




Realist Review on Just Transition Towards Low Emission, Climate Resilient and More Inclusive Societies in Developing Countries

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Received: 13 November 2024 / Accepted: 27 October 2025

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Abstract

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.

keywords Just transition · Realist review · Energy · Agriculture and food · Infrastructure · Ecosystem services

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Résumé

La transition juste désigne la transformation vers des économies et des sociétés plus vertes, plus inclusives et plus résilientes. Cette revue réaliste propose une synthèse rigoureuse de l'évidence mondial sur les interventions visant des résultats contribuant à une transition juste dans les pays en développement, couvrant les secteurs de l'énergie, de l'agriculture et de l'alimentation, des infrastructures et des services écosystémiques. Nous avons identifié des facteurs facilitateurs communs aux interventions de transition juste dans la plupart ou l'ensemble des secteurs, notamment des mécanismes de financement solides, une forte adéquation avec les besoins et priorités, la volonté politique et l'appropriation, le dialogue social et l'engagement des parties prenantes. Les facteurs facilitateurs matériels et immatériels diffèrent selon les secteurs. Nous avons également relevé des obstacles communs à la réussite de la transition juste dans tous les secteurs, tels que des barrières bureaucratiques et juridiques, l'exclusion et la répartition inégale des bénéfices.

Resumen

La transición justa describe la transformación hacia economías y sociedades más verdes, inclusivas y resilientes. Esta revisión realista ofrece un resumen riguroso de la evidencia global sobre intervenciones orientadas a resultados que contribuyen a una transición justa en países en desarrollo, abarcando los sectores de energía, agricultura y alimentación, infraestructura y servicios ecosistémicos. Identificamos facilitadores comunes para las intervenciones de transición justa en todos o la mayoría de los sectores, como mecanismos sólidos de financiamiento y financiación, una fuerte alineación con las necesidades y prioridades, voluntad política y apropiación, diálogo social y participación de las partes interesadas. Los facilitadores duros y blandos variaron según el sector. También encontramos barreras comunes para el éxito de la transición justa en todos los sectores, incluyendo obstáculos burocráticos y legales, exclusión y distribución desigual de los beneficios.

Introduction

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 article 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, 2023). 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).



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.¹ 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).^{2,3} 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). These 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).⁴

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 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% of Nationally Deter-

¹ 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).

² 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.

³ See also International Labour Organisation (2023).

⁴ 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.



mined Contributions (NDCs) incorporating these principles, and 56% of Long-Term Low-Emission Development Strategies (United Nations Framework Convention on Climate Change 2023).^{5,6}

The Rationale for This Review

To date, most research on just transition has come from Annex I countries,⁷ 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.⁸

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, this is an opportune time to harness 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 energy, agriculture and food, infrastructure and ecosystem services.⁹ 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

⁵ 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.

⁶ 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.

⁷ 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.)

⁸ We focus our review on developing countries as defined in the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC).

⁹ The scope of the GCF's Updated Strategic Plan for 2024–2027 provides sufficient room for close alignment with contributions towards just transitions.



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.¹⁰

The ILO's 'Guidelines for a Just Transition towards Environmentally Sustainable Economies and Societies for All' were used as a foundation for the review.¹¹

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 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 outcomes?
6. How can the evidence base be best synthesized to support programming by global climate funds and international agencies?¹²

Interventions at the Sectoral 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 through examining underlying theories of change to illuminate the mechanisms and conditions for just transition through overarching and sectoral enablers and barriers.¹³

¹⁰ We refer to non-Annex I countries as developing countries. We use these two terms interchangeably.

¹¹ 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.

¹² The aim here is to synthesize evidence into a series of graphics to support programming and policy makers.

¹³ 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



Energy

The energy sector is at the centre of just transition debates. In 2019, 34% of net global GHG emissions came from the energy sector (Intergovernmental Panel on Climate Change) and 82% 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:

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

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, 2023).

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 re-allocating 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 a just transition identifies and mitigates risks and enhances positive employment and social impacts.

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% of global GHG emissions across all sectors (Food and Agriculture Organization of the United Nations 2020). This sector employs a significant proportion of the world's population (Gass et al. 2021) with more than 60% of the world's employed population in the informal economy. Estimates suggest over 90% of agricultural workers in developing countries are in informal employment (International Labour Organization 2018). Workers and smallholders operating in the infor-

review focused on the agricultural sector due to the importance of smallholder production for sustainable development, poverty reduction and adaptation.



mal economy in developing countries are typically not covered by social protection schemes, increasing their vulnerability to shocks, including those associated with climate change (Leal et al. 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 et al. 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 for 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% of the world's food in value terms and farms smaller than 2 hectares produce roughly 35% of the world's food (Lowder et al. 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. The International Fund for Agricultural Development reported 80% 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).

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% 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). When infrastructure 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 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.

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. Ecosystems are key in our approaches to climate mitigation and adaptation in the context of a just transition (Green Climate Fund 2022a, b).

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. Specific channels 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% of the world's population, but protect around 80% 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.

Methods

The Overall Realist Review Design Approach

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 purposive 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. Full details of the decisions taken can be found in the companion approach paper for this realist review, including inclusion/exclusion criteria, study designs, search steps, screening and data extraction/management.



In terms of quality assurance, the research team adhered to the following steps when screening studies. For initial screening, the team reviewed the abstracts of selected literature to assess the relevance and rigour of each case identified for answering the research questions.

The team asked (i) if the case is good enough to provide some evidence to contribute to the synthesis, (ii) whether it is relevant to answering hypotheses, and (iii) whether it is rigorous in its own terms. This moves the synthesis away from the conventions of systematic reviews and towards a realist understanding for the inclusion of evidence. Rigour was tested continuously as each study moved to data extraction and synthesis steps.

Data Analysis

The analysis identifies 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 outcomes. The analysis was done at multiple levels: (i) an overarching analysis across the whole population of studies, (ii) a sector-level analysis for each sector, 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.

The Landscape of Studies

First, a full data set of 99 interventions extracted from the 76 included studies (see appendices) was reviewed and consolidated to determine the landscape of studies related to a just transition in non-Annex I countries. The finalized dataset 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, units, and scale, ranging from the individual-level to national.

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. This updated overarching theory of change provides a high-level framework for the intended causal pathways of interventions contributing towards outcomes consistent with a just transition in non-Annex I countries.

The same process was then followed at the sector level to create 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.

Evidence of Contribution Towards a Just Transition

To help demonstrate the contribution of approaches towards a just transition in the sectors included in this review, the team mapped and analysed the evidence of just transition interventions influencing climate or social equity and social gains outcomes. A series of charts visually represent the relationships observed in the evidence (see below). The charts were developed using standardized values for activities and outcomes to apply a consistent framework across sectors. These categories 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 a very limited number of studies.

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, including barriers which led to underperformance, 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 along 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 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.

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.

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.

Due to budget and resource limitations, only literature written and published in English was included in this realist review. Literature written and published in other languages was excluded from the study. This decision limited the completeness of the study and imparts a degree of bias. Further research should supplement the study by exploring literature published in other languages.

Fourth, a further inherent limitation within the study is our reliance on interventions which have been documented. Researchers are only able to synthesize evidence on interventions types once they have been described, communicated and have entered the public record, broadly speaking. There are, of course, interventions, including those which are consistent with a just transition, that are implemented but are not documented and hence are not available in the public domain. Our necessary reliance on solely documented evidence imparts a degree of bias.¹⁴

Fifth, and as highlighted above, some of the included interventions, while very relevant to the review, did not provide comprehensive evidence at outcome level due to ongoing interventions, insufficient detail in case studies or that outcome levels

¹⁴ A component of this limitation is survival bias—as only interventions which last a sufficient length of time, and which are more likely to be successful, are available to be described, evaluated and included in syntheses. There are others which are curtailed, shuttered, fail, and hence are not written up and published.



were yet to be reported. The research team worked within these constraints utilising the available information in a credible and careful manner.

Finally, in the analysis of standardized values presented in the activity-outcome charts, it is also important to note that several factors influenced the reported outcomes 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 statistical or econometric analysis since the nature of the data is not yet suitable for these methods.

Results

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. 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. Out of 99 interventions, only nine had full or partial explicit Theories of Change.

Activity-outcome mapping highlights where evidence exists regarding previously used activities. This indicates where evidence gaps exist, which funders and policy-makers can fill by gathering new evidence, such as whether and how energy interventions improve resilience, enhance adaptive capacity or reduce exposure. 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 incidence of evidence. 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 as have some indicative mechanisms.



Description of Studies: Search Results and Characteristics of the Evidence Base

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 Fig. 1 below. This outlines the process from the initial database searches to title and abstract screening, to full text screening, to the final round of screening during the data extraction phase. From 8726 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 the appendices.

Results of the Search

Geography There are 45 unique countries represented across the 99 interventions, as shown in Fig. 2 and mapped in Fig. 3. This represents 29% 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).¹⁵ This indicates that the incidence of evidence on 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 Figs. 2 and 3.

While considerable regional diversity exists across the 99 interventions, as represented in Fig. 4, some regions were less prevalent in the study. 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.¹⁶ These findings suggest that the incidence of evidence on just transition interventions is currently less prevalent in SIDS. The lower number of studies mentioning interventions 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.

Interventions 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 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,

¹⁵ One included study combined Italy, Indonesia and Australia.

¹⁶ 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.



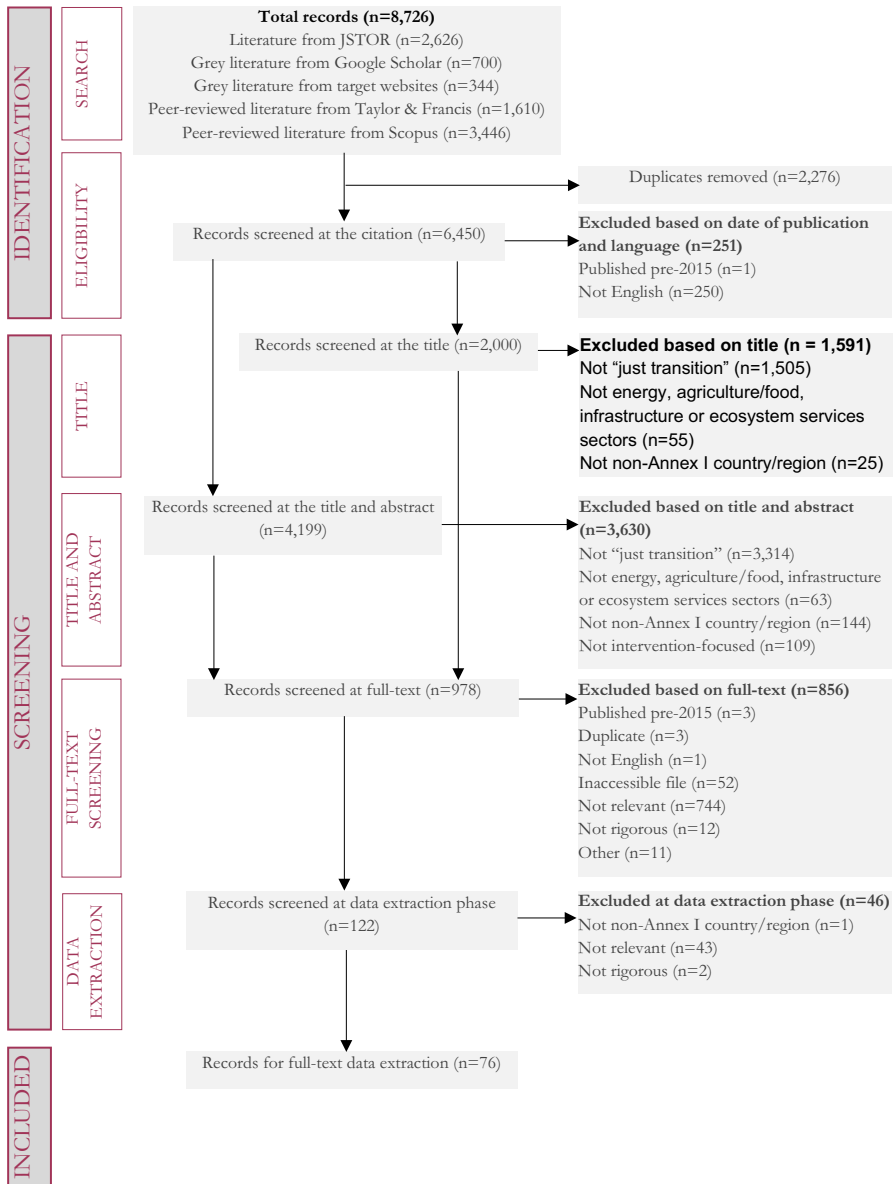


Fig. 1 PRISMA diagram

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 Fig. 5. The intervention types were typically derived from narrative descriptions of each intervention, as the studies did not always clearly classify them.



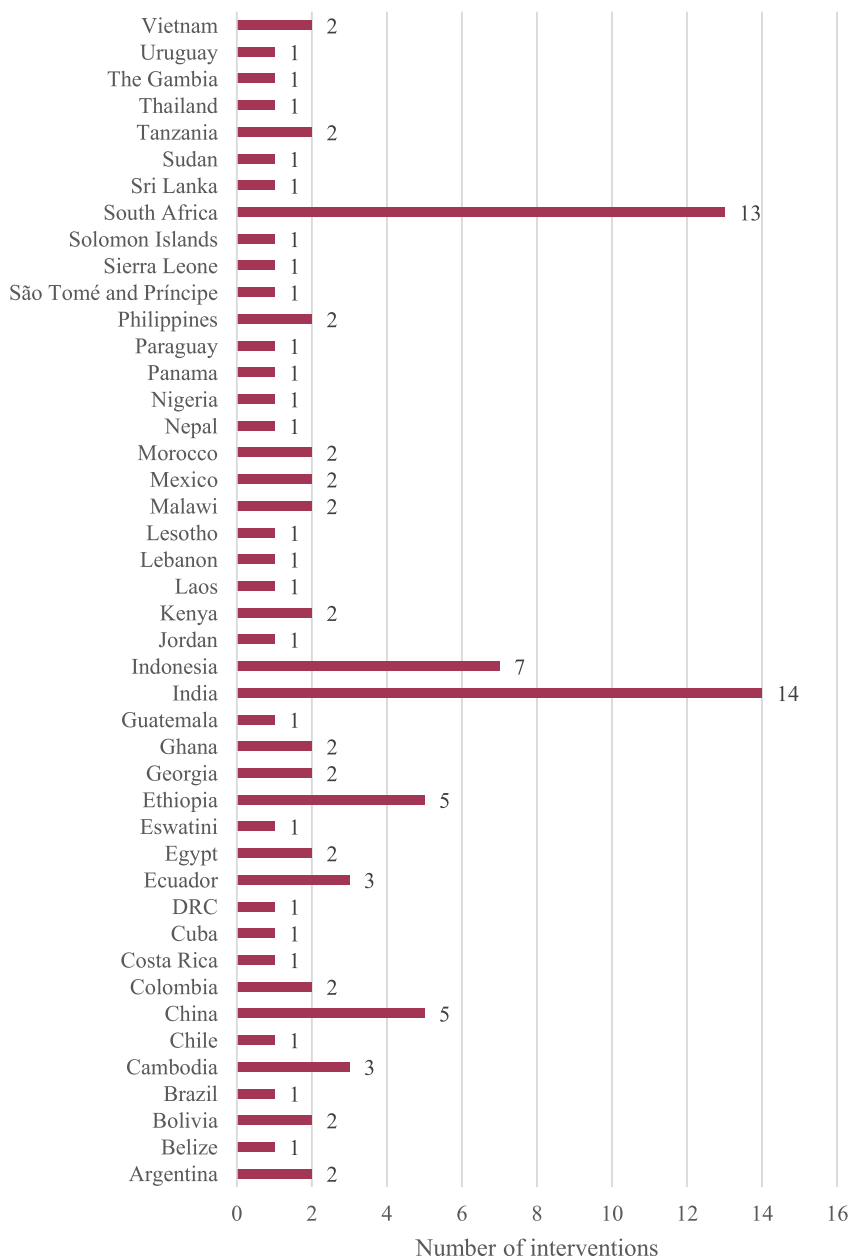


Fig. 2 Country location of interventions studied

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 renew-



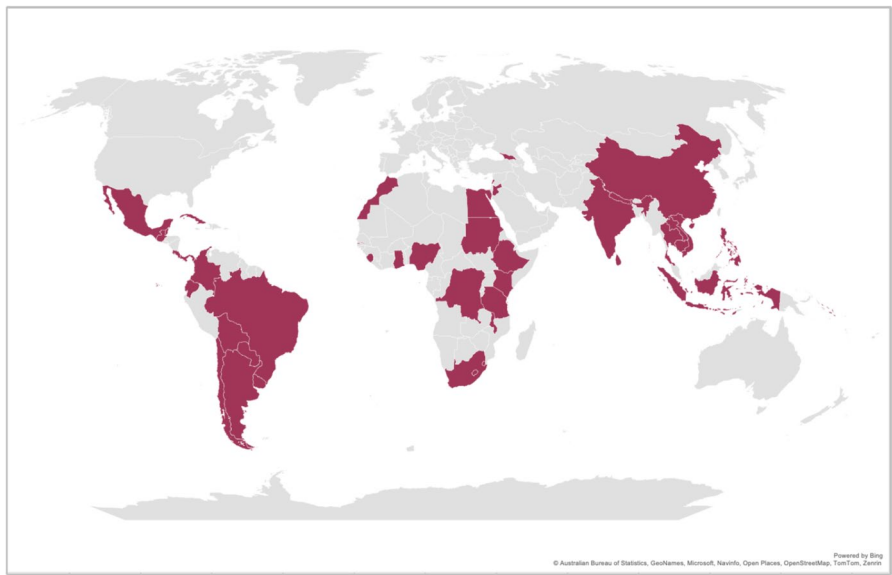


Fig. 3 Regional diversity of interventions studied

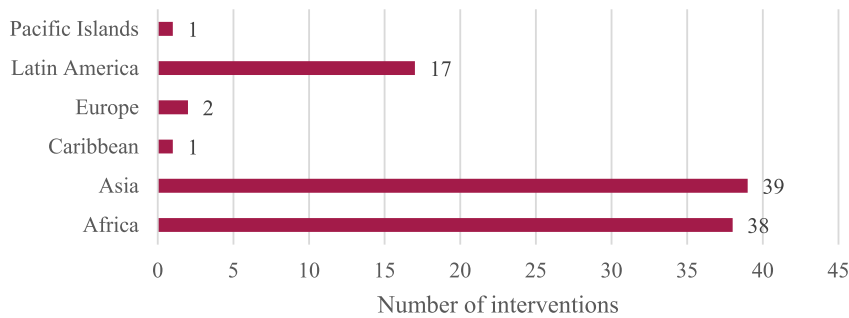


Fig. 4 Regional location of interventions studied

able 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).

Interventions were also classified as focused on adaptation, mitigation or both, as shown in Fig. 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.

As Fig. 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



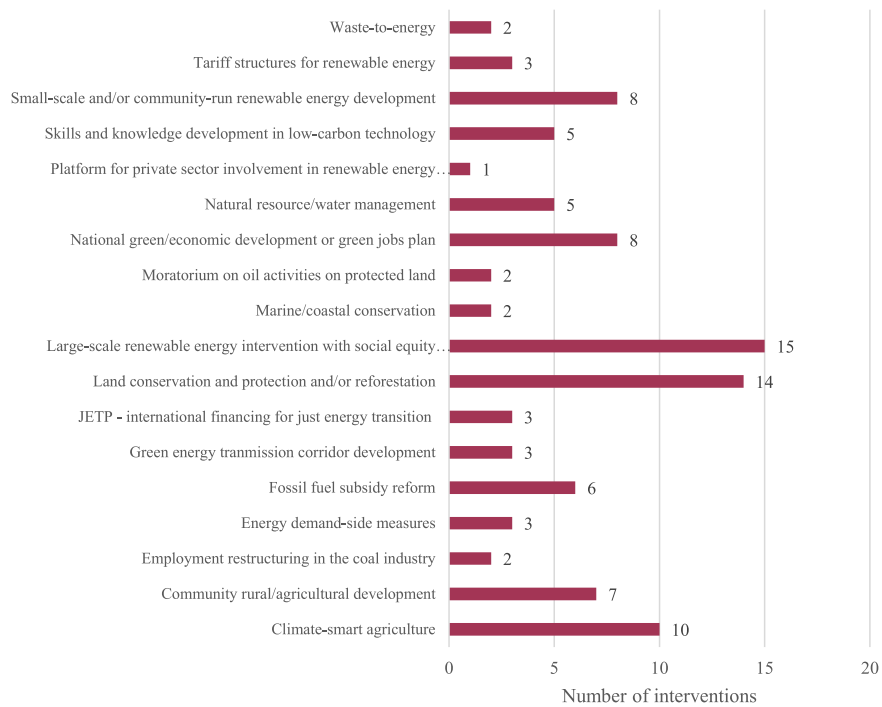
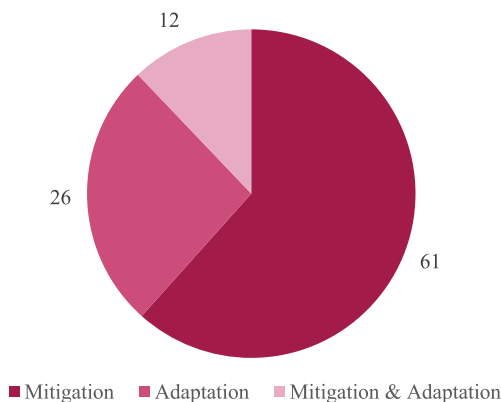


Fig. 5 Types of interventions found in the included studies

Fig. 6 Number of interventions by climate objective



public sector. Notably, 10 interventions targeted the public sector and corporations/firms.

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



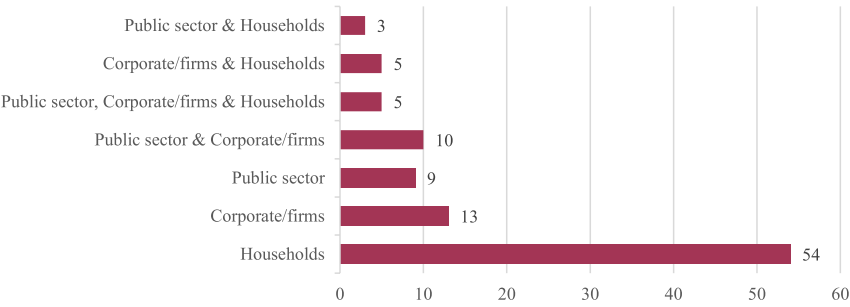


Fig. 7 Target level of interventions studied

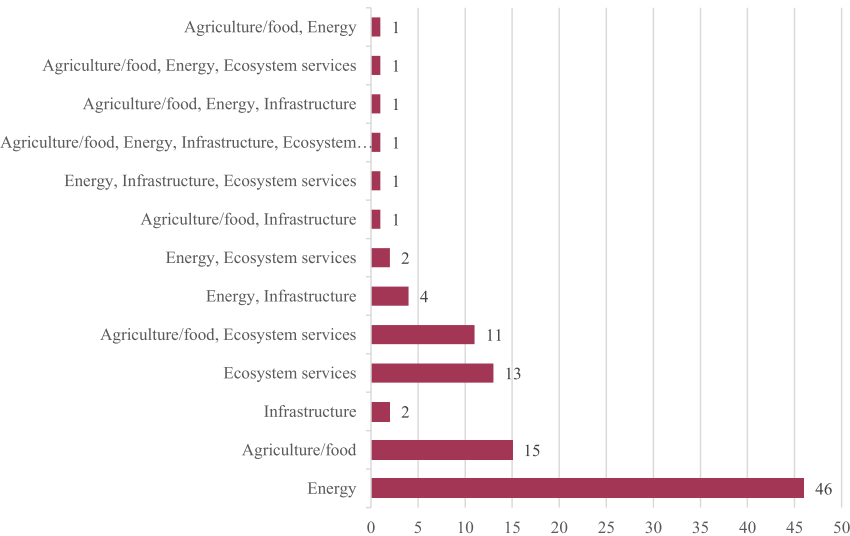


Fig. 8 Sectoral distribution of interventions studied

dled 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).

Mapping sectors against geography highlights that the incidence of evidence on just transition interventions ranges across a combination of sectors in Africa, Asia and Latin America, as illustrated in Fig. 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 relatively 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.

The incidence of evidence shows a variety of intervention types within each sector, as illustrated in Table 1. The review identified 13 intervention types in the energy sector, four in the agriculture/food sector, two in the infrastructure sector, and three



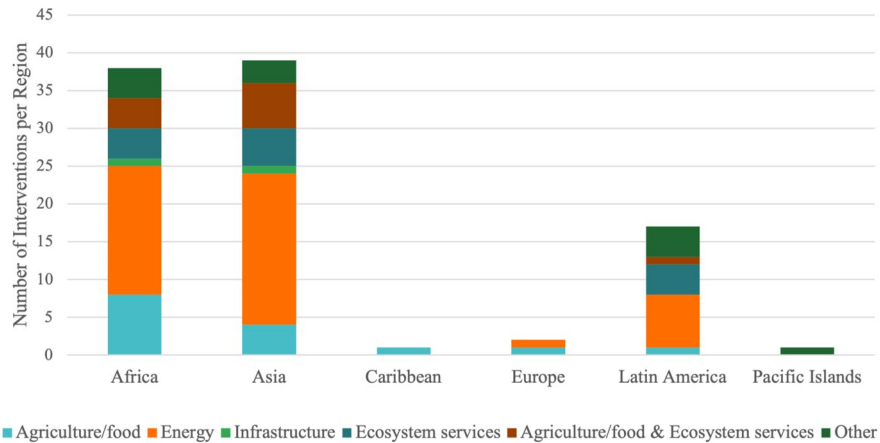


Fig. 9 Sectoral and regional distribution of interventions studied

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.

The 99 interventions included in this review reveal that the incidence of evidence on 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.¹⁷ 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 (Fig. 10).

¹⁷ Some interventions at the district level also benefit households and individuals.



Table 1 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	—	—

Overarching Findings on Just Transition Interventions in Non-Annex I Countries

The approach paper for this study sets 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 on the experience of just transition in Annex I countries. As described above,



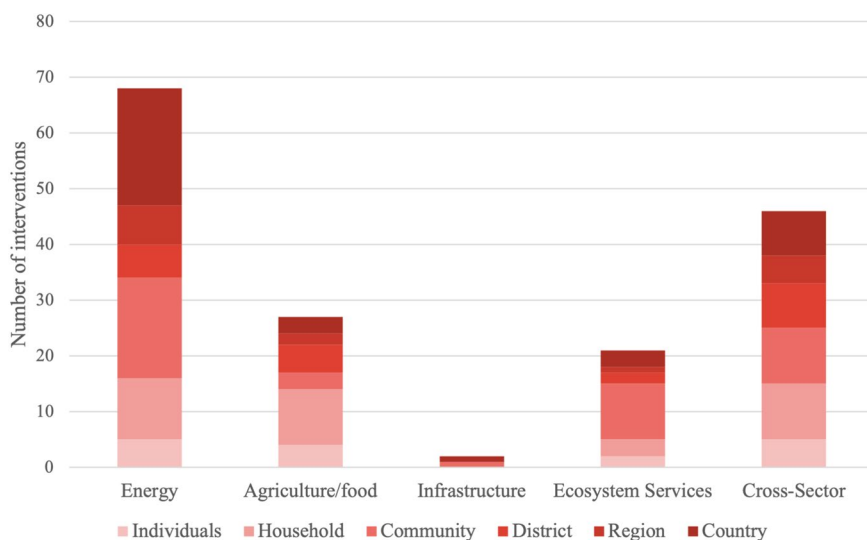


Fig. 10 Number of interventions by sector and scale (there are more than 99 interventions represented in this graph because interventions that took place across multiple scales were counted for each location.)

the approach paper's theory of change was further assessed, refined, and developed 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 Fig. 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, 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.

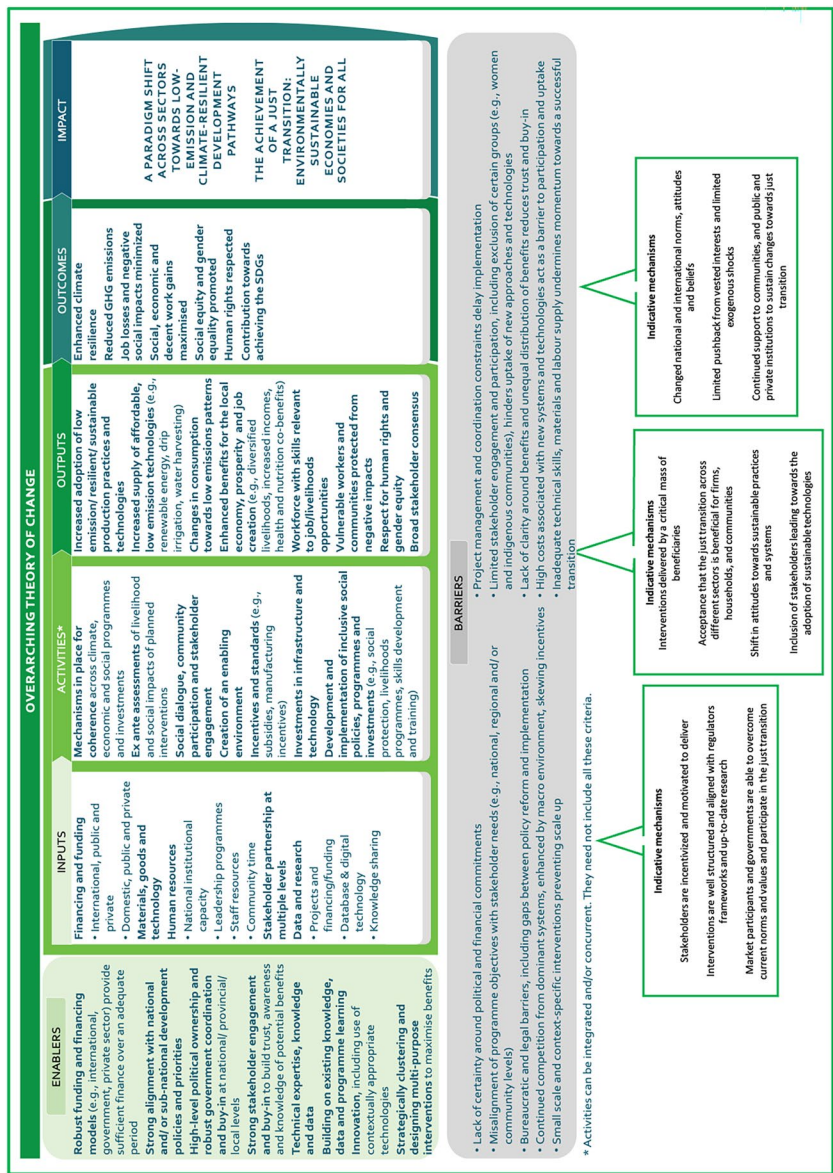


Fig. 11 Overarching theory of change

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. 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 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.¹⁸ 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

¹⁸As set out in the GCF handbook, Integrated Results Management Framework (IRMF), outputs and outcomes are defined as follows:

- Outputs: Changes delivered as a result of project/programme activities that contribute to the achievement of outcomes.

- Outcomes: Changes in conditions such as behavioural or systemic change that occur between the completion of project/programme outputs and the achievement of impact. (Green Climate Fund [2022a, b](#)).



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 outcomes
- 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 outcomes
- 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 Fig. 11. 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 outcomes and job losses. Slightly less evidence exists regarding interventions



in these countries that prevent or mitigate negative outcomes, 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.

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 conducted 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 for the key enablers and barriers to consider when developing and/or implementing interventions intended to contribute to a just transition in each sector.

Energy

This section presents a theory of change for just transition in the energy sector (see Fig. 12). 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.

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



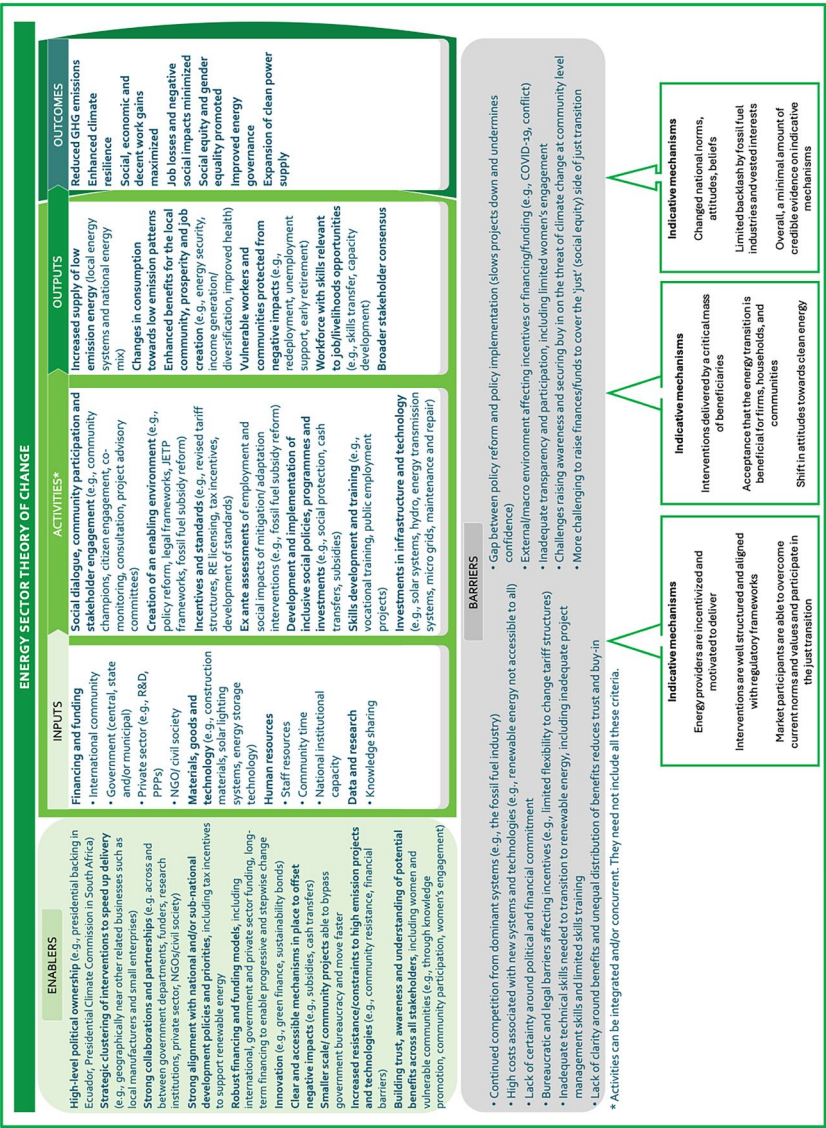


Fig. 12 Theory of change for the energy sector



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.

Other findings on barriers in energy were nuanced. 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. 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.

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.



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.¹⁹ 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 et al. 2023). Overall, the review of available evidence found a limited degree of engagement by workers' and employees' organizations within formal social dialogue processes.

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 outcomes 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

¹⁹ Limited evidence on social dialogue involving trade unions and employers/business organizations emerged from the interventions studied.



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 scale interventions. For example, in Indonesia's fossil fuel subsidy reform, significant budgetary savings were channelled into health care, poverty reduction and infrastructure programmes. 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 outcomes, 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 et al. 2018). Several of the outcomes identified in the energy sector relate to the clusters of soft enablers and activities set out above.

Mechanisms

To aid the reader in gleaning insights into the possible causal pathways for each sector—from inputs to activities, from activities to outputs, from outputs to outcomes—the research isolated indicative mechanisms to help explain why change took place (in other words, the mechanism of the realist CMO approach). Energy studies suggested a range of indicative mechanisms between the nodes of the theory of change. From inputs to activities, examples suggested energy providers needed to be incentivized and motivated to deliver, that interventions were well structured and aligned with regulatory frameworks, and that market participants were able to overcome current norms and values and participate in the just transition.

To allow these activities to lead to outputs, studies highlighted how interventions needed to be delivered by a critical mass of beneficiaries alongside a widespread acceptance that the energy transition is beneficial for firms, households, and communities. In other words, that scaled interventions are accompanied with a broad shift in



attitudes towards clean energy. The studies provided a minimal amount of evidence on the realisation of outcomes in the energy sector, but the evidence within our studies suggested limited backlash by fossil fuel industries and vested interests alongside changes in national norms, attitudes and beliefs.

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 (Fig. 13).

As set out in the landscape analysis, 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

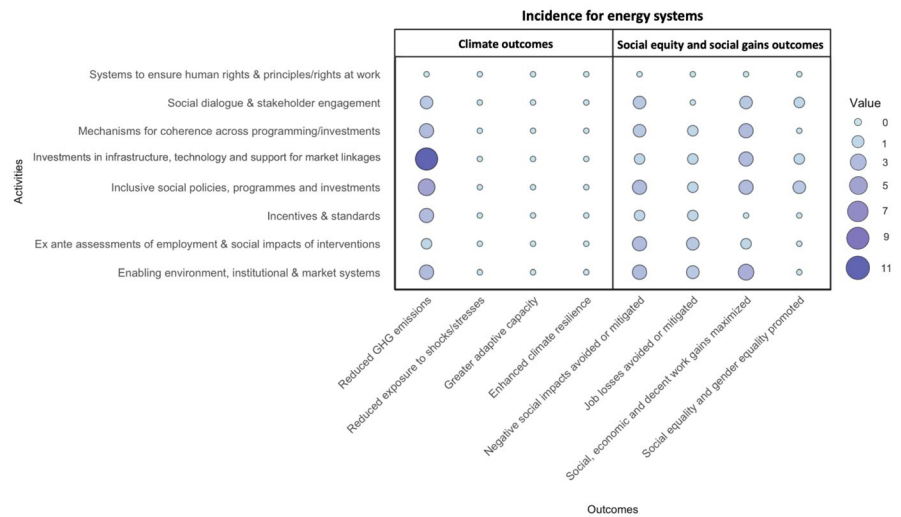


Fig. 13 Activities mapped against outcomes in the energy sector (note that the mapping shows incidence both by the size and the depth of colour of the bubbles.)



African Renewable Energy Independent Power Producer Procurement Programme, which funded projects such as the Cookhouse wind farm (Chetty et al. 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 138.6MW, the project's 66 wind turbines have prevented the emission of 384,000 MtCO₂^e.²⁰ 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 outcomes 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. 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.

Agriculture and Food

The theory of change developed from just transition interventions included in this study for the agriculture/food sector is presented in Fig. 14. This has been developed based on the implicit theories of change set out for the interventions studied.

²⁰ Metric tons of carbon dioxide equivalent.



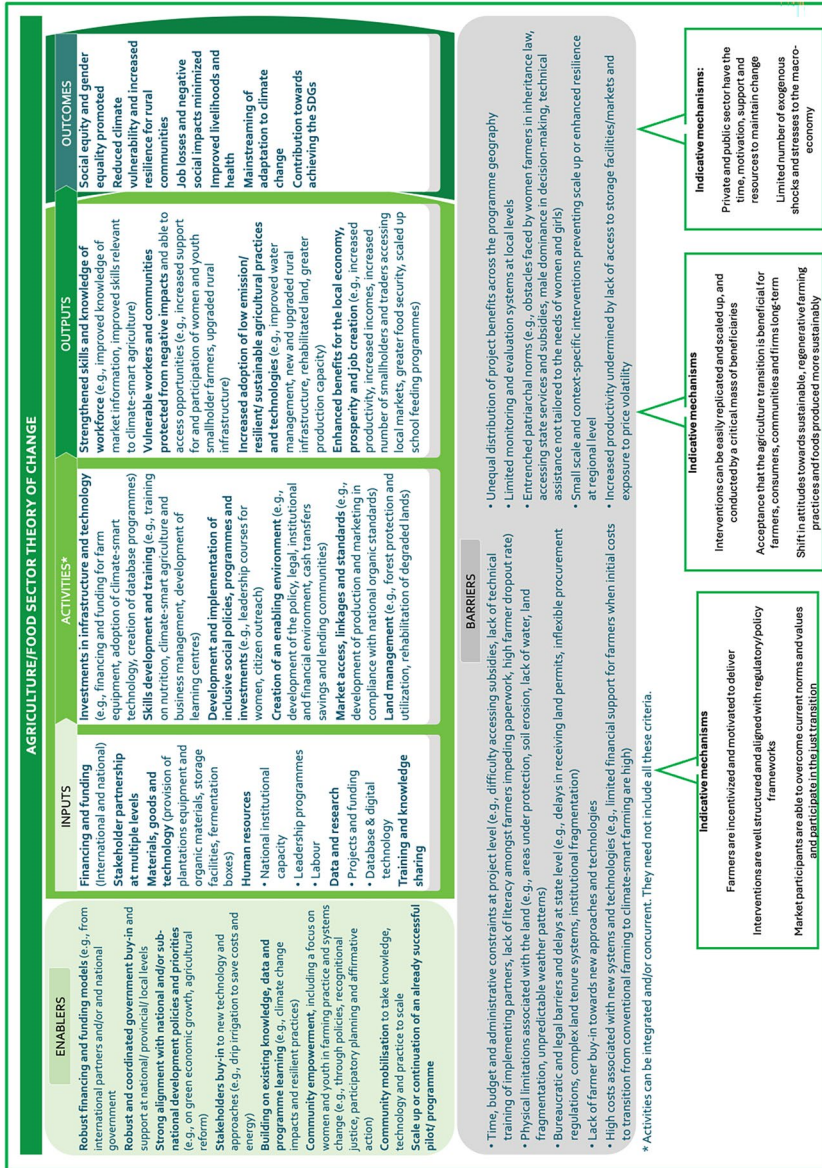


Fig. 14 Theory of change for the agriculture/food sectors

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 et al. 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). The project also had low coverage across targeted districts, contributing to an unequal spread of benefits and reducing potential community-level outcomes. 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 et al. 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 et al. 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, may have 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).

Mechanisms

The agriculture/food sector ToC offers examples of indicative mechanisms for transitions within this sector. It suggests farmers need to be incentivized and motivated to deliver well-structured interventions which are aligned with regulatory frameworks for inputs to lead to activities. Further, it highlights that a driver of change is that market participants are able to overcome prevailing norms and values and start to participate in the just transition. The realisation of outputs from activities can be explained by the delivery of interventions which can be easily replicated and scaled up, so they are conducted by a critical mass of beneficiaries. There are also key community and societal mechanisms at play here, including an acceptance that the agriculture transition is beneficial for farmers, consumers, communities and firms in the long-term. Such an acceptance is reflected in a shift in attitudes towards sustainable, regenerative farming practices and the production of food in a sustainable manner.

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 Fig. 15.

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.



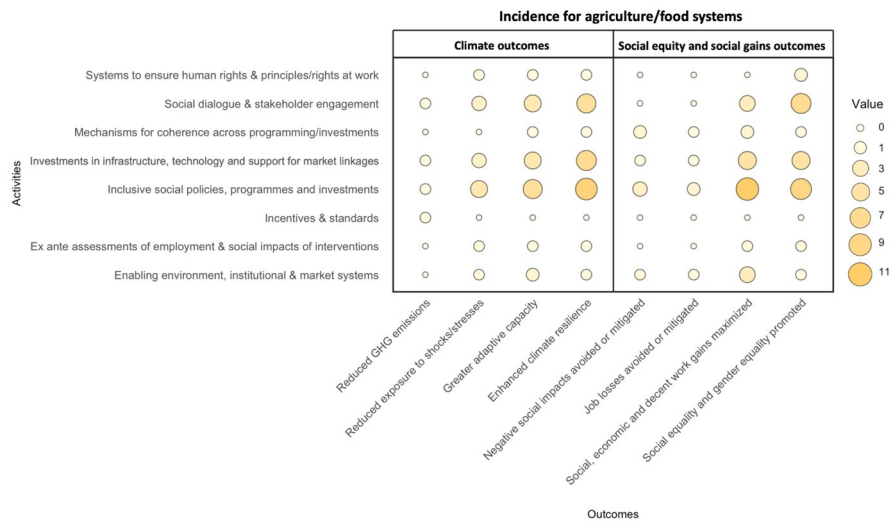


Fig. 15 Activities mapped against outcomes in the agriculture and food

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.

The mapping found relatively low reported incidences of interventions helping to avoid, minimize or mitigate job losses and negative social outcomes 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.

Ecosystems

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 shown in Fig. 16.

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 Peoples 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 included entrenched patriarchal norms, exclusion of certain groups from wider dialogue, and social fragmentation. For example, a community-based 'Reduced Emissions from Deforestation and Degradation



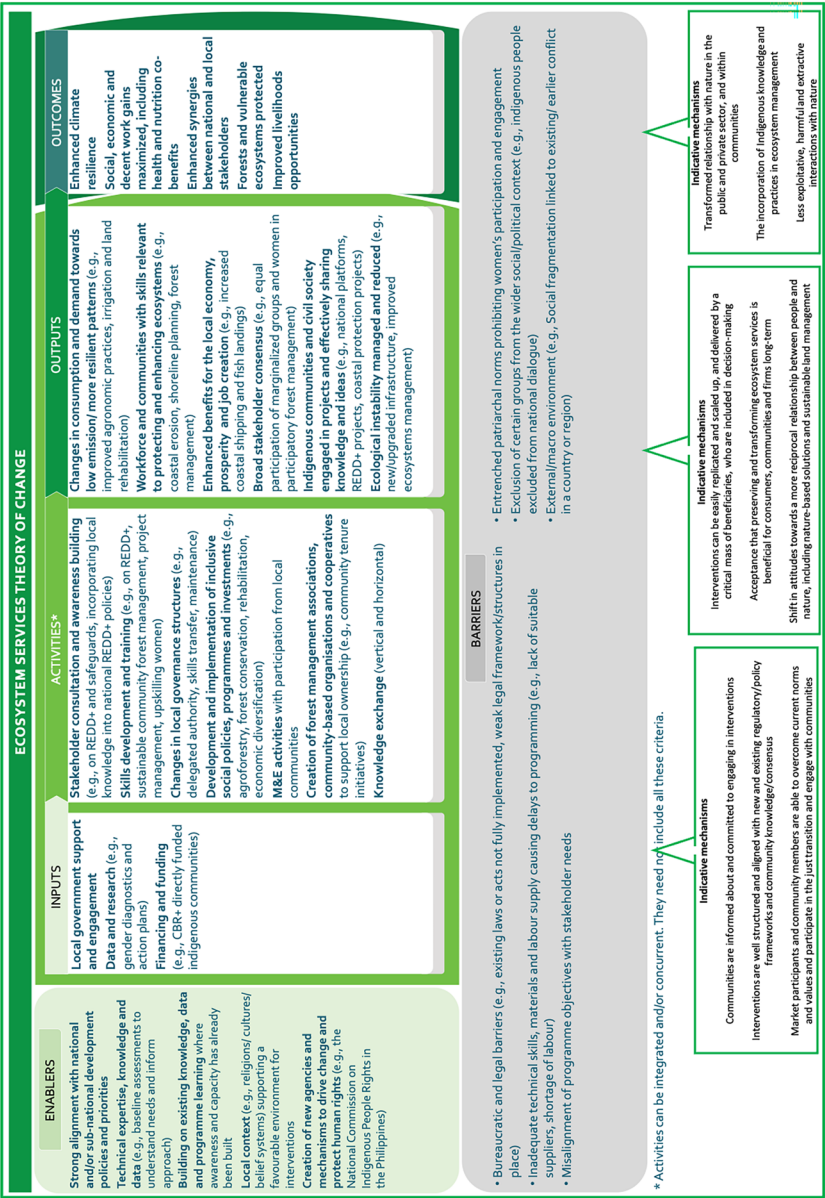


Fig. 16 Theory of change for ecosystem services

(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

Ecosystem inputs 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% to 40% within two years (Biegel and Lambin 2021).

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.

Mechanisms

While studies only provided limited evidence on the causal pathways for activities leading to results within studies on ecosystem services, the evidence base suggests activities took place when communities were informed about and committed to engaging in interventions. Further, that interventions need to be well structured and aligned with regulatory/policy frameworks and community knowledge/consensus. Market participants and community members should also be able to overcome current norms and values and participate in the just transition and engage with communities. The evidence base suggested the realisation of outputs from activities supporting ecosystem services took place because interventions were delivered by a critical mass of beneficiaries who are included in decision-making and who accepted that preserving and transforming ecosystem services was beneficial for consumers, communities and firms long-term. These mechanisms were buttressed with a broader shift in attitudes towards a more reciprocal relationship between people and nature, including nature-based solutions and sustainable land management. We now map activities against outcomes in ecosystem services (Fig. 17).

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. The mapping also found low incidence of prevented or reduced negative social outcomes 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

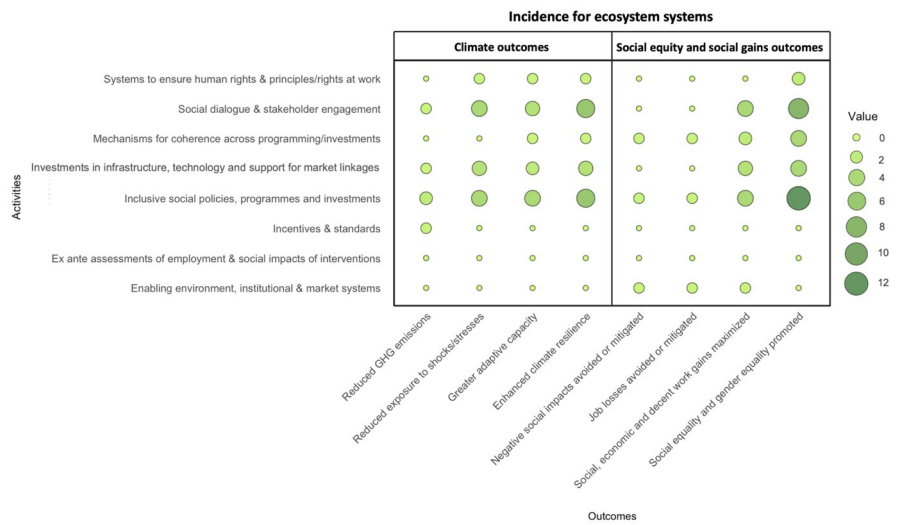


Fig. 17 Activities mapped against outcomes in ecosystem services



and the quality of data is less well developed. Also, there was lower incidence of reduced GHG emissions.

Combining the Theories of Change for the Agriculture/Food and Ecosystems

The theory of change developed from just transition interventions for the combination of agriculture/food and ecosystem services is presented in Fig. 18.

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 typical 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 et al. 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-



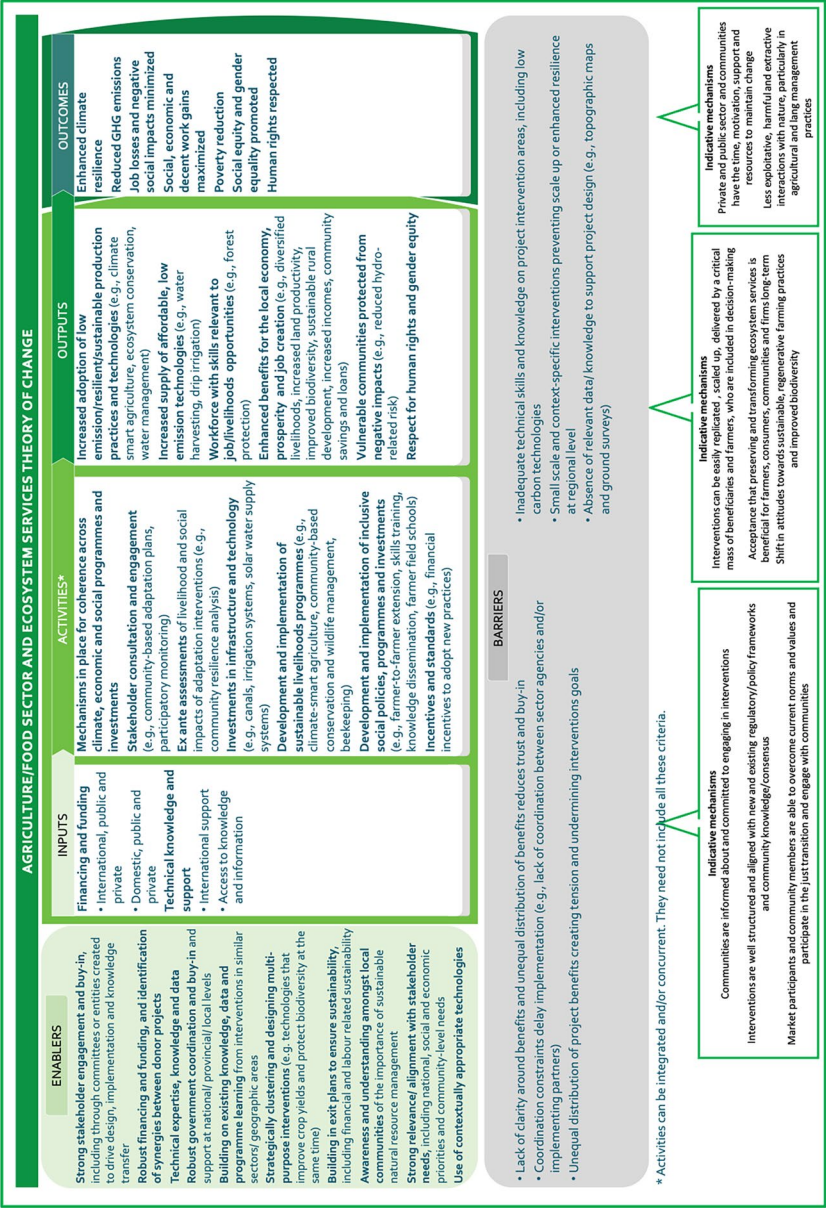


Fig. 18 Combined theory of change for the agriculture/food and ecosystems



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. Further examples include a skilled workforce, enhanced benefits for the local economy, increased prosperity and job creation, vulnerable communities protected from negative outcomes 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% 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 outcomes, 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.

The mechanisms which help explain the reasons for the successful transitions from inputs to activities, from activities to outputs, and from outputs to outcomes are broadly as described for the individual sectoral theories of change.



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.

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: (i) social dialogue and stakeholder engagement (ii) investments in infrastructure, technology and support for market linkages, and (iii) 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, as well as 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 (Fig. 19).

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



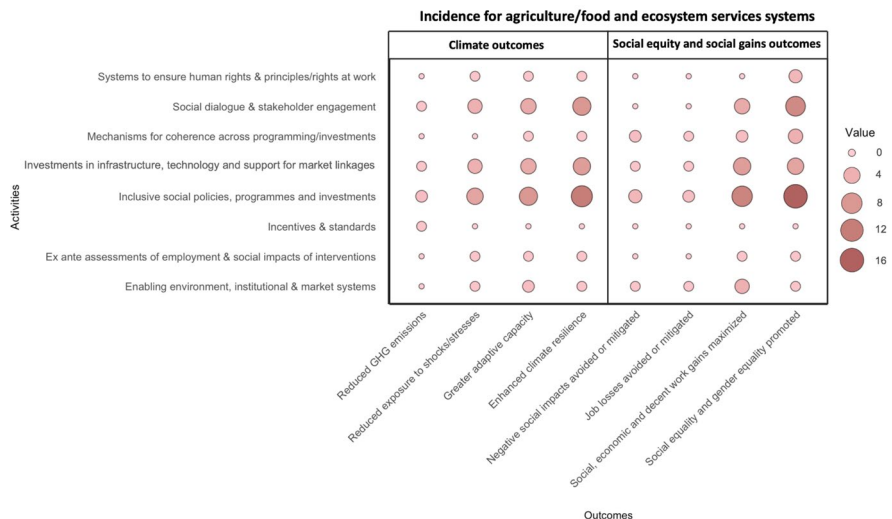


Fig. 19 Activities mapped against outcomes in the combined agriculture/food and ecosystem

Vietnam, and educational initiatives, such as Indonesia’s Sriwijaya University providing graduate and professional education in climate and the environment (Fakir 2023; O’Brien et al. 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) 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% of installed solar PV powered pumps to directly benefit women and to ensure 50% of project beneficiaries comprise farms that are headed or predominantly staffed by women. In Jordan, the Improving Rural Livelihoods, Environment, and Green Jobs Opportunities in Mafraq Governorate Programme prioritized the creation of green jobs by constructing and operating a solid waste segregation unit in Zaatari Municipality with 20% of the unit’s workforce as women and 50 employees as 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 when it was evaluated. 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 outcome 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. The results across the sectors are synthesised and presented in Table 2.

Conclusions and Implications

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 1% 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 transi-



tion 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. The indicative mechanisms presented allow us to understand pathways of change, and help to explain why specific results occurred. In addition to the barriers and enablers outlined above, the study has also found evidence on indicative mechanisms across the four sectors.

Overall, the evidence suggests for activities to be realised from a range of inputs, stakeholders need to be incentivized and motivated to deliver. In addition, interventions need to be well structured and aligned with regulatory frameworks and up-to-date research. Market participants and governments also need to be able to overcome current norms, values and participate in the just transition.

In terms of the mechanisms for achieving outputs from these activities, the evidence presented suggests interventions need to be delivered by a critical mass of beneficiaries based on a broad acceptance that the just transition across different sectors is beneficial for firms, households, and communities. Further, that there is a shift in attitudes towards sustainable practices and systems such that a broad range of stakeholders are included to lead towards the adoption of sustainable technologies.

The evidence suggests the achievement of outcomes can be supported by changes in national and international norms, attitudes and beliefs alongside limited pushback by vested interests. Finally, there is a need for continued support to communities, and public and private institutions to sustain changes towards just transition.

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 Annex I countries.



Table 2 Synthesis of overarching results and by sector

Context	<ul style="list-style-type: none">• Research found interventions contributing towards outcomes consistent with a just transition in national, regional and community settings across 45 non-Annex I countries• Higher concentration of studies in wealthier developing countries, including Indonesia, India, South Africa and China• Few studies in SIDS compared to other regions, with very few studies in the Caribbean or Pacific Islands• Data extracted from 76 studies on 99 interventions across multiple combinations of geographies, sectors, scales and intervention types• Scale—A mix across the energy sector, from households up to country level. In agriculture/food sector, interventions were mainly at the household level. Ecosystem interventions mostly occur at the community level. Absence of studies on large-scale programmes in agriculture/food as well as ecosystem services• Richness, complexity and wide range of variables present challenges in terms of a descriptive synthesis of political, economic, social, and cultural factors
Enablers, barriers, mechanisms and conditions	
Common enablers	<ul style="list-style-type: none">• Robust funding mechanisms• Strong alignment with needs and priorities• Political will and ownership• Social dialogue and stakeholder engagement• Sectoral nuance for political will and ownership• Energy—political will and ownership focuses more on high-level political backing, such as the presidential and national level• Other sectors—political will and ownership at the departmental, regional, local government levels for government coordination and funding• Sectoral nuance for social dialogue and stakeholder engagement• Agriculture/food and ecosystem services—focus on securing local support for new approaches• Energy—focus on building trust and awareness across multiple stakeholders and levels
Hard enablers	Energy—Funding, investments in infrastructure and technology as well as strategic clustering
Soft enablers	<ul style="list-style-type: none">• Energy—Political will, trust building and collaborations and partnership• Agriculture and ecosystem sectors—Alignment, coordination and contextual awareness emerged as important features of just transition interventions, alongside funding and technical know-how
Barriers	





Table 2 (continued)

Barriers ^a	<ul style="list-style-type: none">• Bureaucratic and legal barriers (except for agriculture/food and ecosystems combined)• Exclusion and unequal distribution of benefits with a focus on 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 (especially in ecosystem services)• Inadequate technical skills (except agriculture)^b
	Sectoral nuance
	Energy—Imbalance of financing and funding across activities/outcomes
Mechanisms	
Overarching inputs to activities	
• Stakeholders are incentivized and motivated to deliver	
• Interventions are well structured and aligned with regulators frameworks and up-to-date research	
• Market participants and governments are able to overcome current norms and values and participate in the just transition	
Overarching from activities to outputs	
• Interventions delivered by a critical mass of beneficiaries	
• Acceptance that the just transition across different sectors is beneficial for firms, households, and communities	
• Shift in attitudes towards sustainable practices and systems	
• Inclusion of stakeholders leading towards the adoption of sustainable technologies	
Overarching from outputs to outcomes	
• Changed national and international norms, attitudes and beliefs	
• Limited pushback from vested interests and limited exogenous shocks	
• Continued support to communities, and public and private institutions to sustain changes towards just transition	
Outcomes	

Table 2 (continued)

Climate	Reduced GHG emissions Enhanced resilience, reduced exposure to shocks and stresses and greater adaptive capacity
Social equity and social gains	Minimized job losses and negative social outcomes Maximized social, economic and decent work gains Increased social equity and gender equality Enhanced respect for human rights Increased commitment to the SDGs

^aSome barriers were the opposite of common enablers. For example, uncertainty around political will, financing and funding commitments and limited stakeholder engagement in projects and programmes. That studied interventions highlight financing and funding, political will, and social dialogue and stakeholder engagement as both enablers and barriers indicates their relative importance to successful just transitions across multiple sectors and scales

^bWhile 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



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 above, 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 8726 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 above, 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.

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.



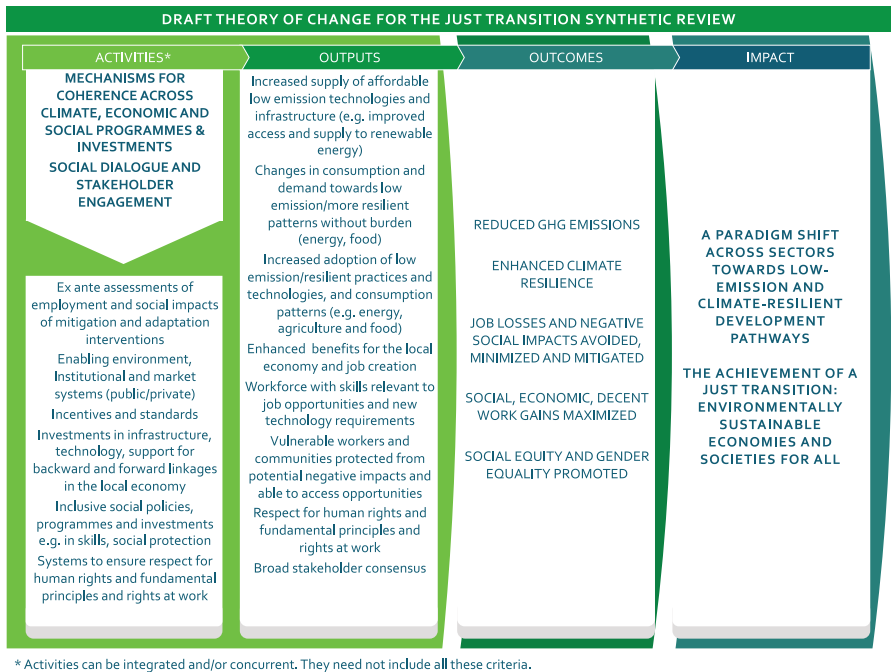


Fig. 20 Draft theory of change from the approach paper

Appendix 1

The studies included in the review and the 99 interventions can be found in the online report. This is available here: <https://ieu.greenclimate.fund/document/realist-review-just-transition>

Appendix 2: Draft just Transition Theory of Change Developed in the Approach Paper

Figure 20.

Appendix 3: Search Steps

Details of the search terms and a summary of the steps taken to search each database are available in the online report: <https://ieu.greenclimate.fund/document/realist-review-just-transition>.



Appendix 4: Data Extraction Form

This is available at: <https://ieu.greenclimate.fund/evidence-review/just-transition>.

Appendix 5: List of Potential Interventions of Interest and Backward Citations

A full list of potential interventions of interest and additional backward citations can be found in the online report available here: <https://ieu.greenclimate.fund/document/realist-review-just-transition>.

Acknowledgements The authors would like to thank the advisers for this evidence review for their comments and direction: Justice Musah and Hansol Park from the Green Climate Fund Secretariat, Moustapha Kamal Gueye from the International Labour Organization, and Philip Gass from the International Institute for Sustainable Development. Our gratitude also goes to Brendan Curran, Senior Policy Fellow, Sustainable Finance at the Grantham Research Institute at the London School of Economics, for his comments. The article expresses the authors' views and does not represent the views of organisations they are affiliated to. The realist review was co-financed by the Independent Evaluation Unit of the Green Climate Fund and by the International Labour Organisation. Data is available on request.

Data availability Data is available on request.

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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