality. Nature Communications, 13(1), pp.3629.

[119] IEA, 2023. Op cit.

[120] UNDRR (United Nations Office for Disaster Risk Reduction), 2024. Household air pollution. Available at: https://www.undrr.org understandingdisaster-risk/terminology/hips/en0001#:~:text=Exposure%20to%20smoke%20from%20cooking,fuels%20and%20kerosene%20for%20cooking. Accessed February 2025.

[121] IEA (International Energy Agency), IRENA (International Renewable Energy Agency), UNSD (United Nations Statistics Division), World Bank, WHO (World Health Organization), 2024. Tracking SDG 7: The Energy Progress Report. World Bank, Washington DC. Available at: https://trackingsdg7.esmap.org/data/files/download-documents/sdg7-report2024-0611-v9-highresforweb.pdf Accessed February 2025.

[122] WeADAPT. (2024). Solar Irrigation for Agriculture Resilience in South Asia (SoLAR). https://weadapt.org/knowledge-base/sdc-network-climat-edrr-and-environment/solar-irrigation-for-agriculture-resilience-solar. Accessed 21 January 2025.

[123] Buisson, M-C., et al. 2023. Impact assessment of Solar Irrigation Pumps (SIPs) in Bangladesh: A baseline technical report. New Delhi, India: International Water Management Institute (IWMI).

[124] Sustainable Energy for All (SEforALL). 2024. Providing clean power to health facilities in Sierra Leone: 2022-Ongoing. https://www.seforall.org/system/files/2024-06/rm-case-study-sierra-leone-hospitals.pdf Accessed March 2025.

[125] ITPEnergised. 2024. Independent evaluation of SEforALL projects in Sierra Leone: Powering Sierra Leone's hospitals programme. https://www.seforall.org/system/files/2024-10/Powering%20Sierra%20Leone%E2%80%99s%20Hospitals%20Programme%20Evaluation%20of%20Phase%201%20May%202024-web_FINAL.pdf Accessed March 2025.

[126] UNSD (United Nations Statistics Division), 2024. Extended Report on Goal 7: Affordable and Clean Energy. New York: United Nations Statistics Division. Available at: https://unstats.un.org/sdgs/report/2024/extended-report/Extended-Report_Goal-7.pdf. Accessed February 2025.

[127] FAO (Food and Agriculture Organization), 2023. The status of women in agrifood systems. Rome: Food and Agriculture Organization. Available at: https://doi.org/10.4060/cc5343en. Accessed February 2025.

[128] GEM (Global Energy Monitor), 2024. A Race to the Top: Southeast Asia 2024. GEM. Available at: https://globalenergymonitor.org/wp-content/uploads/2023/12/GEM_Race-To-The-Top_SE-Asia-2024.pdf Accessed January 2025.

[129] Burgess, R., et al. 2023. Electricity demand and supply on the global electrification frontier. POID Working Paper 083. London: The London School of Economics and Political Science.

[130] IEA (International Energy Agency). 2024. Renewables 2024: Analysis and forecast to 2030. Paris: IEA. https://www.iea.org/reports/renewables-2024 Accessed March 2025.

[131] IRENA (International Renewable Energy Agency), 2024. Decentralised Solar PV: A Gender Perspective. Abu Dhabi: International Renewable Energy Agency. Available at: https://www.irena.org/Publications/2024/Oct/Decentralised-Solar-PV-Gender-Perspective-2024 Accessed January 2025.

[132] Balasubramanya, S., Garrick, D., Brozoviş, N., Ringler, C., Zaveri, E., Rodella, A.-S., Buisson, M.-C., Schmitter, P., Durga, N., Kishore, A., Minh, T.T., Kafle, K., Stifel, D., Balasubramanya, S., Chandra, A. and Hope, L., 2024. Risks from solar-powered groundwater irrigation. Science, 383(6680), pp.256-258.

[133] Bera, R; Mishra, P; Patnaik, P (2024) Renewable energy for women empowerment: Experiences from rural West Bengal. Renewable and Sustainable Energy Reviews. Vol 198.

[134] Li, X., An, L., Zhang, D., Lee, C., Yu, C., (2024) Energy access and female labour force participation in developing countries. Renewable and Sustainable Energy Reviews. 199

[135] Nath, S. & Das, G., (2025). Does women empowerment impact child well-being? Evidence from India. Social Science & Medicine, 367, p.117686. Available at: https://www.sciencedirect.com/science/article/pii/S0277953625000152. Accessed April 2025.

[136] Ewerling, F., Lynch, J. W., Mittinty, M., Raj, A., Victora, C. G., Coll, C. V., & Barros, A. J. (2020). The impact of women's empowerment on their children's early development in 26 African countries. Journal of global health, 10(2), 020406.

[137] Johnson, O. W., Han, J. Y.-C., Knight, A.-L., Mortensen, S., Aung, M. T., Boyland, M., & Resurrección, B. P. 2020. Intersectionality and energy transitions: A review of gender, social equity, and low-carbon energy. Energy Research & Social Science, 70, 101774. https://doi.org/10.1016/j.erss.2020.101774

[138] Saywood Studio. (n.d.). For the future: Solar Sister—Empowering women entrepreneurs to grow and sustain clean energy businesses. Available at: https://saywoodstudio.co.uk/blogs/news/for-the-future-solar-sister-empowering-women-entrepreneurs-to-grow-and-sustain-clean-energy-businesses. Accessed May 2025.

[139] Shiradkar, S., Sharma, R., Choudhary, D., Venkateswaran, J., Kumar, P. & Solanki, C.S., 2023. Can community based solar energy initiatives deliver on women's empowerment in India? Evidence from rural Assam, Bihar, Jharkhand and Uttar Pradesh. Energy Research & Social Science, 104, p.103225. https://doi.org/10.1016/j.erss.2023.103225.

[140] International Energy Agency. 2019. Seven Women Entrepreneurs of Solar Energy. Available at: https://www.iea.org/reports/seven-women-entrepreneurs-of-solar-energy. Accessed 12 February 2025.

[141] Dutta, S. 2020. Promoting women's entrepreneurship in distribution of energy technologies: Lessons from ENERGIA's WEE Programme. IDS Bulletin. 51:2.
Available at: https://bulletin.ids.ac.uk/index.php/idsbo/article/view/3075/3064.
Accessed February 2025.

[142] Andriamahery, A. and Qamruzzaman, M., 2022. Do access to finance, technical know-how, and financial literacy offer women empowerment through women's entrepreneurial development? Frontiers in Psychology, Vol 12.

[143] Ojong, N., Simba, A., Leo-Paul, Dana, L-P., 2021. Female entrepreneurship in Africa: A review, trends, and future research directions. Journal of Business Research Vol 132.

[144] Bera, R., Mishra, P., and Patnaik, P., 2024. "Renewable energy for women empowerment: Experiences from rural West Bengal," Renewable and Sustainable Energy Reviews, Elsevier, vol. 198.

[145] ILO (2017) The gender gap in employment: What's holding women back? https://webapps.ilo.org/infostories/en-GB/Stories/Employment/barriers-women?. Accessed February 2025.

[146] IRENA, 2024. Op cit.

[147] World Health Organisation WHO (2024) Violence Against Women. Available at https://www.who.int/news-room/fact-sheets/detail/violenceagainst-women. Accessed February 2025.

[148] Hemson, D. and Peek, N., (2017). 'Training and integrating rural women into technology: A study of Renewable Energy Technology in Bangladesh'. Gender, Technology and Development, 21(1–2), pp. 46–62. https://doi.org/10.1080/09718524.2017.1385315.

[149] ILO (International Labour Organisation). World Social Protection Report 2020–22: Social Protection at the Crossroads. 2021. ILO, Geneva. Available at: https://www.ilo.org/publications/flagship-reports/world-social-protection-report-2020-22-social-protection-crossroads-pursuit. Accessed May 2025.

[150] Bastagli, F., Hagen-Zanker, J., Harman, L., Barca, V., Sturge, G. and Schmidt, T., 2020. The impact of cash transfers: A review of the evidence from low- and middle-income countries. Journal of Social Policy, 48(3), pp. 569–594.

[151] Abay, K.A., Abay, M.H., Berhane, G., Chamberlin, J., 2022. Social protection and resilience: The case of the productive safety net program in Ethiopia. Food Policy, 112, pp.102367.

[152] Sabates-Wheeler, R., Roelen, K., Lind, J. and Devereux, S., 2024. Introduction: Social Protection in a Time of Global Uncertainty. IDS Bulletin, 55(2).

[153] Devereux, S. 2023. Performing social policy diffusion: Reflections on agents as social protection policy entrepreneurs in Africa. Global Social Policy, 23(3),
pp. 457-480

[154] Morais, G.A. de Sampaio, Magno, L., Paim, J.N., Aranha, T. and Dourado, I., 2024. Impact of emergency financial support program on testing demand, SARS-CoV-2 prevalence, and social isolation during COVID-19 outbreak in Brazil: a quasi-experimental study. BMC Public Health, 24, pp.3435.

[155] International Labour Organisation. 2025. World Social Protection Report 2024–26. Available at: https://www.ilo.org/sites/default/files/2024-09/WSPR_2024_EN_WEB_1.pdf Accessed April 2025.

[156] ILO. (International Labour Organization), 2024. World Social Protection Report 2024–26. Geneva: International Labour Organization. Available at: https://www.social-protection.org/gimi/RessourceDownload.action?id=2 Accessed January 2025.

[157] WHO (World Health Organization), 2024. Hunger numbers stubbornly high for three consecutive years as global crises deepen – UN report. Available at: https://www.who.int/news/item/24-07-2024-hunger-numbers-stubbornly-high-for-three-consecutive-years-as-global-crises-deepen–unreport. Accessed February 2025.

[158] WFP (World Food Programme), 2023. WFP and Social Protection: Annual Review 2023. Available at: https://docs.wfp.org/api/documents/WFP-0000161197/download/ Accessed February 2025.

[159] USDA (U.S. Department of Agriculture) 2025. US Department of Agriculture. Global Changes in Agricultural Production, Productivity, and Resource Use Over Six Decades Available at: https://www.ers.usda.gov/amber-waves/2024/september/global-changes-in-agricultural-production-productivity-and-resource-use-over-six-decades/ Accessed January, 2025.

[160] USDA, 2025. Op cit.

[161] United Nations Environment Programme (UNEP), 2024 Food Waste Index Report 2024. Think Eat Save: Tracking Progress to Halve Global Food Waste. Available at: https://wedocs.unep.org/20.500.11822/45230 Accessed January 2025

[162] UNEP, 2024. Op cit.

[163] UNEP, 2024. Op cit.

[164] Kummu, M., de Moel, H., Porkka, M. and Siebert, S., 2012. Lost food wasted resources: Global food supply chain losses and their impacts on freshwater, cropland, and fertiliser use. Science of the Total Environment, 438, pp. 477–489.

[165] Smith, P., Calvin, K., Nkem, J., Campbell, D., Cherubini, F., Grassi, G., Korotkov, V., Le Hoang, A., Lwasa, S., McElwee, P. and Nkonya, E., 2020. Which practices co-deliver food security, climate change mitigation and adaptation, and combat land degradation and desertification? Global Change Biology, 26(3), pp. 1532–1575.

[166] Swannell, R., Bruns, H., Brüggemann, N., Candeal, T., Casonato, C., Diercxsens, C., Garcia Herrero, L., Gil Roig, J.M., Haglund, Y., Van Herpen, E. and Kaptan, G., 2023. Evaluation of consumer food waste prevention interventions. *Publications Office of the European Union: Luxembourg.* Available at: https://www.matvett.no/uploads/documents/JRC-Evaluation-of-Consumer-interventions-2023.pdf Retrieved March, 2025

[167] Reynolds, C., Goucher, L., Quested, T., Bromley, S., Gillick, S., Wells, V.K., Evans, D., Koh, L., Kanyama, A.C., Katzeff, C. and Svenfelt, Å., 2019. Consumption-stage food waste reduction interventions – What works and how to design better interventions. Food Policy, 83, pp. 7–27

[168] Bajželj, B., Richards, K., Allwood, J. et al., 2014. Importance of food-demand management for climate mitigation. Nature Climate Change, 4, pp.924–929.

[169] Crippa, M. et al., 2024. Op cit.

[170] Stathers, T., et al. 2020. A scoping review of interventions for crop postharvest loss reduction in sub-Saharan Africa and South Asia. Nature Sustainability, 3(10), pp.821-835.

[171] Shukla, P.R., Skea, J., Slade, R. et al. (eds.), 2019. Technical Summary. In: Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems, P.R. Shukla, J. Skea, E. Calvo Buendia, et al. (eds.). Cambridge University Press, Cambridge, UK and New York, NY, USA.

[172] Jalava, M., Guillaume, J.H., Kummu, M., Porkka, M., Siebert, S. and Varis, O., 2016. Diet change and food loss reduction: what is their combined impact on global water use and scarcity? Earth's Future, 4, pp. 62–78.

[173] Smith, et al., 2020. Op cit.

[174] UNEP, 2024. Op cit.

[175] Stathers, et al. 2020. Op cit.

[176] Greene, D.L., Kahn, J.R. and Gibson, R.C., 1999. Fuel economy rebound effect for US household vehicles. The Energy Journal, 20(3), pp. 1–3. Page 37 of 37

[177] Ward, F.A. and Pulido-Velazquez, M., 2008. Water conservation in irrigation can increase water use. Proceedings of the National Academy of Sciences, 105(47), pp. 18215–18220.

[178] Although Sustainable Development Goal 14: Life Below Water is not explicitly addressed in this report, there are numerous examples that demonstrate how efforts to conserve and sustainably manage marine resources can contribute to multiple SDGs. These efforts promote biodiversity conservation, enhance resilience to climate change, and support social equity and improved human nutrition (See: Mariani, G., Moullec, F., Atwood, T.B. et al., 2024. Co-benefits of and trade-offs between natural climate solutions and Sustainable Development Goals. Frontiers in Ecology and the Environment, 22, e2807; Viana, D.F., Gill, D.A., Ahmadia, G. et al., 2024. Sustainable-use marine protected areas provide co-benefits to human nutrition. One Earth, 7(10), pp. 1762–1771).

[179] See, for example, ongoing work of UN DESA's (UN Department of Economic and Social Affairs) Expert Group on Harnessing Climate and SDG Synergies, Available at: https://sdgs.un.org/climate-sdgs-synergies. Accessed February 2025

[180] APPG (All-Party Parliamentary Group on the UN Goals for Sustainable Development). 2021. Saving Resources: Actions that achieve both climate goals and the SDGs. Report from the All-Party Parliamentary Group on the UN Global Goals for Sustainable Development, in cooperation with the University of Sussex. A Report to Climate COP 26 Delegates. Available at: https://www.appg-globalgoals.org/saving-resources. Accessed February 2025.

[181] World Bank Group 2015. Bangladesh - First Phase of the Coastal Embankment Improvement Project: resettlement plan: Resettlement action plan (English). Washington, D.C.: World Bank Group. Available at: http://documents.worldbank.org/curated/en/726681468212375296/Resettlementaction-plan Accessed February 2025.

[182] Mugelé, R., 2018. La Grande muraille verte : géographie d'une utopie environnementale au Sahel. Doctoral dissertation. Université Paris 1 - Panthéon Sorbonne.

[183] Singh, G.G., Cisneros-Montemayor, A.M., Swartz, W., Cheung, W., Guy, J.A., Kenny, T.A., McOwen, C.J., Asch, R., Geffert, J.L., Wabnitz, C.C. and Sumaila, R., 2018. A rapid assessment of co-benefits and trade-offs among Sustainable Development Goals. Marine Policy, 93, pp. 223-231.

[184] Dzebo, A., Janetschek, H., Brandi, C. and Iacobuta, G., 2019. Connections between the Paris Agreement and the 2030 Agenda: the case for policy coherence. SEI Working Paper. Stockholm Environment Institute, Stockholm.

[185] Buss, D., Rutherford, B., Kumah, C. and Spear, M., 2021. Beyond the rituals of inclusion: The environment for women and resource governance in Africa's artisanal and small-scale mining sector. Environmental Science and Policy, 116, pp.30-37.

[186] UN (United Nations), 2015. Transforming our world: the 2030 Agenda for Sustainable Development. Available at: https://sdgs.un.org/2030agenda. Accessed February 2025

[187] UN (United Nations), 2015. The Paris Agreement. Available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf. Accessed February 2025.

[188] UNFCCC (United Nations Framework Convention on Climate Change), 2010.
Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010. United Nations Framework Convention on Climate Change. Available at: https://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf Accessed February 2025.

[189] Allen, M.R., Dube, O.P., Solecki, W., Aragón-Durand, F., Cramer, W., Humphreys, S., Kainuma, M., Kala, J., Mahowald, N., Mulugetta, Y., Perez, R., Wairiu, M., and Zickfeld, K., 2018. Framing and Context. In: Masson-Delmotte, V., Zhai, P., Pörtner, H.-O., Roberts, D., Skea, J., Shukla, P.R., Pirani, A., Moufouma-Okia, W., Péan, C., Pidcock, R., Connors, S., Matthews, J.B.R., Chen, Y., Zhou, X., Gomis, M.I., Lonnoy, E., Maycock, T., Tignor, M., and Waterfield, T. (eds.) In Global Warming of 1.5°C: An IPCC Special Report on the Impacts of Global Warming of 1.5°C Above Preindustrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 49-92.

[190] APPG, 2021. Op cit.

[191] APPG, 2021. Op cit.


UK International
Development
Partnership | Progress | Prosperity


UNIVERSITY
OF SUSSEX


institute of
development
studies