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REALIST REVIEW ON JUST TRANSITION TOWARDS LOW EMISSION, CLIMATE RESILIENT AND MORE INCLUSIVE SOCIETIES IN DEVELOPING COUNTRIES

Theodora Yeung, Lekha Tlhotlhalemaje, Camilla Roman, Archi Rastogi, Martin Prowse, Gemma Norrington-Davies, Agata Makowska, Rob Macquarie, Maikel Lieuw-Kie-Song, Yeonji Kim, Daisuke Horikoshi, Zephaniah Danaa, Catherine Cameron

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175, Art center-daero
Yeonsu-gu, Incheon 22004
Republic of Korea
Tel. (+82) 032-458-6450
Email: ieu@gcfund.org
https://ieu.greenclimate.fund

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Credits
Head of the GCF Independent Evaluation Unit: Andreas Reumann
Task managers: Dr. Martin Prowse, Evaluation Specialist, Independent Evaluation Unit, Green Climate Fund; and Camilla Roman, International Labour Organization
Editing: Greg Clough
Layout and design: Giang Pham
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About this IEU Learning Paper

Just transition describes the transformation towards greener, more inclusive, and more resilient economies and societies. This realist review provides a rigorous summary of global evidence on interventions targeting outcomes contributing towards a just transition in developing countries, spanning energy, agriculture and food, infrastructure, and ecosystem services. We found *common enablers* for just transition interventions across all or most sectors, including robust funding and financing mechanisms, strong alignment with needs and priorities, political will and ownership, social dialogue and stakeholder engagement. Hard and soft enablers differed across sectors. We also found *common barriers* to successful just transition across all sectors, including bureaucratic and legal barriers, exclusion and unequal distribution of benefits, and technical skills that can be enhanced. A short summary of findings is available in the companion brief.

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LIST OF AUTHORS

The authors of the realist review on just transition towards low emission, climate resilient and more inclusive societies in developing countries report are (in reverse alphabetical order by last name):

FULL NAME	AFFILIATION
Theodora Yeung	Agulhas Applied Knowledge
Lekha Tlhotlhalemaje	Agulhas Applied Knowledge
Camilla Roman	International Labour Organization
Archi Rastogi	Independent Evaluation Unit, Green Climate Fund
Martin Prowse	Independent Evaluation Unit, Green Climate Fund
Gemma Norrington-Davies	Agulhas Applied Knowledge
Agata Makowska	London School of Economics
Rob Macquarie	Independent
Maikel Lieuw-Kie-Song	International Labour Organization
Yeonji Kim	Independent Evaluation Unit, Green Climate Fund
Daisuke Horikoshi	Independent Evaluation Unit, Green Climate Fund
Zephaniah Danaa	Independent Evaluation Unit, Green Climate Fund
Catherine Cameron	Agulhas Applied Knowledge

EXECUTIVE SUMMARY

Just transition describes the transformation towards greener, more inclusive, and more resilient economies and societies and contributes towards keeping global warming below 2°C and ideally below 1.5°C above pre-industrial levels. It represents a strategic approach to achieving climate goals and sustainable development, minimizing the social risks and maximizing opportunities associated with climate interventions. Just transition achieves this through fair processes, equitable distribution of costs and benefits and a foundation built on social dialogue, stakeholder engagement, and respect for human rights, including labour rights. It is place-based, meaning each country uses different approaches and policies according to national circumstances and priorities. However, considerable potential exists for international co-learning to improve the design and quality of policies, financial support, and stakeholder collaboration in delivering a successful just transition.

Objectives

As there are a limited number of targeted just transition interventions currently taking place in developing countries, this realist review on just transition towards low emission, climate resilient and more inclusive societies in developing countries, hereafter called "Realist review of just transition", undertaken by the Green Climate Fund Independent Evaluation Unit (GCF-IEU) and the International Labour Organization (ILO), provides a rigorous summary of global evidence of interventions that could be interpreted to be aiming at outcomes contributing towards a just transition in non-Annex I countries[1], specifically in energy, agriculture and food, infrastructure and in ecosystem services.

The ILO's 'Guidelines for a Just Transition towards Environmentally Sustainable Eonomies and Societies for All' were used as a foundation for the review.[2] This realist approach focuses on the mechanisms, contextual enablers and barriers to successful just transition. It provides early indicators and signals that seek to identify not whether a programme or intervention is effective, but if and how it works, in what context and for whom.

Methods

To identify relevant studies, we conducted searches of academic and peer reviewed literature accessed through the Scopus and Taylor & Francis databases and grey literature accessed through selected institutional websites, Google Scholar and JSTOR databases. The choice of sources was guided by the type of literature to be included, the relevance and coverage of different databases, and the time to conduct the literature review and analysis. Boolean operators were used to combine search terms to cast a wide net within the just transition literature while also narrowing results by geography and sector. Search terms were grouped into the following categories: geography, general interventions, sectoral interventions, and outcomes. Hand searching of the institutional websites required a bespoke approach.

Selection criteria, quality appraisal and risk of bias

Only interventions that met the following criteria were included:

1) The intervention took place in a non-Annex I country.
2) The intervention intended to advance outcomes contributing towards a just transition in one or more of the following sectors or systems: energy, agriculture and food, infrastructure and ecosystem services.

[1] We refer to non-Annex I countries as developing countries through the report. We use these two terms interchangeably.
[2] The ILO's *Guidelines for a Just Transition Towards Environmentally Sustainable Economies and Societies for All*, 2015 endorsed by the 187 ILO's Member States, is available at https://www.ilo.org/global/topics/green-jobs/publications/WCMS_432859/lang--en/index.htm.

3) The intervention had an underlying theory of change (explicit or implicit) and was sufficiently advanced to demonstrate evidence of causal effect at the output and/or outcome level.

The review included quantitative and qualitative studies that aim to demonstrate the effect of interventions on relevant outcomes. Given the emergent nature of just transition, most studies deployed a qualitative case study-led approach. All studies were screened to ensure they used robust and replicable research methods. Outcomes have been collected, situated, consolidated, and compared within and across the resulting data sets using the CMO approach (context – mechanism – outcome) to explain generative causation. To prioritize the latest information and align with the formalization of the term "just transition" through the Paris Agreement and subsequent United Nations Framework Convention on Climate Change (UNFCCC) ratifications, studies conducted outside the time frame 2015-2023 were excluded. Due to limitations in budget and resources, only literature written and published in English was included.

The team used a three-stage quality appraisal form developed with the GCF-IEU and ILO to guide the full text screening process. A study had to progress through all three stages to reach the final data extraction phase. At each stage, the reasons for inclusion/exclusion were documented.

A data extraction form captured information about each intervention, including location, description, scale, sector focus, implementing partners and funders. It also contained more specific details on each intervention's theory of change, the contextual factors, enablers and barriers driving or undermining progress. Other extracted details included output and outcome level results and any unintended impacts or consequences resulting from the intervention. The team also captured relevant backward citations from bibliographies and reference lists at the end of each data extraction form.

There are several limitations to the study. These include the nascent nature of the evidence base in developing countries, the limited geographic diversity due to the exclusive use of studies in English, and the conceptual overlap between development and just transition interventions.

Results

From 8,726 just transition studies found across four databases and 30 websites, 76 studies made it through all screening stages to the final data extraction stage. The team completed data extraction forms for 99 interventions found within the 76 studies, revealing multiple combinations of geographies, sectors, scales, and intervention types. A summary of findings is available in the companion brief.

The study found interventions contributing towards just transition outcomes in a wide range of national, regional, and local settings across 45 developing countries. A higher concentration of studies was found in wealthier developing countries, including Indonesia, India, South Africa, and China. In contrast, the study found few studies on Small Island Developing States (SIDS) and only a small number from the Caribbean and the Pacific Islands. These geographical findings may be linked to the methodology, particularly the focus on studies published in English.

Due to the very low number of interventions found under infrastructure, the study only conducted a narrative analysis of this sector instead of a full analysis. One cross-over sector – food/agriculture with ecosystems – was mapped given the high degree of overlap found between these two sectors.

Many of the interventions in the study combine multiple activities. These could produce different effects if the same activities were carried out in isolation in the same context. There are 39 unique combinations of activities across all 99 interventions. Interventions in energy are typically focused on mitigation. In contrast, those in agriculture and food, as well as ecosystem services tend to focus on adaptation and resilience. In terms of scale, the study found more variety in the energy sector, from households up to country level. In agriculture and food, interventions at the household level predominated. However, there were also a small number at the regional and country levels. There

was a concentration at the community level for ecosystem services, with smaller numbers at all other levels. At this stage, there may be limited evidence on larger scale programmes in these sectors in developing countries, such as jurisdictional forestry or landscape restoration. Research and evidence could be gathered on these when they are implemented as, given the systemic nature of changes necessary for delivering just transition, large scale, economy-wide changes are required.

Notwithstanding the diversity and complexity across this study, some very high-level patterns are emerging regarding common mechanisms, barriers and enablers, that may impact the success of interventions working towards outcomes contributing to a just transition in non-Annex I countries. These findings are not intended to be conclusive.[3] They are intended to offer early indications and signals of the common mechanisms and conditions that policymakers, funders and programme designers/implementers working in this space should be aware of. They also vary across the different sectors, highlighting nuances in how similar mechanisms and conditions are framed and discussed in the current literature.

We found **common enablers for interventions across all or most sectors analysed**, including the need for *robust funding and financing mechanisms, strong alignment with needs and priorities*, *political will and ownership*, and *social dialogue and stakeholder engagement.* This suggests that some critical factors are required to support and enable successful just transition in developing countries.

These findings are nuanced across the different sectors and break down slightly differently for each. Overall, we found that ***hard enablers*** such as *funding and financing*, *investments in infrastructure and technology* and *strategic clustering of projects* were more evident in the **energy sector**, together with ***soft enablers*** such as *political will*, *trust building* and *collaborations and partnerships*. In **agriculture and food** as well as **ecosystems sectors**, we found that ***soft enablers*** such as *alignment*, and *coordination and contextual awareness* emerged as important features of just transition interventions, alongside *funding and financing* and *technical know-how*.

We also found several **common barriers to successful just transition across all sectors**, including *bureaucratic and legal barriers*, *exclusion and unequal distribution of benefits*, and *technical skills that could be enhanced*. Unsurprisingly, we also found that some barriers identified were the inverse of common enablers set out above, for example, uncertainty around political will, financing and funding commitments, and social dialogue and stakeholder engagement in projects and programmes. The fact that the studied interventions highlight these factors (*financing and funding*, *political will*, *social dialogue*, and *stakeholder engagement*) as both enablers and barriers indicates their relative importance to successful just transition across multiple sectors and scales. Other findings on barriers were more nuanced and sector specific.

The study found evidence **that both climate outcomes, social equity and social gains are achieved through interventions** contributing towards just transition outcomes across all sectors that were analysed (energy, agriculture and food, ecosystem services, as well as agriculture/ecosystems combined). While there is a dominance towards one side or the other in some sectors (e.g. a dominance towards climate outcomes in the energy sector and a dominance towards social equity and social gains outcomes for ecosystem services), these findings are reassuring. They demonstrate that emerging approaches to just transition in developing countries recognize that a transition can only be "just" if it includes both climate and social elements and is already delivering interventions across different sectors and scales that showcase how this can be achieved.

[3] The term 'just transition interventions' can be seen as shorthand for interventions contributing towards just transition outcomes.

Conclusions

Overall, the landscape of studies highlights the value of detailed, overarching, yet high-level theories of change towards low emission and climate resilient pathways in developing countries across sectors and a range of possible interventions. While typically working towards similar outcomes/impacts, approaches to a just transition within key economic sectors are nuanced across each sector. The sectoral theories of change developed in this study demonstrate this.

This realist review's examination and development of underlying theories of change shed light on the mechanisms for just transition through overarching and sectoral enablers and barriers. As just transitions in developing countries are at a formative stage, understanding the degree to which these enablers and barriers exist can help predict the likelihood of early indicative outcomes and impacts. A full summary of findings is available in the companion brief.

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ABBREVIATIONS

ADB	Asian Development Bank
CMO	Context – mechanism – outcome
COP	Conference of the Parties
CSV	Comma-separated values
EIT	Economy in transition
EU	European Union
GCF	Green Climate Fund
GEF	Green Environment Facility
GHG	Greenhouse gas
GIZ	*Deutsche Gesellschaft für Internationale Zusammenarbeit*
ICCAs	Indigenous Peoples and Local Communities Conserved Areas and Territories
IDR	Indonesian rupiah
IEU	Independent Evaluation Unit of the Green Climate Fund
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
JETP	Just Energy Transition Partnership
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MtCO2e	Metric tons of carbon dioxide equivalent
NDC	Nationally Determined Contributions
OECD	Organization for Economic Cooperation and Development
PICO	Populations, Intervention, Comparison and Outcome
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PV	Photovoltaic
REDD+	Reducing emissions from deforestation and forest degradation
SDGs	Sustainable Development Goals
SIDS	Small Island Developing States
SPRINGS	Sustainable Poverty Reduction through Income, Nutrition and Access to Government Services
ToC	Theory of change
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change

A. BACKGROUND

1. THE NEED FOR JUST TRANSITION AS PART OF THE GLOBAL RESPONSE TO CLIMATE CHANGE

The world is experiencing multiple environmental crises, including climate change, biodiversity loss, and degradation of land and oceans. These crises are interconnected and require a coherent response promoting sustainable development through economic, social, and environmental dimensions. This report focuses on climate change and climate action within the overarching sustainable development agenda. According to the most recent Intergovernmental Panel on Climate Change (IPCC) report, human activities have unequivocally caused global warming, resulting in a 1.1°C rise in global surface temperature since the pre-industrial era (Intergovernmental Panel on Climate Change, 2023b). This temperature rise has caused widespread and rapid changes in all regions of the world, disproportionately impacting the lives of the world's most vulnerable people. The IPCC estimates that average temperatures will increase by 2.6°C to 4.8°C by the end of the twenty-first century if greenhouse gas (GHG) emissions continue increasing at their current rate (business as usual). According to the IPCC Sixth Assessment Report:

> Prioritizing equity, climate justice, social justice, inclusion and just transition processes can enable adaptation and ambitious mitigation actions and climate resilient development. Adaptation outcomes are enhanced by increased support to regions and people with the highest vulnerability to climatic hazards. Integrating climate adaptation into social protection programmes improves resilience. Many options are available for reducing emission-intensive consumption, including through behavioural and lifestyle changes, with co-benefits for societal well-being. (high confidence)

The United Nations Development Programme (UNDP) asserts that "to avert catastrophe, we must now radically switch to a sustainable, net-zero future. This transition needs to happen fast, but it also has to happen in a fair and inclusive way" (United Nations Development Programme, 2022a). Thus, there is a great urgency to transform our economies and societies to fulfil the aspirations of the Paris Agreement and keep global warming below 2°C while trying to limit the temperature increase to 1.5°C above pre-industrial levels (United Nations Framework Convention on Climate Change, 2015).

The concept of "just transition" originated from the US labour movement in the 1980s.[4] Since then, it has acquired a broader scope and support base among different constituencies and stakeholders globally. It has also come of age as a key element in the global response to climate change. The preamble to the Paris Agreement explicitly recognizes the need to consider "the imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities" (United Nations Framework Convention on Climate Change, 2016).[5] According to the *Conclusions of the 2023 International Labour Conference*, a just transition "promotes environmentally sustainable economies in a way that is inclusive, by creating decent work opportunities, reducing inequality and by leaving no one behind" (International Labour

[4] The concept of just transition originated from the United States labour movement in the 1980s (Labor Network for Sustainability, 2016). It was first mentioned by United States trade union leader and environmental activist, Tony Mazzochi, in 1993, who called for a "superfund for workers" to provide support and compensation for workers displaced by environmental protection policies (Olsen and La Hovary, 2021)

[5] Decent work refers to productive work for women and men in conditions of freedom, equity, security and human dignity. The four pillars of the decent work agenda are employment creation, social protection, rights at work, and social dialogue.

Organization, 2023). Social dialogue and stakeholder engagement are an integral part of this process, helping to drive consensus building and social acceptance for the goal and pathways to sustainability (International Labour Organization, n.d-b). The International Labour Organization (ILO) defines social dialogue as including "all types of negotiation, consultation or simply exchange of information between, or among, representatives of governments, employers and workers, on issues of common interest relating to economic and social policy". In his 2021 report, *Our Common Agenda*, the United Nations Secretary-General called "on all countries to embrace the ILO guidelines for a just transition towards environmentally sustainable economies and societies for all" (United Nations, 2021). The ILO's guidelines for a just transition towards environmentally sustainable economies and societies for all, endorsed by the 187 ILO member states, provide the key international reference for policymaking and present guiding principles and policy entry points (International Labour Organization, 2015).[6] The notion of just transition also applies to responses to wider environmental challenges in broad terms, including biodiversity loss and pollution.

The focus of this study is just transition in the context of climate action (recognizing its relationship with responses to other planetary crises). Transitioning to a low-carbon economy can generate significant employment and social gains, including enhancements in job quality. For example, the ILO estimates that energy related actions will create approximately 24 million new jobs throughout the global economy by 2030 (International Labour Organization, 2018). Yet some jobs will be displaced, mainly in fossil fuel related sectors. Changes in economies and societies will be far-reaching. There will be implications regarding economic and labour-market structures, skill requirements, equity and people living in poverty or vulnerable situations. Equitable social outcomes are possible but do not happen by default. The question is how to achieve employment and other benefits to secure the futures and livelihoods of workers and their communities across various sectors and scales.

Achieving and sustaining a just transition at pace over time is essential to the global effort to mitigate and adapt to climate change. Increasingly, countries are placing greater value on just transition principles, with at least 38 per cent of Nationally Determined Contributions (NDCs) incorporating these principles, and 56 per cent of Long-Term Low-Emission Development Strategies (United Nations Framework Convention on Climate Change, 2023).

According to the Conclusions of the 2023 International Labour Conference, a just transition involves "maximizing the social and economic opportunities of climate action", including an enabling environment for sustainable enterprises "while minimizing and carefully managing any challenges" based on social dialogue, respect for fundamental principles and rights of work, and stakeholder engagement (International Labour Organization, n.d-a). A gender responsive and inclusive just transition is important for all countries at all levels of development.

Just transition describes the transformation towards greener, more inclusive, and more resilient societies. It contributes towards keeping global warming below 2°C and ideally below 1.5°C above pre-industrial levels.[7] In driving climate-related action and systems change, just transition also supports progress across the Sustainable Development Goals (SDGs) and is expected to substantially benefit the global economy.[8] However, if not carefully managed through just transition

[6] The notion of just transition also applies to responses to wider environmental challenges in broad terms, including biodiversity loss and pollution. This study focuses on transition in the context of climate action, recognizing its relationship with responses to other planetary crises.
[7] United Nations Development Programme (2022a) has elaborated five ways that just transition can help to tackle climate change: (i) bringing the public along by demonstrating the socioeconomic benefits of a green transition, (ii) supporting a green jobs revolution, (iii) laying the social groundwork for a resilient net-zero economy, (iv) driving local solutions, and (v) reinforcing the urgency for concerted efforts to combat climate change.
[8] Research by The New Climate Economy (2018), for example, finds that bold climate action could yield a direct economic gain of USD 26 trillion through to 2030 compared to business as usual.

policies and processes, economic changes could result in increased social inequality, disillusionment, civil unrest, reduced productivity, and less competitive businesses, sectors, and markets. Thus, we must capture the lessons from these policies and processes, recognizing there is no one-size-fits-all approach to a just transition, given that it depends on national contexts, circumstances and development priorities.

This study reviewed 99 interventions that potentially contribute towards just transition outcomes in developing countries across energy, agriculture and food, infrastructure, and ecosystem services.[9] It aims to provide an evidence base for interventions contributing to a just transition towards low emission and climate resilient development pathways in developing countries, highlighting cases that illuminate the effectiveness and efficiency of interventions and the mechanisms and conditions that influence their approach and impact.

Although the review was conducted over a relatively short research period and limited to studies published in English, it has found good evidence of just transition-related activities and outputs in developing countries, as well as some emerging outcomes across the three sectors and ecosystem services. Findings are synthesized both at the study level and presented separately for each sector except infrastructure, where there was limited evidence. A narrative for infrastructure has been provided instead. The report also developed cross-sectoral findings on the overlap between agriculture/food and ecosystems, given their high level of interaction.

The synthesis of these findings offers several lessons on the track record of just transition in developing countries. It indicates important gaps to address when designing future interventions and programmes. To conclude, the study makes suggestions for further research to improve the evidence base. It also highlights areas that may be of strategic interest for policymakers, global climate funds and co-funding agencies as momentum and urgency around just transition grows.

2. EXPLORING JUST TRANSITION INTERVENTIONS AT THE SECTOR LEVEL

Just transition is emerging and accelerating across several sectors and at various scales. This realist review explores evidence regarding interventions contributing towards a just transition in energy, agriculture and food, infrastructure as well as ecosystem services, through examining underlying theories of change to illuminate the mechanisms and conditions for just transition through overarching and sectoral enablers and barriers.[10]

a. Energy

The energy sector is at the centre of just transition debates. In 2019, 34 per cent of net global GHG emissions came from the energy sector (Intergovernmental Panel on Climate Change, 2023a) and 82 per cent of the world's energy is supplied by fossil fuels (Energy Institute, 2023). The energy sector has immense potential for transformation, primarily due to the emergence of more affordable low emission energy technologies. The IPCC AR6 notes that:

[9] 'Intervention' is used throughout this study for consistency with the Populations, Intervention, Comparison and Outcome (PICO) model, and in the context of just transition can include a wide range of policies, programmes, and processes carried out by any public or private actor. For example, both an act of national legislation and a series of village meetings can be considered interventions if they relate to climate mitigation and/or adaptation, and social equity.

[10] The selection of our four sectors is based on recent discussions within the UNFCCC. The GCF's programming priorities for 2024-2027 are designed to incorporate evolving understandings of just and equitable pathways in line with how these discussions develop and come to fruition. The GCF is aiming to promote a paradigm shift and just transition within energy and infrastructure (including buildings and industry) alongside nature-based solutions and ecosystem-based approaches. In addition, our realist review focused on the agricultural sector due to the importance of smallholder production for sustainable development, poverty reduction and adaptation. Our report reviewed interventions that potentially contribute towards just transition outcomes in non-Annex I countries across energy, agriculture and food, infrastructure, and ecosystem services.

> From 2010-2019 there have been sustained decreases in the unit costs of solar energy (85 per cent), wind energy (55 per cent), and lithium-ion batteries (85 per cent), and large increases in their deployment, e.g., >10x for solar and >100x for electric vehicles (EVs), varying widely across regions.
> (Intergovernmental Panel on Climate Change, 2023b)

However, if the world is to limit warming to below 2°C and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, almost all electricity must be supplied by zero or low-carbon sources by 2050 (Intergovernmental Panel on Climate Change, 2023a).

Shifting to sustainable energy systems generates employment. It is estimated that energy related measures can create over 24 million jobs globally by 2030. Nevertheless, approximately 6 million jobs can be displaced in the energy transition, particularly in fossil fuel sectors (International Labour Organization, 2018). Within the energy sector transformation, there is a tricky balance between producing sufficient energy for a growing population (especially in developing economies), developing low-carbon energy infrastructure, and providing alternatives to those workers dependent on fossil fuel extraction and power generation. In 2019, global government support for fossil fuel production and consumption reached USD 802 billion (Sánchez and others, 2021, p. 1). Transitioning to sustainable energy systems will involve reallocating a significant portion of this budget to clean energy, clean electricity incentives and social investments. There are many risks and challenges associated with this transition, including major economic and social disruptions to industries, workers and communities (Sánchez and others, 2021). Thus, it is critical that a just transition identifies and mitigates risks and enhances positive employment and social impacts.

b. Agriculture and food

Emissions from agricultural activities, including crops and livestock, comprise a significant percentage of GHGs. The Food and Agriculture Organization of the United Nations (FAO) found that in 2018 agriculture and related land-use emissions comprised 17 per cent of global GHG emissions across all sectors (Food and Agriculture Organization of the United Nations, 2020). This sector also employs a significant proportion of the world's population –1 billion people, according to the United Nations Framework Convention on Climate Change (UNFCCC) (Gass and others, 2021). More than 60 per cent of the world's employed population are in the informal economy and estimates suggest that over 90 per cent of agricultural workers in developing countries are in informal employment (International Labour Organization, 2018). ILO used the categorization of low- and middle-income countries when referring to the proportion of agricultural workers in informal employment. Workers and smallholders operating in the informal economy in developing countries are typically not covered by social protection schemes, increasing their vulnerability to shocks, including those associated with climate change (Leal, Roman and van Doorn, 2022).

There are many pressures on the agricultural sector: the world's population is increasing, leading to greater demand on food systems, and changing weather patterns and extreme climate events place additional strain on food systems (Carlin, Arshad and Baker, 2023). In the transition away from high-polluting agricultural practices, the goal is to reduce the emission of GHGs (primarily methane, nitrous oxide, and carbon dioxide), while creating resilient food systems that can support a growing population, adapt to the changing climate, and reduce biodiversity loss (Green Climate Fund, 2021a). Adopting sustainable agricultural practices can also help mitigate emissions by sequestering carbon from the atmosphere.

As agriculture and food systems adjust to these changing conditions and as governments, organizations and corporations implement interventions that will lead to more resilient systems and lower GHG emissions, social and economic impacts on workers, suppliers and consumers will need

to be mitigated (Viglione, 2021; Agriculture & Food Pathway, PwC and Council for Inclusive Capitalism, 2023). Smallholder farmers are at the forefront of this sector – family farms produce roughly 80 per cent of the world's food in value terms and farms smaller than 2 hectares produce roughly 35 per cent of the world's food (Lowder, Sánchez and Bertini, 2021). There is also a significant gender dimension, with high dependence on agrarian livelihoods among women from non-Annex I countries (Atteridge, 2023). Small-scale farming communities face the greatest economic, social, and environmental challenges but offer the greatest platform for agricultural transformation given their collective scale.

Financing and funding for systems change in the agriculture sector remains a challenge, however, alongside widespread poverty among those working in the sector. The International Fund for Agricultural Development reported that 80 per cent of the world's poor still live in rural areas where farming is the primary economic driver (International Fund for Agricultural Development, n.d.). Despite global food security challenges – globally over 3 billion people cannot afford a healthy diet – some governments still underfund this sector (World Bank, n.d.). For example, a recent report found that three-quarters of African governments had recently reduced their agricultural budgets (Oxfam International, 2023). Recognizing our high dependency on food systems for human survival and livelihoods, just transition interventions in this sector will be complicated and face many potential trade-offs (Atteridge, 2023). This matter will need to be approached with great care and awareness of potential harms, while leveraging opportunities and benefits.

c. Infrastructure

Infrastructure, including buildings, cities, industries and appliances, contributes significantly to GHG emissions. Infrastructure-related emissions are concentrated in urban areas, with cities representing 58 per cent of global GHG emissions (Green Climate Fund, 2021b). Moreover, some of the world's infrastructure is suffering from the effects of climate change. Extreme events such as heat waves and floods have limited the function of key infrastructure (Intergovernmental Panel on Climate Change, 2023a). When these systems suffer from climate impacts, it harms social and economic well-being.

The turn away from a high-emitting infrastructure sector – involves decarbonizing energy systems (especially in urban areas), improving the energy efficiency of buildings, resilient urban planning design and circular economy practices. The challenges in this sector are institutional, technical and financial. There are also social factors to consider as countries want to transition away from high-emitting infrastructure while ensuring access to housing and decent jobs in this evolving sector. As in other sectors, financing is a significant obstacle. According to the Organization for Economic Cooperation and Development (OECD), USD 6.9 trillion per annum of infrastructure investment, predominantly in developing countries, is required to keep global warming below 2^{o}C (Green Climate Fund, 2021b).

d. Ecosystem services

According to the Millennium Ecosystem Assessment, ecosystem services include (i) provisioning services – food, water, timber, (ii) regulating services – flood control, disease and pest control, waste decomposition, pollination, (iii) cultural services – recreation, spiritual benefits, and (iv) supporting services – soil formation, photosynthesis and nutrient cycling (Millennium Ecosystem Assessment, 2005). This description of ecosystems' range of services is useful in understanding people's relationship with nature. There is an urgent need to transition away from exploitative, harmful and extractive interactions with nature that have caused biodiversity loss and ecosystem degradation. Ecosystems are key in our approaches to climate mitigation and adaptation in the context of a just transition (Green Climate Fund, 2022).

The public push for different and more reciprocal relationships between people and nature is evident in recent progressive policies and laws, such as the United Nations resolution for the human right to a clean, healthy, and sustainable environment and the implementation of the Rights of Nature in some localities (United Nations Environment Programme, 2022). Specific mechanisms for transition include implementing nature-based solutions, improving forest management (reforestation and restoration), protecting and restoring grasslands and peatlands, managing watersheds sustainably, restoring wetlands, and instituting sustainable fishing practices. It is important to incorporate the knowledge and perspectives of Indigenous Peoples, who continue to play a key role in safeguarding ecosystems. Indigenous Peoples comprise 5 per cent of the world's population, but protect around 80 per cent of the world's remaining biodiversity (Müller and Robins, 2022). Ecosystem services straddle the three systems outlined above, intersecting with numerous just transition challenges and opportunities.

3. THE IMPORTANCE OF EVIDENCE SYNTHESIS ON JUST TRANSITION

To date, most research on just transition has come from annex I countries,[11] including, for example, transitioning from heavy manufacturing in northern England, from coal mining in former east Germany, and from coal, oil and gas production in Alberta, Canada (Stone and Cameron, 2018; Environment and Climate Change Canada, 2018). Critical components of a just transition in Annex I countries include the creation of new value chains, transferring skills, maintaining or enhancing social protection (or compensation), and driving inclusive stakeholder participation and dialogue (Stone and Cameron, 2018). Studies on just transition in developing countries are considerably less common.

With the Just Transition Declaration agreed at the Conference of the Parties 26 (COP26) and the subsequent establishment of Just Energy Transition Partnerships (JETP) in South Africa, Indonesia, Senegal and Vietnam, and with the increasing attention to just transition climate processes under the UNFCCC more generally, this is an opportune time to harness the momentum around just transition. Recognizing there are a limited number of targeted just transition interventions taking place in developing countries, the Independent Evaluation Unit of the Green Climate Fund (GCF-IEU) and the ILO undertook a rigorous and global evidence review of interventions that could be regarded as aiming at outcomes contributing towards a just transition in non-Annex I countries, specifically in the energy, agriculture and food, infrastructure and ecosystem services.[12] A realist synthesis approach was used to explore the enabling preconditions, barriers, mechanisms and contexts that might contribute towards a just transition. This realist approach has the advantage of providing an explanatory analysis that seeks to identify not whether a programme or intervention is effective, but if and how the intervention works, in what context and for whom. This review draws on published academic literature and grey literature focusing on non-Annex I countries to improve access to up-to-date and contextually relevant evidence for decision makers and project implementers in non-Annex I countries.

[11] Annex I Parties include the industrialized countries that were members of the OECD in 1992, plus countries with economies in transition (the EIT Parties). Annex II Parties consist of the OECD members of Annex I, but not the EIT Parties. Non-Annex I Parties are mostly developing countries. Some of these countries may be especially vulnerable to the adverse effects of climate change. Other countries, such as those heavily dependent on income from fossil fuel production and commerce, feel more vulnerable to the potential economic impacts of climate change response measures. (United Nations Framework Convention on Climate Change, n.d.)

[12] The scope of the GCF's Updated Strategic Plan for 2024-2027 provides sufficient room for close alignment with contributions towards just transitions.

B. OBJECTIVES

This realist review seeks to answer the following questions:

1) What evidence exists regarding interventions contributing to a just transition towards low emission and climate resilient development pathways in non-Annex I countries in energy, agriculture and food, infrastructure as well as ecosystem services?
2) How can interventions that contribute to a just transition and outcomes from a just transition be adequately defined from a methodological point of view within non-Annex I countries, especially at the level of workers, households, and firms?
3) What is the landscape of studies related to a just transition in non-Annex I countries? How can these studies be clustered to aid learning?
4) How effective have approaches to a just transition been within key economic sectors, including the energy, agriculture and food, infrastructure, as well as ecosystem services?
5) How does examining the underlying programme theories illuminate the effectiveness and efficiency of interventions contributing to a just transition and the mechanisms and conditions that influence their approach and impact?
6) How can the evidence base be best synthesized to support programming by global climate funds and international agencies?[13]

C. METHODS

Our research team mapped the landscape of available academic literature and grey material on just transition interventions in non-Annex I countries through an iterative search process designed to identify, select and evaluate the literature using bibliometric methods with pre-determined and transparent selection criteria for relevance and quality. A purposeful sampling approach was used, enabling the team to select studies based on their specific characteristics and relevance to the research question, ensuring they provide valuable insights or unique perspectives.

1. CRITERIA FOR CONSIDERING STUDIES FOR THIS EVIDENCE SYNTHESIS

The review team worked to identify and review the academic and grey literature on just transition approaches, learning and interventions across non-Annex I countries. Recognizing the challenge of identifying evidence in a nascent area, the team worked hard to develop a robust research protocol that sought multiple entry points into the literature to ensure inclusivity and avoid selection bias. This protocol was informed by the Populations, Intervention, Comparison and Outcome (PICO) model to ensure that the design enabled a realist synthesis, focusing on how, for whom, and under what circumstances interventions function in complex environments. This approach is set out in more detail below.

Only interventions that met the following criteria were included:

1) The intervention took place in a non-Annex I country.
2) The intervention intended to contribute towards the outcomes of a just transition in one or more of the following sectors/systems: energy, agriculture and food, infrastructure and ecosystem services.

[13] The aim here is to synthesize evidence into a series of graphics to support programming and policy makers.

3) The intervention had an underlying theory of change (explicit or implicit) and was sufficiently advanced to demonstrate evidence of effect.

a. Types of participants (population)

Only interventions taking place in UNFCCC non-Annex I countries were included in the study. All interventions in the study also had to have documented evidence that their activities and outputs could be interpreted to be aiming for outcomes consistent with a just transition. Any interventions in Annex I and II Parties and/or that had activities and outputs incompatible with just transition outcomes were excluded from the study.

b. Types of interventions

As just transition is an emergent area of programming in non-Annex I countries, this study focuses on interventions labelled as just transition interventions and interventions that could be interpreted as aiming for outcomes contributing to a just transition. The study covers interventions in at least one of the key sectors identified above (energy, agriculture and food, infrastructure, and ecosystem services), which includes interventions that straddle multiple combinations of these sectors, including multi-sectoral and cross-sectoral interventions.

The types of interventions identified for this study draw on sector priorities and approaches described in section A and the overarching draft theory of change shared in the approach paper (see Appendix 2). While we focus on interventions taking place and/or impacting at various scales, including household, community, district, region and country, interventions included in the study had to be sufficiently advanced to demonstrate evidence of causal effect.

c. Types of outcome measures

The thematic focus of this study, just transition, is at an early stage of implementation in non-Annex I countries. The review, therefore, looked at various outcomes contributing to a just transition. Examples include outcomes related to building more resilient communities and sustainable environments or enhancing health and well-being. It then sought to identify and measure changes in these outcomes that reflected progress towards a just transition. Our list of outcomes was based on the overarching theory of change shared in the approach paper (Independent Evaluation Unit, 2023), which was developed and refined in consultation with the GCF-IEU and ILO during the design phase of this research.

The team took an intentionally inclusive approach to interventions that contribute to the three primary branches of sustainability (economic viability, social equity, and environmental protection). Metrics to measure potential harm were also considered, including unintended effects of interventions such as increased inequality and negative reactions from industry, consumers and vested interests.

d. Comparison

The review included both quantitative and qualitative studies that aimed to demonstrate the effect of interventions on relevant outcomes, including both experimental and quasi-experimental studies. However, given the emergent nature of just transition, most studies deployed a qualitative case study led approach. All studies were screened to ensure they used robust and replicable research methods. Outcomes have been collected, situated, consolidated, and compared within and across the resulting data sets using the (context – mechanism – outcome) CMO approach to explain generative causation.

e. Exclusion criteria

Due to budget and resource limitations, only literature written and published in English was included in the study. The research team acknowledges that this approach limits the completeness of the study and could result in potential bias. Further research could supplement this study by exploring literature published in other languages. Studies conducted outside the time frame 2015-2023 were also excluded to prioritize the latest information and in alignment with formalization of the term "just transition" through the Paris Agreement and subsequent UNFCCC ratifications.

The research team further excluded studies that did not attempt to demonstrate effects of the intervention on intermediate outcomes towards a just transition.

2. Search methods for identification of studies

The choice of databases used for this study was guided by the type of literature to be included, the relevance and coverage of different databases, and the time to conduct the literature review and analysis. The research included:

- academic and peer reviewed literature accessed through the Scopus and Taylor & Francis database
- grey literature accessed through the Google Scholar and JSTOR databases and selected website searches

Scopus and Taylor & Francis were selected as the academic databases for this review due to their wide coverage of peer reviewed scientific journals, conference proceedings and books. The Google Scholar and JSTOR databases were included because they straddle academic and grey literature. Any duplication of academic literature across the four data sets was screened out.

Additional grey literature to inform the study was identified through a hand search of 30 institutional websites.[14] This additional material included policy and programme documents, fact sheets, speeches and statements, conference proceedings, news articles and blogs available on the websites of selected institutions. Accessing this type of grey material was useful for obtaining information on "live" policies and programmes and helped avoid any publication bias that can result from relying solely on peer reviewed literature (DeVito and Goldacre, 2018). The organizations and institutions were selected for inclusion in the study as in Table 1.

Table 1. Selected organizations and institutions for review

Multilateral organizations	Philanthropic foundations and international NGOs[15]	Other stakeholders
World Bank	Bill and Melinda Gates Foundation	International Trade Union Confederation
United Nations Development Programme	World Wildlife Fund	International Organization of Employers
International Labour Organization	World Resources Institute	Collaboration for Environmental Evidence Database of Evidence Reviews
European Bank for Reconstruction and Development		Conservation Evidence
African Development Bank		Ecologic Institute EU
Asian Development Bank		Earth–Eval
Inter-American Development Bank		

[14] Up to 30 relevant articles, reports, blogs and programme documents were selected for each website. In cases where fewer than 30 relevant results were identified, only those results deemed to be relevant to the study would be saved.
[15] Non-governmental organizations

MULTILATERAL ORGANIZATIONS	PHILANTHROPIC FOUNDATIONS AND INTERNATIONAL NGOS[15]	OTHER STAKEHOLDERS
Global Environment Facility		Environmental Evidence Library
International Fund for Agricultural Development		Green Finance Platform
United Nations Framework Convention on Climate Change		United States Agency for International Development Evaluations Clearinghouse
Food and Agriculture Organization of the United Nations		International Institute for Environment and Development
Intergovernmental Panel on Climate Change		International Institute for Sustainable Development
United Nations Research Institute for Social Development		Wuppertal Institute for Climate, Energy and Environment
Green Climate Fund		Just Transition Initiative

3. SEARCH TERMS

The review team initiated the research process by curating a set of specific search terms aligned with the core questions of the synthetic review (see section B above). Different combinations of the agreed search terms were then tested to identify the best approach to searching each database based on its unique characteristics, including character limitations and different search functions.

Boolean operators were used to combine search terms to cast a wide net within the just transition literature while also narrowing results by geography and sector. Search terms were grouped into the following categories: geography, general interventions, sectoral interventions and outcomes. The ”OR” Boolean operator was used to group search terms within each category, with the “AND” Boolean operator used to combine categories. We also used the ‘NOT’ Boolean operator to exclude studies that were not intervention-focused. The exact search terms used and steps taken to search each database can be found in Appendix 3.

Hand searching of the institutional websites required a different approach to database searching. Given the range of institutions included in this study, from multilateral banks to foundations to confederations of trade unions, applying the same search string terms to each website was inappropriate. Instead, our research team drew on the search terms agreed in the approach paper to develop tailored searches for each institution. These were further iterated in real-time to allow for snowballing. The team used different combinations of search terms based on the websites they were searching and the results they were finding.

4. DATA COLLECTION AND ANALYSIS

a. Initial screening

The review team carried out title and abstract screening for all results returned through the Scopus and Google Scholar databases and completed title only screening for all results returned through the JSTOR and Taylor & Francis databases. Through this screening process, the team assessed the relevance and rigour of each result, guided by the following questions:

- Is the case good enough to provide some evidence to contribute to the synthesis?
- Is the case relevant to answering hypotheses?
- Is the case rigorous in its own terms?

When screening the grey literature in Google Scholar, our team found that abstracts were not always available. In this case, we extracted executive summaries, introductions and/or contents pages to support the screening process. Where these were unavailable, our team made manual notes against the result to capture the article's essence.

This screening process was managed using a shared Excel spreadsheet. For each study, a member of the team checked to see if the study met five criteria in line with the PICO model: (i) published after 2015, (ii) published in English, (iii) focuses on just transition, (iv) includes one or more of the four sectors, and (v) is intervention-focused. If a study met all five criteria, it progressed to full text screening. However, it was not always easy to tell from title only screening if a study met all criteria, particularly the just transition and intervention-focused criteria. Studies that fell into this category were automatically put through for further screening.

A second reviewer completed a double screening for 20 per cent of the results from Google Scholar and JSTOR. A small number of disagreements were resolved by discussing with the two reviewers and a third team member.

Records from the hand search of institutional websites were automatically included for the next screening stage, given that these had already been subject to a manual search approach based on the five criteria.

b. Full text screening

The team used a three-stage quality appraisal form, developed with the GCF-IEU and ILO to guide the full text screening process. A study had to progress through all three stages to reach the final data extraction phase. If at any stage a study was deemed ineligible for the synthetic review, it was screened out and did not progress to the next stage of quality appraisal. At each stage, the reasons for inclusion/exclusion were documented.

Stage 1: The first part of the full text screening focused on double-checking the initial screening criteria set out above (i.e. the criteria used for title and abstract screening). This step was put in place because some studies had been put through for further screening due to difficulties in assessing them at the “title only” screening stage.

Stage 2: This focused on the study's relevance to climate and social equity contributions and the presence of an implicit or explicit theory of change for the intervention(s) described. The review team also assessed bias, rating the risk of each study’s relevance bias as low, moderate, high, or critical. Studies with a high or critical risk bias were screened out at this stage.

Stage 3: Studies with a low or moderate risk bias progressed to part three of the full text screening process. This stage tested for methodological rigour and applied the same risk of bias approach to determine which studies should be screened out and which should progress through to the final data extraction phase.

Six researchers independently screened the 978 studies identified for full text screening. In cases where further judgment was required, the study was flagged for double screening, which another researcher conducted. All actions and decisions taken during the process were documented carefully. In addition, 5 per cent of the shortlisted studies for full text screening were randomly selected for double screening by the GCF-IEU.

c. Data extraction and management

A data extraction form (see Appendix 4) was developed by the team. Four studies were selected in the pilot – one from each sector – and a data extraction form was completed for each. After this pilot, the data extraction form was refined based on reviewer feedback. Once finalized, it was uploaded into a Google Form that automatically collated all responses in one database.

The research team ran the data extraction form for each intervention identified in the included studies, noting that some studies contained more than one intervention focused on or contributing towards the outcomes of a just transition. In such cases, separate forms were completed and submitted, using a unique identifier to ensure each form linked back to the original study.

The data extraction form captured general information about each intervention, including location, description, scale, sector focus and implementing partners and funders. It also contained more detailed information on each intervention's theory of change, the contextual factors, barriers, and enablers driving or undermining progress, outputs and outcomes, and any unintended consequences resulting from the intervention. The team also captured relevant backward citations from bibliographies and reference lists at the end of each data extraction form. These are included in Appendix 5 as a reference resource for any future research.

As per the process used during the full text screening stage, a second team member screened any studies that required further judgment. A second data extraction form was completed in these cases, and the team discussed and reconciled differences. The analysis only included the final data extraction form for each intervention and excluded all duplicates. All steps and decisions taken were documented.

d. Data analysis steps

The analysis aims to identify cases that illuminate the effectiveness and efficiency of interventions contributing to a just transition, as well as the mechanisms and conditions that influence their approach and impact. The analysis was done at multiple levels: (i) an overarching analysis across the whole population of studies, (ii) a sector-level analysis for each of the four sectors, including cross-sector analysis where interventions straddled more than one sector, and (iii) an overarching synthesis of key findings across the study.

To achieve this, the following steps were taken:

i. The landscape of studies

Firstly, the full data set of 99 interventions extracted from the included studies (see Appendix 1) was reviewed and consolidated to determine the landscape of studies related to a just transition in non-Annex I countries. The finalized data set was then summarized using headline characteristics across all interventions to reflect the distribution of observed interventions. These characteristics encompass the interventions' geography, sector, regional diversity, targets such as households, private firms, or the public sector, and scale, ranging from individual-level to national. The landscape of studies is presented in section D.2.

ii. Mapping the intended pathways to a just transition

While explicit theories of change were rarely included in the studies examined, data extracted from the studies was typically granular enough to understand how each intervention aimed to contribute to a just transition. The studies described the intended inputs, activities, outputs, and outcomes for each intervention examined in varying degrees of detail. The team used this information to reconstruct and refine the overarching theory of change for just transition shared in the approach paper, with a clearer focus on practice to date in non-Annex I countries. Additionally, the team developed sector-level theories of change for energy, food and agriculture, and ecosystem services and an additional multi-sector theory of change for food/agriculture and ecosystem services combined.

As a first step, the inputs, activities, outputs, and outcomes across all interventions were clustered into categories using a qualitative assessment to identify and pull together similar elements. These categories were then compared with the overarching theory of change for just transition shared in the approach paper. Further refinements were made based on the evidence collected and new inputs,

activities, outputs and outcomes (see section D). This updated overarching theory of change provides a high-level framework for the intended causal pathways of interventions contributing towards a just transition in non-Annex I countries.

The same process was then followed at the sector level to create the theories of change for energy, agriculture/food, ecosystem services, and agriculture/food and ecosystems combined. These sector-level theories of change similarly provide a high-level framework for the intended causal pathways for just transition interventions occurring in specific sectors in non-Annex I countries.

When compiling, cleaning, and clustering the extracted data to develop theories of change, only interventions that targeted the precise sector or cross-sectoral combination were included. This "purist" approach was viable because there was enough information on theories of change found in the included studies, and the objective was to highlight the most important inputs, activities, outputs, and outcomes relevant to specific sectors. In contrast, as indicated below, we incorporated all relevant single sector and cross-sectoral interventions when mapping actual activities and outcomes. The team adopted this broader approach to evidence mapping due to the relatively limited data availability on reported outcomes and to ensure it did not exclude any relevant just transition interventions.

iii. Evidence of contribution towards a just transition

Learning if certain activities are critical for outcomes or how different activities interact with one another may help financing institutions and implementing partners in refining programme and intervention design. To help demonstrate the effectiveness of approaches towards a just transition in the sectors included in this review, the team mapped and analysed the evidence of just transition interventions that have produced climate or social equity and social gains outcomes. A series of charts visually represent the relationships observed in the evidence (see sections D.4.a-D.4.d). The charts were developed using standardized values for activities and outcomes to apply a consistent framework across the research. These values were taken from the approach paper's overarching theory of change and coded for each intervention during the data extraction process. This analysis does not include infrastructure interventions, as the research identified only two.

However, it is important to note that some identified interventions, while relevant to the review, did not provide comprehensive evidence at output or outcome level. This could be due to ongoing interventions or insufficient detail in the case studies.

Of the 99 interventions in this study, 30 had no climate outputs identified in their respective studies, and 28 had no social equity outputs. Further up the results chain, 64 interventions had no climate outcomes identified in their respective studies, and 58 had no social equity and social gains outcomes. The team agreed to include these studies in the research, recognizing that just transition is in its early stages in non-Annex I countries, meaning there is less evidence of outputs and outcomes. These studies provided valuable evidence in shaping and developing the overarching and sector-level theories of change and important information on contexts, barriers, and enablers. Nevertheless, the absence of outcomes in so many studies means that the relationship mapping draws on a much smaller sample size than the total of 99 interventions.

While this analysis does not map direct causal pathways, given the large number of different activity combinations, it does support a deeper understanding of the types of interventions that appear to be working, offering some insight into where causal pathways may be emerging. The analysis is further supported by findings on key barriers and enablers identified at the sector level. Comparing the activity-outcome charts with the high-level intentional pathways in both overarching and sector-level theories of change allows us to examine how the expectations in theory and programme designs play out in practice. However, there are limitations to the valid interpretation of these findings, as discussed below.

5. LIMITATIONS

This study's methodology and realist synthesis approach has a small number of shortcomings. The first is that multiple stages of screening might lead to excluding important interventions from the final sample despite their potential contribution to a just transition. For a study in the literature review to pass all screening stages, it had to meet certain standards, such as database source, date and language of publication, and degree of rigour. There is a chance that interventions relevant to a just transition, and from which we could draw valuable lessons and information, have not been covered in studies meeting these criteria.

A second consideration is that the qualitative and highly specific information on interventions concerning just transition's place-based and contextual nature was subject to the analysis team's interpretation during the data extraction. Shared definitions of key terms, team discussions around ambiguous cases, and careful documentation of all decisions during the screening and data extraction helped ensure the resulting data set's internal consistency. However, a degree of imperfection in the final data set is inevitable due to the subjective nature of individual interpretation. Furthermore, the standardized categories used to synthesize the data also obscure nuances in the original studies. The team added information to the forms during the data extraction stage. However, not all of it can be analysed systematically.

Finally, in the analysis of standardized values presented in the activity-outcome charts, it is also important to note that several factors heavily influenced the observed impacts of interventions. Such factors include the context in which interventions occur, whether they are concluded or still under way, and the focus of reporting methodologies and results in the surveyed literature. Consequently, we only present information as the "incidence of evidence" on activities and associated outcomes. We do not carry out any other type of statistical or econometric analysis since the nature of the data is not yet suitable for these methods.

D. RESULTS

1. INTRODUCTION TO FINDINGS

This section presents the study's results and findings. It starts by summarizing the landscape of studies on just transition in non-Annex I countries, highlighting the diversity of findings across different geographies and sectors, and across intervention type and scale. The landscape analysis provides several interesting findings and highlights the complexity of identifying which type of just transition interventions have the potential to be most effective and in what context.

Attention then turns to outlining how just transition interventions are presented in the reviewed studies and the emerging findings on the outcomes different kinds of activities achieve. Overarching and sector-level theories of change are formulated based on the enablers and barriers and the intended or envisaged inputs, activities, outputs, and outcomes of interventions identified during the data extraction. While the theories of change are necessarily high level, they assist ongoing and future interventions aiming to contribute towards a just transition in non-Annex I countries. They should be reviewed alongside the activity-outcome mapping, which examines the incidence of activities and outcomes found across the interventions and indicates actual rather than intended pathways towards just transition outcomes.

Activity-outcome mapping highlights where evidence exists regarding previously used activities. This indicates where evidence gaps exist, which funders and policymakers can fill by gathering new evidence, such as whether and how energy interventions improve resilience, enhance adaptive capacity or reduce exposure (see sections 4.a-4.d). The team's mapping does not comprehensively

evaluate every possible intervention design and its effects. However, we spotlight several patterns in the data to draw tentative conclusions that might support further research.

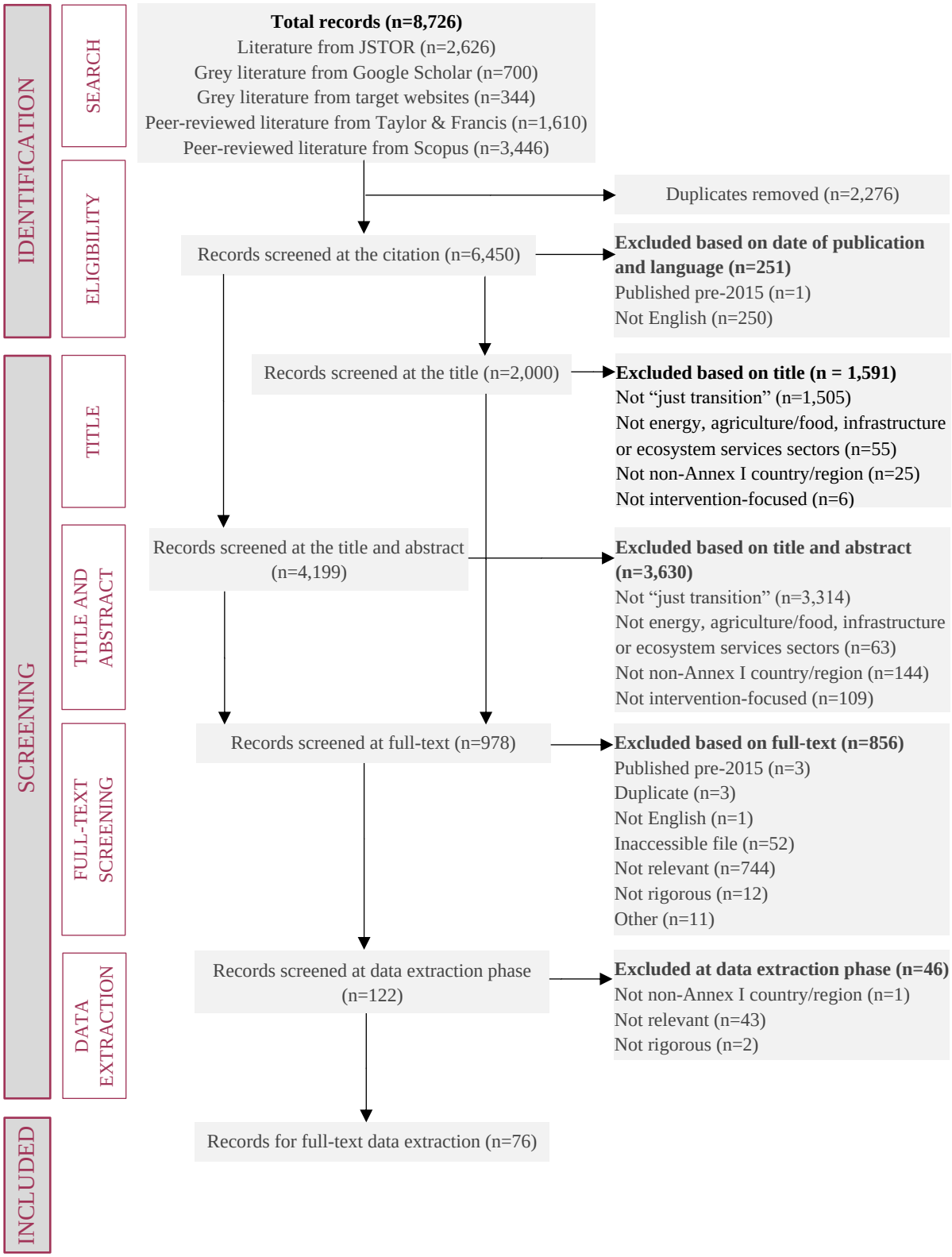
Furthermore, the relationships mapped represent the volume of evidence of correlations. They do not necessarily represent causal pathways. Understanding causality requires evaluating the influence of mechanisms and conditions, including contexts, barriers, and enablers. These were found to be highly intervention specific. For example, data on context were specific to location and time and varied significantly. However, enablers and barriers have been captured at the sector level.

2. LANDSCAPE ANALYSIS

This section sets out the landscape of interventions related to a just transition in non-Annex I countries. It is important to note that interventions included in the study were highly diverse in geography, economic and social context, sector, and scale.

The search and screening process is presented in the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) diagram in Figure 1 below. This outlines the process from the initial database searches to title and title and abstract screening, to full text screening, to the final round of screening during the data extraction phase. From 8,726 just transition studies found across four databases and 30 websites, 76 studies made it through all four screening stages to the final data extraction stage. The team completed data extraction forms for 99 interventions found within the 76 studies. The 99 interventions are detailed in Appendix 1.

Figure 1. PRISMA diagram

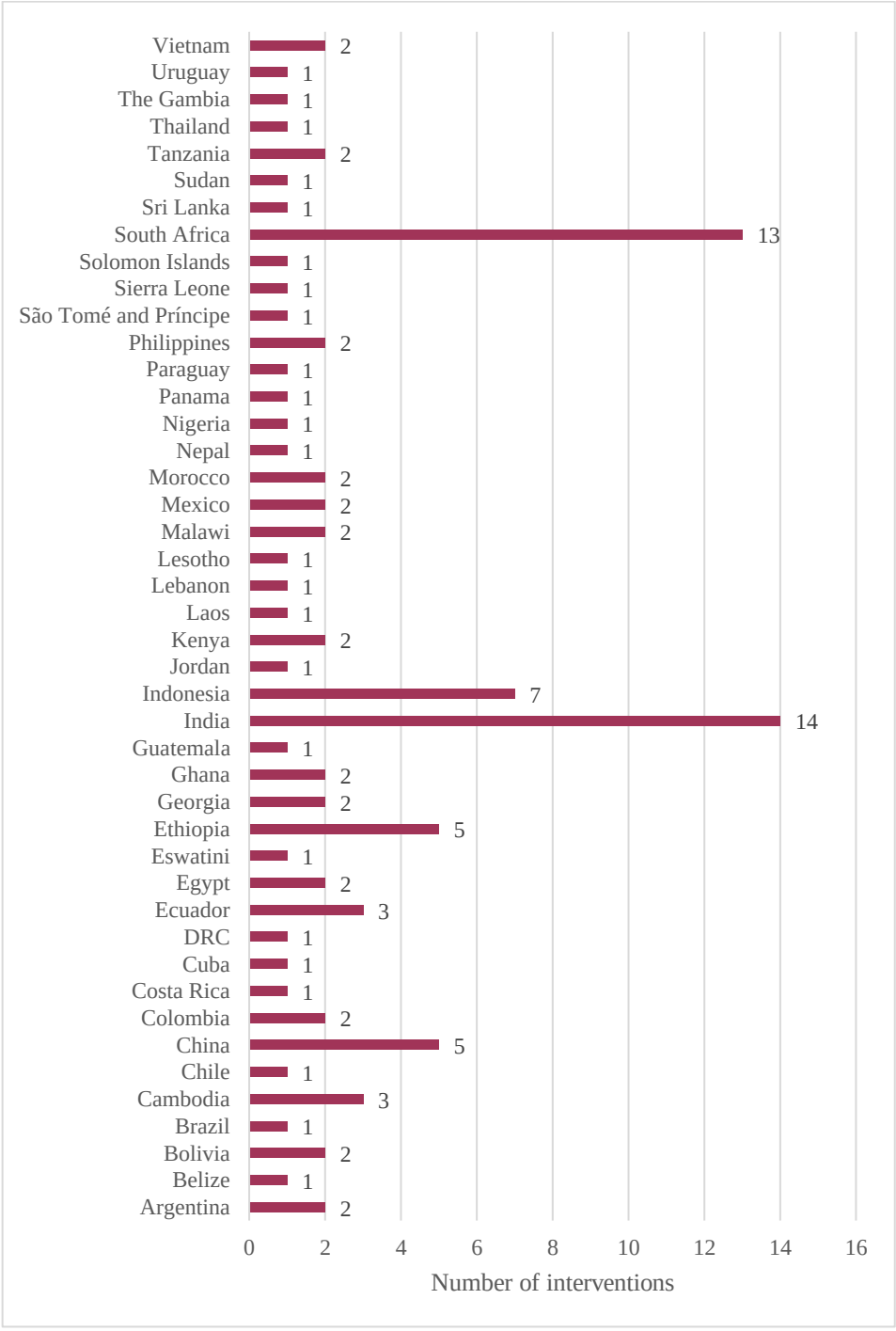


a. Geography

There are 45 unique countries represented across the 99 interventions, as shown in Figure 2 and mapped in Figure 3. This represents 29 per cent of the 155 countries classified as non-Annex I. The countries with the highest representation in the study are India (14 interventions), South Africa (13),

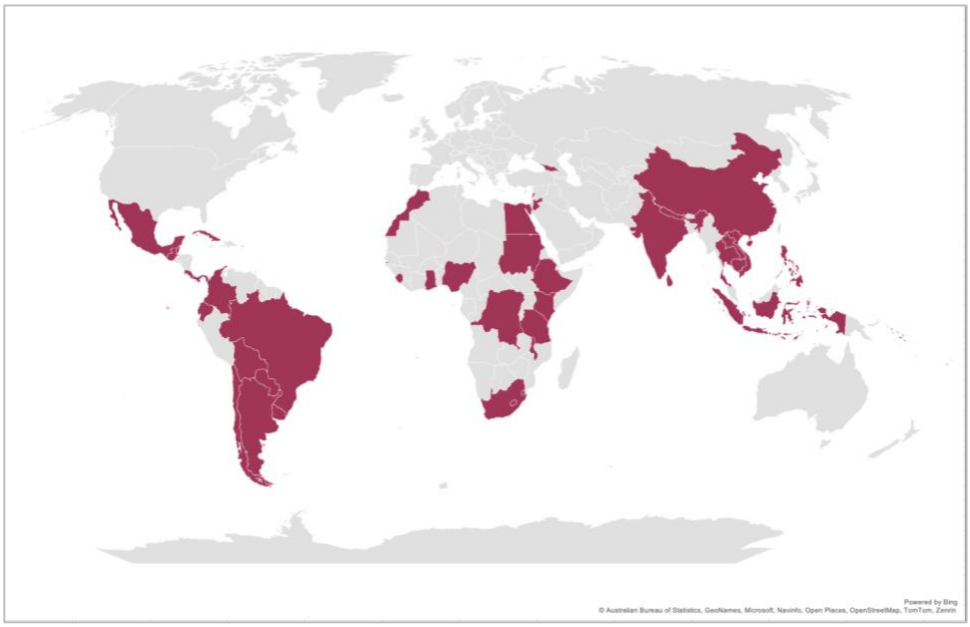
Indonesia (7), China (5) and Ethiopia (5).[16] This indicates that interventions contributing towards a just transition are currently more closely studied (within the English-language literature) in wealthier developing countries. The total number of countries is higher than the number of interventions because there were two multi-country interventions where each country was counted individually. One intervention was also on a continental scale (Africa), so is not included in Figure 2 and Figure 3.

Figure 2. Country location of interventions studied



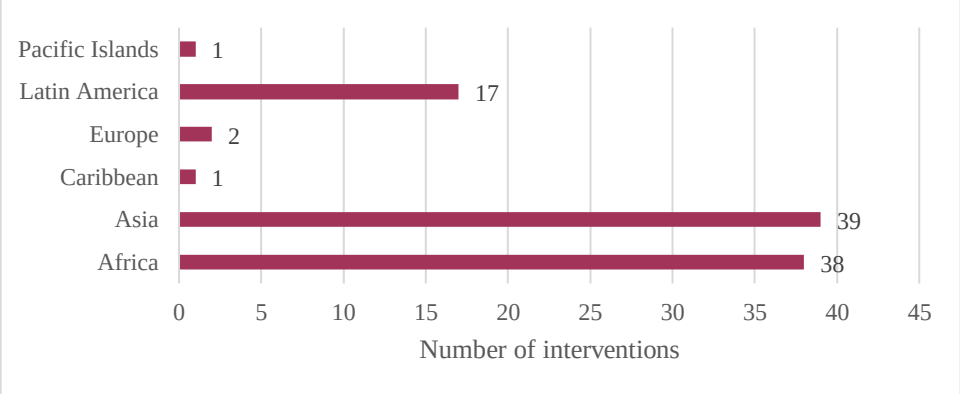
[16] One included study combined Italy, Indonesia and Australia.

Figure 3. Regional diversity of interventions studied



While considerable regional diversity exists across the 99 interventions, as represented in Figure 4, some regions were underrepresented in the findings. The study included 38 interventions from Africa, 39 from Asia and 17 from Latin America but only two from Europe, one from the Caribbean, and one from the Pacific Islands.[17] These findings suggest that just transition interventions are currently less prevalent in SIDS in the Caribbean and Pacific Islands. The underrepresentation of countries in Latin America, parts of Asia (especially Central Asia) and other places without English as an official language is partly due to the English-language bias of this study.

Figure 4. Regional location of interventions studied



b. Intervention type and target

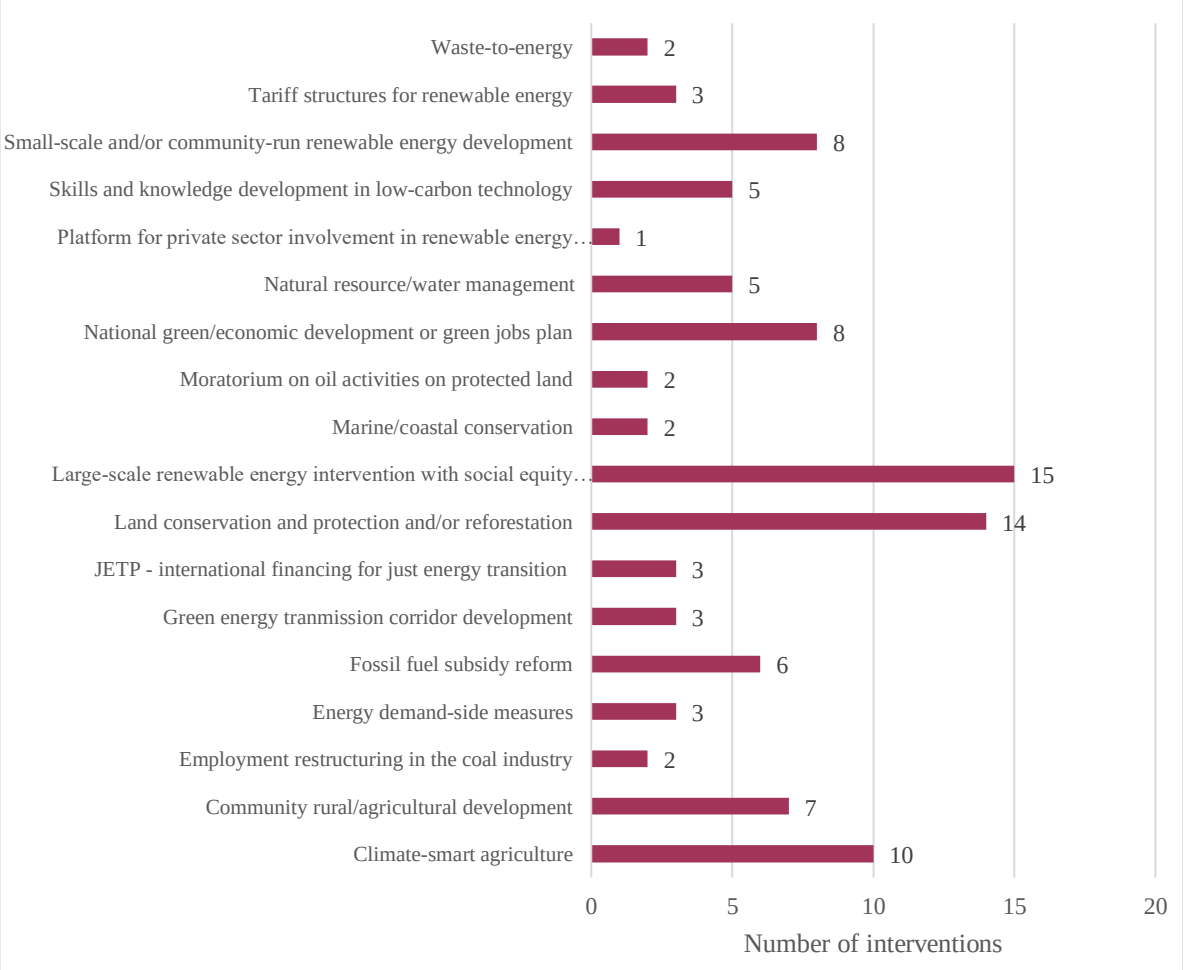
The studies included in this review identified a wide range of interventions, extending from large-scale fossil fuel subsidy reform, on the one hand, to localized climate-smart agriculture programmes

[17] One study was of Georgia, which is sometimes considered a transcontinental country. Although located at the intersection of Western Asia and Eastern Europe, it is generally regarded as part of Europe.

on the other. They were funded and/or implemented by a similarly wide range of institutions. These include governments, climate funds, international agencies, state-owned companies, banks, corporations, small businesses, public-private entities, educational institutions and community organizations.

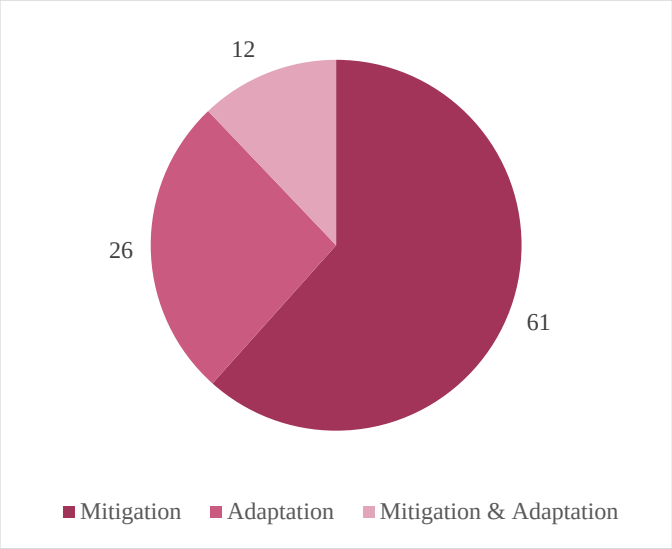
Across the 99 studies, the team identified 18 different types of interventions as illustrated in Figure 5. The intervention types were typically derived from narrative descriptions of each intervention, as the studies did not always clearly classify them. The most common interventions were large-scale renewable energy infrastructure with social equity components (15 interventions), land conservation and protection and/or reforestation (14), climate-smart agriculture (10), national green/economic development or green jobs plans (8) and small-scale and/or community-run renewable energy development (8). Other well-represented interventions included community rural/agricultural development (7 interventions), fossil fuel subsidy reform (6), natural resource/water management (5) and skills and knowledge development in low-carbon technology (5).

Figure 5. Types of interventions found in the included studies



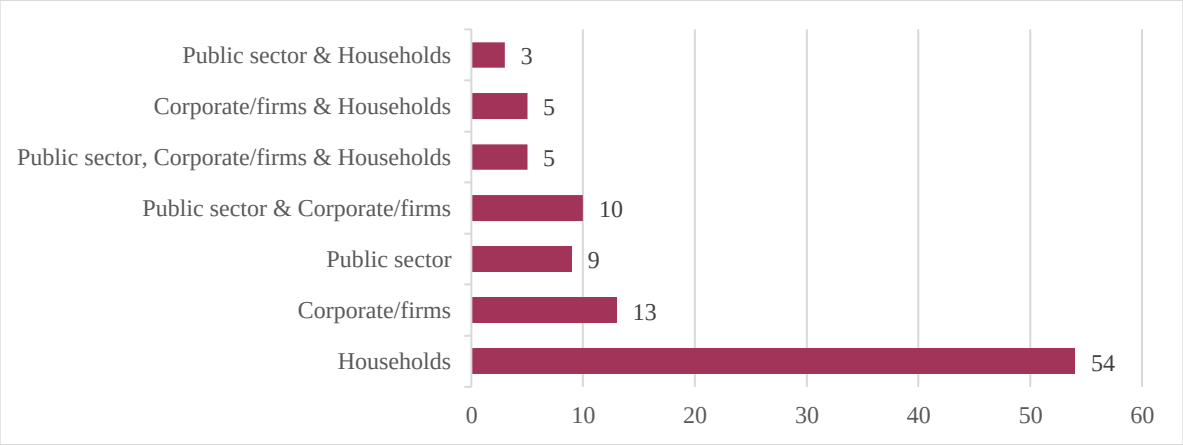
Interventions were also classified as focused on adaptation, mitigation or both, as shown in Figure 6. Overall, the balance of interventions focused on mitigation, with 61 interventions categorized as mitigation and 12 categorized as both adaptation and mitigation. Twenty-six interventions, just over a quarter, were classified as focusing only on adaptation.

Figure 6. Number of interventions by climate objective



As Figure 7 illustrates, interventions were also classified according to their target – households, corporate/firms, the public sector, or some combination of these. Overall, 54 interventions were targeted at households, 13 at corporations/firms and nine at the public sector. Notably, 10 interventions targeted the public sector and corporations/firms.

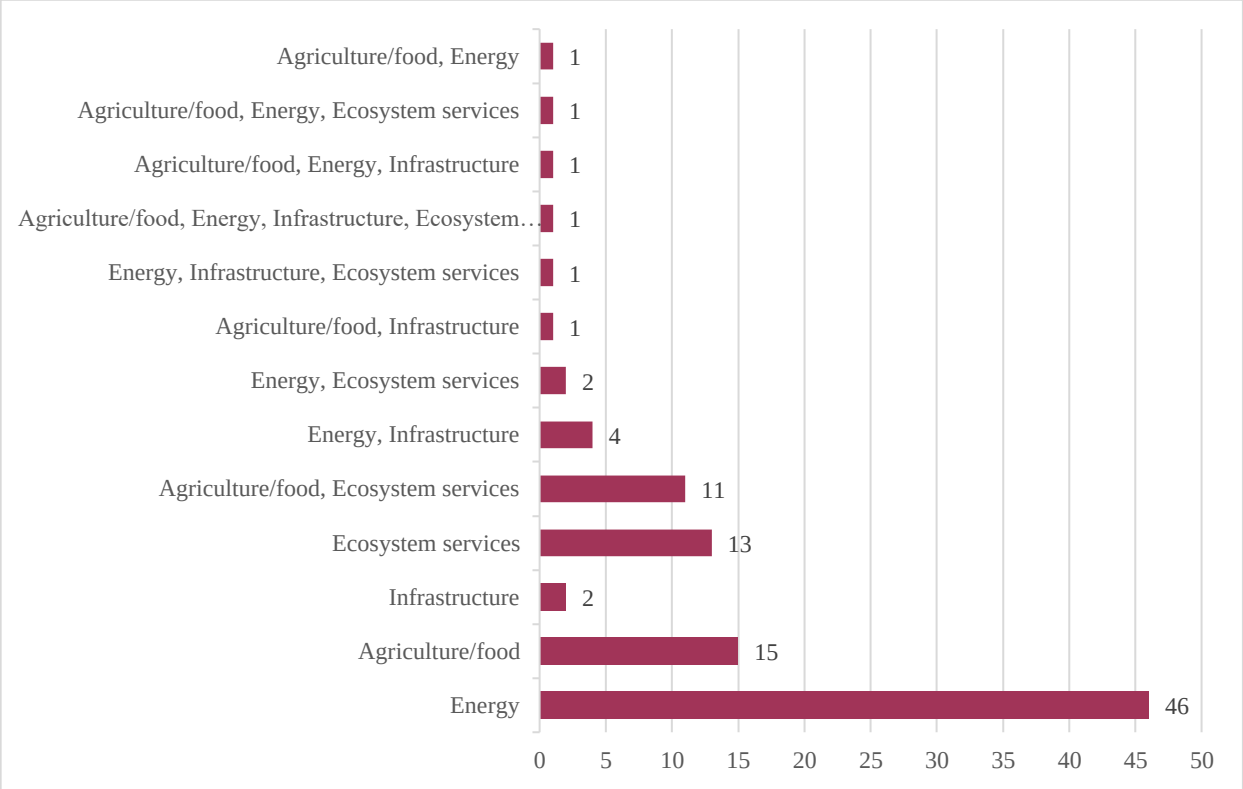
Figure 7. Target level of interventions studied



c. Sectors

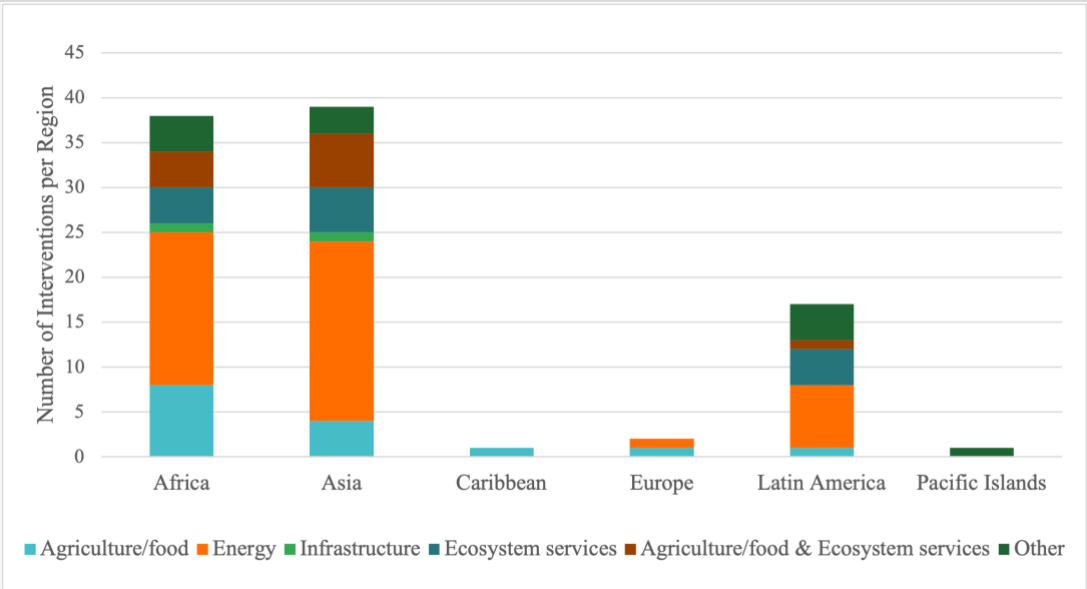
Figure 8 shows the distribution of interventions across the sectors studied. The sectors with the largest number of single sector interventions in the data set are energy (46 interventions), agriculture/food (15), and ecosystem services (13). Only two interventions were found in the infrastructure sector. However, four were identified that straddled the infrastructure and energy sectors and a further four that straddled infrastructure and one or more other sector(s). Several interventions straddled multiple sectors, the most common combination being agriculture/food and ecosystem services (11 interventions).

Figure 8. Sectoral distribution of interventions studied



Mapping sectors against geography highlights that just transition interventions are taking place across a range and combination of sectors in Africa, Asia and Latin America, as illustrated in Figure 9. Africa had the highest number of agriculture/food interventions, while Asia had the highest number of energy interventions. Interventions focused on ecosystem services were evenly distributed across Africa, Asia and Latin America. Far fewer interventions and thus lower sector coverage were found in the Caribbean, Europe and the Pacific Islands.

Figure 9. Sectoral and regional distribution of interventions studied



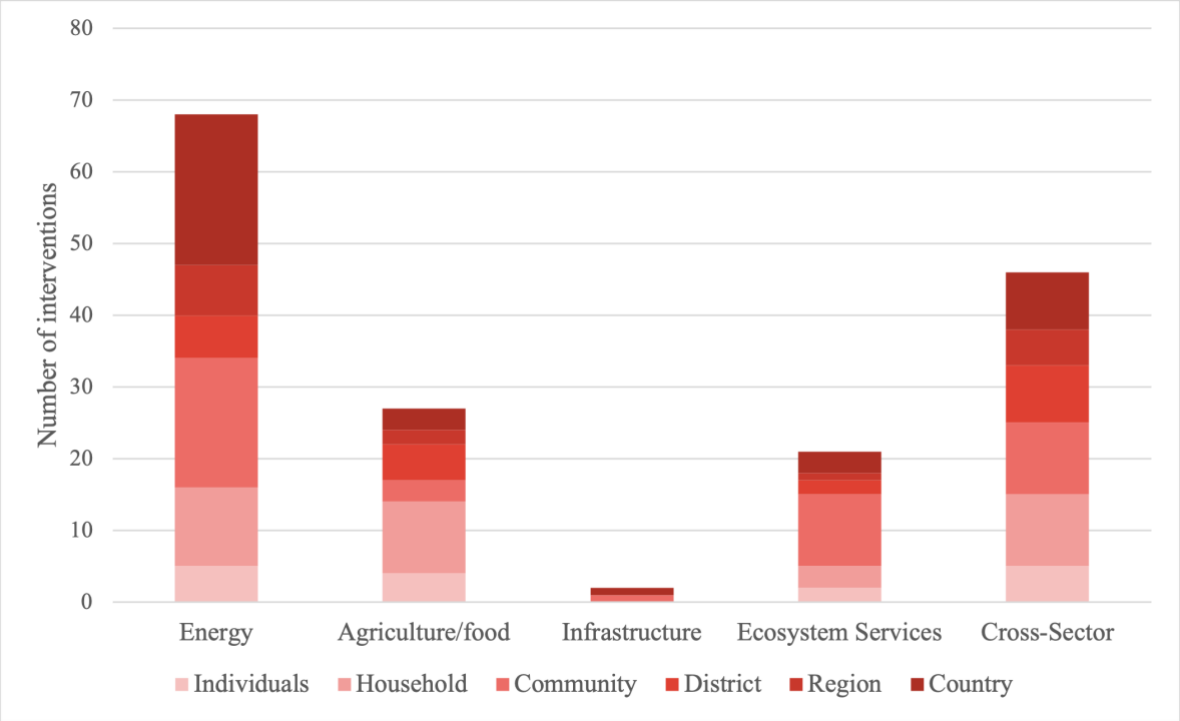
There is a variety of intervention types within each sector, as illustrated in Table 2. The review identified 13 intervention types in the energy sector, four in the agriculture/food sector, two in the infrastructure sector, and three in ecosystem services, with the latter comprising land protection interventions. Some interventions cut across multiple sectors, such as skills and knowledge development in low-carbon technology. Others are more sector specific, such as land conservation, protection and/or reforestation, relevant only to ecosystems and associated cross-over sectors.

Table 2. Intervention types identified within each sector

	ENERGY	AGRICULTURE/FOOD	INFRASTRUCTURE	ECOSYSTEM SERVICES	CROSS-SECTOR
Climate-smart agriculture	-	7	-	-	3
Community rural/agricultural development	-	5	-	-	2
Employment restructuring in the coal industry	2	-	-	-	-
Energy demand-side measures	3	-	-	-	-
Fossil fuel subsidy reform	6	-	-	-	-
Green energy transmission corridor development	3	-	-	-	-
JETP – international financing for just energy transition	2	-	-	-	1
Land conservation and protection and/or reforestation	-	-	-	10	4
Marine/coastal conservation	-	-	-	2	-
Moratorium on oil activities on protected land	1	-	-	-	1
National green/economic development or green jobs plan	1	-	-	-	7
Natural resource/water management	-	1	-	1	3
Platform for private sector involvement in renewable energy projects	1	-	-	-	-
Large-scale renewable energy intervention with social equity components	14	-	1	-	-
Skills and knowledge development in low-carbon technology	2	2	-	-	1
Small-scale and/or community-run renewable energy development	6	-	-	-	2
Tariff structures for renewable energy	3	-	-	-	-
Waste-to-energy	1	-	1	-	-

The 99 interventions studied in this review reveal that interventions contributing towards a just transition occur at various scales across sectors. Scales ranged from interventions focused on individuals, households and/or communities to interventions focused at the district, regional and/or country level.[18] Most interventions included in the study covered multiple scales. Renewable energy projects, for example, ranged from local community-run projects to large scale, countrywide interventions. Overall, we found 26 different combinations of scale. Examples include the financing and implementation of solar photovoltaic (PV) microgrids for household electricity in 14 remote villages in the Bundelkhand region of India and the USD 8.5 billion JETP renewable energy project in South Africa, although we note that the latter is only just getting under way (Suharsono and Maulidia, 2023; Standal and Feenstra, 2021). Many agriculture/food sector interventions, such as the Sustainable Poverty Reduction through Income, Nutrition and Access to Government Services (SPRINGS) project in Lesotho, involve international, national, or regional funds and policies implemented at the community level to enhance resilience and/or mitigate emissions.

Figure 10. Number of interventions by sector and scale[19]



3. Overarching findings on just transition interventions in non-Annex I countries

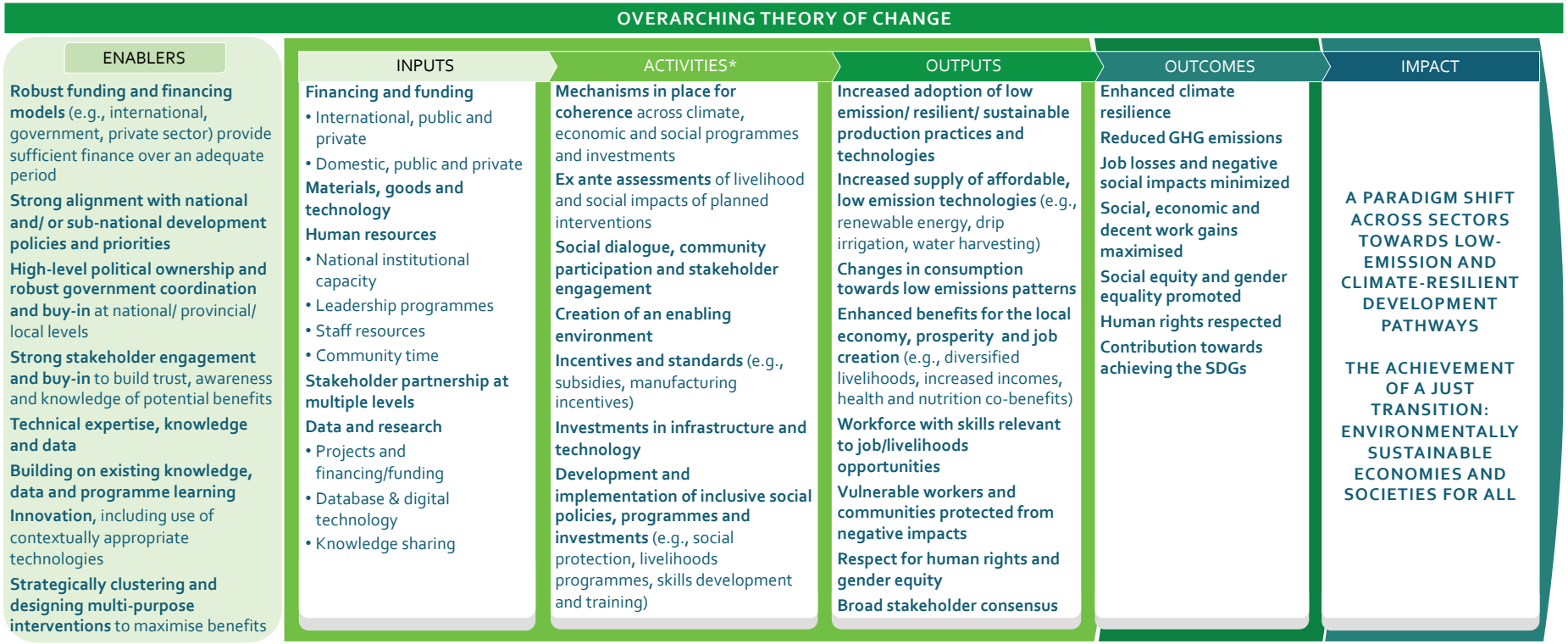
The approach paper for this study set out an overarching working theory of change for just transition interventions in non-Annex I countries. This was co-developed by the research team, GCF-IEU and the ILO based on existing knowledge and literature, documents by governments, international organizations and civil society, and research on just transition interventions worldwide. Much of this information draws heavily on the experience of just transition in the Global North. As described in section C.4, the approach paper's theory of change was further assessed, refined, and developed

[18] Some interventions at the district level also benefit households and individuals.
[19] There are more than 99 interventions represented in this graph because interventions that took place across multiple scales were counted for each location.

based on findings from this research to produce an overarching theory of change based on actual learning from non-Annex I countries, as shown in Figure 11.

The updated theory of change synthesizes our findings on how interventions are intended to contribute to a just transition. It is based on accounts of those plans or intentions (explicit or implicit) and the contextual factors likely to enable or obstruct progress identified in the interventions studied. At this stage, these findings do not reflect the actual results of existing interventions in potentially making these contributions. Many of the outcome level categories are consistent across the working and final ToC, which may reflect the influence of the wider discourse, knowledge and learning on the objectives of interventions. However, these categories are necessarily broad to cover the range of interventions identified across the four sectors, even though the findings from the included interventions were often more specific to their sector, scale, and context. Therefore, these outcomes can be met in diverse ways across different interventions. For example, for a national energy sector programme promoting "greater social equity and gender equality" could mean that income support for people losing employment has helped to prevent disparities in household income and that hiring for new jobs has been tailored to benefit women. In contrast, in district or community level interventions for forest conservation, the same outcome might mean that forestry-related revenues supported people and groups facing degrees of deprivation and exclusion.

Figure 11. Overarching theory of change



* Activities can be integrated and/or concurrent. They need not include all these criteria.

Enablers

This study sought to identify key enablers for a successful just transition in non-Annex I countries. While the enablers identified are explored in more depth at the sector level, several key enablers have been consistently identified across the literature and should be considered when designing or supporting future just transition interventions. These include hard enablers, such as robust financing and funding models, technical expertise, knowledge, and data. They also include soft enablers, such as high-level political ownership, robust government coordination, and strong alignment with national and/or subnational development policies. Coordination and stakeholder engagement are also important for building the awareness, knowledge and trust required to drive systems change and ensure inclusive programmes, policies and investments support a just transition. Such engagement can occur at all stakeholder levels, from government agencies to local communities. Another important enabler is strategically clustering and designing interventions with complementary objectives. For example, interventions focused on enhancing renewable energy capacity or energy transmission and distribution often lead to additional benefits. Similarly, strategically designing multipurpose interventions that span and maximize benefits across more than one sector, such as ecosystems and agriculture, can help create and drive an enabling environment.

Barriers

Barriers to successful just transition interventions are also explored more deeply at the sector level. These can be similarly clustered into key areas that impact an intervention at multiple stages studied. Such barriers include a lack of certainty around political commitments, buy-in and ownership, bureaucracy, legal issues, and unfulfilled expectations of policy reform undermining new approaches. Another set of barriers exists around stakeholder engagement and alignment with need, which can happen at multiple scales. Exclusion of certain groups, such as women and Indigenous communities, can happen at both the community and national level, such as being excluded from national dialogue on policy reform. Barriers relating to limited engagement and a lack of clarity around benefits can create distrust and undermine just transition interventions. Other barriers identified include the continued competition from dominant systems, enhanced by macro environmental factors and the high costs associated with new systems and technologies.

Inputs

Inputs help to fill gaps in enablers and to unblock, minimize, or reduce barriers to successful interventions. Inputs were not consistently identified but were captured where available. While these vary to some degree across sectors, we aggregated the most common inputs and included them in the overarching ToC. They include:

- Funding from international and domestic actors, private and public
- Materials, goods and technology
- Human resource inputs, including national institutional capacity, leadership programmes, and the work hours necessary to implement projects and engage with communities
- Consultations and engagement, including informed consent from community stakeholders to develop gender responsive and inclusive advocacy strategies
- Existing data and research to serve as a knowledge base for new interventions

Activities

Activities vary widely across sectors, scales and geographies. The team aggregated activities across the 99 interventions and found eight types of activities that incorporate climate and social equity considerations and contribute towards a just transition. However, the balance between activities' climate and social objectives varies. They include:

- Technical, financial and development types such as investments in infrastructure, technology, and implementation of inclusive social policies and programmes (social protection, livelihoods programmes, skills development and training)
- Analysis, coordination and consultation activities, such as mechanisms in place for coherence across climate, economic and social programmes and investments, ex ante assessments of livelihood and social impacts of planned interventions, and social dialogue, community participation and stakeholder engagement
- Enabling activities, such as the creation of an enabling environment and the introduction of incentives and standards (e.g. subsidies, manufacturing incentives)

Outputs

Outputs are intermediary achievements on the way to just transition outcomes. The scale of these outputs varies across interventions, depending on the available input and the selected activities. Across interventions, outputs can be categorized as climate or social equity and social gains outputs.

Climate outputs include:

- Increased adoption of low emission/resilient/sustainable production practices and technologies
- Increased supply of affordable, low emission technologies, such as renewable energy, drip irrigation and water harvesting
- Changes in consumption towards low-emissions patterns

Social equity and social gains outputs include:

- Enhanced benefits for the local economy, prosperity and job creation, such as diversified livelihoods, increased incomes, and health and nutrition co-benefits)
- A workforce with skills relevant to job and livelihood opportunities
- Vulnerable workers and communities protected from negative impacts
- Respect for human rights and gender equity
- Broad stakeholder consensus

Outcomes

Although outcomes are less reported across the intervention studies, they are relatively consistent across sectors because they occur at such a high level. Some outcomes, like GHG emissions reduction, are easier to measure. Other outcomes, like social equity and gender equality are more difficult to measure yet no less important. A just transition can only be achieved by successfully achieving both climate outcomes and social equity and social gain outcomes.

Climate outcomes include:

- Enhanced climate resilience
- Reduced GHG emissions

Social equity and social gains outcomes include:

- Minimized job losses and negative social impacts
- Maximized social, economic and decent work gains
- Increased social equity and gender equality
- Enhanced respect for human rights
- Increased commitment to the SDGs

A just transition can be realized through interventions successfully combining climate and social equity and social gains. The ensuing impact equates to achieving a paradigm shift towards low

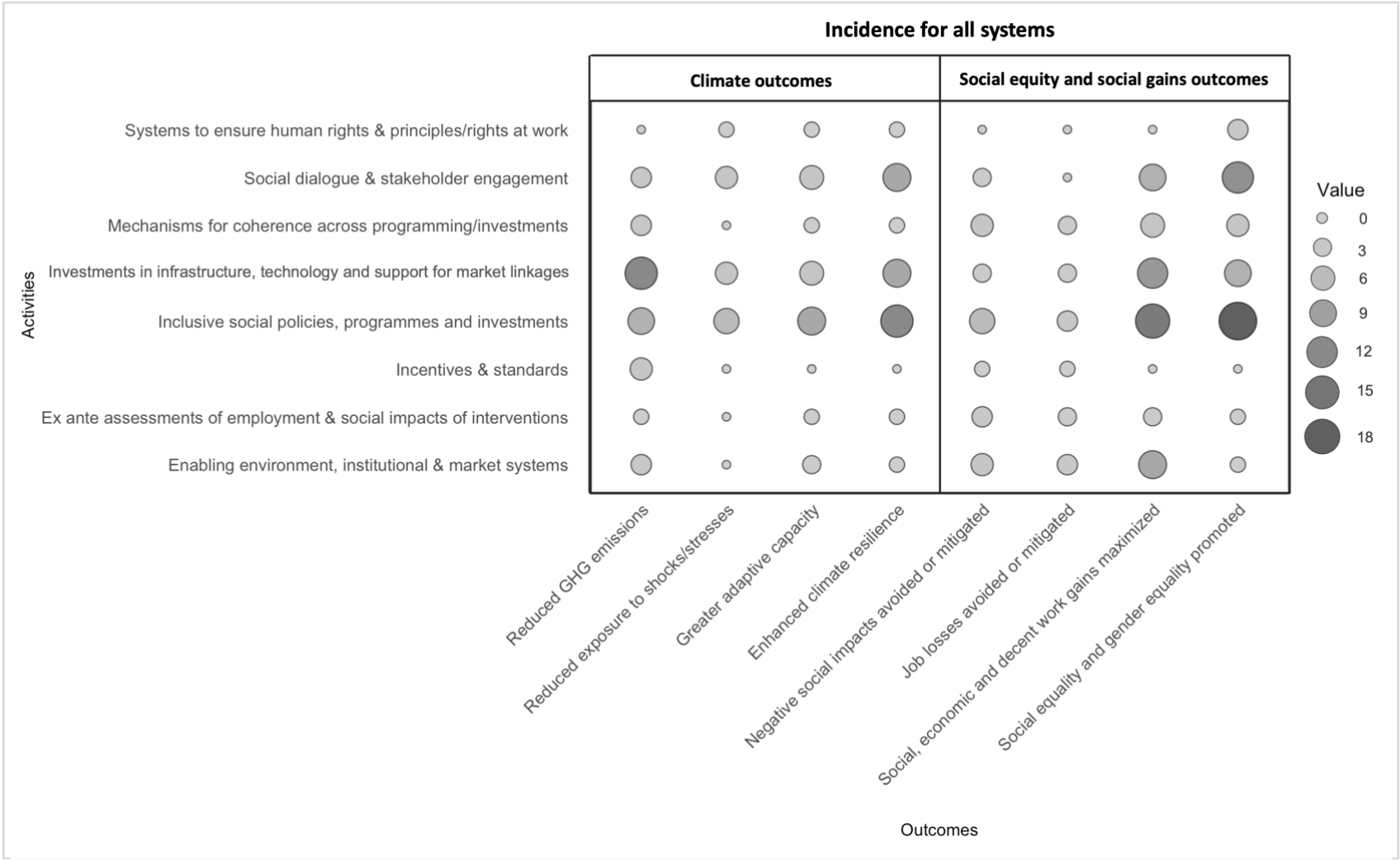
emission and climate resilient development through a just transition that ensures environmentally sustainable economies and societies.

Exploring activities mapped against outcomes across all sectors

Mapping the relationship between activities and outcomes for all systems combined shows a high frequency of evidence across four main outcomes. These are distributed evenly across climate outcomes, including enhanced climate resilience and reduced GHG emissions, and social equity and social gain outcomes, including optimized socioeconomic and work opportunities and increased social equality and gender equality, as illustrated in Figure 12. There is also a moderate to good incidence across all other outcomes, particularly reduced exposure to shocks and stresses and greater adaptive capacity, with slightly lower incidence for prevented and addressed negative social impacts and job losses. This study confirms climate and social equity and social gain outcomes are due to interventions contributing towards a just transition across non-Annex I countries. Slightly less evidence exists regarding interventions in these countries that prevent or mitigate negative impacts, such as job losses or other costs for individuals, which have typically been the focus of just transition discourse in Annex I countries.

The outcomes highlighted above are most associated with three activities: (i) inclusive social programmes, policies and investments, including skills training, (ii) social dialogue and stakeholder engagement and (iii) investments in infrastructure, technology and support for market linkages. This indicates that investment, inclusion and dialogue are important components of interventions aiming to achieve just transition outcomes. However, due to the highly varied landscape of included interventions reporting at the outcome level, it is not possible to draw robust conclusions on the most effective combinations of these activities. This challenge is examined in Box 1 in section 4.a, which explores the effects of combining activities in just transition interventions in the energy system. This system was selected for this level of analysis as it was the system for which we found the highest number of relevant interventions.

Figure 12. Activities mapped against outcomes across all just transition interventions



4. SECTOR-LEVEL FINDINGS ON JUST TRANSITION INTERVENTIONS IN NON-ANNEX I COUNTRIES

The team developed theories of change and mapped the relationships between activities and outcomes for three sectors (energy, food and agriculture, and ecosystem services). Given the low number of interventions captured under the infrastructure sector, the GCF-IEU and ILO agreed to conducting a narrative analysis. One cross-over sector—food/agriculture with ecosystems – was mapped given the high degree of overlap found between these two sectors (11 interventions focused on both agriculture/food and ecosystems).

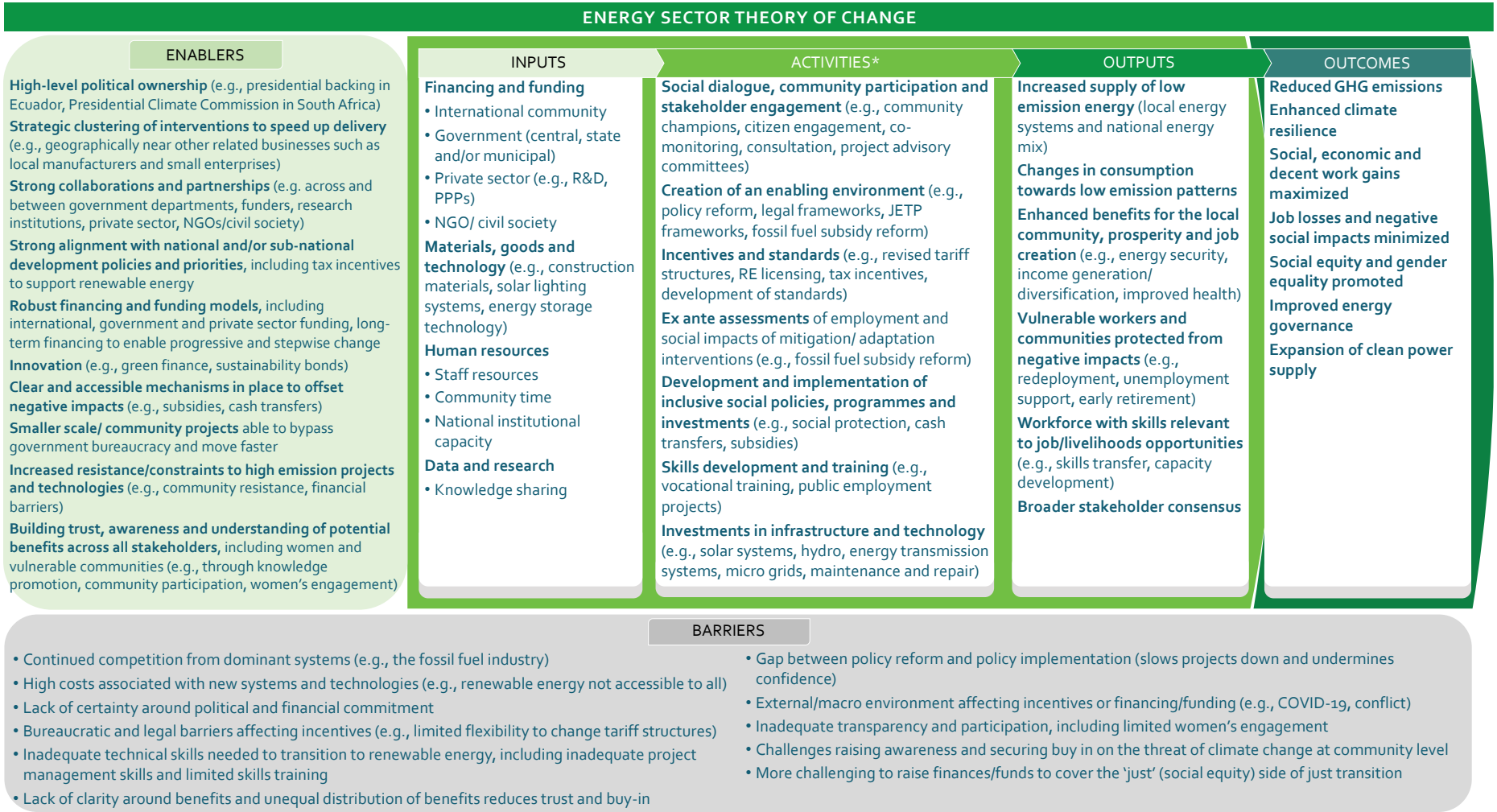
The theories of change, including sector-level findings on barriers and enablers, and the activity – outcome charts for each sector are discussed below. In all cases, the sectoral theories of change offer greater specificity for the activities, outputs and outcomes than the overarching theory of change shown above. They also provide an additional column of information on inputs and boxes for the key enablers and barriers to consider when developing and/or implementing interventions intended to contribute to a just transition in each sector.

a. Energy

Developing a sector specific theory of change for the energy sector

This section presents a theory of change for just transition in the energy sector. We present key barriers and enablers to successful just transition and provide examples of inputs, activities, outputs and outcomes extracted from the energy sector interventions studied.

Figure 13. Theory of change for the energy sector



Enablers

Several enablers were identified for a just transition in the energy sector. These group into clusters of well understood 'hard' and 'soft' enablers. Hard enablers include robust financing and funding models and the provision of longer-term financing. Soft enablers include high-level political ownership, trust and awareness among stakeholders, and strong partnerships between different groups of stakeholders, including government, funders, research institutions, private sector, and civil society representatives. This research finds that soft enablers are driven through the roles of key stakeholders, their commitment to acting in support of just transition interventions, and the relationships between them.

Barriers

Barriers to a just transition in the energy sector can be similarly clustered into key areas for consideration. These include hard barriers such as the high costs associated with new systems and technologies and continued large-scale fossil fuel investment, the high relative cost of renewable energy, and the uncertainty surrounding international and domestic finance for energy transition. There are also temporal barriers. Examples include the gap between policy reform and implementation, communication and awareness-raising obstacles, insufficient clarity regarding just transition's benefits, inadequate transparency and limited stakeholder participation. A further cluster was identified around understanding, perception and belief, including challenges securing community-level buy-in for interventions. For example, Greenpeace and two local non-governmental organizations encountered challenges setting up a solar microgrid in a small village in Bihar, India, to help eradicate energy poverty (Pandey and Sharma, 2021). Many people did not trust solar energy, calling on the state government state to provide "real energy and not this fake energy". The government complied, reconnecting the village to the conventional grid. As a result, fewer people used the solar microgrid.

Inputs

All theories of change developed during this research, including the sector-level and overarching theories of change, now include an additional column of information on the inputs. For the energy sector, these are grouped into four typical areas:

- Financing, funding and technical support from various stakeholders, including the international community, central, state/regional or municipal governments, civil society organizations, and the private sector through research and development or public-private partnerships.
- Materials, goods, technology and/or the innovation to develop them, including construction materials, solar lighting systems and energy storage.
- Human resources, including staff resources, community time and executive capacity.
- Data and research, including access to and sharing of existing knowledge.

Inputs are important because they help to fill gaps in enablers and to unblock, minimize, or reduce barriers to successful interventions, typically by building the implementing actors' capabilities. An example of a programme with significant financial input is a JETP now commencing in South Africa. The project is expected to receive USD 8.5 billion of international funding in its first phase to support the country's energy transition (Matola and Connock, 2023). This funding will prove critical in a country facing several barriers to a just energy transition, including large-scale investment needs and debt burdens that limit domestic resource mobilization. It is expected to support an enabling environment for private sector investment in large, utility-scale generation projects, developing transmission systems, and repurposing of "end-of-life" coal power plants, ultimately reducing GHG emissions and tackling inequality, poverty and unemployment (Suharsono and Maulidia, 2023).

Early-stage research is also a common input in energy sector interventions. For example, several of the partners in the La Estrecha Solar Community in Medellín, Colombia, were academic institutions (including EIA University, University College London and UK Royal Academy of Engineering) (Cárdenas Álvarez and others, 2023). Their partnership provided a strong knowledge base on solar communities essential to the project, allowing project implementers to run community workshops on energy systems and set out how small-scale grids would work. These research inputs helped to overcome the barriers typically associated with this type of community-level energy intervention, including the high degree of technical knowledge required and the lack of incentives for communities to develop these schemes.

Activities

Activities found to be most relevant to a just transition in the energy sector included:

- Creation of an enabling environment for just transition, such as policy reform, including fossil fuel subsidy reform, legal frameworks, and investment frameworks, such as South Africa's JETP.
- Incentives and standards, such as revised tariff structures and renewable energy licensing.
- Investments in infrastructure and technology, with a focus on generating more renewable energy capacity. Examples might include support for renewable energy technology, materials, and systems, and increased transmission of renewable energy through greater transmission capacity and microgrids.

Regarding social equity and social gains, we found that inclusive social policies, programmes, and investments typically included social protection, cash transfers and vocational training. We found, for example, that cash transfers were used to support fossil fuel subsidy reform in both Indonesia and Egypt (see Box 1).

Box 1. Cash transfers to support fossil fuel subsidy reform

In Indonesia, a key challenge for transitioning towards a less carbon-intensive energy sector was to manage distributive effects so that the transition did not disproportionately burden poor households (United Nations Research Institute for Social Development, 2019). In 2016, the Government of Indonesia committed to reducing its emissions by 29 per cent, conditional on receiving international support. The government developed a low-carbon development plan, which included fossil fuel subsidy reform, reducing their spending on fossil fuel subsidies from Indonesian rupiah (IDR) 1,124 trillion in 2011-2014 to IDR 447 trillion in 2015-2018. Low-income households were hit hardest by these reforms, presenting a challenge to the government as these households initially opposed the changes. The government responded by implementing a redistributive cash transfer programme to mitigate the reform's impacts on low-income households and to strengthen social buy-in.

Similarly, cash transfer and other social protection programmes were developed in Egypt to offset the impact of increased fuel prices on vulnerable groups (Donald, 2022). Before 2012, the Egyptian government spent approximately 20 per cent of its national budget on fossil fuel subsidies. The government began phasing them out in 2012-14 by increasing gasoline prices. In 2014, the government introduced social protection measures designed specifically to offset the reform's negative social impacts, allocating 53 per cent of its savings to health, education, and other programmes. In 2016, the government again reduced the fossil fuel subsidy while increasing food subsidies. Throughout this period, social protection in the form of cash transfer programmes targeted low-income families with children of school-age, the elderly, people with disability and

orphans. The government also increased subsidies on infant formulas and paediatric medicines and introduced free school meals and gas connections in poor areas. The ILO estimates these programmes reached 6 million Egyptians. Other sources indicate the programmes reached 2.5 million households – one-third of households below the national poverty line.

We also found information on the types of stakeholder engagement intended to help drive a just energy transition, such as ensuring ongoing consultation and citizen engagement, identifying and nurturing community champions, and co-monitoring energy interventions.[20] For example, in South Africa, a community initiative that employs women as renewable energy and energy efficiency advisers under the Renewable Energy and Energy Efficiency for Development Initiative conducts consultation to understand local needs regarding energy use and access (Donald, 2022). A solar community in Medellín, Colombia, supports stakeholder engagement through monthly workshops to build community awareness of energy issues. It also creates community spaces to discuss decision-making, answer questions, ask advice, and report on project progress (Cárdenas Álvarez and others, 2023). Overall, the review of available evidence found a limited degree of engagement by workers' and employees' organizations within formal social dialogue processes and mechanisms.

Outputs

Outputs have been grouped into five main areas, again with increased detail that captures the type of outputs most observed in the energy sector. These flow logically from the activities, with a large focus on increasing the supply of low emission energy from local energy systems and the national energy mix, and changes in consumption towards low emission sources such as solar and hydropower at the community level and in the national grid. Outputs include protecting vulnerable workers and communities from the negative impacts of a transition, including through support to replace lost income, find re-employment, or reduce additional cost burdens. There is also a focus on developing a workforce with the relevant skills to transition into new or emerging subsectors and job roles. In China, for example, when the government ordered the closure of a series of coalmines, metallurgic industries and electricity companies in 2016 and 2017, it introduced measures to help workers find new jobs (van der Ree, 2019). This included the Public Employment Projects programme which helps workers to find employment, provides social protection measures such as medical and pension benefits for retrenched employees, and offers re-training subsidies.

Other critical outputs in the energy sector include enhanced benefits for the local community, such as job creation, greater energy security, income generation and co-benefits such as improved health. We found several examples of small-scale interventions, including projects focused on biogas, solar PV, solar cookers and micro-hydropower, explicitly aiming to deliver livelihoods and social equity benefits to local communities. One example is decentralized community-based micro-hydropower plants implemented by the German Development Cooperation in Ethiopia. The initiative sought to deliver multiple social equity and social gains outcomes, including reducing the time women spent cooking, allowing students to study at night and improving health outcomes through increased access to electronic media (Wiese, 2020). The risks of an unjust transition occurring through these community-level interventions are not typically the same as those associated with a transition from a more advanced, fossil-based energy system. This is because job and income losses are less relevant than how benefits are shared among people in recipient communities. Nevertheless, the paradigm of protecting individuals against losses also has some precedent in non-Annex I countries, as do larger

[20] Limited evidence on social dialogue involving trade unions and employers/business organizations emerged from the interventions studied.

scale interventions. For example, in Indonesia's fossil fuel subsidy reform, significant budgetary savings were channelled into health care, poverty reduction and infrastructure programmes (see Box 1 above). These investments were designed to protect the public, especially low-income communities.

Outcomes

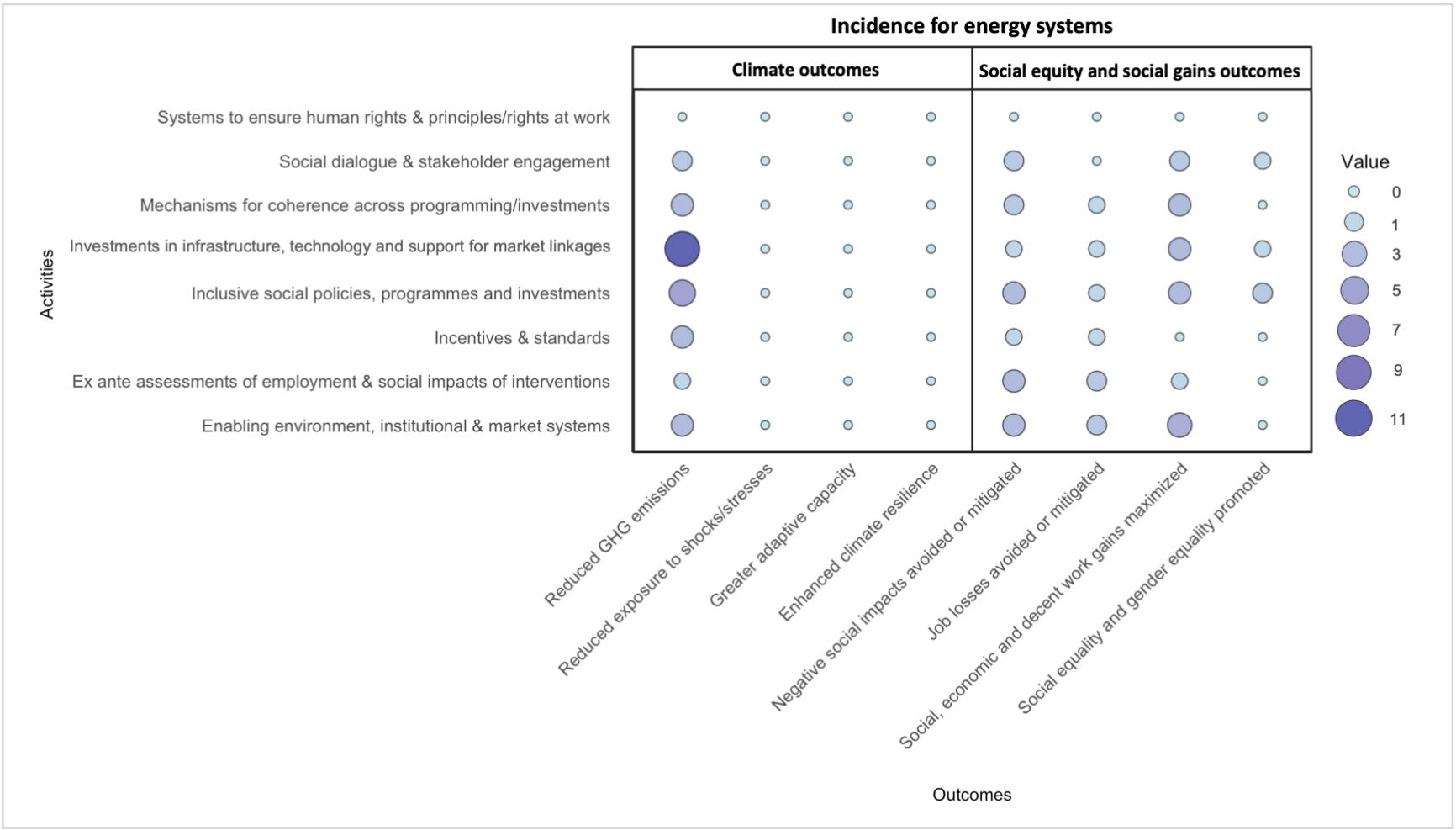
The research identified eight key outcomes for the energy sector. Unsurprisingly these include an expanded clean power supply and reduced GHG emissions. Linked to this, we also found improved energy governance to be a key outcome for several interventions in this sector. For example, the Asian Development Bank (ADB) funds the Himachal Pradesh Clean Energy Development Investment Programme in India, an initiative to create a sustainable state level electricity sector by improving energy sector governance (Asian Development Bank, 2022a).

Other outcomes identified for the energy sector include enhanced climate resilience, maximized social, economic, and decent work gains, minimized job losses and negative social impacts, and improved social equity and gender equality. For instance, the Africa-European Union (EU) Renewable Energy Cooperation Programme set up a platform for private sector participation in Africa's renewable energy markets that incorporated social equity objectives, such as mainstreaming gender in renewable energy (Benkenstein and Murungi, 2020). In Indonesia, the Cinta Mekar micro-hydropower plant – flagship of UNESCO's pro-poor public-private partnership programme – reduces carbon emissions by increasing renewable energy and supports social outcomes by utilizing income from the sale of electricity to support local livelihood initiatives and scholarships for under-privileged children (Sarrica and others, 2018). Several of the outcomes identified in the energy sector relate to the clusters of soft enablers and activities set out above.

Mapping the relationship between activities and outcomes in energy

After examining the theory of change for the energy sector, we focused on how energy sector interventions contributing towards a just transition are linked in practice to reported outcomes. To do this, we mapped the actual incidence of activities and outcomes captured from interventions in the energy sector to identify if strong correlations exist between them (see section C.4.d).

Figure 14. Activities mapped against outcomes in the energy sector[21]



[21] Note that the mapping shows incidence both by the size and the depth of colour of the bubbles.

As set out in the landscape analysis (section 2), the energy sector was the most richly represented across the literature, with the highest number of interventions overall, with 46 targeting energy specifically and 11 targeting energy and some combination of other sectors. This richness provided us with a higher number of reported activities and outcomes than for other sectors, although outcome level data was not available for all energy interventions studied.

Mapping the relationship between activities and outcomes for the energy sector shows that the highest incidence occurs for one outcome: reduced GHG emissions. This outcome is most strongly associated with investments in infrastructure, technology, and support for market linkages. However, there is moderate to good association across all other activities, except for systems to ensure human rights including labour rights. These findings show that there are energy interventions that focus on climate, social equity and social gains in non-Annex I countries. An example of a combination of climate and social gains focused activities is to be found in the South African Renewable Energy Independent Power Producer Procurement Programme, which funded projects such as the Cookhouse wind farm (Chetty and others, 2023). In addition to diversifying South Africa's energy portfolio and reducing GHG emissions, the Cookhouse project includes social equity elements, such as supporting community ownership, providing community skills training, encouraging youth employment, meeting Broad-Based Black Economic Empowerment standards, and investing in health care investments. With a capacity of 138.6 megawatt, the project's 66 wind turbines have prevented the emission of 384,000 MtCO2e[22]. There is also good to moderate incidence of reduced GHG emissions associated with five other activities: mechanisms for coherence across programming and investments, incentives and standards, creating an enabling environment, institutional and market systems (public/private), and social dialogue and stakeholder engagement.

Social outcomes with the highest incidence across energy sector interventions include prevented or reduced negative social impacts within social groups and across societies and maximized social, economic, decent work gains within regions or countries. There is also good incidence of prevented and reduced job losses within sectors or the whole economy and improved social equality and gender equality within social groups or society. This demonstrates that interventions aiming at a just transition in the energy sector in non-Annex I countries are achieving a complementary set of positive outcomes across the energy sector beyond reducing GHG emissions. Key activities associated with these outcomes include action on climate and social equity and social gains, investments in infrastructure and technology, support for market linkages, creation of an enabling environment, institutional and market systems (public/private), social dialogue, stakeholder engagement, and inclusive social policies, programmes and investments. Mechanisms for coherence across programmes and investments and ex ante assessments of employment and social impacts of interventions were also prominent.

The mapping found no reported incidence of energy interventions leading to enhanced climate resilience, greater adaptive capacity, or reduced exposure to shocks and stresses. This implies that activities supporting energy sector interventions do not contribute to enhanced climate resilience or greater adaptive capacity. While this is perhaps unsurprising, given that energy sector interventions are predominantly intended to achieve climate mitigation, the incidence of reported outcomes might be skewed by a focus on mitigation in the results frameworks developed to monitor and evaluate their progress and performance. Some focus on the upskilling of workers in new and emerging industries such as renewable energy technologies and transmission systems emerged. Notably, no evidence was found of dedicated activities supporting systems for ensuring human rights, including labour rights. To take this analysis one step further, we examined the importance of certain activities

[22] Metric tons of carbon dioxide equivalent

for achieving outcomes. Given the many combinations of activities and outcomes across different interventions, it was not a straightforward exercise. Box 2 sets out our findings.

Box 2. Understanding the effects of combining activities in just transition interventions in the energy system

Among the 13 energy system interventions that reported GHG reductions, 11 featured investments in infrastructure, technology, and support for market linkages. In four of these interventions, no other activities were undertaken. This suggests that investment in infrastructure remains a core component of energy system reform in non-Annex I countries and that activities to build social capital are often still considered optional. Furthermore, roughly half of the interventions reporting successful climate outcomes did not report any outcomes for social equity and social gains, despite the studies where they were cited as clearly noting their inclusion of social elements and relevance for social objectives. This proportion was the same among interventions that only included investment in infrastructure.

However, interventions that combined infrastructure investments with other activities and reported social equity and social gains outcomes, show that the benefits can be significant. A closer examination of certain projects revealed the importance of designing interventions that address social equity and consider the project's context. The Pavagda solar park in Karnataka, India, for example, provides an example of how state government and electricity companies built in innovative land leasing arrangements to allow farmers to benefit from investment by private developers, even in a context of uneven and insecure land tenure (Ghosh, Bryant and Pillai, 2022). Another example is the Pollinate intervention in Bangalore that involved training for community members and supplying over 10,000 people with solar lighting systems, saving over 40,000 litres of kerosene and reducing emissions by 100tCO2e (Chatterton, 2019). The focus on developing local skills created a local energy market and generated community support. Finally, the ADB funded Himachal Pradesh Clean Energy Development Investment Programme's construction of hydropower infrastructure included facilitating coherence across programmes and investments, including those of the German development bank, KfW, and the World Bank, and engaging with stakeholders, including communities and the state government (Asian Development Bank, 2022a). The combination of these activities appears to have supported both the climate and social equity and social gains pillars of just transition.

It is important to note that these findings do not imply causality and might simply result from differences in reporting between studies in the literature, especially given such a small sample size. However, they suggest that more evidence is needed to understand precisely how undertaking additional activities targeting social equity can produce desired impacts in the energy sector.

b. Agriculture and food

Developing a sector specific theory of change for agriculture and food

The theory of change developed from just transition interventions included in this study for the agriculture/food sector is presented in Figure 15. This has been developed based on the implicit theories of change set out for the interventions studied.

Figure 15. Theory of change for the agriculture/food sectors

* Activities can be integrated and/or concurrent. They need not include all these criteria.

Enablers

Enablers for a just transition in the agriculture/food sector can be classified as hard or soft. Like enablers in the energy sector, these include hard enablers linked to robust financing and funding models, including international and domestic funding, and soft enablers such as solid and coordinated government support across different levels and strong alignment with national and/or subnational economic and development policies.

Soft enablers are critical in a sector where most interventions contributing towards the outcomes of a just transition are currently focused at household or community level. These include community empowerment, mobilization, and approval for new agriculture interventions and practices. In Tanzania, for example, the CARE-WWF Alliance worked with smallholder farmers to adopt climate-smart agriculture practices while supporting the development of village savings and loan associations and engaging communities in participatory forest management (Margoluis, 2021). Funds from these activities enabled the community to invest in priority development activities, reinforcing the link between sustainable natural resource management and human well-being.

The last group of enablers can be clustered around knowledge, recognizing the importance of scaling up or continuing an already successful pilot or programme and building on existing data and knowledge of climate resilient agriculture. In Lao PDR, for example, the Nam Ngum River Basin Development Sector Project, an integrated water resource management project designed to deliver livelihoods and agriculture benefits and supported by the Asian Development Bank (ADB), Agence Française de Développement and the Government of Lao PDR, drew on the experience and lessons of previous ADB investments in irrigation, water supply, and hydropower (Asian Development Bank, 2016).

Barriers

Barriers to a just transition in the agriculture/food sector are wide ranging and can arise at multiple points across an intervention lifecycle. Considering the study's scale of agriculture and food interventions, it appears that financial barriers are less about securing major international funding and more about farmers' access to timely support for shifting to new systems and technologies. This shift requires significant upfront costs, even when relevant skills have been acquired. However, limited financial options and a lack of readily available subsidies can hinder farmers' ability to make these crucial investments. In Morocco, for example, while the government offers farmers large financial incentives to install drip irrigation, a micro-irrigation system that can help to save water while maintaining yields, only a small number of farmers have taken up the opportunity, largely due to barriers in accessing credit and government subsidies (Jobbins and others, 2015). The high cost of drip irrigation technology was also an implementation barrier in the Increasing Farmer Resilience to Climate Change-Upscaling Market Oriented Climate Smart Agriculture Project implemented in Eswatini, significantly impacting project coverage. A key factor in this case was the reliance on and high cost of externally manufactured technology (United Nations Development Programme, 2021a).

There is also a cluster of barriers related to administration and bureaucracy in the agriculture/food sector, including project delays linked to insufficient technical training for implementing partners, inadequate literacy levels impeding paperwork, limited monitoring and evaluation systems at local levels, and bureaucratic and legal barriers and delays linked to land tenure, land access and procurement. For example, in Thailand's Mae Chaem district, delays in issuing permits have held back implementing the government's Khok Nong Na Model, a new agricultural model based on applying local knowledge and the sufficiency economy philosophy (Partnership for Action on Green Economy, 2023).

On the social equity side, we found a cluster of barriers relating to societal norms, including entrenched patriarchal norms and legal frameworks restricting women's engagement in decision-

making and training. We also found an unequal distribution of project benefits across programme geographies, which, together with the financial and administrative barriers noted above, undermined community support for some interventions. In the Oromia region of Ethiopia, for example, many participants dropped out of a Japan International Cooperation Agency (JICA) funded Farmer Field School project aimed at building increased resilience partly because they did not understand the training's objectives and benefits (Kubo, 2023). This project was implemented by the Oromia Bureau of Agriculture and Natural Resource in collaboration with JICA. The project also had low coverage across targeted districts, contributing to an unequal spread of benefits and reducing potential community-level impact. Other barriers identified included physical limitations associated with the land, such as unpredictable weather patterns, soil erosion and land fragmentation, and access to storage or market facilities for processing higher crop yields. Importantly, these barriers are often surmountable through appropriate project design. For instance, limited access could be addressed in the design of an intervention.

Inputs

As highlighted above, the theory of change for the agriculture/food sector includes a new column of information on inputs. These can be grouped into five key areas:

- Financing and funding from international and national actors, including government
- Stakeholder partnerships at multiple levels, including across communities, local implementing agencies and local government departments or authorities
- Provision of materials, equipment and technology to support a transition towards new and more sustainable agricultural practices
- Data and research, with a focus on learning from past and ongoing projects and drawing on data and digital technology to support intervention design
- Human resources, including the institutional capacity to support intervention start-up and delivery, leadership programmes and farmer participation in training

Activities

While some of the activities align with those captured in the overarching theory of change, further information is provided on the specific ways they are articulated. This concerns, for example, the types of investment in infrastructure and technology and the various ways to support an enabling environment for just transition interventions in the agriculture/food sector. While investments typically focus on farm equipment and adopting climate-smart technology, creating an enabling environment requires developing policy, legal, institutional and financial frameworks that support successful interventions. We also found that micro-level savings and lending communities were a key part of creating a sustainable enabling environment for community-level interventions, as highlighted by the CARE-WWF Alliance described under enablers. Another example is UNDP adaptation and resilience building work in Malawi, which supports the development of village saving and loan associations.

Given that skills development and training featured so prominently, it has been included as its own activity for agriculture/food, with specific examples provided, rather than as a subset of inclusive social policies. In the interventions studied, skills development included a focus on climate-smart agriculture and business management, as well as training on nutrition co-benefits. The SPRINGS programme in Lesotho, implemented by the Ministry of Social Development, while focused on homestead gardening and food preservation techniques, also included nutrition training through community-led complementary feeding and learning sessions (Daidone and others, 2023).

Three new sector specific activities have also been added to the theory of change. These include market access, linkages, and standards. They particularly focus on compliance with organic

standards and land management, especially regarding forest protection, land rehabilitation, and market access. If these are not properly factored into programme design and implementation, they can impede success. Alongside organic farming training, the farmers involved in the International Fund for Agriculture Development's Participatory Smallholder Agriculture and Artisanal Fisheries Development Programme and its successor, the Smallholder Commercial Agriculture Project in São Tomé and Príncipe, were given professional training and support in accessing markets. The programmes provided assistance in terms of transport, development of new products, and participation in new markets (Garbero and others, 2019).

Outputs

Outputs have been grouped into four main areas for the agriculture/food sector with an overarching theme of resilience and livelihoods. This flows naturally from the activities, with all four outputs closely interlinked and complementary. Strengthening the skills and knowledge of the workforce and increasing the adoption of low emission, resilient and sustainable agricultural practices complement protecting vulnerable workers and communities from climate change's negative impacts, enhance benefits for the local economy, build prosperity, and create jobs. In Cuba, for example, introducing more resilient farming practices and early warning systems under the Cooperativa Agrícola Niceto Pérez project, has helped increase crop quality and production and raise local farmers' incomes (United Nations Development Programme, 2021b).

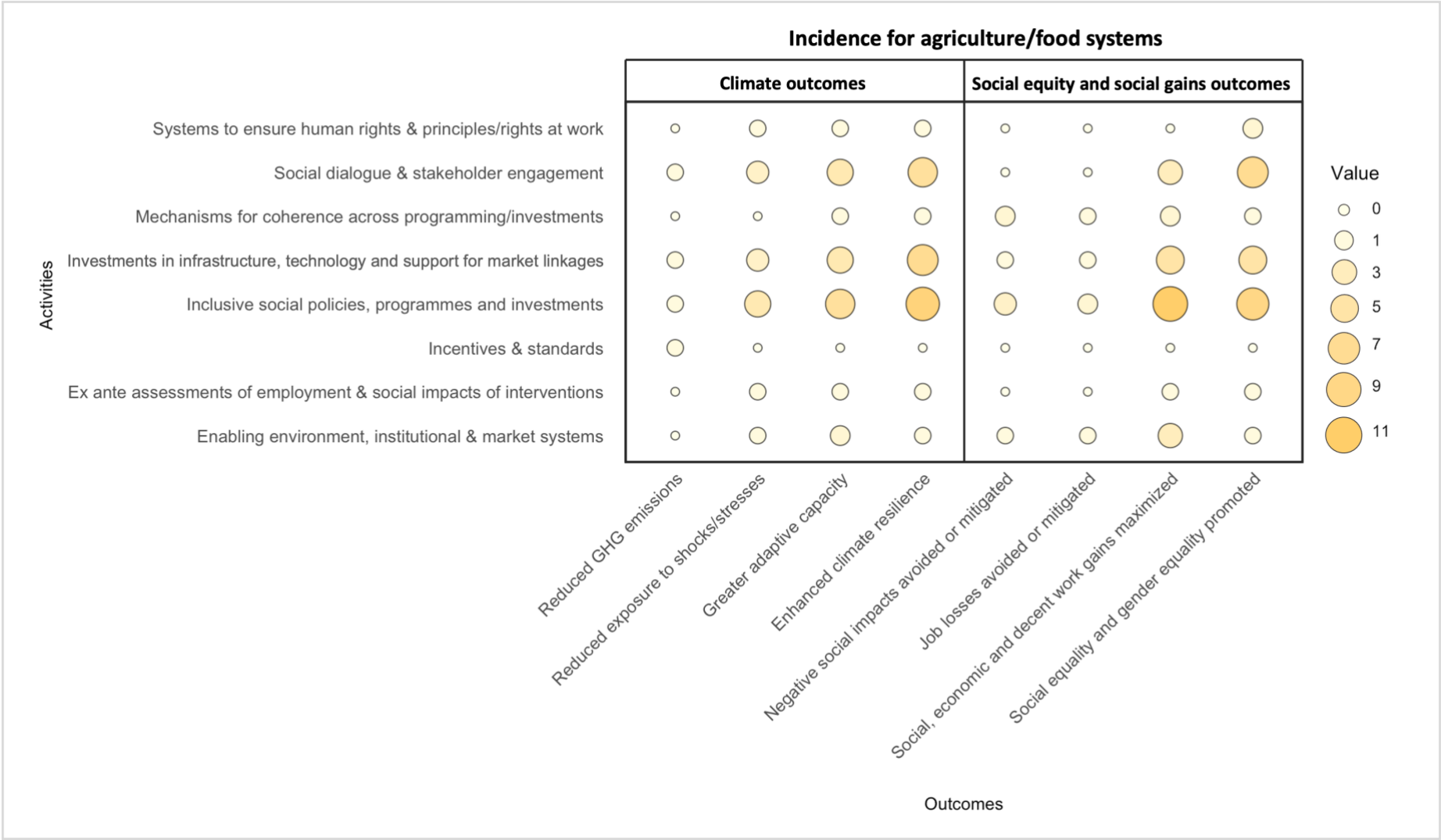
Outcomes

Five key outcomes have been identified for the agriculture/food sector. Again, these build on the overarching theme of resilience and livelihoods. Given that the agriculture/food interventions included in this research were mostly targeted at community and household levels, the nature of the outcomes extracted from the data is not surprising. Alongside reduced climate vulnerability and improved livelihoods and health, we also found a focus on the promotion of social equity and gender inclusion at the outcome level – in particular, an emphasis on women's empowerment and inclusion in decision-making and a more explicit focus on contributing to the SDGs, namely poverty reduction (SDG 1) and increased food and nutrition security (SDG 2).

Mapping the relationship between activities and outcomes in the agriculture/food sector

As for the energy sector, after examining the theory of change for just transition in the agriculture/food sector, we explored how intervention activities are linked to reported outcomes. To do this, we mapped the actual incidence of activities and outcomes in the agriculture/food sector to identify correlations between them as illustrated in Figure 16. Data extracted to complete this exercise used a standard framework based on the activities and outcomes identified in the approach paper's overarching theory of change.

Figure 16. Activities mapped against outcomes in the agriculture and food



Of the 31 just transition interventions identified in the agriculture/food sector, 15 focused on agriculture/food only, while the rest included agriculture/food and some combination of other sectors. The team created a list of all activities identified across the 31 interventions and mapped the incidence of outcomes reported against each. As we found for the energy sector, outcome level reporting was not available for all interventions.

Mapping the incidence of activities and outcomes for agriculture and food shows that the highest incidence occurs for three main outcomes, distributed across one climate outcome (enhanced climate resilience) and two social equity and social gains outcomes (maximized social, economic, decent work gains and improved social equity and gender equality). There is also good to moderate incidence of greater adaptive capacity and reduced exposure to shocks and stresses. These outcomes are most strongly associated with three activities: social dialogue and stakeholder engagement, investments in infrastructure, technology and support for market linkages, and inclusive social policies, programmes, and investments. This shows that activities related to a just transition in the agriculture/food sector in non-Annex I countries currently have a strong focus on social equity and social gains, which may be important in building adaptive capacity and increased resilience.

Box 3. India's Mahatma Gandhi National Rural Employment Guarantee Act

While India's Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) was not designed as a climate programme, it helped rural communities adapt to climate change and become more resilient (Fischer, 2020). The Act gives a legal guarantee of 100 days of minimum wage labour per year to all rural households, which is used to implement small-scale development projects in labourers' communities. The MGNREGA has become one of the country's largest financing and funding sources for small-scale development projects, supporting a range of natural resource and livelihood interventions. The Act's decentralized approach allows village-level government to oversee project implementation.

A survey of 1,400 households in 35 villages within the Kangra District of Himachal Pradesh found that the Act helped reduce exposure to climate risks. Specific outcomes identified within these 1,400 households include:

- 90 per cent of households had benefited from at least one small-scale development project.
- While MGNREGA labour is not the primary income source for most households, two out of three households reported receiving at least some labour days from the Act, with a median of 120 days labour per household.
- Historically marginalized people and people living below the poverty line were more likely to seek and receive labour. Women were more likely to receive labour than men, working a median of 90 days per year, compared to 75 for men.
- For many, MGNREGA labour one of the few sources of labour available outside of seasonal agricultural labour.
- Climate resilience was enhanced through building water management infrastructure, erecting walls to prevent land flooding during the monsoon season and renovating canals. The new development projects improved water access for 61.5 per cent of households.
- Projects incorporating substantial local knowledge of context-specific needs into the design contributed to the success of the Act, emphasizing the value of the decentralized approach.

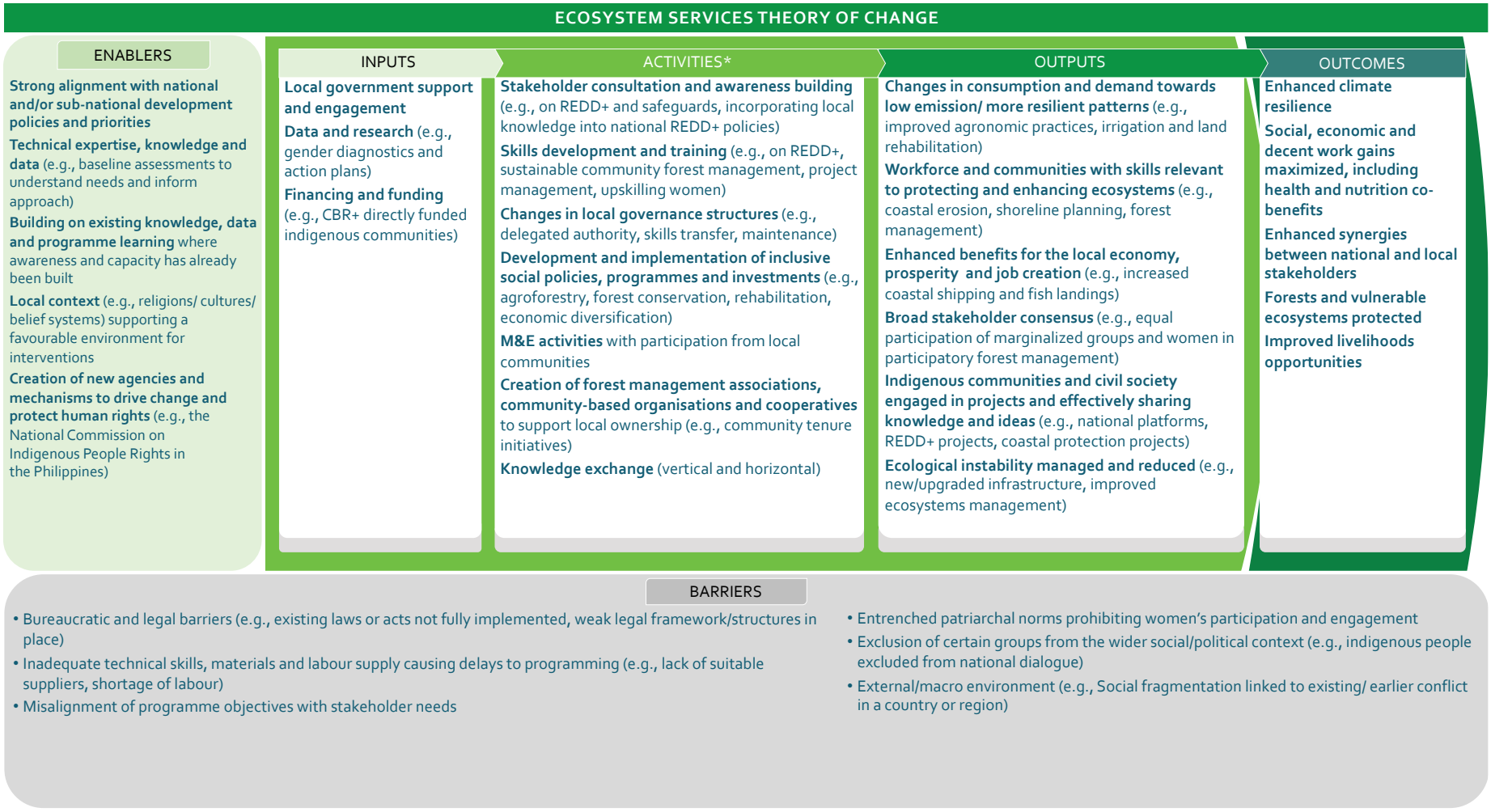
The mapping found relatively low reported incidences of interventions helping to avoid, minimize or mitigate job losses and negative social impacts resulting from climate change, and even fewer instances of interventions reporting reduced GHG emissions. Overall, the findings from this mapping imply that interventions contributing towards a just transition in the agriculture/food sector are predominantly smaller in scale and focused on adaptation. Attention is yet to turn to large-scale interventions designed to drive systemic change and reduced GHG emissions in the agriculture/food sector, which might prevent the achievement of results at scale and more resilient agricultural systems in the medium to long-run as climate impacts worsen.

c. Ecosystems

Developing a sector specific theory of change for ecosystem services

This section presents a theory of change for just transition in ecosystem services, including the key barriers and enablers to successful just transition and examples of inputs, activities, outputs and outcomes extracted from the ecosystem service interventions studied. The theory of change is explained in Figure 17.

Figure 17. Theory of change for ecosystem services



* Activities can be integrated and/or concurrent. They need not include all these criteria.

Enablers

The review identified several enablers for a just transition for ecosystems. These group into clusters of well understood enablers, including alignment with national and/or subnational development policies and priorities and building on well-established programmes where awareness and capacity have already been built. An interesting new enabler for this area is the creation of new agencies and mechanisms to drive change and protect human rights. For example, a Green Environment Facility (GEF) project promoting biodiversity and supporting Indigenous people in the Philippines created policies and guidelines to institutionalize Indigenous Peoples and Local Communities Conserved Areas and Territories (ICCAs) (Global Environment Facility, 2023). GEF also established an Inter-Agency Working Group to help register ICCAs and provide technical assistance for related national legislation development. An important place-based enabler is the local context, including religion and culture, supporting a favourable environment for interventions. For example, a community forestry initiative in Cambodia had high levels of success due to the region's predominantly Buddhist population, which attributes significant spiritual value to forests (United Nations Development Programme, 2022b).

Barriers

Barriers to a just transition in the ecosystems sector can similarly be clustered into key areas for consideration. These include well recognized barriers of a weak enabling environment, inadequate technical and workforce skills and misalignment between programme objectives and stakeholder needs. For example, the ADB funded Sustainable Coastal Protection and Management Investment Programme in the states of Goa, Karnataka and Maharashtra in India faced numerous barriers to implementation (Asian Development Bank, 2022d). The project had the combined objectives of improving incomes, reducing poverty levels of coastal communities, and protecting and managing shorelines. Challenges included late changes to implementation design and scope, a lack of suitable suppliers and contractors experiencing labour shortages. Covid-19 further delayed implementation. The ADB responded by increasing the financing and funding period from nine to 10 years. However, due to delays and other challenges, Maharashtra did not participate in parts of the project, and time and cost overruns emerged. The project completion report evaluated the project as low in effectiveness because several outcome performance indicators were only partially achieved. Nevertheless, the project was rated as relevant to the government's development objectives and ADB's country and sector strategies, efficient in achieving its overall intended outcome and outputs, and likely sustainable because the hybrid nature-based solutions were deemed innovative and appropriate to the context.

Also, an important group of soft barriers, including entrenched patriarchal norms, exclusion of certain groups from wider l dialogue, and social fragmentation. For example, a community-based 'reducing emissions from deforestation and forest degradation (REDD+)' project in Panama designed to empower marginalized peoples faced rejection from Indigenous authorities due to the national government's failure to address Indigenous rights and exclude Indigenous Peoples from national dialogues on forestry and climate change (United Nations Development Programme, 2022b). To overcome this barrier, the REDD+ project was relaunched under a different name, the Bosques de Vida programme, with all financing targeting Indigenous communities.

Inputs

All theories of change developed during this research, including the sector-level and overarching theories of change, now include an additional column of information on the inputs. Ecosystems are grouped into three areas: local government support and engagement, financing and funding, and data and research – such as gender diagnostics. For example, a sustainable forestry business focusing on women's employment conducted a gender analysis of the workforce and adopted a

gender action plan. This prompted the business to establish a goal of increasing women's representation in the workforce from 26 per cent to 40 per cent within two years. (Biegel and Lambin, 2021)

Inputs are important because they help to fill gaps in enablers and to unblock, minimize, or reduce barriers to successful interventions, in this case, by supporting the enabling framework for the implementing actors.

Activities

At the activity level, while some activities align with those captured in the original overarching theory of change, we have provided further information on the specific ways they are articulated. For example, more detail on the types of stakeholder consultations and awareness building and the development and implementation of inclusive social policies, programmes and investments. We have also included skills development and training as its own activity within ecosystems, rather than presenting them as a subset of inclusive social policies. Finally, a new ecosystems specific activity has been added to the theory of change: the creation of forest management associations, community-based organizations and cooperatives. Creating such entities helps build the community ownership necessary to ensure sustainable interventions.

Similarly important are inclusive social policies, programmes and investments through agroforestry, forest conservation, rehabilitation and economic diversification. For stakeholder consultation and awareness building, we found that activities typically focused on areas such as incorporating local knowledge into national policies concerning REDD+. The creation of forest management associations, community-based organizations and cooperatives was aimed at supporting local ownership. Programmes in Panama, Paraguay, the Democratic Republic of the Congo, Nigeria, Cambodia and Sri Lanka empowered marginalized groups to engage in the design, implementation and monitoring of REDD+ readiness activities to feed into national REDD+ processes.

Outputs

Outputs for the ecosystems sector have been grouped into six main areas with an overarching theme of resilience and livelihoods, similar to the agriculture/food sector. This flows naturally from the activities, with the six outputs interlinked and complementary. Indigenous community engagement in projects and processes contributes towards the development of skills relevant to sustainably managing ecosystems, delivering local economic benefits, creating jobs and building stakeholder consensus. These social equity-led outputs link with changes in consumption, increased demand for low emission and more resilient pathways, and reduced ecological instability.

Box 4. Indigenous communities, forest preservation and carbon trading in the Solomon Islands

In the Solomon Islands, a great deal of logging for exports occurs on native-owned land, mostly by logging companies (Jacobi and Campello Torres, 2021). Logging takes place at over 20 times the generally recognized sustainable rate, leading to a range of human rights and environmental issues. Climate change presents acute ecological, social, cultural and economic challenges in this Pacific Island country. Sea level and temperature rise threaten settlements, subsistence agriculture and fishing, and exacerbate already vulnerable forest, marine and other biodiverse ecosystems. This is particularly relevant in Indigenous communities, whose culture and traditions are threatened by the destruction of culturally significant sites.

Indigenous and local communities have taken the lead in bringing local knowledges to climate change responses. A local NGO, the Natural Resources Development Foundation, works with tribal communities on forest preservation and carbon trading. They have two aims. Firstly,

complying with the Forest Stewardship Council certification and carbon credit programmes so that they can participate in carbon markets. Secondly, implementing livelihood activities to create alternative employment. The programme hopes to provide these communities with alternatives to granting logging companies access to their land as their key source of income. There was a strong enabling environment for this initiative as carbon offset projects are enabled by regulated and voluntary carbon markets. This initiative had climate and social equity aspirations, namely carbon offsetting, job creation, and increased resilience of tribal communities.

Outcomes

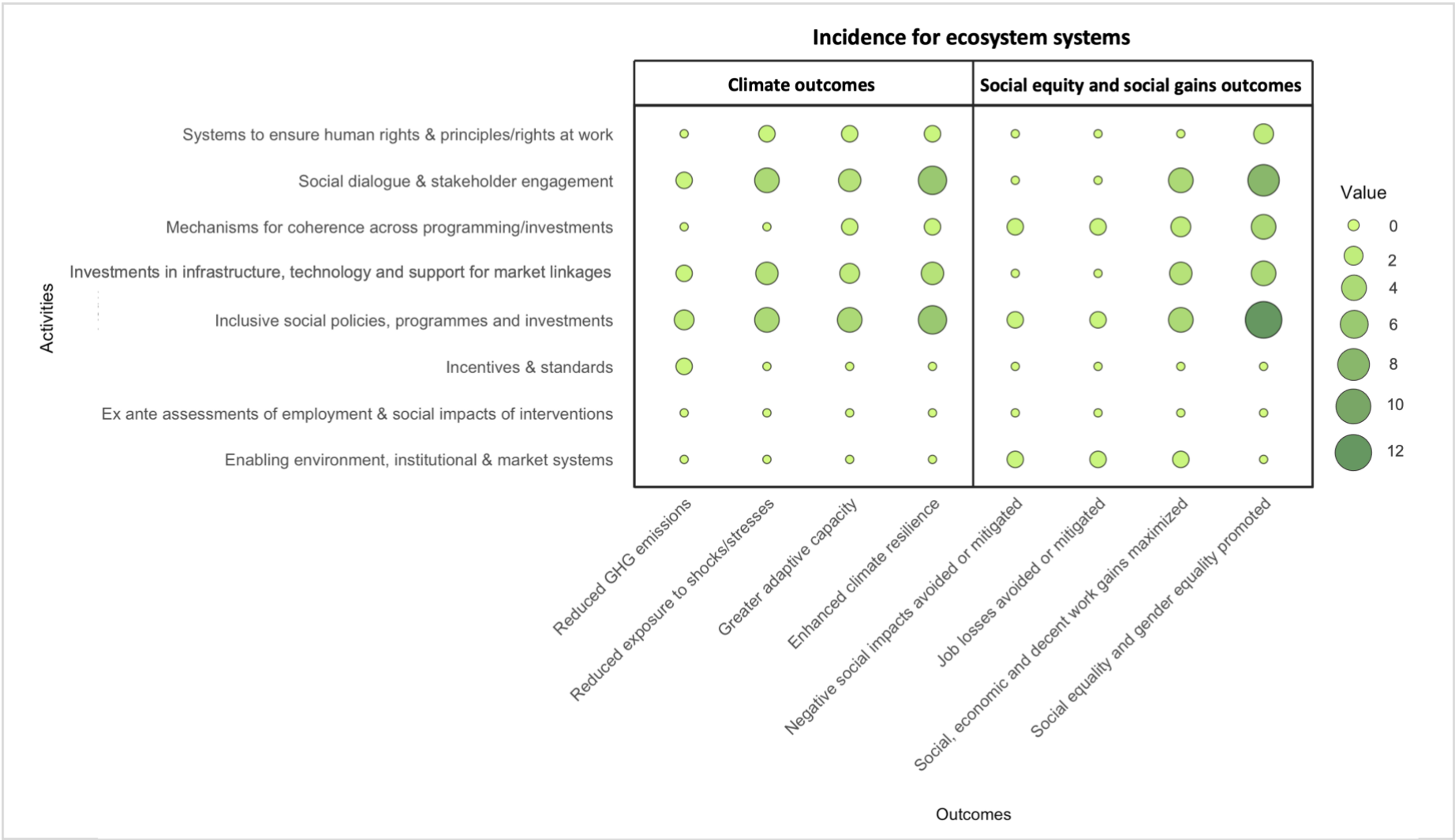
Like the agriculture/food sector, these build on the overarching theme of enhancing resilience and livelihoods while including wider ecosystem and environmental benefits. Given that the ecosystems interventions included in this research were mostly targeted at community levels and local governments, the nature of the outcomes extracted from the data is not surprising. These have been grouped as enhanced climate resilience, protected forests and vulnerable ecosystems, improved livelihood opportunities, maximized social, economic and decent work gains, and enhanced synergies between national and local stakeholders.

In one forest-related example, the project aimed to promote sustainable forest management through community participation. This would be achieved by transferring land rights from the state to the community, enabling local communities to manage and utilize forest resources sustainably (United Nations Economic Commission for Africa, 2015). The project enhanced climate resilience and promoted social equality and gender equality. In a second coastal-related example, referenced in the ecosystem services barriers section above, a sustainable investment helped address the issues of coastal protection and management. The programme reduced exposure to shocks and stresses and contributed to social, economic and decent work gains (Asian Development Bank, 2022d). Specific outcomes included establishing a coastal management information system, reducing coastal erosion, private sector investment in coastal protection and management (with 30 per cent women beneficiaries), and numerous economic benefits. The main financial and economic benefits relate to protecting land, buildings and infrastructure from future damage caused by coastal erosion and monsoon storms, reducing the adverse productivity and/or income impacts on agriculture and fishing. Addressing the erosion risks also helps encourage future investment in the coastal zone. These outcomes align with the approach paper's overarching theory of change but provide more depth and richness for ecosystem services than was previously available.

Mapping the relationship between activities and outcomes in ecosystem services

After examining the theory of change for ecosystem services, we focused on better understanding how intervention activities linked to reported outcomes work in practice. To do this, we mapped the actual incidence of activities and outcomes in ecosystem services to identify any strong correlations between them, as illustrated in Figure 18.

Figure 18. Activities mapped against outcomes in ecosystem services



The review identified 13 just transition interventions that focused on or contributed towards a just transition in ecosystem services. The team created a list of activities identified in this sector and mapped the incidence of outcomes reported against each activity. As we found for the other sectors, outcome level reporting was not available for all interventions. Good reporting was available for both climate outcomes and social equity and social gains outcomes.

Mapping the activities and outcomes for the ecosystem services shows that the highest incidence occurs for one main social equity and social gains outcome – greater social equality and gender equality within social groups or society. This outcome is strongly associated with two activities: inclusive social policies, programmes and investments and social dialogue and stakeholder engagement. There is also moderate to good incidence with two further activities: the softer intervention of mechanisms for coherence across programming and the harder intervention of investments in infrastructure, technology, and support for market linkages.

There was also moderate to good incidence across the following outcomes: enhanced climate resilience, greater adaptative capacity, reduced exposure to shocks and stresses, and maximized social, economic and decent work gains. These outcomes were most associated with the following activities: stakeholder engagement, inclusive social policies, programmes and investments, and investments in infrastructure, technology and support for market linkages.

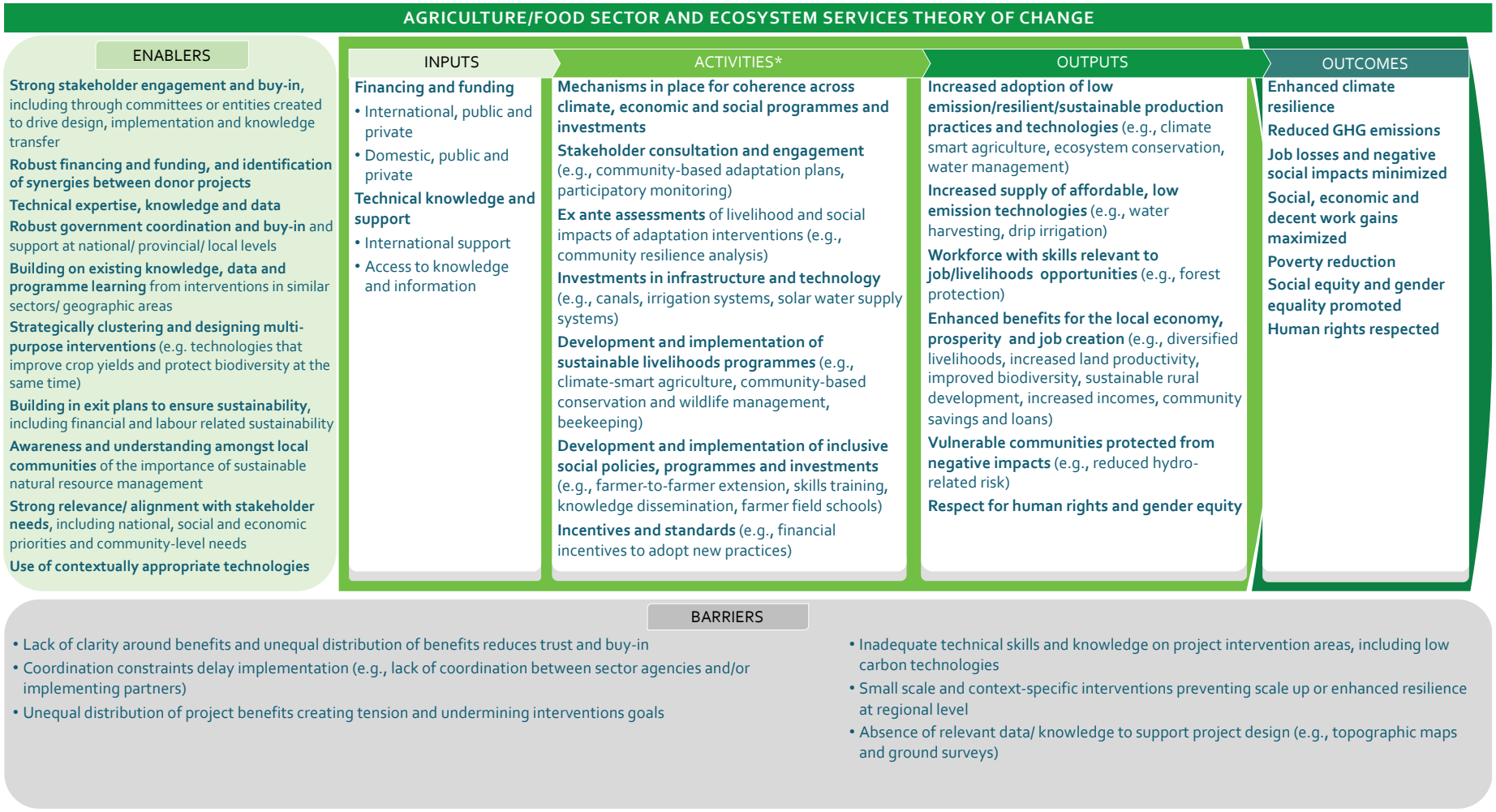
The mapping found low incidence of the social equity and social gains outcome through prevented or reduced job losses within sectors or the whole economy and prevented or reduced negative social impacts within social groups or across society. These findings may be due to ecosystem services operating more in the informal economy, where the recording of job numbers and the quality of data is less well developed. Also, there was lower incidence of the climate outcome, reduced GHG emissions.

d. Combining the theories of change for the agriculture/food and ecosystems

Developing a sector specific theory of change for agriculture/ecosystems combined

The theory of change developed from just transition interventions for the combination of agriculture/food and ecosystem services is presented in Figure 19.

Figure 19. Combined theory of change for the agriculture/food and ecosystems



* Activities can be integrated and/or concurrent. They need not include all these criteria.

Enablers

Enablers for a just transition in the combined ecosystem services and agriculture and food system feature soft social equity enablers significantly, including strong stakeholder engagement and buy-in, awareness and understanding among local communities, strong relevance/alignment with stakeholder needs, building on existing knowledge, data and programme learning in similar interventions and using contextually appropriate technologies. For example, the ADB-financed Uplands Irrigation and Water Resources Management Sector Project in Cambodia built on the technical knowledge of other ADB-supported irrigation projects, and residents in Farmer Water User Communities were involved with the design and implementation of the project (Asian Development Bank, 2023a).

Other typically hard enablers include robust financing and funding and identifying synergies between donor projects and technical expertise, knowledge and data.

Barriers

Barriers also cluster around social equity issues, including inadequate coordination between sector agencies and implementing partners, insufficient clarity around benefits for targeted stakeholders, and unequal distribution of benefits, creating tension and undermining intervention goals. In one case study, a project in Indonesia focused on improving pine-coffee agroforestry systems was hindered by a lack of understanding of the conditions farmers faced, the farmers' limited technical expertise, and the high start-up labour costs such agroforestry practices require (Rowe and others, 2022).

Inputs

As highlighted above, the combined theory of change for the ecosystem services and agriculture and food includes a new column of information on inputs.

These are grouped into two traditional areas: (i) financing and funding, both international and including loans and domestic public finance, and (ii) technical knowledge and support, including international support and access to knowledge.

Activities

While some of the activities align with those captured in the overarching theory of change, we have provided more detail on how these are articulated. For example, this includes information on the range of inclusive social policies, including farmer-to–farmer extension, skills training and farmer field schools. An example is the Zero Budget Natural Farming intervention adopted by the provincial government of Andhra Pradesh to improve soil fertility, reduce costs and risks, reduce irrigation requirements, and increase yields (Food and Agriculture Organization of the United Nations, 2019). Such intervention encourages farmers to avoid using synthetic fertilizers and pesticides in favour of low-cost home-made alternatives derived from locally sourced materials, including cow dung, urine and mulch (Duddigan, 2022). Important activities within this programme were farmer-to-farmer extensions and skills and knowledge dissemination through farmer collectives, farmer field schools and facilitator-mediated videos. These activities were essential to increasing soil organic matter, water-holding capacity, and biodiversity in the region.

Outputs

Outputs have been grouped into seven main areas with the same overarching theme of resilience and livelihoods identified across both ecosystems and agriculture and food. These outputs are complementary to one another, including the increased adoption of low emission, resilient and sustainable production practices and technologies, increased supply of affordable low emission technologies such as water harvesting and drip irrigation, diversified livelihoods and increased household incomes, skilled workforce, enhanced benefits for local economy, increased prosperity

and job creation, vulnerable communities protected from negative impacts, including climate-related risk, and respect for human rights and gender equity. For example, the Adapt Plan project in Malawi adopted a gender responsive and socially inclusive community-based adaptation plan aiming to increase community uptake of resilient farming and land conservation practices. The project aimed to target 60 per cent of women and facilitate targeted engagements with women and youth to work towards gender equality (United Nations Development Programme, 2020).

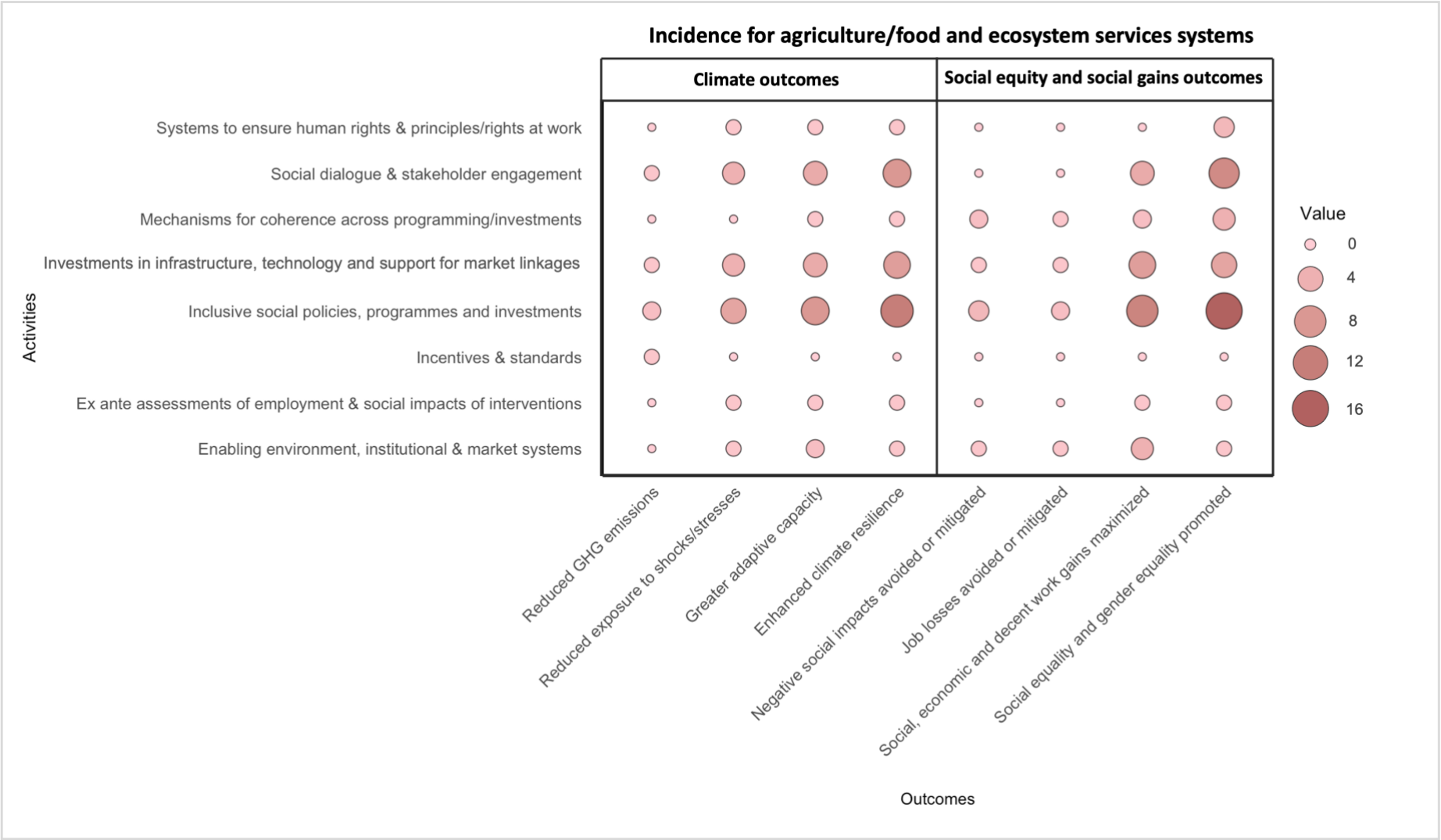
Outcomes

Seven key outcomes have been identified. These include a range of climate and social equity and social gains outcomes. On the climate front, there is both enhanced climate resilience and reduced GHG emissions. The social equity and social gains included minimized job losses and negative social impacts, maximized social, economic, and decent work gains, reduced poverty reduction, improved social equity and gender equality, and increased recognition of human rights. For example, in the Tanzanian CARE-WWF Alliance example mentioned in the agriculture/food sector enablers, the programme fostered women's health, rights and participation (Margoluis, 2021). This was accomplished through campaigns to raise awareness about and action against of gender-based violence and improve women's participation and leadership in natural resource organization.

Mapping the relationship between activities and outcomes for agriculture/ecosystems combined

After combining the theory of change for just transition in ecosystem services and the agriculture and food, we examined how intervention activities are linked to reported outcomes. To do this, we mapped the actual incidence of activities and outcomes in ecosystem services and agriculture and food to identify any strong correlations between them (see section C.4.d). Data extracted to complete this exercise used a standard framework based on the activities and outcomes identified in the overarching theory of change set out in the approach paper.

Figure 20. Activities mapped against outcomes in the combined agriculture/food and ecosystem



The team identified 11 interventions that focused on or contributed towards a just transition across both agriculture and food and ecosystem services. A list of activities was identified for this combined sector and the incidence of outcomes was mapped against each activity. This mapping shows that the highest incidence occurs across three outcomes: enhanced climate resilience, maximized social, economic and decent work gains within regions or countries, and greater social and gender equality. This illustrates that it is possible to design combined agriculture/ecosystems interventions that include both climate and social equity and social gains outcomes in non-Annex I countries. For example, the Uplands Irrigation and Water Resources Management Sector Project in Cambodia mentioned above is a good example of a project achieving both climate and social equity and social gains outcomes (Asian Development Bank, 2023a). The project was successful at increasing land and water productivity. The consequent increase in rice production supported poverty reduction, income growth and gender inclusivity, with women playing a more substantial role in decision-making and having greater access to resources.

These outcomes are strongly associated with three activities: social dialogue and stakeholder engagement, investments in infrastructure, technology, and support for market linkages, and inclusive social policies, programmes, and investments. There is a moderate association with two further activities focused on ensuring successful connections – ensuring coherence across programming and investments and creating an enabling environment, including institutional and market systems, whether public or private. There was also moderate to good incidence across the outcomes concerning reduced exposure to shocks and stresses and greater adaptive capacity. These outcomes were most associated with the three activities highlighted above, indicating their importance for programmes and projects operating across agriculture and ecosystems: social dialogue and stakeholder engagement, investments in infrastructure, technology and support for market linkages, and inclusive social policies, programmes, and investments.

There was lower incidence across the following outcomes: prevented or reduced job losses within sectors or the whole economy, prevented or reduced negative social impacts within social groups or across society, and reduced GHG emissions at sectoral and national levels.

e. Infrastructure

Interventions targeting infrastructure, defined as buildings, cities, industries, and appliances, represented only a small number of the interventions included in this research. These were mostly interventions that covered multiple sectors. Examples include national level programmes for investment, such as South Africa's JETP, programmes intended to build capacity and knowledge that would support socially-positive climate action, such as Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) providing green macroeconomic training to government officials in Vietnam, and educational initiatives, such as Indonesia's Sriwijaya University providing graduate and professional education in climate and the environment (Fakir, 2023; O'Brien, Wilts and Wuppertal Institute, 2017; Tarigan and Sagala, 2018).

Only two interventions with goals and activities specific to infrastructure were recorded. These include a project providing pumps for water supply powered by solar PV in Sudan (African Development Bank, 2023b) and a programme installing a waste processing unit for producing biogas and fertilizer in Jordan (Food and Agriculture Organization of the United Nations, 2022). The still embryonic project in Sudan aims to improve water supply by implementing irrigation technology, while fostering economic and social development. It wants 50 per cent of installed solar PV powered pumps to directly benefit women and to ensure 50 per cent of project beneficiaries comprise farms that are headed or predominantly staffed by females. In Jordan, the Improving Rural Livelihoods, Environment, and Green Jobs Opportunities in Mafraq Governate Programme prioritized the creation of green jobs by constructing and operating a solid waste segregation unit in

Zaatari Municipality. Twenty per cent of the unit's workforce are women and 50 employees are Syrian refugees from the Zaatari refugee camp. The programme also provided workers with a cash allowance when the project paused during the Covid-19 pandemic. Another important component of the project was the synergy the project's founders developed with other funds and government agencies to ensure the project's sustainability after they exited. Both projects were financed by international funders, the African Development Bank and the EU, respectively. They were implemented by a national authority in Sudan and, with some assistance from the FAO, a local authority in Jordan.

Different timelines mean that these two interventions cannot be compared in great detail, chiefly because the Sudan project, initiated in 2019, had not produced any results upon its evaluation. The project's design had gender-sensitive metrics and included measures for farmers to address barriers and risks, including concessional government finance to meet upfront capital costs and workshops to address performance issues with the pumps. However, the project demonstrates the impact macro-level factors can have on interventions, as it was suspended in 2021 due to growing unrest in the country.

The waste processing intervention in Jordan confirms the potential for innovative investments in physical infrastructure to deliver social equity gains and cross-sectoral economic benefits. The intervention aimed to provide decent work and livelihoods, primarily for Syrian refugees, and produce green compost and electricity through biogas. It reduced the volume of waste reaching landfills and provided employment to the mostly female refugee community. Another impact was improved training for staff in the public implementing institution and coordination in the solid waste management sector.

In summary, scarcity of evidence precludes drawing a coherent theory of change for the infrastructure sector in non-Annex I countries. Still, there is potential to apply just transition principles to infrastructure projects (beyond energy generation) and contribute to national and global climate goals. Questions for future reviews or evidence-based interventions include how private sector firms can increase their investment in and delivery of infrastructure projects, which are typically funded and implemented by public institutions.

5. SYNTHESIS OF RESULTS

a. Context

We found interventions contributing towards the outcomes consistent with a just transition in a wide range of national, regional and community settings across 45 non-Annex I countries. A higher concentration of studies was found in wealthier developing countries, including Indonesia, India, South Africa and China. In contrast, Small Island Developing States (SIDS) were underrepresented with very few studies on interventions in the Caribbean or Pacific Islands. As reflected in the landscape analysis, the extracted data has ample diversity and complexity to form various analytical perspectives. Data extracted from the 76 studies on 99 interventions reveals multiple combinations of geographies, sectors, scales and intervention types.

The role of the unique set of political, economic, social, and cultural factors that shape each intervention's prospects is partially captured by the examples throughout the preceding analysis. However, these cannot be aggregated without losing their specificity. The richness, complexity and many variables in this research also present risks when seeking to extract a synthesis of results. For example, interventions can cover multiple scales, geographies, and types within a single sector. Many of the interventions in the study combine multiple activities, potentially producing different effects when a given activity is carried out separately in the same context. These occur in 39 different combinations.

b. Mechanisms and conditions, including barriers and enablers

Notwithstanding the study's diversity and complexity, high-level patterns are emerging regarding common mechanisms and conditions, including barriers and enablers, that may impact the success of interventions working towards just transition outcomes in non-Annex I countries. These findings are not intended to be conclusive. Rather, they provide policymakers, funders, programme designers and implementers with useful information regarding common mechanisms and conditions. The findings also vary across the different sectors, highlighting nuances in how similar mechanisms and conditions are framed and discussed in the current literature.

The study found that interventions more focused on mitigation are in the energy sector, while those more focused on adaptation and resilience are in the agriculture/food sector and in ecosystem services. In terms of scale, the study found more of a mix across the energy sector, from households up to country level. For the agriculture/food sector, the interventions predominated at the household level, with fewer interventions at the regional and country levels. Ecosystem interventions mostly occur at the community level, with smaller numbers at all other levels. The prominence of small-scale interventions reflects how the low-carbon transition has typically been closely linked to development activities in non-Annex I countries related to raising incomes and improving access to services for poor households and communities. At this stage, there may be an absence of evidence on larger scale programmes in these sectors in non-Annex I countries, such as jurisdictional forestry or landscape restoration. Large-scale JETP investments are just getting under way, and similar packages do not yet exist for non-energy sectors. Further research and evidence could be gathered on larger scale interventions when these are implemented and when more learning becomes available.

We found common enablers for just transition interventions across all or most sectors. These include (i) the need for robust financing and funding mechanisms – identified in all sectors except ecosystem services, (ii) strong alignment with country and community needs and priorities, including alignment with national development plans – identified in all sectors, (iii) political will and ownership - identified in all sectors, and (iv) stakeholder engagement. However, these findings are nuanced and break down slightly differently in each sector, explaining the need for separate theories of change per sector level.

For instance, the political will and ownership enabler focuses more on high-level political backing in the energy sector, such as the presidential and national level. This is likely a result of forthcoming JETP investments and efforts to deliver NDC priorities on GHG emission reductions. For other sectors, political will and ownership are seen as more important at the departmental, regional or local government levels, particularly regarding the government support needed for a just transition, such as coordination and funding. There is also some nuance across the stakeholder engagement enabler. Interventions in agriculture and ecosystem services typically focus on securing local support for new approaches. For energy, the focus leans towards building trust and awareness, at times across multiple stakeholders and levels.

Overall, we found hard enablers such as financing and funding, investments in infrastructure and technology, and strategic clustering of projects were more evident in the energy sector, together with soft enablers such as political will, trust building, and partnerships. In ecosystem services and agriculture and food, soft enablers such as alignment, coordination and contextual awareness emerged as important features of just transition interventions, alongside financing and funding and technical know-how.

We also found several common themes relating to barriers to successful just transition across all sectors, including:

- Bureaucratic and legal barriers – evident across all sectors except agriculture/ecosystems combined, with a focus on challenges such as a lack of flexibility in government systems and processes
- Institutional fragmentation and delays slowing down or undermining project delivery, exclusion and unequal distribution of benefits – identified across all sectors, although with more focus on exclusion of certain groups in ecosystem services
- Inadequate technical skills – evident in all sectors except agriculture

While skills training and transfer were built into numerous interventions across multiple sectors, building the depth, breadth and sustainability of skills required to drive systems change can take time and may not be sufficiently factored into project development. Skills are a pivotal part of just transition and fall into multiple categories, including barriers, inputs, and activities.

Unsurprisingly, we also found that some barriers identified were the opposite of common enablers. For example, uncertainty around political will, financing and funding commitments and limited stakeholder engagement in projects and programmes. The fact that the interventions studied highlight financing and funding, political will, and social dialogue and stakeholder engagement as both enablers and barriers indicates their relative importance to successful just transition across multiple sectors and scales.

Other findings on barriers were more nuanced and sector specific. In the energy sector, for example, we identified an imbalance of financing and funding across climate activities/outcomes and social equity and social gains activities/outcomes as barriers to just transition. This finding could be related to the analysis of activity combinations in the energy sector, presented in Box 2. The analysis shows that interventions focusing on physical investments have delivered some positive social outcomes. These findings might also reflect the nascency of large-scale energy investments with intentional social elements. As mentioned, JETPs are only now getting under way. They have received less attention in the literature than large-scale investments in renewable energy and large-scale transmission projects, which may disproportionately focus on investments' hard rather than soft aspects. As the JETPs are implemented across South Africa, Indonesia, Vietnam and Senegal, and similar programmes are agreed upon with other countries, further research exploring this balance could be valuable.

We also identified sector specific barriers in ecosystem services, and in agriculture and food. These included the physical limitations associated with the land and climate in the agriculture sector, such as soil erosion, lack of water, land fragmentation and changing and unpredictable weather patterns. In ecosystem services we identified the misalignment of programme objectives with stakeholder needs as a sector specific barrier. Conversely, in all the other sectors, including agriculture/ecosystems combined, identified strong alignment with national and subnational development priorities as a key enabler. While there is clear commonality across the enablers and barriers highlighted in the theories of change, these examples give some insight into why a sector-level focus is important and should not be overlooked.

c. Outcomes

The study found good evidence of both climate and social equity and social gains outcomes, albeit across a relatively small sample of interventions. While the overarching and sector-level theories of change are useful for explaining possible pathways towards a just transition, it is important to reiterate that not all interventions studied reported actual outcomes (see section C.4.d.iii). Sometimes, this is because the work is ongoing and outcome level results are yet to be reported. In other cases, although projects had been completed, there may not have been enough sufficiently detailed reporting to identify and capture outcome level results. The activity-outcome mapping and

analysis, set out in section 3 at an overarching level and for each sector, provides evidence against eight overarching outcomes. Overall, the study found a mix of climate and social equity and social gains outcomes evident across all sectors.

Box 5. Eight reported outcomes of just transition interventions in non-Annex I countries

- Enhanced climate resilience
- Reduced GHG emissions at sectoral/national levels
- Reduced exposure to shocks and stresses
- Improved adaptive capacity
- Prevented and reduced negative social impacts within social groups or across society
- Prevented and reduced job losses within sectors or the whole economy
- Maximized social, economic, decent work gains within regions or the country
- Increased social and gender equality within social groups or across society

This study identifies several high-level insights on differentiated outcomes across sectors that may be useful for policymakers and funders when designing and implementing interventions and approaches to just transition across the four sectors. Across all sectors (energy, agriculture and food, ecosystem services and agriculture/ecosystems combined), there is evidence that both climate outcomes and social equity and social gains outcomes are being achieved through interventions intended to contribute towards a just transition. While there is a dominance towards one side or the other in some sectors, such as the energy sector emphasizing climate outcomes and ecosystem services emphasizing social equity and social gains, the findings show a good overall balance. They demonstrate that emerging approaches to just transition in non-Annex I countries recognize that a transition can only be just if it includes both climate and social elements and interventions being implemented across different sectors and scales that showcase how this can be achieved.

The most frequently reported climate outcome of interventions in the energy sector has been reduced GHG emissions, which is unsurprising and links to the focus on mitigation observed in these interventions' purpose and design. Yet there is also a good mix of reporting against the four social equity and social gains outcomes. The agriculture/food sector similarly reports good incidence of both climate outcomes and social equity and social gains outcomes. The climate outcomes include little evidence of reduced GHG emissions; rather, they are mostly related to enhanced resilience, reduced exposure to shocks and stresses and greater adaptive capacity. This indicates that large-scale agricultural transformation remains emergent in non-Annex I countries.

Box 6. Human rights in just transition interventions in non-Annex I countries

In the data extraction process for this study, respect for human rights including labour rights was recorded as an intervention output rather than an outcome and appears at this level in the overarching theory of change. Human rights straddle all sectors and geographic contexts. However, like other outputs and outcomes, alignment with this pillar of just transition may be addressed differently, depending on the intervention's scale. For instance, national or subnational legal instruments can be assessed against international human rights laws. Interventions involving

dialogue and capacity-building in communities might produce effects that are harder to assess and monitor especially in interventions that do not have an explicit focus on human rights. Despite the challenges in information, it is important to highlight that the review found limited evidence of explicit systems addressing human rights, including labour rights in the interventions. This points to a significant gap requiring attention.

Among the interventions included in this study, only four recorded respect for human rights as an explicit output – one in each of the sector or sectoral combinations analysed in detail in this study (energy, agriculture and food, ecosystem services, and agriculture/ecosystems combined). They reflect the variety of rights at stake in a just transition. For example, the GEF funded a project in the Philippines to improve collaboration between public sector managers of protected biodiverse areas and Indigenous Peoples and local communities, thereby protecting those groups' ancestral and customary land rights. By comparison, interventions in Guatemala and Tanzania to encourage female-led climate-smart agriculture and community-based conservation of forests and wildlife strongly emphasized women's right to participate in district or community-level decision-making.

E. Conclusions and implications

1. Summary

This review found a moderate number (76) of academic and grey literature studies that contained evidence on interventions potentially contributing towards a just transition and low emission and climate resilient pathways in non-Annex I countries. Less than one per cent of the studies gathered in an initial web search were considered to provide concrete evidence on interventions and to speak to the theories of change affecting programme and intervention design. However, the 99 interventions found in the 76 studies that passed our screening covered a wide range of geographic and sector contexts, although many interventions were still under way and yet to report significant results.

A refined, overarching theory of change for just transition in non-Annex I countries helps to interpret this diverse landscape of interventions and their emergent nature. The enablers and barriers relevant to such contexts are broad. Identifying enablers and barriers requires assessing the accessibility of strong financing and funding, the level of commitment from public authorities and stakeholders, the degree of alignment with existing policies, the amount of technical expertise or support, and the extent of clear governance and engagement necessary to establish trust. Future just transition interventions and programmes designed by policymakers, funders, and international organizations should understand these enablers and barriers and include activities to address them or seek linkages to other interventions that can.

This study confirms that examining underlying theories of change can identify interventions with the potential to contribute to a just transition and the mechanisms and conditions that influence their approach and impact. Approaches to a just transition within key economic sectors including energy, agriculture and food, and ecosystem services are nuanced, with different interventions required to achieve the desired pathways. There are more investments in physical infrastructure in the energy and infrastructure sectors – which typically follow pathways towards reduced GHG emissions – but efforts to integrate these with soft measures are emerging in non-Annex I countries. These measures include social dialogue and broad stakeholder engagement across systems, including governments, state-owned and private firms, regulators, system operators, workers, and end users. In contrast, agriculture and food and ecosystem services demonstrate a stronger record of inclusive social

policies and engagement while improving livelihoods and community resilience, often by focusing on adaptation with GHG emission reduction co-benefits and wider benefits around social equity, including gender. Very few interventions focused on minimizing and addressing negative employment impacts resulting from interventions, with some exceptions to this in the energy sector. An important step needed for a just transition in all sectors is shifting to greater national or regional scale that expands and accelerates climate action while embedding robust measures for improving social equity. A related consideration is the on-the-ground development context. Many interventions aim to increase living standards where income levels and access to services are limited, while there is little local experience in managing the dislocations associated with transitioning from carbon-intensive energy, infrastructure and food systems. Non-Annex I countries will likely need to take many far-reaching and extensive actions as the pace and scale of just transition grows.

An important contribution of this study is the focus on existing interventions within non-Annex I countries compared to the broader literature on just transition. This broader literature consists largely of policy recommendations, conceptual work, and the experiences of Global North countries.

2. Quality of the evidence and limitations of the review process

The review deliberately targets non-Annex I countries, as limited research exists on their experience of interventions potentially contributing towards a just transition. As detailed in section C, the team adopted a thorough research approach encompassing the breadth of non-Annex I countries and the range and depth of any just transition relevant activities, outputs and outcomes under way or concluded.

The research began with 8,726 potentially relevant studies, eventually reducing this figure to 76 studies and 99 interventions. This suggests that the evidence base for just transition in non-Annex I countries is still nascent, as anticipated in the terms of reference. Particularly limited data was found for the infrastructure sector, which is a finding rather than a limitation of this review.

As discussed in section C, other limitations include the review's exclusive focus on studies published in English, its confinement to four databases, and its hand search of selected relevant websites.

3. Areas for further investigation

This study sought to synthesize the evidence base of just transition interventions in non-Annex I countries across four sectors and multiple scales, identifying patterns and learning across multiple variables and causal pathways. The findings, while necessarily high level, will be useful for different types of stakeholders working on just transition in different sectors and at different scales and can be drawn on in different ways. Such stakeholders may include policymakers, researchers, donors, multi- and bilateral agencies and climate funding institutions. Some stakeholders may wish only to review and draw lessons from individual sector findings. Others may be more interested in the broader learnings and trends identified across the interventions studied.

Having completed this exhaustive review, we are convinced further research is needed, particularly as new just transition interventions begin implementation. This research might include several different approaches, as set out below:

- Updating this study through another thorough research process in two to three years when outcomes are further developed, and more evidence is available, especially given the nascency of large JETP programmes. This would provide an opportunity to apply the learning from this study and reflect on ways to strengthen the research methodology. Further, as just transition interventions develop and deepen, the research could widen its geographical coverage of non-

Annex I countries. For example, it could address SIDS, which are poorly represented across all sectors in the literature identified by this study.

- Undertaking a series of deeper dives into the literature to identify and explore more interventions contributing towards a just transition in a particular sector or geography. A more in-depth review could increase the time and focus on mapping and identifying potential causal pathways. It could also allow researchers to break down broad sectors such as infrastructure into subsectors and identify more specifically relevant information. Similarly, it could also focus on the overlap in agriculture/food and ecosystems, as studying them in combination would be more fruitful than treating them separately. This would also provide a different level, where many interventions are at the worker, household, and community levels, matched with upstream policy and practical support.
- Building on this research by including non-English publications to reduce geographical bias and expanding the knowledge base by increasing the research coverage across different geographies, including Latin America and the Caribbean and central and west Africa.

It is important to build on this study. Just transition is a vital and emerging development area and warrants more research. There is already significant and useful information to support more detailed theories of change and enhance understanding of the range and types of interventions at different levels. Furthermore, evidence on just transition will expand rapidly as just transition programmes increasingly get under way. We must capture and share this emerging evidence to galvanize the pace and scale of a just transition.

APPENDICES

Appendix 1. LIST OF 99 INTERVENTIONS

The list below summarizes each intervention, showing their names and locations. There is some repetition, as several studies covered different aspects of the same intervention (for example, JETP in South Africa).

1) ADB Green Energy Corridor and Grid Strengthening Project, India
2) Adjaristsqali Hydropower Project in Batumi and Shuakhevi village, Georgia
3) Adoption of agroecological innovations - a leadership school for women and girls, Guatemala
4) Africa-EU Renewable Energy Cooperation Programme
5) Agriculture Modernization, Market Access and Resilience project, Georgia
6) Cambodian Community-Based Adaptation Programme
7) CARE-WWF Alliance in Nachingwea District, Tanzania
8) Climate Proofing project in Machinga and Mangochi districts, Malawi
9) Climate-smart agriculture and early warning systems on Cuban farms
10) Community-led micro-hydro project under the World Bank National Programme for Community Empowerment rural programme to reduce poverty in Pekonina, Indonesia
11) Decent work in the transition to low-carbon, green economies in Hebei Province, China
12) Development of updated NDC with just transition elements, Costa Rica
13) Development of updated NDC with just transition elements, South Africa
14) Drip irrigation (to consider the water-energy-food nexus concept from a bottom-up perspective), Morocco
15) Economic Reconstruction and Recovery Plan, South Africa
16) Energizing Development Programme in Sidama, Ethiopia
17) Enhancing the Resilience of Vulnerable Refugee Communities through Cash-for-Work in Anjar, Lebanon
18) Forest conservation project in Pangani town, Tanzania
19) Fossil fuel subsidy reform, Argentina
20) Fossil fuel subsidy reform, Egypt
21) Fossil fuel subsidy reform, Uruguay
22) Gansu Featured Agriculture and Financial Services System Development Project, China
23) GIZ Macroeconomic Reforms/Green Growth Programme, Viet Nam
24) Green Skill Development Programme, India
25) Hariyo Ban Programme, Nepal
26) Himachal Pradesh Clean Energy Development Investment Programme, India
27) Implementing Urgent Adaptation Priorities through Strengthened Decentralized and National Development Plans (Adapt Plan) project in Nkhatabay, Zomba and Ntcheu, Malawi
28) Improving rural livelihoods, environment and green jobs opportunities in Mafraq Governorate in the Hashemite Kingdom of Jordan
29) Incentivizing Variable Renewable Energy projects through a feed-in-tariff policy, Viet Nam
30) Increasing Farmer Resilience to Climate Change-Upscaling Market Oriented Climate Smart Agriculture Project, Eswatini
31) India’s Sustainable Partnership for Rooftop Solar Acceleration in Bharat

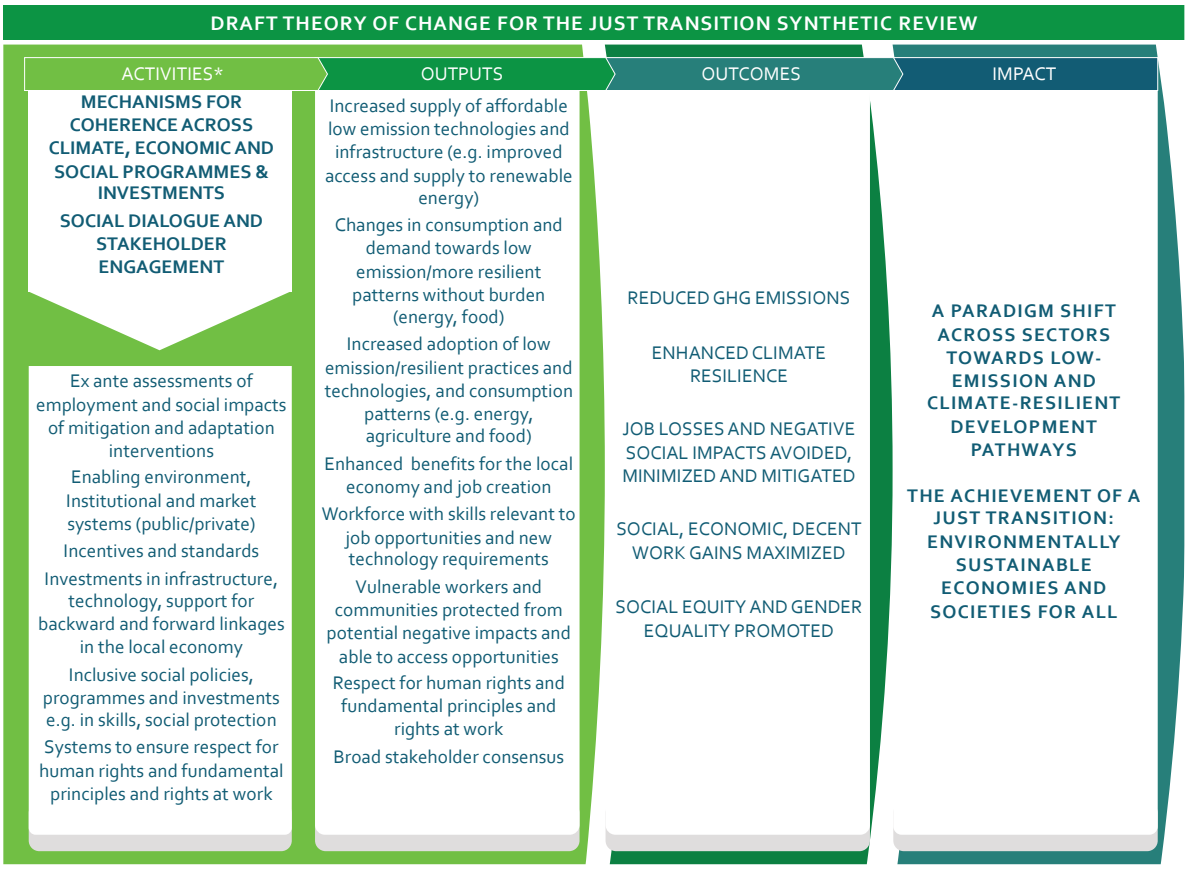
32) Integrating distributed solar PV with urban municipal electricity grid in western Cape, South Africa
33) Introduction of Social Impact Assessments for the renewable energy projects, Mexico
34) Just Energy Transition Partnership, South Africa
35) Just Energy Transition Partnership, South Africa
36) Just Energy Transition Partnership, South Africa
37) Khok Nong Na Model, Thailand
38) Kinangop Wind Park under the Clean Development Mechanism, Kenya
39) La Estrecha Solar Community in Medellín, Colombia
40) Local energy provision in Argentina, Chile and Bolivia
41) Logging ban under the Forest Conservation Programme, China
42) Mahatma Gandhi National Rural Employment Guarantee Act in Himachal, India
43) Micro-hydro plant as part of the UNESCO Pro-Poor Public-Private Partnership programme in west Java, Indonesia
44) Miro's sustainable forestry business with a focus on women's employment in Ghana and Sierra Leone
45) Nam Ngum River Basin Development Sector Project in Lao People's Democratic Republic
46) National electrification goal through state-owned grid expansion and off-grid renewables, Indonesia
47) National Innovation for Climate Resilient Agriculture, Uttarakhand, India
48) NRDF project (forest protection integrated with international carbon markets), Solomon Islands
49) Participatory Forest Management, Ethiopia
50) Participatory Smallholder Agriculture and Artisanal Fisheries Development Programme and its successor, the Smallholder Commercial Agriculture Project in São Tomé and Príncipe
51) Partnership between Sriwijaya University and local companies on biogas waste-to-energy plants, Indonesia
52) Pavagada solar park, India
53) Pilot project supporting the operationalization of the Philippine Green Jobs Act, the 2030 Sustainable Development Agenda and the Philippines' NDCs to address climate change
54) Policy tools to address social opposition to renewables in Oaxaca, Mexico
55) Pollinate Energy in Bangalore, India
56) Power storage in reducing and managing demand for electricity, South Africa
57) Reducing energy subsidies, Indonesia
58) Reducing fossil fuel subsidies, Morocco
59) Removal of fossil fuel subsidies, Ecuador
60) Renewable Energy and Energy Efficiency for Development Initiative, South Africa
61) Renewable Energy Independent Power Producer Procurement Programme in Siyathemba Local Municipality, South Africa
62) Renewable Energy Independent Power Producer Procurement Programme, South Africa
63) Renewable Energy Independent Power Producer Procurement Programme, South Africa
64) Renewable Energy Transition project using second-generation bioethanol in Punjab, India

65) Rural Sustentável (Low-Carbon Agriculture Project), Brazil
66) SGP Community-Based REDD+, Cambodia
67) SGP Community-Based REDD+, Democratic Republic of Congo
68) SGP Community-Based REDD+, Nigeria
69) SGP Community-Based REDD+, Panama
70) SGP Community-Based REDD+, Paraguay
71) SGP Community-Based REDD+, Sri Lanka
72) Shanghai SUS Environment Company Limited Eco-Industrial Park Waste-to-Energy Project, China
73) Small-scale renewable energy projects, supported by "WISIONS of sustainability" Sustainable Energy Project Scheme in multiple countries
74) Solar (PV) Powered Pumping System (Desert-to-Power Initiative), Sudan
75) Solar microgrid in a small village to eradicate energy poverty in south Bihar, India
76) Solar Transmission Sector Project, India
77) Strengthening National Systems to Improve Governance and Management of Indigenous Peoples and Local Communities Conserved Areas and Territories, Philippines
78) Support to low-carbon climate resilient development for poverty reduction in Kenya Joint Programme
79) Sustainable Agricultural Investments and Livelihoods, Egypt
80) Sustainable Coastal Protection and Management Investment Programme (Tranche 2 and Multi-tranche Financing Facility) in Goa, Karnataka, and Maharashtra states, India
81) Sustainable Poverty Reduction through Income, Nutrition and Access to Government Services, Lesotho
82) The Colectora project, Colombia
83) The Economic Inclusion Programme for Families and Rural Communities in the Territory of the Plurinational State of Bolivia
84) The Ethiopian sustainable land management project, Ethiopia
85) The Gambia Agriculture and Food Security Project
86) The Marine Conservation and Climate Adaptation Project, Belize
87) The National Biogas Programme Ethiopia
88) The Project for Sustainable Natural Resource Management through Farmer Field School in the Rift Valley Area of Oromia Region, Ethiopia
89) The University of Brawijaya–UK Centre for Ecology and Hydrology research platform, Indonesia
90) The Yasuni-ITT initiative, Ecuador
91) Thirteenth Five-Year Plan for Coal Industry Development – industrial enterprise restructuring, China
92) Transdisciplinary research project to encourage sustainable energy use in Kumasi, Ghana
93) Transdisciplinary research project to encourage sustainable energy use in Makhanda, South Africa
94) Uplands Irrigation and Water Resources Management Sector Project, Cambodia
95) Uruguay’s Decent Work Country Programme

96) Village Electrification Project in Bundelkhand, India
97) Wind farm deployment through Renewable Energy Independent Power Producer Procurement Programme in Cookhouse and De Aar, South Africa
98) Yasuni-ITT Proposal (Ishpingo-Tambococha-Tiputini oilfield), Ecuador
99) Zero Budget Natural Farming in Andhra Pradesh, India

Appendix 2. DRAFT JUST TRANSITION THEORY OF CHANGE DEVELOPED IN THE APPROACH PAPER

Figure 21. Draft theory of change from the approach paper



* Activities can be integrated and/or concurrent. They need not include all these criteria.

Appendix 3. THE SEARCH TERMS AND A SUMMARY OF THE STEPS TAKEN TO SEARCH EACH DATABASE

The review team initiated the research process by curating a set of specific search terms aligned with the core questions of the synthetic review. The team then tested different combinations of the agreed search terms to identify the best approach to searching each database based on their unique characteristics, including character limitations and different search functions. Our search strategy for each database is set out below.

Scopus and Taylor & Francis

For the Scopus and Taylor & Francis databases, the team took advantage of their higher search string character capability and more sophisticated search functions (compared to Google Scholar and JSTOR). Creating the search strategy for these databases involved integrating synonyms, advanced filters and refined search techniques. Synonyms for just transition included, for example, “fair transition” or “just transformation.” The aim of this strategy was twofold: to ensure comprehensive data capture and to maintain relevance in retrieved literature.

To support the research process, the team utilized iterative screening loops to home in on the desired combination of search terms. For example, to address the assignment questions related to sectors and levels of analysis, such as workers, households, and firms, sector specific terms were integrated into the screening loops. This allowed the team to categorize literature effectively while accounting for different levels of intervention. The team employed a multi-layered approach, first identifying articles that contained key terms in their title, abstract or keyword fields for Scopus and in their titles only for Taylor & Francis. A more stringent criterion was then adopted, where search terms were required to appear in multiple fields to ensure a higher level of relevance. Due to time and scope limitations, a title only screening approach was applied to the Taylor & Francis database.

Natural language processing using an artificial intelligence programme to identify meaningful relationships between the core search terms screened out records that did not meet the inclusion/exclusion criteria. This includes records published before 2015, records not in English, records not relating to just transition, records not relating to one of the four sectors and records deemed not to focus on interventions.

This search strategy harmonizes search term refinement, iterative screening, and sectoral analysis to provide a comprehensive and insightful understanding of the just transition landscape in non-Annex I countries.

Box 7. Step by step research process for Scopus and Taylor & Francis

1) The first initial search used the word “just transition” without a date filter, which yielded 1,984,820 returns for Scopus and 420,590 hits for Taylor & Francis. Applying the date filter (2015 to 2023) reduced the number of returns to 754,038 for Scopus and 140,294 for Taylor & Francis. The team then filtered the returns for non-Annex I countries in the title, abstract and key words (Scopus) and title only (Taylor & Francis). This further reduced the returns to 50,457 for Scopus and 15,162 for Taylor & Francis.
2) A second layer of filtering was then applied using the following search string: *"just transition" OR "energy" OR "agriculture" OR "infrastructure" OR "ecosystems services" OR "green jobs" OR "retrain" OR "upskill" OR "redeploy" OR "social protection" OR "social dialogue" OR "low carbon”.*

3) Based on this second layer of filtering (in title and abstract for Scopus and title only for Taylor & Francis), the team was left with 3,446 returns from Scopus and 1,610 from Taylor & Francis. A language filter was then applied to screen out any documents not in English, which removed 187 records from Scopus (leaving 3,259) and none from Taylor & Francis.
4) On screening for duplicates in the titles and metadata using the Zotero reference manager software, the team identified 12 duplicates in the Scopus returns, and 40 in Taylor & Francis returns. This brought the total number of Scopus returns to 3,247, and the Taylor & Francis returns to 1,570.
5) All 1,570 Taylor & Francis returns were then manually screened at title level against the inclusion/exclusion criteria in the approach paper. This left the team with 218 returns to include for full text screening.
6) All 3,247 Scopus returns were then manually screened at the title and abstract level against the inclusion/exclusion criteria. This left the team with 93 returns to include for full text screening.

Google Scholar

When running searches in Google Scholar, research teams must accommodate a 256-character limitation set by the database for each "search string". This restricted the length of the search strings that could be run by the team, reducing the number of parallel search terms that could be applied. With these restrictions in mind, the team used the "advanced" search function in Google Scholar to test and refine the research strategy for this database to ensure that the most relevant articles were being identified.

The search terms selected from the approach paper were found to deliver the most relevant results, further enhanced by including the terms "resulted" and "outcome" and excluding the words "propose", "concept", "theory" and "plan". Our initial test searches returned a significant amount of theoretical policy and planning material not relevant to actual just transition interventions and learning in non-Annex I countries, hence the inclusion/exclusion of these additional terms to help further refine the search to focus on interventions and case studies. The team also found that adding the term "social protection" as a synonym for general interventions agreed in the approach paper relating to financial/income protection mechanisms provided the most relevant results while keeping the search string within the character limitation.

After performing a series of 20+ test runs, the following search strategy was identified as returning the most relevant material:

"just transition" AND "*COUNTRY NAME*" AND (energy OR agriculture OR infrastructure OR "ecosystems services" OR "green jobs" OR "social protection" OR "social dialogue" OR "low carbon" OR resulted OR outcome) NOT (propose OR "concept OR theory OR plan)

This search strategy was entered into the Google Scholar advanced search, as shown in Box 8.

Box 8. Google Scholar advanced search

Find articles

- with **all** of the words: "*COUNTRY NAME*"

- with the **exact phrase:** "just transition"
- with **at least one** of the words: "energy" "agriculture" "food" "infrastructure" "ecosystems services" "green jobs" "social protection" "social dialogue" "low carbon" resulted outcome
- **without** the words: "propose" "concept" "theory" "plan"
- where my words occur: anywhere in the article

Return articles

- **authored by**: N/A
- **published by**: N/A
- **dated** between: 2015 – 2023

This search was run individually for each of the 155 non-Annex I countries, and the first 40 unique results were saved into a shared Google Scholar library. If a result had already been picked up while running the search for another country, it was considered a duplicate and excluded. This allowed the team to save up to 40 unique results for each country. In cases where fewer than 40 results were returned for an individual country, the team saved all unique results available.

The shared library was then exported to an Excel file for the team to add URLs and abstracts for each return. This Excel file was then used for title and abstract screening, including removing duplicates and any articles not written in English. Twenty per cent of results were double screened by a second reviewer, with a small number of disagreements resolved by discussion with the two reviewers and a third team member.

JSTOR

JSTOR imposes a 200-character limitation for searches, which reduces the number of search terms the team could enter the JSTOR search string. To ensure a consistent approach across search strategies for the different databases, the team used an adapted version of the Google Scholar search string, as shown below:

"just transition" AND "*COUNTRY NAME*" AND (energy OR agriculture OR infrastructure OR "ecosystems services" OR "green jobs" OR "social protection" OR "social dialogue" OR "low carbon" OR outcome)

In this case, it was not possible to include the NOT search terms. Therefore, the team removed the criteria for excluding the words "propose", "concept", "theory" and "plan".

As for Google Scholar, the team ran this search individually for all 155 non-Annex I countries. All results were selected for each country and then downloaded as a research information system file into Zotero country-by-country before being screened for duplicates. After removing the duplicates, the team ran title screening to identify articles to pass through to full text screening. At this stage, we were able to review titles to manually identify and screen out the NOT search terms. A second reviewer double screened 20 per cent of the results. Due to time limitations, the team ran title screening only on JSTOR results, not abstract screening.

Websites

Hand searching of institutional websites requires a very different approach to database searching. Given the range of institutions included in this study, from multilateral banks to foundations to confederations of trade unions, applying the same search string to each website was not appropriate.

Instead, our research team drew on the approach paper's identified search terms to develop tailored searches for each institution that were further iterated in real-time to allow snowballing. In practice, this means our researchers used different combinations of search terms based on the websites they were searching and the results they found. Title and abstract screening were conducted in real-time to aid the selection of results. This required subjective judgment during manual searches based on the criteria set out in the approach paper.

The research team hand searched 29 websites and selected up to 30 relevant articles, reports, blogs and programme documents. In cases with fewer than 30 relevant results, the team saved only those deemed relevant to this study. Bibliographic information for each result was saved into a shared Zotero folder, with each institution tagged, before being downloaded into a CSV (comma-separated values) file to provide the basis for full text screening.

Appendix 4. DATA EXTRACTION FORM

Data Extraction Form

* Indicates required question

Your initials: *

Your answer

Start time: *

Time

:

Study number and title: *

Include a, b, c if there are multiple interventions in one study - e.g. 34b - Tension in Mexico's energy transition). Please insert study title, not intervention name, as that question comes later.

If you are resubmitting, add (resubmission) in the name as well - e.g. 34b - Tension in Mexico's energy transition (resubmission)

Your answer

Following in-depth review for data extraction should this study be included in the synthesis review? *

- ◯ Yes, include in the synthesis review
- ◯ No, screen the study out

If you selected no to the above question, please explain why:

Your answer

Next Clear form

Intervention Details

Country name: *

Your answer

Region, if applicable:

Your answer

Name of process of intervention: *

Your answer

Scale of intervention: *

- [ ] Individuals
- [ ] Household
- [ ] Community
- [ ] District
- [ ] Region
- [ ] Country

Target of process or intervention: *

- [ ] Public sector
- [ ] Corporate/firms
- [ ] Households

Mitigation or adaptation *
Select both if cross-cutting

- [ ] Mitigation
- [ ] Adaptation

Funding partners: *

Your answer

Implementing partners: *

Your answer

Sector(s): *

- [ ] Agriculture/food
- [ ] Energy
- [ ] Infrastructure
- [ ] Ecosystem Services

Specific social groups (if applicable):
e.g. specific indigenous groups, women, youth, people with disabilities

Your answer

Description of process or intervention: *

Your answer

Is a programme or intervention theory of change available? *

- ◯ Yes, full explicit ToC
- ◯ Yes, partial explicit ToC
- ◯ Yes, full implicit ToC
- ◯ Yes, partial implicit ToC
- ◯ No
- ◯ Not clear

Where a full or partial ToC is available (implicitly or explicitly), please capture a summary:
Categorize your findings using the template below - if there is no information on one section, write N/A

Inputs:
Activities:
Outputs:
Outcomes:

Your answer

Assumptions made by reviewer when completing ToC:

Your answer

Timing of intervention: month/year started: *

Your answer

Timing of intervention: Intended or actual duration: *

Your answer

Status of intervention: *

- ◯ Underway
- ◯ Closed
- ◯ Unclear

Enablers and mechanisms: *
Enablers and mechanisms are channels which increase the likelihood a just transition may succeed

Your answer

Barriers and risks: *

Barriers and risks are the channels which decrease the likelihood of momentum for a just transition

Your answer

Contexts: *

A set of economic, political, social and environmental conditions

Your answer

Activities: *

*Note: as opposed to the previous question on the activities of the ToC which asks about the proposed activities, this question asks about **actual** activities that have taken place in the project/intervention*

Mechanisms for coherence across programming and investments: Processes or systems are in place to ensure different programmes and/ or investments are working together towards mutually beneficial outcomes in relation to a just transition.

Social dialogue and stakeholder engagement: All types of negotiation, consultation or simply exchange of information between, or among, representatives of governments, employers and workers, on issues of common interest relating to economic and social policy. It can exist as a tripartite process, with the government as an official party to the dialogue or it may consist of bipartite relations only.

Ex ante assessments of employment and social impacts of interventions: A tool or process used to predict or estimate the likely future effects of an intervention on employment and social impacts.

Enabling environment, institutional and market systems (public/private): The combination of political, economic, social and environmental conditions that affect an intervention's capacity to deliver and succeed.

Incentives and standards: Incentives, financial or otherwise, that are given to businesses adopting environmentally sound practices in line with economic and social sustainability, and the upholding of international labour standards around collective bargaining, occupational safety and health, social security, etc.

Investments in infrastructure, technology, support for linkages: Investments in infrastructure and technology that afford environmental, social and economic benefits to the community, and work to adapt to and/or mitigate climate change.

Inclusive social policies, programmes and investments: Interventions that consider groups facing socio-economic vulnerabilities, such as vulnerable women, persons with disabilities, indigenous peoples, and migrants and refugees, and incorporate inclusive decision-making processes across the local, national, regional and international levels.

Systems to ensure human rights and principles and rights at work: Adherence to conventions on fundamental principles and rights at work and human rights principles.

- [ ] Mechanisms for coherence across programming and investments
- [ ] Social dialogue and stakeholder engagement
- [ ] Ex ante assessments of employment and social impacts of interventions
- [ ] Enabling environment, institutional and market systems (public/private)
- [ ] Incentives and standards
- [ ] Investments in infrastructure, technology, support for linkages
- [ ] Inclusive social policies, programmes and investments
- [ ] Systems to ensure human rights and principles and rights at work

Output category - climate: *

*Note: as opposed to the previous question on the outputs of the ToC which asks about the proposed outputs, this question asks about **actual** outputs that have emerged from the project/intervention.*

- [ ] Increased supply of affordable, low emission technologies and infrastructure
- [ ] Changes in consumption and demand towards low emission/more resilient patterns
- [ ] Increased adoption of low emission/resilient practices and technologies
- [ ] N/A (no evidence available)
- [ ] Other: _____

If they are specified, please describe the climate outputs below:

Your answer

Output category - social equity *

*Note: as opposed to the previous question on the outputs of the ToC which asks about the proposed outputs, this question asks about **actual** outputs that have emerged from the project/intervention.*

- [ ] Enhanced benefits for the local economy, including job creation
- [ ] Workforce with skills relevant to job opportunities and new technology requirements
- [ ] Vulnerable workers and communities protected from potential negative impacts
- [ ] Respect for human rights and fundamental principles and rights at work
- [ ] Broad stakeholder consensus
- [ ] N/A (no evidence available)
- [ ] Other:

If they are specified, please describe the social equity outputs below:

Your answer

Back Next Clear form

Intervention Outcomes and Contextual Factors

Outcome category - climate: *

*Note: as opposed to the previous question on the outcomes of the ToC which asks about the proposed outcomes, this question asks about **actual** outcomes that have emerged from the project/intervention.*

- [ ] Reduced GHG emissions at sectoral / national levels
- [ ] Reduced exposure to shocks and stresses
- [ ] Greater adaptive capacity
- [ ] Enhanced climate resilience
- [ ] Unplanned positive (describe below)
- [ ] N/A (no evidence available)
- [ ] Other:

If you selected 'unplanned positive' in outcome category - climate, describe it below:

Your answer

If they are specified, please describe the climate outcomes below:

Your answer

Outcome category - social equity: *

*Note: as opposed to the previous question on the outcomes of the ToC which asks about the proposed outcomes, this question asks about **actual** outcomes that have emerged from the project/intervention.*

- [ ] Job losses avoided, minimized and mitigated within sectors or the whole economy
- [ ] Negative social impacts avoided, minimized and mitigated within social groups or across society
- [ ] Social, economic, decent work gains maximized within regions or the country
- [ ] Social equality and gender equality promoted within social groups or within society
- [ ] Unplanned positive (describe below)
- [ ] N/A (no evidence available)
- [ ] Other:

If you selected 'unplanned positive' in outcome category - social equity, describe it below:

Your answer

If they are specified, please describe the social equity outcomes below:

Your answer

Unintended actual or potential harms: *

- [ ] Backlash by vested interests
- [ ] Social upheaval and conflict
- [ ] Greater climate denial
- [ ] Retrenchment of social policies
- [ ] Leakage across sector / regions / countries
- [ ] N/A (no evidence available)
- [ ] Other:

Does this data extraction need review (are you uncertain about some aspect of it)? *

- ◯ No, no review necessary
- ◯ Yes, someone else should review this

Completion time: *

Time

__ : __

Do you want to record any backwards citations? *

If you have already submitted backwards citations for the study (if it contains more than one intervention/case study), select no

- ◯ Yes
- ◯ No

Back Next Clear form

Backwards Citations

Please note any backwards citations from the study:

Only note studies that you think will be highly relevant to the synthesis review. They should be studies published in 2015 or later, in English, that look like they focus on just transition interventions being implemented in non-Annex I countries in the energy, agriculture, infrastructure or ecosystems sectors

Your answer

Back Submit Clear form

Appendix 5. LIST OF POTENTIAL INTERVENTIONS OF INTEREST AND BACKWARD CITATIONS

Table 3. Potential interventions of interest

POTENTIAL INTERVENTIONS OF INTEREST	COUNTRY/REGION
The Lake Turkana Wind Power Project	Kenya
Coal-based carbon capture and storage in India	India
Coal-based carbon capture and storage in Mexico	Mexico
Eco Brixs – a closed loop recycling scheme	Uganda
Solomon Islands' Tina River Hydropower	Solomon Islands
Development Project & Morocco's ONE Wind Energy Plan	Morocco
Hydrogen Valley Project, Boegoebaai 'green hydrogen' development and Prieska Power Reserve	South Africa
Hydrogen project in the Tsau/Khaeb National Park	Namibia
German-Moroccan hydrogen partnership	Morocco
Costa Rica public ownership of electricity generation	Costa Rica
Kenya feed-in tariffs	Kenya
African Renewable Energy Initiative	Africa
Memorandum of understanding between Sudan and the United Arab Emirates to build a solar power plant	Sudan
Sagarmala Programme	India
EUROCLIMA+ Programme	Latin America
Pakistan's Ranolia Hydropower Project	Pakistan
Mining and Energy Planning Unit projects	Colombia
Access to Clean Energy Investment Programme	Pakistan
Brick Kilns	Bangladesh
Chulakkurgan Solar	Kazakhstan
Egypt's Nexus of Water Food & Energy's energy pillar	Egypt
Nosy Be Renewable Energy Power Project Preparation	Madagascar
Low-Carbon Olive Value Chain	Palestine
Kairouan solar PV project	Tunisia
Delta for renewable energy	Egypt
Kinguele Aval hydropower project	Gabon
The Africa Energy Transition Catalyst programme	Multiple countries
Dodoma City Outer Ring Road project	Tanzania
The Gambia agricultural and food security project (GAFSP)	Gambia
The CGIAR Excellence in Agronomy initiative	Multiple countries
Catalytic climate action in Iraq	Iraq
Support To Low Carbon Climate Resilient Development for Poverty Reduction	Kenya

POTENTIAL INTERVENTIONS OF INTEREST	COUNTRY/REGION
The Photovoltaic Poverty Alleviation Project in China	China

Table 4. Backward citations

BACKWARD CITATIONS	COUNTRY/REGION
Pedro Henrique Campello Torres, Ana Lia Leonel and Gabriel Pires de Araújo, "Climate Injustice in Brazil: What We Are Failing Towards a Just Transition in a Climate Emergency Scenario?", in *Towards a just climate change resilience*, pp.81-107 (2021)	Brazil
Annika Seiler, Hannah Brown and Samuel Matthews, "The JETP's of south Aftica and Indonesia: Blueprint for the Move Away from Coal?" (Center for Global Development, 2023)	South Africa and Indonesia
Pegah Mirzania and others, "Barriers to powering past coal: Implications for a just energy transition in South Africa", *Energy Research & Social Science*, vol. 101, 103122 (2023)	South Africa
Amollo Ambole and others, "A Review of Energy Communities in Sub-Saharan Africa as a Transition Pathway to Energy Democracy", *Sustainability*, vol. 13, no. 4 (2021)	Sub-Saharan Africa
Kristen Lyons, Peter Walters and Annabel Shewring, ""Forests for Life" or forests for carbon markets? The case of Choiseul Province, Solomon Islands, *Pacific Dynamics: Journal of Interdisciplinary Research*, vol. 3, No. 1, pp. 1–14 (2019)	Solomon Islands
Eskom website: "JET projects underway"	South Africa
Sarah Colenbrander, David Dodman and Diana Mitlin, "Using climate finance to advance climate justice: The politics and practice of channelling resources to the local level", *Climate Policy*, vol. 18, issue 7, pp. 1–22 (2018)	Multiple countries
Independent Power Producers Procurement Programme Office, "REIPPPP focus on northern Cape", Provincial Report volume 1 (South Africa, 2021)	South Africa
Zainal Arifin, "Smart grid development in Indonesia", Presentation (PLN, 2021)	Indonesia
Lena Kitzing and others, "Worth the wait: How South Africa's renewable energy auctions perform compared to Europe's leading countries", *Energy Policy*, vol. 166, article 112999 (2022)	South Africa
Katherine Kramer, "Just energy transition Partnerships: An opportunity to leapfrog from coal to clean energy" (International Institute for Sustainable Development, 7 December 2022)	JETP countries
United Nations Climate Change Conference UK, "12-month update on progress in advancing the Just Energy Transition Partnership (JETP)", 10 November 2021	South Africa
South Africa, The Presidency, *Update on Energy Action Plan – January 2023*	South Africa
South Africa, Public Affairs Research Institute, "South Africa's JETP" (Johannesburg, 2023)	South Africa
A. Lawrence, "Energy Decentralization in South Africa: Why Past Failure Points to Future Success", *Renewable and Sustainable Energy Reviews*, vol. 120 (March 2020)	South Africa
Ashwini Kulkarni and others, "MGNREGA works and their impacts: A study of Maharashtra", *Economic and Political Weekly*, vol. 50, issue 13, 28 March 2015	India
Matthieu Le Quang, "The Yasuní-ITT Initiative: Toward New Imaginaries", *Latin American Perspectives*, vol. 43, issue 1, pp. 187–199 (2016)	Ecuador
Gaia Calligaris; Roberto Trevini Bellini, "The end of the Yasuní -ITT initiative: considerations in a buen vivir perspective", *International Journal of Environmental Policy and Decision Making*, vol. 1, no. 3 (2015)	Ecuador

BACKWARD CITATIONS	COUNTRY/REGION
Carlos de La Torre, "Latin America's Shifting Politics: Ecuador After Correa", *Journal of Democracy*, vol. 29, no. 4 (October 2018)	Ecuador
Donald V. Kingsbury, Teresa Kramarz and Kyle Jacques, 'Populism or Petrostate? The Afterlives of Ecuador's Yasuní-ITT Initiative,' *Society & Natural Resources*, vol. 32, issue 5, pp. 530–547 (2019)	Ecuador
Kathryn Chelminski, "Fossil Fuel Subsidy Reform in Indonesia: The Struggle for Successful Reform." In *The Politics of Fossil Fuel Subsidies and Their Reform*, Jacob Skovgaard and Harro van Asselt, eds, pp. 193–211 (Cambridge: Cambridge University Press, 2018)	Indonesia
Pernille Jægerfelt Mouritsen (ed.), *Cities100: 100 City Projects Making the Case for Climate Action* (London: C40 Cities, Realdania and Nordic Sustainability, 2019)	Multiple countries
Kaysara Khatun and others, "When Participatory Forest Management makes money: insights from Tanzania on governance, benefit sharing, and implications for REDD+", *Environment and Planning A: Economy and Space*, vol. 47, issue 10, pp. 2097–2112 (August 2015)	Tanzania
Ankit Kumar and others, "Solar energy for all? Understanding the successes and shortfalls through a critical comparative assessment of Bangladesh, Brazil, India, Mozambique, Sri Lanka and South Africa", *Energy Research & Social Science*, vol. 48, pp. 166–176 (February 2019)	Multiple countries
Eirik S. Lindebjerg, Wei Peng and Stephen Yeboah, "Do Policies for Phasing Out Fossil Fuel Subsidies Deliver What They Promise? Social Gains and Repercussions in Iran, Indonesia and Ghana", working paper 2015–1 (Geneva: UNRISD, 2015)	Multiple countries
Courtney Work, "Forest Islands and Castaway Communities: REDD+ and Forest Restoration in Prey Lang Forest", *Forests*, vol. 8, issue 2 (The Hague, Netherlands: International Institute of Social Studies, Erasmus University, 2017)	Cambodia
Michaël Aklin and others, "Does basic energy access generate socioeconomic benefits? A field experiment with off-grid solar power in India", *Science Advances*, vol. 3, e1602153 (2017)	India
Peter Newton and others, "Overcoming barriers to low carbon agriculture and forest restoration in Brazil: The Rural Sustentável project", *World Development Perspectives*, vol. 4, issue C (2016)	Brazil
Value for Women, "Innovations in Gender-Inclusive Climate-Smart Agriculture" (August 2018)	Sub-Saharan Africa
the Food and Agriculture Organization of the United Nations and CARE, "Good Practices for Integrating Gender Equality and Women's Empowerment in Climate-Smart Agriculture Programmes" (2019)	Multiple countries
Ezequiel Zarate Toledo, Julia Elena Fraga Berdugo and Rodrigo Patiño, "Justice, social exclusion and indigenous opposition: A case study of wind energy development on the Isthmus of Tehuantepec, Mexico", *Energy Research & Social Science*, vol. 54, pp. 1–11 (2019)	Mexico
Laurent Jodoin, "Let capabilities ring: Operationalizing energy justice in Guinea", *Energy Research & Social Science*, vol. 72, issue 1, 101894 (2021)	Guinea
Paola Velasco-Herrejon and Thomas Bauwens, "Energy justice from the bottom up: a capability approach to community acceptance of wind energy in Mexico", *Energy Research & Social Science*, vol. 70 (December 2020)	Mexico
Sandra J. Barragan-Contreras, "Procedural injustices in large-scale solar energy: a case study in the Mayan region of Yucatan, Mexico", *Journal of Environmental Policy and Planning* (November 2021)	Mexico

BACKWARD CITATIONS	COUNTRY/REGION
Abidah B. Setyowati and lorraine Elliott, "Towards a Socially Just Transition to Low Carbon Development: The Case of Indonesia", *Asian Affairs*, vol. 51, pp. 875-894 (November 2020)	Indonesia
S. De Royer, Meine van Noordwijk and James M. Roshetko, "Does Community-Based Forest Management in Indonesia Devolve Social Justice or Social Costs?" *International Forestry Review*, vol. 20, issue 2, pp. 167-180 (June 2018)	Indonesia

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_____ (2022a). *India: Himachal Pradesh Clean Energy Development Investment Program (Tranches 1 and 2)*. Completion report. Available at https://www.adb.org/projects/documents/ind-41627-023-41627-033-pcr.

_____ (2022b). *People's Republic of China: Gansu Featured Agriculture and Financial Services System Development Project*. Completion report. Available at https://www.adb.org/projects/documents/prc-47046-002-pcr.

_____ (2022c). *India: Green Energy Corridor and Grid Strengthening Project*. Completion report. Available at https://www.adb.org/projects/documents/ind-44426-016-pcr.

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_____ (2023b). *Adjaristsqali Hydropower Project (Georgia)*. Extended Annual Review Report. Available at https://www.adb.org/projects/documents/geo-47919-014-xarr.

_____ (2023c). *Shanghai SUS Environment Company Limited Eco-Industrial Park Waste-to-Energy Project (People's Republic of China)*. Extended Annual Review Report. Available at https://www.adb.org/projects/documents/prc-51399-001-xarr.

_____ (2023d). *India: Solar Transmission Sector Project.* Completion report. Available at https://www.adb.org/projects/documents/ind-49214-002-pcr.

Aung, May Thazin, and others (2020). Uneasy Transition to Renewable Energy in Indonesia. In *Low-Carbon Transitions in West Sumatra, Indonesia: Gender and Equity Dimensions*, Catherine McMullen, eds. Stockholm Environment Institute. Available at http://www.jstor.org/stable/resrep26595.4.

Benkenstein, Alex, and Grace Murungi (2020). Skills Transfer and Women in Africa's Green Transition. Policy Briefing 219, September. South African Institute of International Affairs. Available at http://www.jstor.org/stable/resrep28398.

Beuermann, Christiane, and Victoria Brandemann (2021). *Just Transition in National Climate Plans: An Analysis of Case Studies from South Africa, Costa Rica and Ukraine*. Friedrich Ebert Stiftung. Available at https://library.fes.de/pdf-files/iez/18464.pdf.

Biegel, Suzanne, and Sophie Lambin (2021). *Gender & Climate Investment: A Strategy for Unlocking a Sustainable Future*. GenderSmart and partners. Available at https://www.impactprinciples.org/sites/default/files/2021-03/Gender%20%26%20Climate%20Investment%20%28Report%29.pdf.

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Independent Evaluation Unit
Green Climate Fund
175 Art center-daero, Yeonsu-gu
Incheon 22004, Republic of Korea
Tel. (+82) 032-458-6450
ieu@gcfund.org
https://ieu.greenclimate.fund

International Labour Organization
4 route de Morillons
CH-1211 Genève 22, Switzerland
Tel. (+41) 022 799 6111
ilo@ilo.org
https://ilo.org

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International Labour Organization