



Green Jobs, Skills and Enterprises

RESEARCH, DOCUMENTATION, APPROACHES AND RECOMMENDATIONS

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Introductory Message

VSO has a long history of working on youth employment, enterprise and entrepreneurship, working with young people not in education or employment. VSO is implementing Resilient Livelihoods projects in over 10 countries that are aligned to its updated strategic framework and theory of change under 2 global programmes: 1). Youth empowerment, green jobs and decent work and 2). Women empowerment, control of incomes and right to food.

Green jobs are one of the priorities of the Resilient Livelihoods Practice Area strategy. The aim is to support creation of decent employment opportunities for young women and men in the green economy, focusing on sustainability and climate change adaptation. This document has been pulled together as part of an effort by VSO to deepen its understanding of current discourse and approaches around green economy. VSO's work in the areas of agroecology or climate resilient farming, climate adaption and ecotourism, waste management, are all examples of work in the Green economy and the opportunities that both formal and informal sectors provide for young people.

We hope you will engage with this report, which is a backgrounder that we are using to generate a conversation, to complement our green skills assessment survey, to guide our small innovation grants, to guide our work on curriculum development for both individuals, enterprises and TVETs.

VSO supports young people to address these barriers enabling the creation of green jobs through:

- Investment in climate adaptation programming
- Promoting business models and enterprises that incorporate re-skilling and up-skilling on green jobs
- Enhancing TVET (technical and vocational education and training) and adapting curricula to take into consideration green skills
- Promoting the use of renewable energy
- Promoting waste management and recycling
- Supporting the transition to agroecology and climate resilient agriculture
- Demanding social protection for informal workers in the green economy

Please do join our learning lab on green skills and green jobs to share your experience. Contact Roland.Charles@vsoint.org and Samuel.Jones@vsoint.org

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List of Acronyms

BNG	Biodiversity Net Gain
CBDR	Common but Differentiated Responsibility
CSOs	Civil Society Organisations
CSR	Corporate Social Responsibility
EV	Electric Vehicle
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
ICE	Internal Combustion Engine
ILO	International Labour Organisation
IPCC	Intergovernmental Panel on Climate Change
PWD	People With Disabilities
PV	Photovoltaic
SDGs	Sustainable Development Goals
SEEA	System of Environmental-Economic Accounting
TVET	Technical Vocational Education and Training
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America
VfD	Volunteering for Development
VSO	Voluntary Service Overseas
WBCSD	World Business Council for Sustainable Development

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Executive Summary

The Intergovernmental Panel on Climate Change 6th Synthesis Report reiterates the need for immediate emissions reductions across sectors while recognising progress in adaptation planning and implementation and mitigation laws and policies. There are huge societal shifts required in transitioning to a low-carbon economy and to keep global warming to within 1.5°C. The outcomes characterising development pathways in this scenario, include societies and communities with low emissions (climate mitigation), low climate risk (climate adaptation), system transitions, transformation, equity and justice, and achievement of the Sustainable Development Goals. What the IPCC reports supports is the necessary transition to a low-carbon economy if we are to remain within planetary boundaries. This transition needs to be cross-sectoral, and inclusive of women, youth, and people with disabilities (PWD). There are huge opportunities for job growth, enterprises, and skills development in meeting this vitally important challenge.

The skills needed for the greening of jobs and enterprises should be intersectional and able to address not only climate change, but also inequality and poverty. There are many quantitative measures that one could use to demonstrate progress being made on becoming more green; these include, but are not limited to, demonstrable reductions in waste-to-landfill, increased recycling rates, reductions in GHG emissions from energy, transport, buildings and practices, increased use of recycled materials in production, reduced use of common resources such as water, soil and land, access to efficient technologies, or increased energy efficiencies. As the central concept related to the work on green skills, jobs and enterprises, the green economy has become the centre of international policy debates and frameworks. The green economy involves activities that create and consolidate Earth's natural capital or are involved in reducing environmental deficiencies and threats.

A green and fair economy should adopt five principles centred around wellbeing, justice, planetary boundaries, efficiency and sufficiency, and good governance. Globally there is insufficient green talent, green skills or green jobs to deliver the green transition. Green jobs and skills are on the rise, but they are not rising at the level needed to meet climate pledges as set out in the Paris Agreement. The three core environmental challenges that green skills span are nature and biodiversity, climate change and decarbonisation, and waste and pollution reduction. The relationship between green skills and jobs is characterised by the fact that the green transition will change every industry and every business.

The main core skills necessary for green jobs include strategic and leadership skills, adaptability and transferability skills, environmental awareness and willingness to learn about sustainable development, coordination, management and business skills, systems and risk analysis skills, entrepreneurial skills, innovation skills, communication and negotiation skills, marketing skills, consulting skills, and networking, IT, and language skills. Green skills can also include specific, generic and transformative capacities. Specific capacities are those needed to thrive in green jobs. Generic capacities are the cross-cutting 'life' or 'socio-emotional' skills that can contribute to a greener and more environmentally friendly way of thinking, being and doing. These include skills such as problem-solving, critical thinking, teamwork, coping with uncertainty and empathy. The transformative capacities are those that need to disrupt and challenge the individual, collective and societal factors that systematically exacerbate the climate crisis. These are key skills that should be utilised in designing a skills framework for VSO programmes centred on improving and developing green skills for women, youth, and people with disabilities.

The foundational principles of green jobs should nurture and develop humanity's individual and collective capacity to care for others and the environment and to educate ourselves and others about the unsustainability of the status quo. This definition centres the focus on the rights of communities that are often left marginalised and outside of economic circles. This is a key consideration for VSO to consider expanding its definition of green jobs, as well as focusing on future generations should be included as a foundational principle of sustainable development.

VSO should consider clearly delineating between enterprise types and categorise them according to their activities related to the green economy. Some MSMEs will be conducting business operations entirely focused on green economy – for example, production using recycled materials, tree planting, agroecological farming practices or renewable energy providers. Others will have business operations that have some impact on the green economy – for example, waste management services. There will be other MSME types



who need support in greening their operations – for example, implementing waste reduction measures and increasing recycling of products. All types of enterprise can and should contribute towards the green

economy, and some will need to be supported more than others as they make the transition. The categorisation aids in understanding the level of skills development and types of training needed to support green economy initiatives.

While skills, jobs and enterprises underpin the green economy, there are other concepts that are gaining recognition in political and economic circles that operationalise the green transition. These should be considered by VSO as ways to frame programmatic interventions for the green transition. These include the Just and Equitable Transition, Planetary Boundaries, Doughnut Economics, Natural Capital and Ecosystem Accounting, Circular Economy, Green New Deal and Future Generations Commissions.

Most INGOs that have a climate focus are working on adaptation-based interventions. This looks at building the resilience of primary actors in the face of increasing climate risks and disasters and the impact that this has on lives and livelihoods. This recognises that the most vulnerable and marginalised individuals and communities are often situated in the regions which are feeling the effects of climate change, including extreme heat, more intense rainfall, increased frequency and intensity of storms, and increased risk from natural disaster events. The International Labour Organisation are the leading international organisation working in the field of green jobs and have generated evidence and accrued knowledge across many years. Several INGOs working in the International Development and Humanitarian sectors have published working papers or positions on the need for a Just Transition, including ActionAid and Oxfam. Circular economy initiatives are being used to achieve the Sustainable Development Goals in Bangladesh, Guyana, Philippines, Thailand and China, and Tearfund have released a report highlighting the lack of INGOs adopting circular economy principles and examining how the concept interrelates with the Sustainable Development Goals. INGOs that are promoting renewable energy production alongside women's economic empowerment include EnDev and Christian Aid.

Climate change mitigation is a key aspect of environmental policy, as well as the greening of skills, jobs, and enterprises. At the core of climate change mitigation is the need to reduce or prevent Greenhouse Gas emissions. However, mitigation also seeks to promote new technologies that aid efficiencies or renewable energy production, as well as change individual, community, and organisations behaviour. Understanding where Greenhouse Gas emissions come from and how much is emitted is an important step in documenting part of the environmental footprint of an individual, community, public sector organisation, non-profit entity or for-profit enterprise. For enterprises, it represents an opportunity to invest in solutions that reduce GHG emissions along their supply chain and encourage lower-carbon behaviour of both suppliers and consumers. This should be a key consideration for VSO when undertaking green interventions with enterprises. Understanding the importance of emission sources enables the development of climate action that address the mitigation aspects of climate change. It also increases carbon literacy which in turn allows for behaviour change to a lower-carbon lifestyle and operating model.

Scope 1 emissions are direct greenhouse gas emissions released into the atmosphere from company-owned and control resources. Scope 2 emissions are indirect emissions released into the atmosphere from the generation and consumption of purchased energy. Scope 3 emissions are all indirect emissions not included in Scope 2 that occur in the value or supply chain or the reporting company, including both upstream and downstream emissions. Downstream emissions are indirect GHG emissions from sold goods and services and are associated with the end-user. Upstream emissions are indirect GHG emissions from purchased or acquired goods and services which ordinarily involves the supply chain of a particular company or service. However, it is important to consider the environmental impacts that go beyond just reporting on carbon emissions. There has been a real tendency among corporates, governments and public sector organisations to narrowly focus on carbon emissions while avoiding making plans for other environmental and social factors.

Climate change adaptation is the recognition that the climate change is almost exclusively negatively affecting communities and societies around the world. Often, these are the poorest, most vulnerable and marginalised within society who are also the ones who have contributed the least amount to the climate crisis. In recent years there has been considerable attention paid to nature-based solutions to climate change. Nature-based solutions can be incorporated into urban planning and design through creating green roofs and walls, planting trees in cities, expanding public parks, gardens, and green spaces. This not only has benefits for biodiversity and wildlife, but also for environmental justice.

The green skills needed for climate change adaptation are a mixture of specific, generic and transformative skills. These types of skills go alongside more technical skills that are needed for adaptation measures, for example, civil or mechanical engineering skills, planning skills and security skills. The generic skills related to climate change adaptation include adaptability, communication, collaboration, critical thinking and reasoning, empathy, flexibility, participatory, resilience and teamwork skills. These are cross-cutting life skills that empower individuals and communities to seek out opportunities to enhance their resilience and their ability to respond to external pressures, shocks, and threats. The transformative skills related to climate change adaptation include collective action, political agency and activism, valuing knowledge and Indigenous Knowledge, solidarity and coalition building. All these skills are aimed at transforming the unjust social and economic structures that contribute to the increased risk faced by these communities as a result of climate change. These skills correlate effectively with VSO's Core Approaches. Climate change adaptation and resilience jobs are wide and varied, falling along the spectrum of adaptation categories of action: measure and learn, plan, fund and invest, develop and deploy technology, communicate and engage, build physical infrastructure, shift management practices and recurring behaviour, and change policy and law.

There are certain economics sectors are well-suited for VSO programmatic interventions due to a track record of working through volunteers with primary actors. Others are new and emerging industries that will shape the future of work and enterprise development in many countries and offers an opportunity for VSO to build a track record of implementing circular economy and just transition based programming. These sectors include energy, transport, industry (construction, textiles, waste management, tourism), agriculture, and land use. These sectors are major contributors to greenhouse gas emissions and therefore programmatic interventions across these sectors can aid in climate change mitigation. As not many INGOs are working in climate change mitigation, this would enable VSO to be a visible leader in this space and the volunteering for development model is well-suited in engaging with key sectors to both reduce the impact on the environment, but also to develop the skills, jobs and enterprises needed for the transition to a green economy.

Considerations for VSO:

- Adopt a people-centred definition of green skills
- Conduct skills gap analyses in countries seeking to implement new green skills and jobs programmes across resource efficiency, low-carbon economy, climate resilience and managing natural assets.
- Promoting Green New Deal policies and objectives in government advocacy and policy-setting, including for a 'Buy Clean' procurement strategy and tax incentives for renewable energy production.
- Working with enterprises to ensure they meet the standards for a Buy Clean policy and secure contracts
- Lobbying and advocating for a Future Generations Commissioner in each VSO country to ensure that sustainable development and the needs of future generations are considered by political parties and government policies.
- Forming partnerships with other INGOs and CSOs to collectively position for a Future Generations Commissioner in each VSO country.
- Offering carbon literacy training to youth, women and PWD in programmes
Design a 'Train the Trainer' programme to disseminate learning about the different types of carbon emissions and what scope they put in.
- Recommending enterprises to consider taking carbon-neutral or net-zero pledges as part of their CSR initiatives and to attract investors.
- Measuring the carbon footprints of MSMEs and work with them to make climate action plans to reduce emissions as much as possible and invest in nature-based solutions as offsets
- Using the mitigation hierarchy when designing projects and programmes for green skills, jobs, and enterprises.

- All other aspects of environmental policy, such as biodiversity loss, eutrophication, pollutants, and water usage, when advising enterprises on business strategies and adopting environmental policies.
- Conducting analyses in country offices to understand the skills and jobs needed for climate change adaptation and resilience in that context
- Promoting the use of nature-based, as opposed to hard engineering-based, solutions in climate change adaptation
- Ensuring that local and Indigenous knowledge are utilised in community action plans while recognising the intellectual property of Indigenous peoples to their knowledge and ways of learning
- Utilising the GHG mitigation hierarchy in relation to transport; the first option should always be to avoid GHG emissions from transport use and to encourage active travel methods where possible. This not only has an emissions reduction election, but also contributes to improved mental health and wellbeing, cleaner air, reduced pollution and increased levels of physical fitness.
- Where this is not possible, then VSO should lobby and advocate for improvements to local transport plans that put forward effective public transport options that works for marginalised people, such as youth, women, and PWD, as part of a shift to a low-carbon economy. Improvements to public transport systems generates jobs that are considered green.
- The technical skills needed for vehicle types entering the market (EVs) differ from traditional ICE vehicles. VSO should work with TVETs to enable these technical skills to be taught to primary actors, including women, youth and PWD, to future-proof and get ready for the changes in vehicles.
- Advocating for policies at the national level to support decentralised renewable energy production.
- Conducting a labour market analysis for the construction industry in country contexts that focuses on the types of people entering the market and the type of labour protections they hold.
- Working with MSMEs along the construction industry supply chain to utilise circular economy principle and repurposing of materials into construction materials
- Working with producers of raw textile materials to encourage greener practices, such as through regenerative agriculture and agro-ecology, and support them with certification
- Encouraging MSMEs who manufacture textiles to collectively purchase materials that are certified or that come from local sources that use greener or more environmentally friendly methods.
- Developing case studies that document waste management enterprises across programmatic countries
- Training MSMEs on the waste management hierarchy and the adopting of circular economy initiatives
- Supporting primary actors to start enterprises that address the issue of food waste within local food systems.
- Conducting a tourist potential analysis in project locations to see if the industry is developing and the types of activities that may be needed
- Promoting environmentally friendly and green practices for MSMEs to both mitigate against any adverse impacts but also to market their business to prospective tourists
- Encouraging the use of composting for food waste in enterprises throughout the tourism industry
- Continuing to adopt agro-ecological principles in relation to smallholder farmer development and climate change resilience.

- Adding in agro-ecological principles into carbon literacy training modules for VSO staff and volunteers.
- Advocating for the protection of virgin forests and working on tree-planting initiatives in areas that are vulnerable to intense climatic events, such as floods and storms.
- Supporting primary actors to start enterprises that address the issue of food waste within local food systems.

The recommendations for VSO to consider as an organisation are:

1. The principle of 'do no harm' should be extended to cover the environment and climate.
2. The Greenhouse Gas Mitigation Hierarchy should be adopted as a way to frame climate change mitigation-related interventions.
3. VSO should roll out carbon literacy training for VSO staff and volunteers. For staff, this should be designed with locality in mind so participants can engage in the key concepts of carbon literacy in the context they find themselves in. For volunteers, this should form part of essential pre-placement training.
4. VSO should adopt definitions of green skills, jobs and enterprises that capture the benefits for primary actors, including women, youth and PWD, as well as for future generations.
5. VSO should work closely with partners, including with other INGOs and private sector organisations, to share approaches and learning on the green economy
6. VSO should map out donor opportunities and potential funding pots to pilot new approaches to VSO programmes

There are a series of recommendations for VSO to consider across the VfD framework's programme outcomes across domains:

Recommendations at the Individual Level

- Primary actors engaged in vocational training and education should be offered the chance to take part in carbon literacy training as a way to learn and identify individual practices that have a smaller carbon footprint.
- Skills that should be prioritised are green transformation skills, which are adaptation skills aimed at transforming unjust social and economic structures. These skills enable the inclusion of VSO's Core Approaches in skills training and development.

Recommendations at the Family and Community Level

- Families and communities should continue to be supported in developing green life skills and green transformational skills that build resilience and political agency
- Local and Indigenous Knowledge should be at the centre of community climate change mitigation and adaptation plans.

Recommendations at the System Level

- VSO should seek to advocate for policies in national frameworks that support the just transition and implementation of circular economy within the context of planetary boundaries



- Design and implementing training for Natural Capital and Ecosystem Accounting as part of a Green Skills Framework.
- VSO should look to advocate for and adopt circular economy principles where possible, including supporting youth entrepreneurs to adopt circularity principles in business design and incubation, and to promote the 3Rs in programme design.
- 4. VSO should advocate for policies at the national level to support decentralised renewable energy production.

Recommendations at the Policy Level

- 1. VSO should seek for the adoption of national policies and frameworks within each country's context to push forward with circular economy, just transition and planetary boundaries.
- 2. VSO should advocate for 'Buy Clean' procurement policies that provide incentives for private sector organisations to adopt cleaner and greener business practices.

Proposed Next Steps

- Identify a country office to pilot the development of a green skills framework that is embedded in national education and training policies.
- Conduct market-based assessment and green jobs analyses in each country office that are inclusive of women, youth and PWD (similar to approaches already taken by Nepal and Pakistan).
- Identify a country office or a project team to pilot a carbon literacy programme. This should involve both staff and volunteers and content should be tailored to the specific context
- Convene a learning workshop for countries seeking to implement green economy approaches. This should include the lessons learned from previous projects and an analysis of the policy frameworks that could determine funding availability for the initiation of green skills or enterprise training.

Introduction

The timing of this report for Voluntary Service Overseas (VSO) Resilient Livelihoods Core Practice Area neatly coincides with the release of the Intergovernmental Panel on Climate Change (IPCC) 6th Synthesis Report. The science is clear; absolute Greenhouse Gas (GHG) emissions remain on the rise globally, with *“unequal historical and ongoing contributions arising from unsustainable energy use, land use and land-use change, lifestyles and patterns of consumption and production across regions, between and within countries, and among individuals”*.¹ Additionally, the latest IPCC report states with high confidence that *“vulnerable communities who have historically contributed the least to current climate change are disproportionately affected”*.² This makes the climate crisis an intersectional crisis: one that must be dealt with in conjunction with other crises such as inequality, poverty, food security, biodiversity, and environmental health. The synthesis report reiterates the need for immediate emissions reductions across sectors while recognising progress in adaptation planning and implementation and mitigation laws and policies. However, there are still huge gaps in finance flows for both mitigation and adaptation measures, especially for developing countries, to successfully meet climate goals across regions and sectors. All countries must take steps to reduce emissions as quickly as possible, while contributing towards health, wellbeing, and justice for all citizens.

According to the latest IPCC report, *“climate resilient development is the process of implementing greenhouse gas mitigation and adaptation measures to support sustainable development”*.³ There are huge societal shifts required in transitioning to a low-carbon economy and to keep global warming to within 1.5°C (see Fig.1). The outcomes characterising development pathways in this scenario, include societies and communities with low emissions (climate mitigation), low climate risk (climate adaptation), system transitions, transformation, equity and justice, and achievement of the Sustainable Development Goals (SDGs). The conditions that enable individual and collective actions include inclusive governance, diverse knowledge and values, finance and innovation, integration across sectors and timescales, ecosystem stewardship, synergies between development and climate actions, and behaviour change supported by policy, infrastructure, and socio-cultural factors. This requires a balanced and fair relationship between governments, civil society, and the private sector.

Conversely, if global warming exceeds 1.5°C and progress towards the achieving the SDGs is inadequate, then prospects for climate resilient development will become increasingly limited. The outcomes characterising development pathways in this scenario include high emissions, increasing climate risk, limits to the amount of adaptation that can be achieved as well as maladaptation to the effects of climate change, entrenched societal systems, reduced options for development, and environmental degradation. This scenario involves conditions that constrain individual and collective action, such as: poverty, inequity, and injustice; siloed responses; economic, institutional, social and capacity barriers; lack of and barriers to appropriate finance and technology; and trade-offs with the achieving the SDGs.

As climate change is a global phenomenon and nature does not respect national boundaries, all countries must take action to reduce emissions. The principle of ‘Common but Differentiated Responsibility’ (CBDR), enshrined in the 2015 Paris Agreement, means that there is a duty on all countries to tackle climate change and take climate action, but that the types of actions they take will depend on differing national circumstances.⁴ The Paris Agreement reaffirms that developed countries should take the lead in providing financial assistance to developing countries, so they can take adequate measures to fight climate change, including investing in adaptation measures.

What the IPCC reports supports is the necessary transition to a low-carbon economy if we are to remain within planetary boundaries. This transition needs to be cross-sectoral, and inclusive of women, youth, and people with disabilities (PWD). There are huge opportunities for job growth, enterprise and skills development in meeting this vitally important challenge. For example, the International Labour Organisation (ILO) estimate that a shift to a greener economy could create 24 million new jobs globally by 2030 if the right policies are put in place.⁵ This includes jobs focused on the green economy and just transition, for example, decarbonising transport and energy systems or promoting agroecology and regenerative agricultural practices. This is on top of the 1.2 billion jobs worldwide in agriculture, fisheries, forestry, tourism, and pharmaceuticals, that depend on a stable and healthy environment.⁶

There will be considerable job losses (estimated 6 million) in extractive industry activities such as petroleum extraction and refinery, coal mining and production of electricity from coal. Likewise, environmental degradation and projected temperature increases negatively impacts productivity and working conditions. As more extreme weather and climate events occur, jobs that depend on natural resources, ecosystem services



and on a stable environment (such as agriculture, fisheries and forestry) will be affected, with the ILO estimating that 72 million full-time jobs will be lost by 2030 due to heat stress alone.⁷

Simultaneously, there are demographic changes that will affect the ability of economies to adapt to a changing climate and mitigate against the effects of climate change. Factors such as population increases and rural-urban migration across Africa will affect youth unemployment, access to education and training facilities, and securing decent and environmentally friendly jobs. These demographic challenges are beyond the scope of this report, but further research will be needed to assess how increases in population will affect the ability of countries to mitigate against and adapt to climate change.

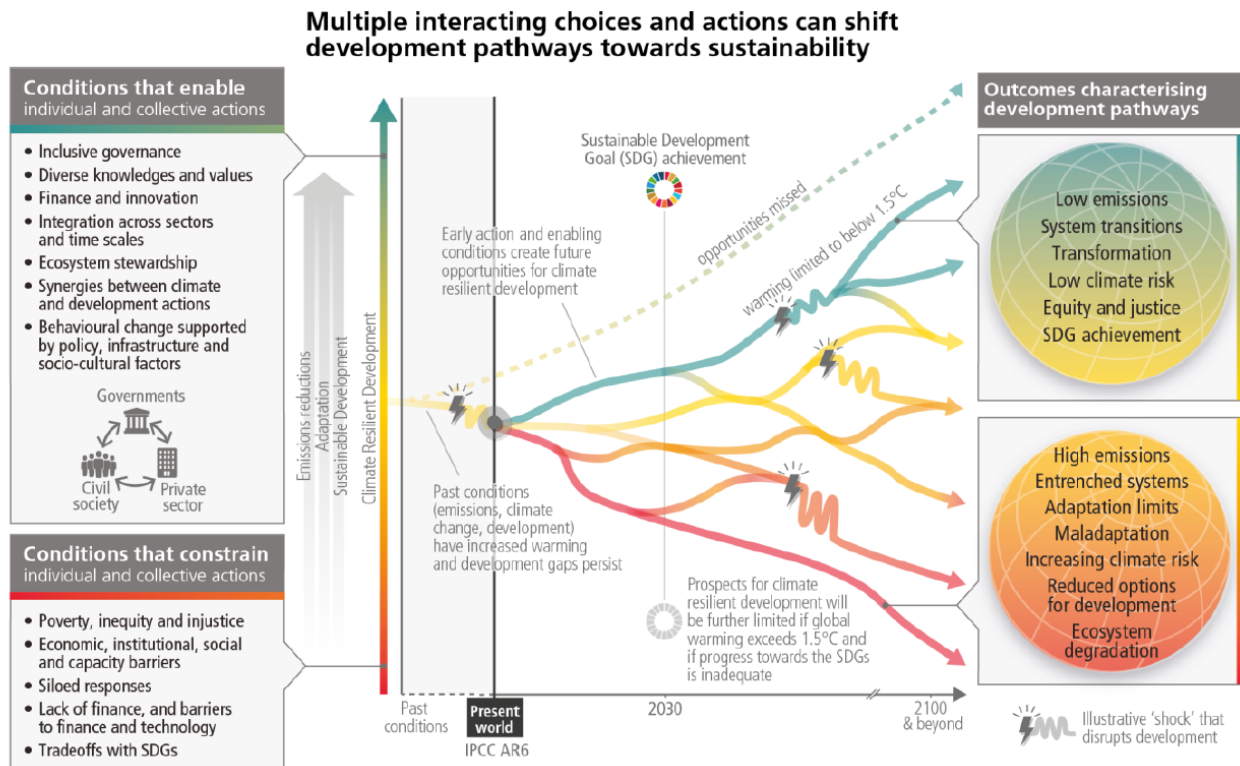


Figure 1 - Multiple Interacting Choices and Actions can shift Development Pathways towards Sustainability. Source: IPCC AR6 Synthesis Report Summary for Policymakers, 2023

VSO Nepal’s report on Green Jobs Opportunities for Women’s Economic Empowerment (2021) clearly states that there is an “urgent need for the adoption of an economic model that will ensure sustainable development of the environmental functions and simultaneously promote equal benefit-sharing among different segments of society.” The report highlights that global initiatives like the SDGs have promoted the integration of economic models that secure decent jobs while protecting the environment (SDG-8) and intersect with other SDGs such as Ending Poverty (SDG-1), Ending Hunger (SDG-2), Gender Equality (SDG-5), Climate Action (SDG-13) and Life on Land (SDG-15). This current report stipulates green skills, jobs and enterprises vitally intersects with Affordable and Clean Energy (SDG-7), Industry, Innovation and Infrastructure (SDG-9), Sustainable Cities and Communities (SDG-11) and Responsible Consumption and Production (SDG-12). To secure decent and clean jobs, there must be a systematic analysis of the sectors and industries that are needed to come together on the journey for the green transition.

This report will examine the different sectors and industries that should be implementing green skills and job growth within the context of anthropogenic climate change. Special attention will be paid to the skills and jobs needed for mitigation of and adaptation to climate change. While some of the examples and case studies illustrated will be global in nature, they highlight the important and innovative work that can be replicated and scaled in other regions of the world. Case studies will reflect considerations for VSO programmatic intervention, taking into account how they address VSO’s Core Approaches, Volunteering for Development (VfD) model and support women, youth and PWD.

Semi-structured interviews with VSO programmatic staff were conducted as part of this desk-based research which sought to identify the projects and programmes that have worked directly on green skills, jobs and enterprises. Additionally, the barriers to successful implementation and the lessons learned were discussed for further consideration. The interviews were conducted online and with country representatives from Cambodia, Bangladesh, Uganda, Nigeria, and Tanzania. Interviews were also held with members of the Global Business Pursuit and Knowledge, Evidence and Learning teams. A review of programmatic interventions across the international development sector was undertaken simultaneously, alongside a literature and best practice review from further afield.

The structure of this report is as follows. Firstly, there is a framing of 'green' and what it means for the green economy. Definitions and principles are outlined before a deeper dive into the definitions and approaches of green skills, jobs and enterprises needed for the transition to a green economy. Other approaches that are linked to the green economy are examined for consideration by VSO as potential ways to frame the work going forward. This includes a Just and Equitable Transition, Planetary Boundaries and Doughnut Economics, Natural Capital and Ecosystem Accounting, Circular Economy, and other political and systems-level approaches.

This is followed by a brief examination of what is currently happening across the sector in terms of climate change mitigation and adaptation, supporting the transition to a green economy, and leveraging support for skills development within the sector. Tied into this is some work being done by other organisations in specific sectors – for example, waste management, circular economy, and renewable energy generation. Consequently, an analysis of opportunities in climate change mitigation and adaptation is proposed for consideration by VSO., including key sectors such as energy, transport, construction, waste management, textiles, tourism, agriculture, and land-use. This is followed by an outline of the sketched outline of the donor trends and funding landscape to be considered as VSO start to build its track record in this programmatic area.

Framing ‘Green’: Key Definitions, Approaches and Concepts

The skills needed for the greening of jobs and enterprises should be intersectional and able to address not only climate change, but also inequality and poverty. While there is not a globally recognised definition of ‘green’, it has come to mean adopting policies or practices which are environmentally friendly, eco-friendly or climate friendly. To become green, therefore, is a fluid process in which individuals, communities and organisations react to the scientific and observable data that each action has on its immediate and global environment. There are many quantitative measures that one could use to demonstrate progress being made on becoming more green; these include, but are not limited to, demonstrable reductions in waste-to-landfill, increased recycling rates, reductions in GHG emissions from energy, transport, buildings and practices, increased use of recycled materials in production, reduced use of common resources such as water, soil and land, access to efficient technologies, or increased energy efficiencies.

Green Economy

As the central concept related to the work on green skills, jobs and enterprises, the green economy has become the centre of international policy debates and frameworks. Therefore, it is not surprising that many different definitions of the green economy have been put forward by UN agencies, Multi-National Corporations (MNCs), International Non-Governmental Organisations (NGOs) and Civil Society Organisations (CSOs). The green economy involves activities that create and consolidate Earth’s natural capital or are involved in reducing environmental deficiencies and threats. Sectors involved in the green economy include:

- renewable energy
- low-emission transport
- energy-efficient construction
- clean technologies
- improved waste management
- sustainable agriculture
- forest management and sustainable fishing⁸

The Green Economy Coalition’s⁹ vision for a green economy is one that provides prosperity for all within the ecological limits of the planet. In 2020, they created 5 principles of what a green and fair economy looks like in principle and in practice, based on precedents set in international policy. These are:

- **Wellbeing:** enables all people to create and enjoy prosperity. The green economy is people-centred, focusing on growing wealth that will support wellbeing. This wealth is not merely financial, but includes the full range of human, social, physical and natural capitals. It offers opportunities for green and decent livelihoods, enterprises and jobs.
- **Justice:** promotes equity within and between generations. The green economy is inclusive and non-discriminatory, it shares decision-making, benefits and costs fairly, avoids elite capture and especially supports women’s empowerment. It takes a long-term perspective of the economy, creating wealth and resilience that serves the interests of future citizens, while also addressing today’s multidimensional poverty and injustice crisis. It is based on solidarity and social justice, supporting human rights, the rights of workers, Indigenous peoples and minorities. It promotes empowerment of MSMEs, social enterprises and sustainable livelihoods. Finally, it seeks a fast and fair transition; leaving no-one behind, enabling vulnerable groups to be agents of transition, and innovating in social protection and reskilling.
- **Planetary Boundaries:** safeguards, restores and invests in nature. An inclusive green economy recognises nature’s diverse values - whether they be functional (providing goods and services that underpin the economy), cultural (underpinning societies) or ecological (underpin all of life itself). It employs a precautionary principle to avoid loss of critical natural capital and breaching ecological limits. It invests in protecting, growing and restoring biodiversity, soil, water, air and natural systems.

It is innovative in managing natural systems, informs processes of circularity and aligns with local community livelihoods based on biodiversity and natural systems.

- **Efficiency and Sufficiency:** supports sustainable consumption and production. An inclusive green economy is low-carbon, resource-conserving, diverse and circular. It embraces new models of economic development that address the challenge of creating prosperity within planetary boundaries. It recognises that a global shift is needed to limit consumption of natural resources to physically sustainable levels as well as a social floor of basic goods and services that are essential in meeting people's wellbeing and dignity. It aligns prices, subsidies, and incentives with true costs to society through mechanisms such as 'polluter pays' or where benefits accrue to those who deliver inclusive green outcomes.
- **Good Governance:** integrated, accountable, and resilient institutions. An inclusive green economy is evidence-based and deploys both sound science and economics along with local knowledge for adaptive strategy. It is supported by institutions that are integrated, collaborative and coherent and with adequate capacity to meet their respective roles in effective, efficient, and accountable ways. It requires public participation, prior informed consent, transparency, social dialogue, democratic accountability, and freedom from vested interests in all institutions, whether they be public, private, and civil society.

Several of these principles highlight important areas for consideration for VSO's programmatic interventions and will be explored further.

Skills for the Green Economy

The ILO define green skills as *"specific skills required to adapt products, services or operations to meet adjustments, requirements or regulations designed to stem further climate change or adapt to the impact it is already having"*.¹⁰ The ILO have identified the main core skills necessary for green jobs in their analysis titled Skills for Green Jobs: A Global View¹¹:

- strategic and leadership skills to enable policymakers and business executives to set the right incentives and create conditions conducive to cleaner production, cleaner transportation etc;
- adaptability and transferability skills to enable workers to learn and apply the new technologies and processes required to green their jobs;
- environmental awareness and willingness to learn about sustainable development;
- coordination, management and business skills to facilitate holistic and interdisciplinary approaches incorporating economic, social and ecological objectives;
- systems and risk analysis skills to assess, interpret and understand both the need for change and the measures required;
- entrepreneurial skills to seize the opportunities of low-carbon technologies; innovation skills to identify opportunities and create new strategies to respond to green challenges;
- communication and negotiation skills to discuss conflicting interests in complex contexts; marketing skills to promote greener products and services;
- consulting skills to advise consumers about green solutions and to spread the use of green technologies;
- networking, IT, and language skills to perform in global markets.

The Brookings Centre for Universal Education¹² define green skills as *"the specific, generic, and transformative capacities needed to contribute to a socially-, economically-, and environmentally-just human society that cares for the human and non-human world and reduces the impact of human activity on others"*. Specific capacities are those needed to thrive in green jobs and include skills from caring to coding. Generic capacities are the cross-cutting 'life' or 'socio-emotional' skills that can contribute to a greener and more

environmentally friendly way of thinking, being and doing. These include skills such as problem-solving, critical thinking, teamwork, coping with uncertainty and empathy. The transformative capacities are those need to disrupt and challenge the individual, collective and societal factors that systematically exacerbate the climate crisis. This includes, for example, the ability to recognise and redress unequal power relations. These are key skills that should be utilised in designing a skills framework for VSO programmes centred on improving and developing green skills for women, youth and PWD.



Figure 2 – A Green Skills Framework. Source: Brookings Centre for Universal Education, 2021.

Table 1 is a summary of the skills needs for a green economy that was produced by the UK Government. Appendix A contains a table of skills for a low-carbon and resource efficient economy and Appendix B is a table of green skill needs by sector. While focused on the UK, it provides a background to the variability of green skills needed for the green transition.

Skills for a green economy	Skills needs
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Skills supporting resource efficiency	<p>All businesses need generic or light green skills including:</p> <ul style="list-style-type: none"> • Strategic business management to build resource-efficient business models leading to bottom line benefits and in preparation for new regulations • Business/financial accounting services around carbon and natural environment accounting • Skills to design and adopt technologies, products and processes increasing resource efficiency, including lean manufacturing
	<ul style="list-style-type: none"> • Project management skills with clear understanding of resource efficiency • Operator level actions to maximise resource efficiency (e.g. reducing waste in production).
Skills supporting low carbon industry	<p>Low carbon industry focuses on energy generation and industry with high energy requirements. Skills include:</p> <ul style="list-style-type: none"> • Scientists and engineers with training or transferable knowledge for nuclear and renewable energy (including wind and marine) • Technicians with training or transferable knowledge to install energy efficiency measures and retrofit at a household and business premises level • Skills to design and adopt technologies, products and processes to minimise carbon emissions • Operator level actions to minimise carbon emissions (e.g. driving in a fuel efficient manner).
Skills supporting climate resilience	<p>Business requires the capacity to adapt to changes in climate. The necessary skills include:</p> <ul style="list-style-type: none"> • Scientific and technical skills such as modelling and interpreting climate change projections • Risk management such as assessments of future resource availability • Skills to design and adopt technologies, products and processes to improve climate resilience • Operator level actions to improve climate resilience (e.g. retrofitting water efficient technologies in households and business premises).
Skills to manage natural assets	<p>Natural assets underpin all business practice. Skills to protect and manage them include:</p> <ul style="list-style-type: none"> • Accounting services for the natural environment • Understanding of environmental impact assessments • Understanding and interpretation of environmental legislation targets, ecosystem services design and management and land use planning • Skills to design and adopt technologies, products and processes to manage natural assets.

Table 1 – Summary of skills needs for a green economy. Source: UK Government, 2011

LinkedIn's *Global Green Skills 2022* Report notes multiple distinctions in the terminology of the green transition. These include:

- **Green skills:** are those that enable the environmental sustainability of economic activities
 - **Green jobs:** are those that cannot be performed without extensive knowledge of green skills
 - **Greening jobs:** can be performed without green skills, but typically require some green skills
 - **Greening potential jobs:** can be performed without green skills, but occasionally require some level of green skills
 - **Non-green jobs:** are those that do not require green skills to be performed
 - **Green talent:** a LinkedIn member who has explicitly added green skills to their profile and/or are working in a green or greening job
- The report states that “the hard truth is that right now we are nowhere close to having sufficient green talent, green skills or green jobs to deliver the green transition”. Green jobs and skills are on the rise, but they are not rising at the level needed to meet climate pledges as set out in the Paris Agreement.

Additionally, there is a disconnect in local areas between the skills needed to enable jobs in the green economy to thrive. For example, there is a considerable shortage of workers skilled with maintaining and repairing electric vehicles.¹³

Green skills have also been defined as “an umbrella term for the technical skills, knowledge, behaviours and capabilities required to tackle the environmental challenges we face and to unlock new opportunities for growth.”¹⁴ The three core environmental challenges that green skills span are nature and biodiversity, climate change and decarbonisation, and waste and pollution reduction. The relationship between green skills and jobs is characterised by the fact that the green transition will change every industry and every business. This means that every job will change, and employees will need to learn and develop new green skills to stay relevant and employable, including sustainability.

Degree of Skills Change	Occupational Change	Typical Response	Examples
None	None or only quantitative	None or increased training in existing occupation	Bus Driver in CNG buses; national park ranger
Low	Changing established occupation	On-the-job learning or short training courses	Welder in wind turbine production; organic farmer
Medium	Changing or emerging occupation	Short courses or longer continuous training	Energy consultant in building; car mechanic for electric or CNC cars
High	New and emerging occupation	Initial training, university degree or longer continuous training	Solar energy technician; eco-designer; biofuels technician

Table 2 – Changes in skills and occupations for green jobs. Source: ILO, 2011¹⁵

Van der Ree (2019) highlights the current gap between the skills required for jobs in the green sector and the training and competency standards provided by national vocational and tertiary institutions. The example of Kenya is used to illustrate that 80% of the technicians required for the building and operating of a new wind farm were recruited on the international market due to the skills shortage within the country. This is having an effect on the proliferation of investment needed in Africa in general to advance renewable energy through an enterprise-based mechanism.

There are several considerations for VSO here:

- Adopt a people-centred definition of green skills

- Conduct skills gap analyses in countries seeking to implement new green skills and jobs programmes across resource efficiency, low-carbon economy, climate resilience and managing natural assets.

Jobs in the Green Economy

The Brookings Centre for Universal Education defines green jobs as *“any job that contributes to the well-being and flourishing of present and future generations; upholds human rights, including women’s rights and the rights of indigenous populations and peoples of colour; and supports the regeneration of the natural world, its resources, and its socio-ecological systems on which our human economies rely”*.¹⁶ The foundational principles of green jobs should nurture and develop humanity’s individual and collective capacity to care for others and the environment and to educate ourselves and others about the unsustainability of the status quo. This definition centres the focus on the rights of communities that are often left marginalised and outside of economic circles. This is a key consideration for VSO to consider expanding its definition of green jobs.

As stated earlier, LinkedIn differentiate between green jobs, greening jobs and greening potential jobs on their site. They define green jobs as those that cannot be performed without extensive knowledge of green skills. Greening jobs can be performed without green skills, but typically require some green skills. Greening potential jobs can be performed without green skills, but occasionally require some level of green skills. While this terminology appears confusing, the point being made is that any job currently in the economy has the potential to become green through the utilisation of green skills. When you cross-reference the jobs with the skills identified in Figure 2, there is scope for jobs currently in industries to become greener by adopting greener practices through improved environmental data analysis and business development skills. There is potential for VSO to work with enterprises through programmatic interventions to take them on a journey to understanding their environmental footprint and suggest ways to improve it.

The Feminist Green New Deal Coalition and Data for Progress¹⁷ conducted a poll in the USA that found that most respondents believed that care should be central to climate, workforce and infrastructure policies. They found that 69% of respondents agree that “Green” jobs should refer to all jobs related to the well-being of people and the planet, and that includes care. Any intervention that focuses on increasing wellbeing of populations can be argued to constitute an aspect of the green economy. Care jobs, whether for people or for planet, are critical in building an equitable green economy. Novello and Carlock¹⁸ (2019) argue that educators are green workers due to the ability of “any nation to care for and educate its youth in many ways determines the future health of civic, social, and economic outcomes. For each individual, quality education, and early childhood education in particular, is a major determinant in emotional health and lifelong wealth potential”. This framing of green jobs has implications for VSO’s Health, Education and Livelihoods practice areas and therefore programmatic interventions must consider the range of benefits that a green approach can bring to primary actors and communities.

According to the U.S Bureau of Labour Statistics, “green jobs are either a) Jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources; or b) Jobs in which workers’ duties involve making their establishment’s production processes more environmentally friendly or use fewer natural resources.”¹⁸ The definition classifies green jobs into three major categories: renewable energy production, energy efficiency, and environmental management. However, this definition is antiquated and does not capture the needs of a sustainable economy. Novello and Carlock¹⁹ (2019) argue that *“Rather than capture only jobs related to energy production, energy efficiency, and resource management, the standard definition of green jobs should be expanded to include a number of sectors that are crucial to a truly sustainable economy.”* They go on to state that a *“green job should refer to any position that is part of the sustainability workforce: a job that contributes to preserving or enhancing the well-being, culture, and governance of both current and future generations, as well as regenerating the natural resources and ecosystems upon which they rely”*.

VSO define green jobs *“as decent jobs that promote environmental and biodiversity conservation. These are jobs that support reduction of practices that are harmful to the environment and contribute to creating economically and socially inclusive businesses”*. This is similar to the ILO’s definition from 2016. The concept of decent work means that rights are guaranteed at work, social protection is in place and social dialogue has been promoted. These are the pillars of the ILO Decent Work agenda. The framing of jobs needed for the green economy raises several considerations for VSO, including the need to expand its definition to specifically mention the inclusion of traditionally marginalised societal groups. In addition, a focus on future generations should be included as a foundational principle of sustainable development.

Enterprises in the Green Economy

Quite surprisingly there is not a universal definition of a green enterprise, but there are several considerations that comprise defining what a green enterprise is. Some definitions chose to focus on enterprises whose models benefit the environment in some way, shape or form. For example, this could be a tree nursery that sells seedlings to customers for them to plant on their own land. Another example is a company that specialises in waste management and helps to dispose of waste products safely, securely, and legally for other companies. Other definitions focus on enterprises that make products for the economy by utilising the most energy-efficient or environmentally friendly practices possible. For example, a clothing company may choose to limit the use of synthetic materials in production and seek to source waste materials that could be recycled for use in production. There are several enterprises that have made clothing from recycled plastic that was extracted during ocean and beach clean ups. However, there has not been many concrete examples of major enterprises being defined as green due to the pressures being exerted upon companies to make a profit.

Traditionally, law and convention in most high-income countries dictates that firms are run in line with shareholder interests, which has ordinarily pursued profit maximisation channels²⁰. This echoes the neoliberal doctrine that declared that the sole social responsibility of business is to use its resources and engage in activities designed to increase its profits.²¹ This corporate perception of responsibility to legal compliance and shareholder value maximisation has since largely remained in many corporation's business strategies. Since the turn of the century, corporations have become more explicit in their Corporate Social Responsibility (CSR) reporting, moving beyond perceptions that sustainability and CSR were green trends that involved extra costs and regulation. The formation of B-Corporations in 2012, which certifies a business based on value creation for non-shareholding stakeholders, opened avenues for organisations to publicly claim an identity that celebrates both shareholder and stakeholder success.

Certification helps to both recruit and retain employees that want societal purpose to be a key driver or corporate activity (Stammer, 2016). The influence of B-Corporations in the business community is evident by the recent statements made by the World Economic Forum (WEF), whose founder stated: *"a company serves not only its shareholders, but all its stakeholders – employees, customers, suppliers, local communities and society at large [...] to improve the state of the world"* (Schwab, 2019).

A company improving the state of the world could be achieved through investing in marginalised communities, combatting environmental issues at source, reducing their impact on the environment, offering advice and expertise to other organisations or utilising circular designs into their mode of operation. This suggests that a pre-existing business can become a green business or enterprise through adopting environmentally friendly behaviours. This could be in the form of setting out a plan to reduce their impact on the environment through environmental management plans or GHG reduction plans. The leading example of this is the outdoor clothing company Patagonia. In 2018 they changed their business strategy to be more environmentally conscious and address the climate crisis. This is reflected in their mission statement: "We're in Business to Save Our Home Planet". Patagonia regularly score highly on external reporting for social and environmental performance and have advocated for slow fashion, anti-consumerism, recognition of Indigenous Knowledge, anti-racism and protection of wilderness and public lands. As they started out as a company making products for the climbing industry, their mission and purpose changed over time to be more environmentally conscious and attracted a range of like-minded individuals to choose their brand over the competition, despite the difference in costs of the products they sold.

Social enterprises are a model that could be considered green but differ in certain ways. A social enterprise is formed with specific social objectives that serves its primary purpose. A green enterprise still has profit as a driver of activity but conducts business in an environmentally friendly way, whether through reduced use of resources, more efficient technologies, or selling products that aid in climate change mitigation and adaptation.

VSO should consider clearly delineating between enterprise types and categorise them according to their activities related to the green economy. Some MSMEs will be conducting business operations entirely focused on green economy – for example, production using recycled materials, tree planting, agroecological farming practices or renewable energy providers. Others will have business operations that have some impact on the green economy – for example, waste management services. There will be other MSME types who need support in greening their operations – for example, implementing waste reduction measures and increasing recycling of products. All types of enterprise can and should contribute towards the green economy, and some will need to be supported more than others as they make the transition. The

categorisation aids in understanding the level of skills development and types of training needed to support green economy initiatives.

Approaches to the Green Economy

While skills, jobs and enterprises underpin the green economy, there are other concepts that are gaining recognition in political and economic circles that operationalise the green transition. These should be considered by VSO as ways to frame programmatic interventions for the green transition.

Just and Equitable Transition

Considerable attention has been paid to the idea that a Just Transition is needed in order to solve intersectional issues such as climate change, poverty, inequity and food sovereignty. There are many different definitions of what encompasses a Just Transition. The concept emerged in the 1980s when trade unions in the USA sought to protect workers affected by new water and air pollution regulations. It has recently gained traction in reference to meeting climate goals by ensuring the whole of society are brought along in the journey to a net-zero future.²² It has become integral part of many global commitments adopted by countries; for example, The Paris Agreement acknowledges *“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”* and highlights the importance of workers in responding to climate change.

The ILO define the Just Transition as “greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one *behind*”.²³ They state that the Just Transition involves maximising the social and economic opportunities of climate action while minimising and managing the associated challenges. It is important for all countries at all stages of development and is sector agnostic (not just limited to the energy sector alone). This differs from the World Bank Group, whose work on the Just Transition is focused solely on the transition away from coal and towards securing a clean energy future.²⁴

The European Bank for Reconstruction and Development have a similar approach to the ILO. They state that “A just transition seeks to ensure that the substantial benefits of a green economy transition are shared widely, while also supporting those who stand to lose economically – be they countries, regions, industries, communities, workers or consumers.”²⁵ This definition highlights that the transition to a green economy will inevitably lead to economic losses for various industries, most notably workers in the extractives sector. The Institute for Human Rights and Business (IHRB) state that ““Just transitions” focus on the transition out of high-carbon activities and into the green economy, seeking to ensure harm to workers, communities, countries, and regions is avoided while maximising the benefits of climate action”.²⁶ This definition broadens the idea of a Just Transition as countering high-carbon activities but does not specify industries or sectors. Instead, an analysis of key sectors is needed for countries to prioritise transitional activities that reduce or eliminate carbon emissions, whether that be from land-use, transport, agriculture, industry, or energy.

The Just Transition Alliance state that “the “Just Transition” is a principle, a process, and a practice”.²⁷ The principle is that a healthy and vibrant economy and a clean environment can and should co-exist, but the process for achieving this vision should be fair and not cost workers or community resident their health, environment, jobs, or economic assets. They developed six Just Transition principles (see Box 1).

The United Nations Development Programme (UNDP) state several benefits of a just transition for countries to address the impacts of climate change and green their economies.²⁸ These include:

- Bringing the public along through governments demonstrating the socio-economic benefits afforded by a green transition- including economic benefits of green skills and green jobs.
- Supporting a green jobs revolution in which alternative jobs created have decent wages, safe and secure labour conditions, and substantive health benefits.
- Laying the social groundwork for a resilient net-zero economy by using transparent planning process and active stakeholder participation in decision-making.
- Driving local solutions that understand the positive and negative impacts of climate actions and identify the best solutions for that context.

- Reinforcing the urgency for concerted efforts to combat climate change by encouraging a deliberate effort to smoothen out transitions that often are disruptive to people’s lives.

The Just Transition concept fails to recognise that the whole of humanity is currently using natural resources at a rate which is inoperable to which they can be replenished. For example, if it is applied in the USA, then the just transition should also include a degrowth approach to the economy and a systemic recognition that change is needed in the way that life is lived. In other countries this is less of an imperative as they are currently living within the planetary boundaries principle. This is central to the idea of doughnut economics.

BOX 1 - The Just Transition Alliance Six Principles of a Just Transition

1. Workers, community residents, and Indigenous Peoples around the world have a fundamental human right to clean air, water, land, and food in their workplaces, homes, and environment.
2. There is no contradiction among simultaneously creating sustainable development, having a healthy economy and maintaining a clean and safe environment.
3. Liberalization of environmental, health and labour laws and corporate globalization – know no borders. Therefore, solutions call for local, regional, national, and global solidarity.
4. The development of fair economic, trade, health and safety, and environmental policies must include both the frontline workers and fence-line communities most affected by pollution, ecological damage, and economic restructuring
5. The costs of achieving sustainable development, a healthy economy, and clean environment should not be borne by current or future victims of environmental and economic injustices and unfair free trade policies.
6. Workers and community residents have the right to challenge any entity that commits economic and/or environmental injustices. These entities include governments, the military, corporations, international bodies, and mechanisms for securing corporate accountability.

Planetary Boundaries and Doughnut Economics

According to Earth Overshoot Day, humanity is using nature 1.8 times faster than our planet’s biocapacity can regenerate. Biocapacity refers to the “capacity of ecosystems to regenerate what people demand from them”.²⁹ There are inequalities between countries though in terms of their ecological footprint. If everyone were to all of humanity were to live like U.S. residents, then humanity would be using the resources equivalent to 5.1 earths. Table 1 below shows select countries relevant for VSO programming with other interesting examples to demonstrate how many Earths could be supported based on the consumption rate of those countries. It also demonstrates what the biocapacity of a certain country is and how many countries with an equivalent biocapacity are needed to support that lifestyle.

Country	No. of countries required	No. of Earths Required
Bangladesh	2.2	0.6
Cambodia	1.3	0.9
eSwatini	2.6	1.6



Ethiopia	1.8	0.6
India	2.7	0.8
Japan	7.8	2.9
Kenya	2.1	0.6
Luxembourg	10.7	8.2
Malawai	1.3	0.6
Mozambique	0.5	0.5
Myanmar	0.9	1.0
Nepal	1.9	0.8
Nigeria	1.6	0.7
Pakistan	2.8	0.5
Philippines	2.9	0.9
Rwanda	1.9	0.5
Sierra Leone	1.1	0.7
Singapore	104.6	3.7
Tanzania	1.2	0.7
Thailand	1.9	1.5
Uganda	2.3	0.7
United Kingdom	4.1	2.6
United States of America	2.4	5.1
Zambia	0.7	0.8
Zimbabwe	2.0	0.8

Table 3 - No. of Countries and No. of Earths needed to sustain consumption patterns of specific countries. From <https://www.overshootday.org/how-many-earths-or-countries-do-we-need/>

This demonstrates that current global consumption rates are categorically too high for Earth to replenish and regenerate resources. This is contributing to ecological shortfall on a global scale, with the majority of rich countries using more than they are able to replenish, whether that is within their own borders or sourced from elsewhere. The data also highlights the countries that have high resource consumption rates but that also have reservoirs of natural capital. As nature becomes more depleted, the biocapacity rate globally will shrink.

The principles of planetary boundaries and earth overshoot are central to the concept of doughnut economics (see Fig.3) The concept was put forward by Kate Raworth from Oxford University's Environmental Change Institute. Raworth's model has garnered attention in planning authorities across European cities such as Amsterdam, Brussels, Copenhagen, Berlin and Cambridge³⁰ as the tool has become adapted to each context. Raworth's explanation of the concept is worth quoting in full:

“The hole at the Doughnut’s centre reveals the proportion of people worldwide falling short on life’s essentials, such as food, water, healthcare and political freedom of expression – and a big part of humanity’s challenge is to get everyone out of that hole. At the same time, however, we cannot afford to be overshooting the Doughnut’s outer crust if we are to safeguard Earth’s life-giving systems, such as a stable climate, healthy oceans and a protective ozone layer, on which all our wellbeing fundamentally depends”³¹

This approach highlights the nine areas that comprise planetary boundaries (ozone layer depletion, climate change, ocean acidification, chemical pollution, nitrogen and phosphorous loading, freshwater withdrawals, land conversion, biodiversity loss and air pollution). The doughnut in Figure 3 shows what the planetary and social boundaries are for the world as a whole. Appendix A contains the doughnut economic models for East African countries that VSO are implementing green skills, jobs and enterprises through Resilient Livelihoods programming, with reference to other select countries as a comparison. The work led by the Doughnut Economics Action Lab and hosted by the University of Leeds (UK) references that for the past 30 years, no country has met the basic needs of its residents at a globally sustainable level of resource use.³² The pursuit of unsustainable development has had huge consequences for nature and biodiversity, natural resource depletion, GHG emissions and increased poverty, inequity and social injustice.

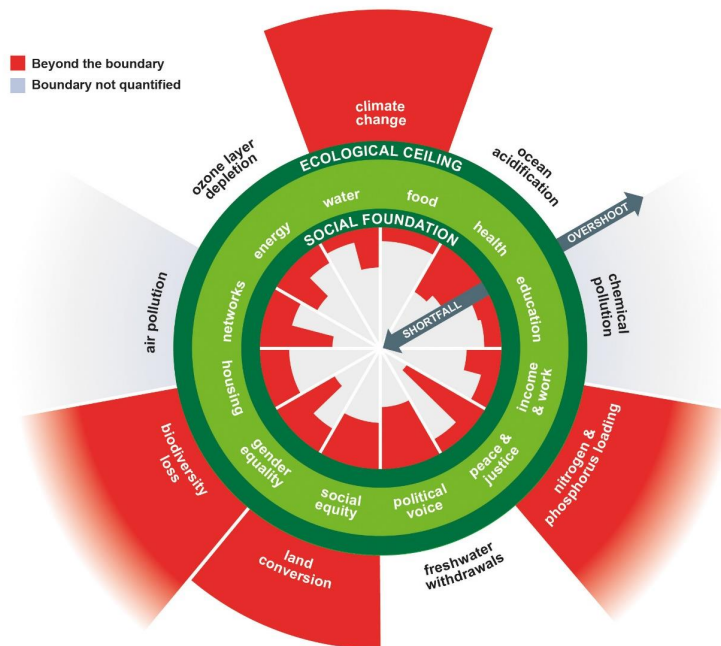


Figure 3 - Kate Raworth's Doughnut Economic Model.

Natural Capital and Ecosystem Accounting

Natural Capital can be defined as “the world’s stocks of natural assets which include geology, soil, air, water and all living things”.³³ Another definition from the UK Government for natural capital is that it “includes certain stocks of the elements of nature that have value to society, such as forests, fisheries, rivers, biodiversity, land and minerals. Natural capital includes both the living and non-living aspects of ecosystems”.³⁴ Humans can derive a wide range of both direct and indirect services and benefits from natural capital which allows for human life to be possible. These services are called ecosystem services. The World Business Council for Sustainable Development (WBCSD) released a short video explaining natural capital, and why it is important for businesses to consider in decision-making.

Natural Capital includes both renewable and non-renewable materials and resources, sinks that absorb, neutralise or recycle waste products, and processes such as climate regulation. Natural Capital, therefore, “is the basis not only of production but of life itself”.³⁵ It is the foundation for four other types of capital. Human capital consists of people’s health, knowledge, skills and motivation which are needed for productive work. **Human Capital** can be enhanced through access to good education, training and healthcare facilities, all of which are central to a productive economy. **Social Capital** consists of the institutions that develop

human capital in partnership with others. This includes communities, families, businesses, schools, voluntary organisations and trade unions. **Manufactured Capital** consists of the material goods and assets which contribute to the production process, as opposed to being the output itself. This include tools, machines, and buildings. Finally, **Financial Capital** enables the other types of capital to be owned and traded as part of the current economic system. It has no real value in itself, but is representative of natural, human, social or manufactured capital. It includes shares, bonds and currency. The Five Capitals are represented below in Figure 4, and provides a basis for understanding sustainability in terms of the economic concept of wealth creation or 'capital'.

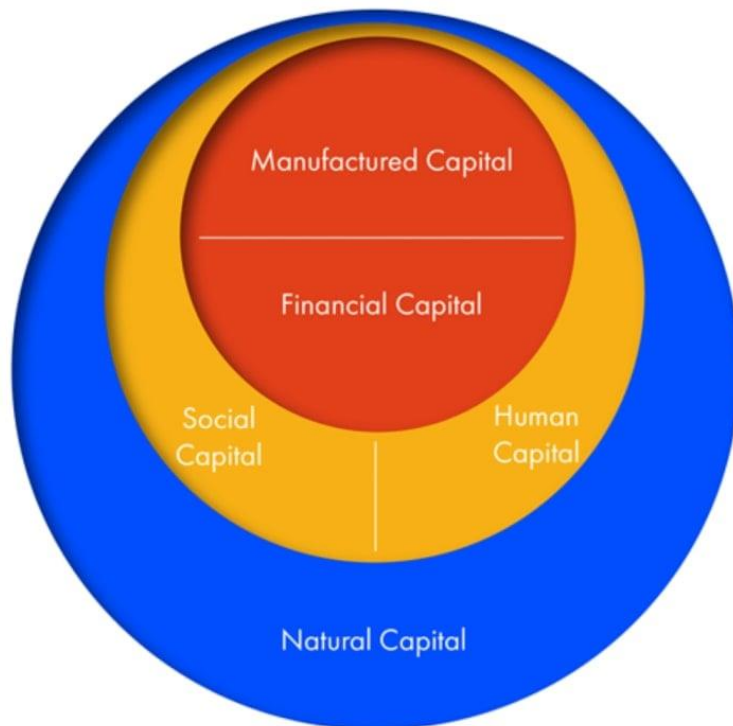


Figure 4 - The 5 Capitals Model. From: <https://www.forumforthefuture.org/the-five-capitals>.

A Natural Capital approach has been gaining traction in political manifestos, green papers, government policies and environmental strategies. The approach has been adopted by governments in the UK³⁶, Kenya, Uganda, Tanzania, South Sudan and Rwanda as a way of documenting and analysing the abundance of natural capital in each country and enable the creation of action plans that strengthen and expand natural assets.

The UN System of Environmental-Economic Accounting (SEEA) have developed an Ecosystem Accounting statistical framework for *“organising data measuring the ecosystem services, tracking changes in ecosystem assets, and linking this about habitats and landscapes, information to economic and other human activity”*.³⁷ This was adopted by the United Nations Statistical Commission in March 2021 and has informed policy development in over 34 countries, including Kenya, Uganda, Zambia, Senegal, Nepal and the United Kingdom (UK). Other countries seeking to implement SEEA include Zimbabwe, Sudan, Lesotho, Myanmar and the United States of America (USA).

The SEEA Ecosystem Accounting framework is built on five core accounts which are compiled using spatially explicit data and information about the functions of ecosystem assets (natural capital) and the ecosystem services they produce. Figure 6 shows how the five ecosystem accounts relate to each other:

1. Ecosystem Extent – records the total area of each ecosystem, classified by type within a specific ecosystem accounting area. These accounts are measured over time in ecosystem accounting area (e.g. nation, province, river basin etc) by ecosystem type.
2. Ecosystem Condition – records the condition of ecosystem assets in terms of selected characteristics at specific points in time. Over time, they record the changes to their condition and provide information on ecosystem health.

3. Ecosystem Services (physical) – records the supply of ecosystem services by ecosystem assets and the use of those services by economic unit, including households.
4. Ecosystem Services (monetary) – records the supply of ecosystem services by ecosystem assets and the use of those services by economic unit, including households.
5. Monetary Ecosystem Asset - records information on stocks and changes in stocks of ecosystem assets. This includes accounting for ecosystem degradation and enhancement.

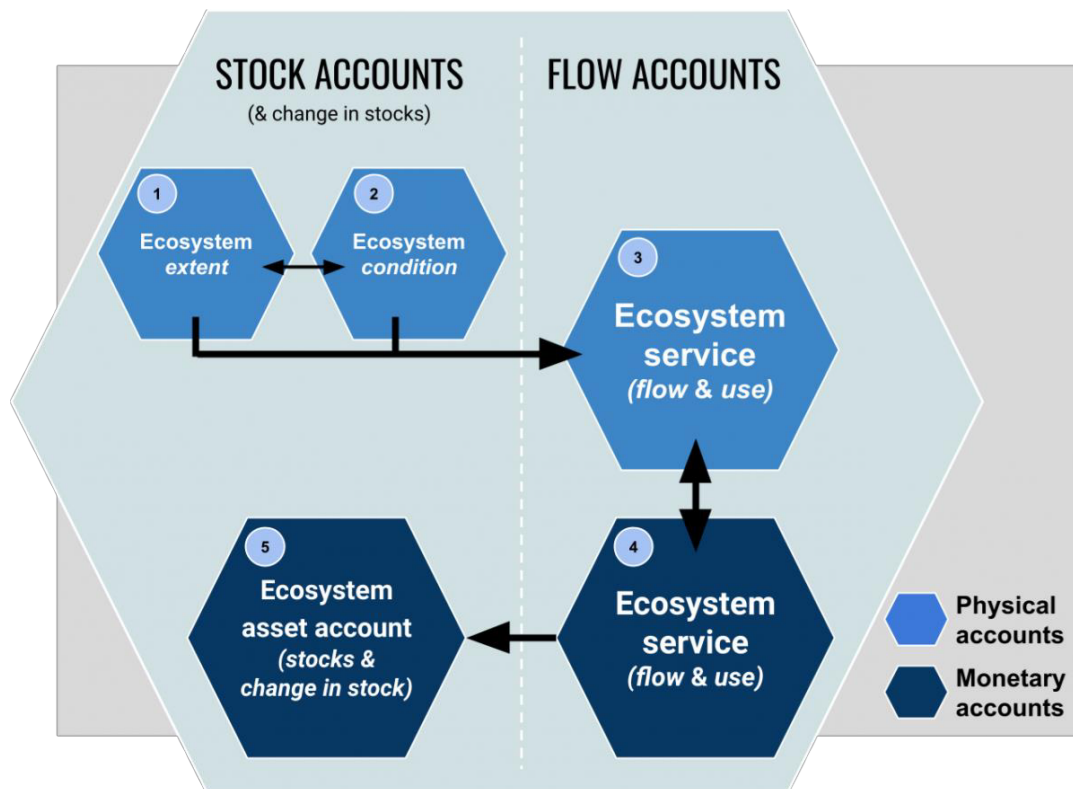


Figure 5 - Ecosystem Accounts and how they relate to each other. (<https://seea.un.org/ecosystem-accounting>)

Circular Economy

The concept of a circular economy has been often cited as one of the best solutions to support sustainable development (Khajuria et al, 2022³⁸) but has been slow in diffusing to industrial arenas, in particularly the developing world where there remains huge potential to be the world's largest economies and workforce (Ngan et al, 2019³⁹). A circular economy "entails markets that give incentives to reusing products, rather than scrapping them and then extracting new resources. In such an economy, all forms of waste, such as clothes, scrap metal and obsolete electronics, are returned to the economy or used more efficiently".⁴⁰ The linear process of production has dominated economic policy and thinking. In this process, materials are taken from the Earth, products are made from them and then they are thrown away as a waste product, never to be used again. A more design-driven, circular approach eliminates waste and pollution being produced in the first place, circulates products and materials at their highest and regenerates nature. At its essence is a transition to renewable energy and materials and a decoupling of economic activity from the consumption of finite resources. As such, it is a systems solution framework that tackles global challenges like climate change, biodiversity loss, waste and pollution. According to the Ellen Macarthur Foundation⁴¹, there is huge potential and power to grow prosperity, jobs and resilience for individuals, communities, and societies who adopt circular economy principles in programmatic and policy interventions.

Whilst the majority of circular economy literature focuses on eliminating single-use items, such as plastic, and combatting waste, the circular economy also focuses on shorter supply and value chains, local production for local consumption and better product design principles. Numerous enterprises have adopted

circular economy principles in product design; whether that be by using recycled plastic and products,

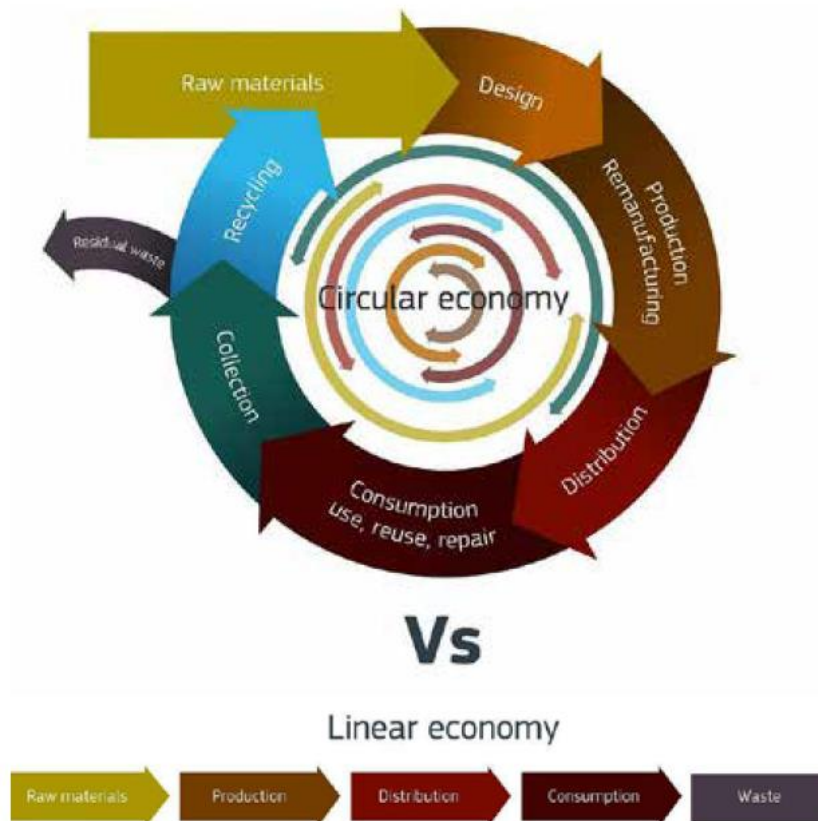


Figure 6 - Circular Economy Versus Linear Economy. Source: UNDP, 2019

extended the life cycle of products through free repair and extended warranty agreements, or utilising food waste as a source of energy. The ILO estimates that global employment could grow by six million jobs by transitioning to a circular economy that includes such activities as recycling, repair, rent and re-manufacture - replacing the traditional economic model of “extracting, making, using and disposing”. If well managed, the circular economy can also create jobs that are inclusive and of a better quality than those in a business-as-usual setting.⁴²

BOX 2 - How a circular economy cuts/reduces greenhouse gas emissions

We need to change the way we think about climate change in order to reduce greenhouse gas emissions (GHGs) and meet the targets set out in the Paris Agreement. Energy efficiency and switching to renewable energy is only half the story. It is vital but would only address 55% of global emissions. To reach net-zero, we also need to change the way we make and use products, materials, and food.

• By adopting the three principles of the circular economy in the products, services and systems we design, we can also start to tackle the remaining 45% of emissions associated with industry, agriculture, and land use that the energy transition can't address:

- By eliminating waste and pollution, we reduce greenhouse gas emissions across the value chain
- By circulating products and materials, we retain their embodied energy
- By regenerating nature, we sequester carbon in soil and products

For example:

- in buildings and construction, by eliminating waste, sharing buildings more, and by reusing and recycling construction materials, we can reduce the emissions from construction materials by 38% by 2050.

Likewise, in agriculture, shifting to regenerative production practices, eliminating food waste, and using better and upcycled ingredients in our food products and menus, we could halve food system emissions by 2050.

From the Ellen Macarthur Foundation

Political and System-level Approaches

There are numerous political and system-level approaches that are useful in framing the green economy and green transition. Two of these are outlined below: Green New Deal and Future Generations Commissioner.

BOX 3 - Green New Deal

- The New York City Council recently passed a job-creating bill that takes aim at the city's largest source of climate pollution: inefficient buildings. This policy will require about 50,000 large buildings to meet ambitious targets for reducing climate pollution. The building retrofits are expected to create 8,000 jobs each year. The policy also includes terms to prevent rent increases in rent-regulated buildings to protect low-income residents.
- Maine recently enacted a new "Act to Establish a Green New Deal for Maine". The law will create a taskforce that includes youth and labour representatives to craft a strategy for achieving 80% renewable energy in Maine by 2040, creating good jobs in renewable energy and manufacturing, and ensuring low-income households have access to affordable solar power.
- In 2019, the Los Angeles Mayor released an update to the Sustainable City Plan, laying out ambitious climate goals for the city. It would invest in L.A.'s local workforce and economy by creating good union jobs for thousands of technicians, electricians, engineers and other clean energy workers. The plan aims to tackle smog pollution and the poor air quality that L.A. and other Southern California communities continue to breathe on a daily basis.
- The Future Energy Jobs Act in Illinois gives low-income families priority access to solar panels, while providing solar-installation job training, particularly for formerly incarcerated people and communities fighting environmental injustice. The law also sets new energy-efficiency standards that are slated to further reduce air and climate pollution, creating over 7,000 new jobs each year to retrofit buildings, and cut \$4 billion in costs for Illinois families.
- California's Buy Clean policy helps stimulate clean manufacturing by requiring public money be spent on goods manufactured under conditions that protect climate and reduce pollutions. This helps to create both clean, good and decent jobs and enterprises.
- After a grassroots campaign in Portland, voters overwhelmingly approved a ballot referendum that will raise between \$30-70 million per year, via a fee on big retailer profits, for energy efficiency, renewable energy, job training, affordable housing, regenerative agriculture, and green infrastructure projects. At least half of the revenue going toward investments in low-income communities and communities of colour.

Examples from the Sierra Club

Green New Deal

The concept of a Green New Deal was first coined by New York Times columnist Thomas Friedman in 2007 and was inspired by U.S President Franklin D. Roosevelt's New Deal that embraced the concept of a government-regulating economy. Since 2019 there has been considerable momentum in the USA for a Green New Deal and over 100 members of Congress have endorsed the landmark Green New Deal resolution. The resolution seeks to tackle the climate crisis and pollution, create millions of high-paying jobs, and counteract systemic injustices.

Versions of the Green New Deal have been put forward in political manifestos in the UK, Canada, Australia, South Korea and the European Union. What this demonstrates is the need for public funding of green and environmental initiatives that are rooted in addressing environmental injustice. Box 3 above illustrates some examples of pro-climate, pro-jobs and pro-equity policies that are laying the groundwork for a national Green New Deal in the USA.

VSO should consider:

- Promoting Green New Deal policies and objectives in government advocacy and policy-setting, including for a 'Buy Clean' procurement strategy and tax incentives for renewable energy production.
- Working with enterprises to ensure they meet the standards for a Buy Clean policy and secure contracts



Future Generations Commissioner

There have been recent examples of countries establishing mechanisms that take into account future generations when making decisions. Wales was the first country in the world to appoint a Future Generations Commissioner, whose job it is to ensure that future generations are considered when pursuing social and economic development (see Box 4). While the Future Generations policy is intended to offer recommendations to policymakers and public bodies, these bodies are not obligated to follow these recommendations, but they do have to respond to say why they are not following these recommendations. Tangible outcomes from this example include a refusal of a road-building scheme in a highly biodiverse area of wetlands from the Welsh First Minister off the back of the recommendations from the Future Commissioner. In turn, this has led to a pause in all new road-building schemes in Wales for the time being, with a review taking place to assess road building policy in line with the Future Generations act.

VSO should consider:

- Lobbying and advocating for a Future Generations Commissioner in each VSO country to ensure that sustainable development and the needs of future generations are considered by political parties and government policies.
- Forming partnerships with other INGOs and CSOs to collectively position for a Future Generations Commissioner in each VSO country.

BOX 4 - FUTURE GENERATIONS COMMISSIONER FOR WALES

In 2015, Wales became the first country in the world to legislate in the interests of future generations. The 'Well-being of Future Generations Act' requires decision in Wales to be made in a way which meets today's needs without compromising the ability of future generations to meet their own – in essence, capturing the fundamental elements of sustainable development.

The Act places a legal responsibility on policy makers in Wales to create inter-connected solutions to improve cultural, social, economic and environmental well-being, via seven national goals, including ambitions for a healthier, more equal, and environmentally resilient society and a well-being economy. In the legislation, the goal for a 'prosperous Wales' does not mention GDP, instead defining growth in terms of 'an innovative, productive and low-carbon society which recognises the limits of the global environment', with an emphasis on 'decent work'.

This Act inspired the UN's vision for a Special Envoy for Future Generations and other countries including Canada, Ireland, Scotland and Gibraltar. The 800-page Future Generations report is structured around the achievement of well-being goals, which include:

❖ A Prosperous Wales:

- Ensuring people can secure decent work
- Transition urgently to a low carbon society which works within its environmental limits
- Ensure we use natural resources efficiently, recognising the limits of the global environment
- Identifying and developing skills fit for the future
- Support inclusive local economies

❖ A Resilient Wales:

❖ A Healthier Wales:

- Make the most of natural green and blue space to support well-being
- Urgent need for a better knowledge of nature
- Clean air and water for wildlife and people
- Ensure we use natural resources efficiently
- A national wellness system- ensuring services support
- People to understand behaviours and choices that benefit future health

❖ A Wales of Cohesive Communities:

- Ensure everyone has access to key services
- Value the role that potential community anchor organisations play in building cohesive communities.

❖ A More Equal Wales:

- Tackling poverty and socio-economic disadvantage
- Public bodies considering the impacts of the changing nature of work
- Public bodies identifying and mitigating the equality impacts of climate change
- Fair work- ensuring equal access to decent jobs, recognising everyone's value

❖ A Wales of Vibrant Culture and Thriving Welsh Language:

- Support the Welsh Language
- Value Culture and Creativity as core dimensions of well-being
- View culture as a mechanism for wider change

❖ A Globally Responsible Wales:

- Ensure Wales is welcoming, safe and fair to all
- Making the right financial decisions now, to enable future generations to thrive
- Ensure our supply chains are fair, ethical and sustainable
- Ensure we use natural resources efficiently, recognising the limits of the global environment, and contribute to global well-being

What is Being Done: A Review of Programmatic Interventions of Green Economy Initiatives in Africa and Asia

An internet-based review of programmatic and policy-based interventions across the international development sector was conducted to see what other INGOs and development organisations have done in relation to the green economy. This review looked holistically at the green economy, including skills, jobs and enterprises, as well as climate change adaptation and mitigation-based interventions.

The initial results are that most INGOs that have a climate focus are working on adaptation- based interventions. This looks at building the resilience of primary actors in the face of increasing climate risks and disasters and the impact that this has on lives and livelihoods. This recognises that the most vulnerable and marginalised individuals and communities are often situated in the regions which are feeling the effects of climate change, including extreme heat, more intense rainfall, increased frequency and intensity of storms, and increased risk from natural disaster events. Examples include:

- CARE International have a programmatic focus on climate justice, which is a response to the climate emergency that centres a future in which the most poor and marginalised people have significantly improved their wellbeing and access to human rights through strengthening resilience and adaptive capacities to the effects of climate change. CARE International work on addressing climate justice through climate change adaptation and disaster risk reduction (DRR), sustainable agriculture, ecosystems and natural resource management and gender equality.
- Oxfam International have a programmatic focus on building resilience to the climate crisis, working with women small-scale farmers and producers as they are hit hardest from the effects of climate change. Oxfam's work aims to enable women to voice their concerns and implement measures to strengthen their capacity to cope.
- Save the Children address the climate crisis through programmatic interventions such as community-led adaptation, anticipatory action in mitigating against disasters, advocating for and with children for climate justice, and education for climate. However, they do have a programmatic focus on green jobs for youth. They refer to the need to shift towards a circular economy, regenerative agriculture and greener jobs, and have lots of experience working in youth economic empowerment programmes.
- BRAC have a climate change programme that focuses on climate-resilient interventions, nature-based solutions, water security, and climate change adaptation. Their work in Bangladesh has supported 3 million people living in climate vulnerability to tackle climate change impacts, supported 700,000 households to build adaptive capacities, and planted 400,000 trees as an adaptation and mitigation measure. BRAC have another programme area that is concerned with skills development and promotion of decent work; however, there does not appear to be a green skills element explicitly mentioned in that pathway.

Green Jobs

The ILO are the leading international organisation working in the field of green jobs and have generated evidence and accrued knowledge across many years. They, along with the Green Jobs Programme and YEF Africa, produced a manual ("Are You in Search of a Green Biz Idea: A Resource Guide") for entrepreneurs willing to start a green business. The report is structured in seven chapters around different sectors and their use in the green transition; for example, renewable energy, agriculture, waste management and recycling, construction, eco-tourism and nature-based tourism, and energy, water and material efficiency in all types of enterprises. The following examples outlined here from Kenya, Uganda and Zambia illustrate the role of partnerships in programmatic work focused on green jobs.

Youth Employment for Sustainable Development - Kenya

The 'Youth Employment for Sustainable Development' (YESD)⁴³ was implemented in 2012 as a joint initiative of the ILO and the governments of Kenya and Japan. The YESD was intended to empower young women and men to participate in addressing the teething socio-economic challenges in their communities through providing them with marketable skills, decent jobs and business opportunities. The development objectives

were to establish viable MSEs owned by the youth to build their involvement and contribution towards realizing sustainable socio- economic, political and environmental development in Kenya. Specific objectives were to:

- Provide business development support to emerging youth owned SMEs
- Create employment opportunities for unemployed youth in the urban and rural Kenya
- Enhance the capacity of implementing agencies through knowledge transfers and skills upgrading
- Initiate dialogue and build the capacity of relevant Government bodies on Green Jobs as a means of addressing the impact of climate change

Outputs included:

- 100 Micro and Small Enterprises (MSEs), owned by up to 2500 young men and women, on Cobblestone (CS) paving develop;
- 30 Micro and Small Enterprises (MSEs), owned by up to 600 young men and women, on “Do-nou” technologies develop.
- Training curriculum and training materials developed for CS and Do-nou technologies as well as green jobs;
- 70,000 person-days of employment created

The YESD Project Strategy adopted a rights-based approach during the entire programme cycle, promoted the use of Employment Intensive technology, and promoted peacebuilding through youth empowerment.

Green Youth Entrepreneurship - Kenya and Uganda

Between 2010 and 2015, the Green Jobs Programme partnered with the ILO Youth Entrepreneurship Facility (YEF) to provide training programmes promoting green youth entrepreneurship in Kenya, and Uganda.⁴⁴ YEF is itself another partnership between the ILO, Africa Commission, and the Youth Employment Network. This programme was funded by the Government of Denmark.

Activities enabled:

- 19,000 young women and men in self-employment to be trained in business and exposed to green entrepreneurship;
- 5,600 students transitioning from secondary school to work to benefit from tailor- made green business training;
- 550 out of 3,000 business plans to be developed through business plan competitions were submitted under the green category.

As a result, many successful green enterprises were created in developing green services or in the production of green goods.

Green Jobs Programme in the Construction Sector- Zambia

The Zambia Green Jobs Programme (ZGJP) is a sustainable development programme which facilitates private sector development for inclusive green growth, more and better jobs particularly for young people and women. The programme is implemented by the Government of Zambia and national partners with technical assistance from the United Nations (ILO, UNEP, UNCTAD, FAO and ITC) and funding from the Government of Finland. By using a value-chain development approach, through private sector promotion and sustainable housing, it aims to create a conducive business environment for inclusive green growth and job creation in the building construction sector, with a strong focus on strengthening local capacity and increasing household income.

The programme development objective is to enhance competitiveness and sustainable business among micro, small and medium-sized enterprises (MSMEs) in Zambia’s building construction sector. Its immediate objective is to create at least 5,000 decent green jobs particularly for young people, improve the quality of at least 2,000 jobs in MSMEs which in turn will improve the incomes and livelihoods of at least 8,000 households that depend on the building construction sector. This objective is pursued through three main outcomes:

- **Outcome 1: Shaping Attitudes and Mindsets** - Increased appreciation in the Zambian public at large and building industry stakeholders in particular, of green building principles;

- **Outcome 2: Greening of Policy Framework** - A refined industry-specific regulatory framework that stimulates demand among private and public housing developers for environmentally friendly building materials, products and methods;
- **Outcome 3: Capacity building for MSMEs** - MSMEs have enhanced capacity to effectively participate in the building construction and green building products and services markets.

At the end of 2015, the Zambia Green Jobs Programme⁴⁵ supported the creation of 2,660 jobs, as well as the quality improvement of 2,018 green and decent jobs existing in micro, small and medium-sized enterprises (MSMEs). In addition, the programme has benefitted more than 6,667 enterprises, workers, and their representatives.

Just Transition

Several INGOs working in the International Development and Humanitarian sectors have published working papers or positions on the need for a Just Transition. In 2020, ActionAid published 'Principles for Just Transitions in Extractives and Agriculture', which aim to shape energy and food systems that work for women, communities and the climate. In this report, they state that Just Transitions must "*address – and not exacerbate inequalities; transform systems to work for people, nature and the climate; ensure inclusiveness and participation; and develop comprehensive plans and policy frameworks*".⁴⁶

In 2022, Oxfam released a research report⁴⁷ entitled 'Towards a Just Energy Transition: Implications for Communities in Lower- and Middle- Income Countries'. This report found that the 12 surveyed countries across Asia, Africa, the Middle East and Latin America had set ambitious emissions reduction targets and were seeking to increase renewable energy production. However, "the speed, scale and nature of their clean energy transitions are constrained by the lack of promised concessionary climate finance from wealthy countries and inadequate investment". The report notes that \$2.8 trillion was invested in renewables globally between 2000 and 2020, but only 2% went to Africa, despite the enormous renewable energy potential and urgent need to bring modern and clean energy to millions of citizens who still lack access. Without external climate finance assistance, lower- and middle-income countries will struggle to achieve carbon reduction and improve energy access and energy security.

Circular Economy

Circular economy initiatives are being used to achieve the SDGs in Bangladesh, Guyana, Philippines, Thailand and China (Khajuria et al, 2022⁴⁸). Ahmed et al⁴⁹ argue that the circular economy model is rarely applied in developing countries as compared to developed nations and review the circular economy model in Bangladesh's move towards sustainable development. They found that the circular economy's model applicability was limited and exercised mostly through recycling processes in some industries.

Tearfund's 'Virtuous Circle: How the circular economy can create jobs and save lives in low and middle-income countries' report⁵⁰, released in 2016, contains several case study of circular economy interventions and initiatives in low- and middle- income countries and highlights significant opportunities to accelerate progress towards the SDGs. They note that up until 2016, the concept of the circular economy was "almost entirely absent from the development discourse" but it holds a promise of an "alternative growth model that reduces the tension between lifting people out of poverty and protecting the planet". They make ten recommendations for policymakers that are split between recommendations for low- and middle- income countries and high-income countries. These include reforming tax systems, setting targets for waste reduction, inclusive waste management policy, public procurement of remanufacturing and repair industries, and close working between business and governments to facilitate technology sharing in the transition to a circular economy.

One interesting case of community-led solutions in circular economy initiatives comes from the UNDP implementing the Global Environment Facility (GEF) Small Grants Programme. This programme provides technical and financial support to projects led by Civil Society Organisations (CSOs) and communities to test innovative approaches and practices for plastic waste management through a circular economy approach. This approach promotes closed- loop production and consumption, including the "reduce, reuse, and recycle" of plastics through material engineering and product design, shifting consumer use and behaviour, and developing approaches to waste collection and management.

Their report focuses on community innovations stemming from traditional local knowledge in tandem with modern science and technology, awareness raising and advocacy. The case studies from the report reveal that the poorest and most vulnerable often bear the greatest costs of plastic pollution. By 2050, they estimate

that there will be about 12 billion tonnes of plastic litter in landfills and the natural environment. The cost of plastics on environmental degradation, climate change, and health hazard are reaching US\$139 billion annually. Many of these projects outlined below are focused on working with women, youth, and PWD.

Select Case Studies from UNDP's Plastic and Circular Economy: Community Solutions⁵¹

Local communities and grassroots solutions are contributing to the implementation of the circular economy concept by providing circular solutions to plastic waste problems through community-based actions to “reduce, reuse and recycle” plastics, known as the “3Rs” ranking by the priority of actions. UNDP's report highlights 10 case studies in which CSOs have partnered with key stakeholders to deliver circular solutions in the problem of managing plastics. With the purpose to highlight their featured practices, these cases have been categorized into the following types of projects:

- Material engineering and product design to promote 3Rs
- Consumer use and behaviour shift due to campaigns, awareness raising and capacity development
- Waste Collection and Management

This report has chosen to focus on four case studies as provided by UNDP in their 2019 report. Two of these case studies are examples of how communities are addressing material engineering and product design to promote the 3Rs. One case study illustrates how campaigns, awareness raising, and capacity development are addressing consumer use and behaviour shift. One final case study illustrates how communities are providing innovative solutions in waste collection and management. For further reading and for other case studies, there is a link provided in the further reading section for the full report.

Material engineering and product design to promote the 3Rs:

- Case Study 1: Banana-tree Bark as an Alternative to Plastic for Seedling Transport Bags (Burundi)

The central innovation of the project was to replace the use of plastic bags during reforestation with bags made from banana-tree bark. Around 300,000 seedlings were planted in the national park, a 3.2% reforestation of 13,000 hectares of forest. The use of bark bags in all SGP projects, saved approximately 3,000,000 plastic bags. The local community also generates income from the sale of the bark bags to the project managers. The sales of bark bags along with cereal and cassava grinding earns every household up to US\$55 per annum. The project was led and executed mainly by women and people from the indigenous Batwa community. The seeds harvested by the Batwa grew at a much better rate and quality than the same seeds planted by an agronomist. It was a telling demonstration of the rich value of indigenous knowledge and practices when it comes to reforestation efforts and protecting natural resources.

Consumer use and behaviour shift due to campaigns, awareness raising and capacity development

- Case Study 2: Plastic Waste Turns into Employment for People with Disabilities (Ghana)

A local NGO, the Godly World International Centre (GOWIC) sought to address the poverty and migration trends by developing the capacities of PWD to manage plastic waste in Bolgatanga, Ve, and Bongo districts. The participants were trained to collect and process the plastic waste into shopping bags, hats, wallet, and doormats, and to sell them. The key activities of the project included feasibility and awareness raising, collaboration with local government bodies, capacity building & financial literacy, waste reuse and reduction. To change consumer behaviour patterns to waste reuse and reduction, GOWIC implemented an innovative model of entrepreneurship. GOWIC acts as a company and pays consumers or households for their empty plastic water sachets. By paying for their waste, GOWIC gives citizens an incentive to collect their waste products, and fewer plastic bags are dumped openly. The project has helped to reduce open burning of plastic waste and introduced a culture of recycling. Close to 5 hectares of residential land and open spaces previously littered with plastic waste is currently under farming by the PWD and the farmers prepare their own compost and practice conservation agriculture. By putting in place a circular method of plastic waste management, this project witnessed an improvement in the quality of life of the beneficiaries. It contributes to the reduction of plastic waste in landfills and drains, and of the overall environmental pollution.

This project has developed into a bankable system of plastic waste management model in Ghana and is being considered by the municipal authorities for implementation on a larger scale.

Waste Collection and Management

• Case Study 3: Community-based Plastic Waste Management for Wetland Conservation (Afghanistan)

The NGO Afghanistan Young Greens (AYG) has been active in conserving the wetlands around the Kol-e Hashmat Khan (KHK) Lake, on the outskirts of Kabul. Currently, huge amounts of waste, especially plastic, are found around and in the lake, due to unorganized local tourism and illegal dumping from local communities and settlements that are encroaching on the lake. The mass of plastic waste inside the lake creates disturbances for migratory birds and creates public health risks for community members, especially children. One of the key innovative aspects of this project is the set-up of a waste management initiative to support lake conservation efforts and to create an additional source of income for local communities. The project focused on reducing the volume of plastic waste produced by the communities, through education and awareness-raising activities, increasing plastic waste collection, monitoring project progress and conservation efforts and supporting local livelihoods. AYG started collecting waste from 1,500 families and installed 20 waste bins around the lake. Some of the family members were hired as waste collectors, responsible for managing and collecting the waste from the families. As a result, they currently receive a monthly income of more than US\$100. Depending on the needs and preferences of the community members, revenue investments can also go towards community infrastructure for drinking water, planting trees and greening the area, or other public works. Due to the education and awareness-raising activities of this project, the perception of the community members has positively changed towards the protection and conservation of the KHK lake. Trust building through the dedicated work of local staff and volunteers was crucial to ensure community participation in the project. The gradual introduction of this innovative approach to waste collection allowed AYG to learn how to work more closely with local communities to address their needs while increasing awareness and strengthening cooperation between them.

Renewable Energy Production

Arndt et al⁵² (2019) state that there have been large declines in generation costs for renewable energy systems. When combined with policy measures designed to limit GHG emissions, there has been a paradigm shift in energy systems. They argue that developing countries have a significant opportunity to “leapfrog directly to more advanced technologies that are low cost, reliable, environmentally more benign and well suited to serving dispersed rural populations”. A study by Shirley et al⁵³ found that the Decentralised Renewable Energy (DRE) sector has already grown a formal workforce comparative to traditional utility-scale power sectors and has an informal workforce that may be twice as large in Nigeria and Kenya. Their research stems from the basis that DRE technologies are fast becoming a popular vehicle for rapid delivery of electricity access, yet the sector’s expansion is hindered by a labour and skills gap. They argue that there is an opportunity for the growth of DRE to help tackle both SDG-7 (universal and clean energy access) alongside SDG-8 (expansion of decent work opportunities).

Mutuku and Mbatia⁵⁴ explored the employment potential of solar PV in Kenya and examined the growth patterns and constraints, and the skills demand versus the skills supply. They identified that in Kenya, solar PV is characterised by a short value chain with just two firms engaging in the manufacturing of solar PV systems. Most enterprises are more actively engaged other elements of the value chain, for example, the distribution, installation, operation, and maintenance phases. Using an employment factor approach, the authors estimated that there would be a compounded annual job growth rate of 51% between 2012 and 2018, and 25% between 2018 and 2024. The total number of jobs is expected to increase to 48,306 jobs by 2024 and are distributed along the supply chain as follows. Operation and maintenance would hold 40% of total jobs and another 40% would be in construction and installation. Manufacturing would account for 12% of jobs, distribution 5% of jobs, and research and development 3% of jobs. However, the authors note that the skills availability rate for the total number of jobs is inadequate, which reflects global trends. Finally, they contend that the key constraints limiting the industry’s growth in Kenya are high capital, installation and maintenance costs, limited financial schemes for investments, low presence of local manufacturers, and limits to the transmission and distribution networks in key focus locations.

There are several examples of INGOs promoting renewable energy production alongside women’s economic empowerment. EnDev was established in 2004 as a partnership between the Dutch and German governments to deal with citizens access to energy, particular electricity, in the nations and regions that are most in need and work through partnerships with local governments and other INGOs to scale their impact.

Their work across Asia, Africa and Latin America focuses on three core components: stoves, solar and biogas. For example, EnDev Kenya supports enterprises through training in technical energy saving technology skills and business skills. This goes alongside facilitating access to solar PV systems in rural areas and build the capacity of agro-based SMEs to demonstrate technical and economy viability of power generation from biogas sources⁵⁵. As of December 2021, over 25 million people have gained access to modern energy services, 81,700 SMEs have grown their businesses through the productive use of energy, nearly 32,000 jobs have been created, 30,900 social institutions have gained access to modern energy services (including over 18 thousand schools and over two thousand health centres) and have reduced 2.55 millions tCO₂e annually.⁵⁶

Christian Aid's Breaking the Barriers⁵⁷ programme ran between 2018 and 2022 and aimed to increase rural women's jobs and incomes in the sustainable energy sector while improving working and living conditions, promoting gender equality, and strengthen women's social status. The EU funded (over €6 million) multi-country programme (Burkina Faso, Malawi, Ethiopia and Honduras) estimated that around 3 million people benefitted from the project. The project enhanced awareness of sustainable energy and women's role in sustainable energy sector and supported increased access to energy in rural communities across the four countries. Christian Aid approached this through supporting women to create and own Women's Led Sustainable Energy Enterprises and providing training in sustainable energy products and technologies, and business skills. Through access to sustainable energy products, communities reduced expenditure on unsustainable energy sources, including wood, kerosene and batteries. Women were also trained to lobby regional and national platforms and networks to produce favourable policies for sustainable energy enterprises.

The Barefoot College in India's Rajasthan state has run numerous cohorts of the Solar Mamas project. In total, they have trained 2,200 rural women as solar engineers from 93 countries, leading to over 18,000 households with solar home lighting systems. VSO Malawi engaged with this project and enabled eight women to take part in a six-month intensive course in building and wiring electrical components at the Barefoot College in India. VSO provided the components to build solar lanterns, which were then built and installed by the women in their rural villages in Malawi.

Green Opportunities in Climate Change Mitigation and Adaptation

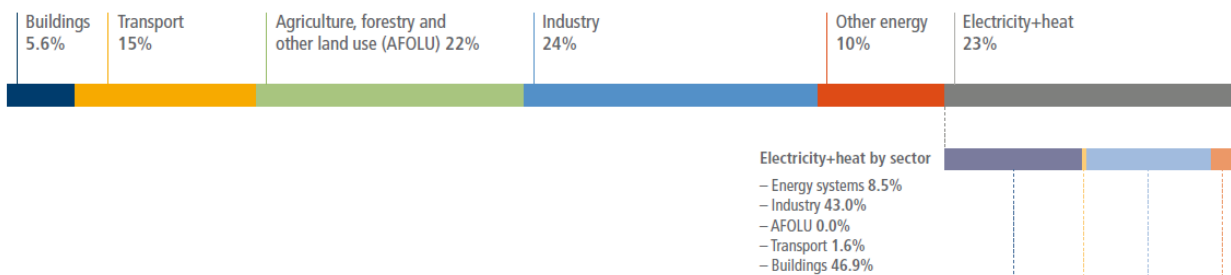
Climate change mitigation is a key aspect of environmental policy, as well as the greening of skills, jobs, and enterprises. The United Nations Environment Programme defines **Climate Change Mitigation** as “efforts to reduce or prevent emission of greenhouse gases. Mitigation can mean using new technologies and renewable energies, making older equipment more energy efficient, or changing management practices or consumer behaviour.”⁵⁸At the core of this definition is the need to reduce or prevent GHG emissions. However, mitigation also seeks to promote new technologies that aid efficiencies or renewable energy production, as well as change individual, community, and organisations behaviour. Each of these will be examined through background information which can inform potential programmatic interventions.

This chapter will define climate change mitigation and demonstrate its importance in the development of green enterprises and green jobs. The skills required for climate change mitigation differ from those needed for climate change adaptation, although there are some crossover skills needed for the green transition.

Reducing or Preventing Greenhouse Gas Emissions

Understanding where GHG emissions come from and how much is emitted is an important step in documenting part of the environmental footprint of an individual, community, public sector organisation, non-profit entity or for-profit enterprise. Figure 8 below details direct and indirect emissions by sector at the global level.

Direct emissions by sector (59 GtCO₂-eq)



Direct+indirect emissions by sector (59 GtCO₂-eq)

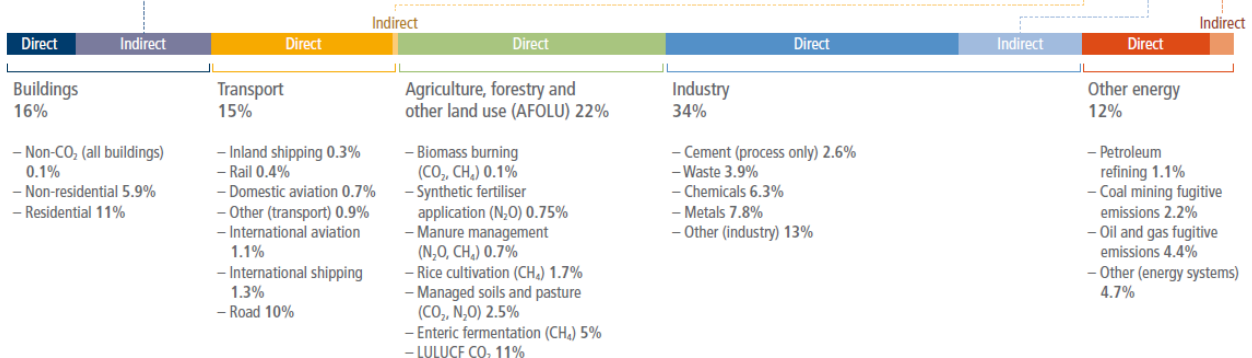


Figure 7 - Direct and Indirect Emissions by Sector. Source: IPCC Technical Summary, 2022.

Only with an understanding of GHG emission sources can individuals, communities and enterprises realistically reduce emissions. For enterprises, it represents an opportunity to invest in solutions that reduce GHG emissions along their supply chain and encourage lower-carbon behaviour of both suppliers and consumers. This should be a key consideration for VSO when undertaking green interventions with

enterprises. Understanding the importance of emission sources enables the development of climate action that address the mitigation aspects of climate change. It also increases carbon literacy⁵⁹ (see Box 5) which in turn allows for behaviour change to a lower-carbon lifestyle and operating model.

BOX 5 - Carbon Literacy Project and the City of Manchester

The Carbon Literacy Project was founded in Manchester (UK) as a response to policy aims to cut emissions by 41% by 2020 and create a 'low carbon culture'. As a result, it offers every individual in the Manchester Metropolitan Area a day's worth of certified Carbon Literacy learning that encompasses climate change science, context and action. The Carbon Literacy Project is based on the principle that residents, workers and businesses who are carbon literate will have an increased understanding of the carbon impacts of their activities and can, therefore, make informed choices and decisions about the most energy and resource-efficient options available to them. The project supports learners to create positive low-carbon changes in their workplace, community, home or any other setting.

As it has been rolled out across businesses, organisations, schools, colleges, communities and districts, the approach remains unique worldwide in providing a consistent but adaptable piece of climate change learning to all those who live, work and study in the city region. It's fitting that the city that kick-started the industrial revolution is now pioneering ways to reduce GHG emissions and encourage low carbon behaviour. To date, the project has certified over 50,000 learners with an estimated carbon saving of over 180,000tCO₂e. That's the equivalent of taking 38,784 cars off the road for a year.

Figure 9 below illustrates how GHG emissions are split into three scopes, which is the standard terminology in emissions reporting. These are:

- **Scope 1- Direct Emissions:** these are direct GHG emissions released into the atmosphere from company-owned and control resources⁶⁰. All fuels that produce GHG emissions must be included in Scope 1 reports. This is divided into four categories:
 - Stationary Combustion (fuels, heating sources)
 - Mobile Combustion (vehicles, such as cars, vans and trucks, owned or controlled by a company that burn fuel)
 - Fugitive Emissions (leaks from GHGs such as refrigeration and air conditioning units)
 - Process Emissions (released during industrial processes and on-site manufacturing- such as chemicals, factory fumes and cement manufacturing).
- **Scope 2- Indirect Emissions- Owned:** these are indirect GHG emissions released into the atmosphere from the generation and consumption of purchased energy, such as electricity, steam, heat and colling, from a utility provider.⁶¹
- **Scope 3 - Indirect Emissions - Not Owned:** these are all indirect emissions not included in Scope 2 that occur in the value or supply chain or the reporting company, including both upstream and downstream emissions.⁶²
 - **Upstream emissions** include those from:
 - Purchased goods and services
 - Capital goods
 - Fuel and Energy Related Activities
 - Transportation and Distribution (suppliers)

- Waste Generated in Operations
- Business Travel
- Employee Commuting
- Leased Assets

- **Downstream emissions** include those from:

- Transportation and Distribution (customers) ▪ Processing of sold products
- Use of sold products
- End-of life treatment of sold products
- Leased assets
- Franchises
- Investments

Downstream emissions are indirect GHG emissions from sold goods and services⁶³ and are associated with the end-user. Downstream emissions also include emissions from products that are distributed but not sold (i.e., without receiving payment). Upstream emissions are indirect GHG emissions from purchased or acquired goods and services⁶⁴, which ordinarily involves the supply chain of a particular company or service.

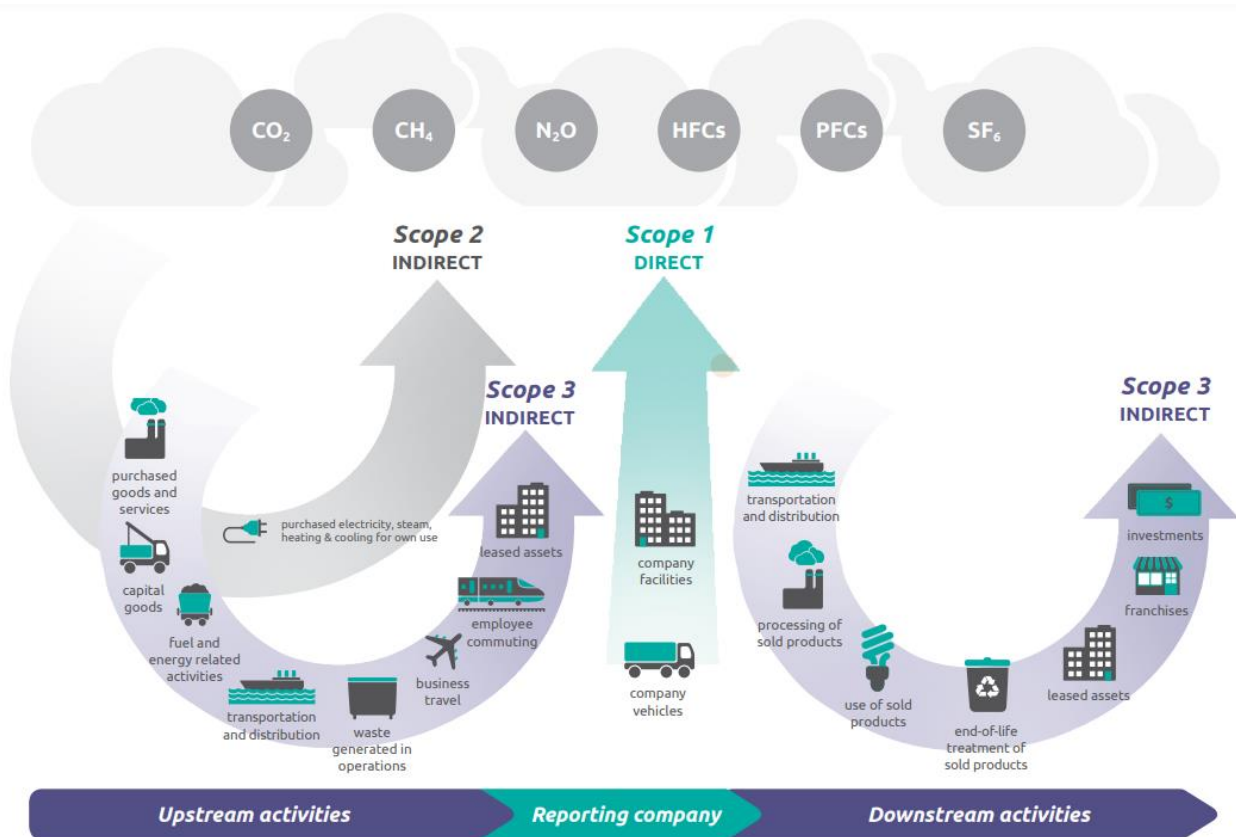


Fig 8 - Overview of GHG Protocol scopes and emissions across the value chain. Source: GHG Protocol⁶⁵

VSO should consider:

- Offering carbon literacy training to youth, women and PWD in programmes
- Design a 'Train the Trainer' programme to disseminate learning about the different types of carbon emissions and what scope they put in.
- Recommending enterprises to consider taking carbon-neutral or net-zero pledges as part of their CSR initiatives and to attract investors.
- Measuring the carbon footprints of MSMEs and work with them to make climate action plans to reduce emissions as much as possible and invest in nature-based solutions as offsets

Sustainability Jargon Buster: Carbon Neutral Vs Net Zero

Carbon neutrality is defined as “having a balance between emitting carbon and absorbing carbon from the atmosphere”.⁶⁶ Absorbing carbon from the atmosphere involves building, maintaining, and restoring carbon sinks, which is any system that stores more carbon than it emits. These include soils, forests, and oceans. Achieving carbon neutrality for GHG emitting companies means that they have offset their emissions through carbon-trading, purchasing of carbon credits (offsets) or planting additional trees to sequester the same amount of carbon they emitted for each year. Therefore, project activities such as tree planting can be classified as climate change mitigation as it contributed to a reduction in the amount of atmospheric GHGS. It can also be classed as an adaptation activity in contexts where tree planting aims to reduce climate risks, such as reducing flood risk, combatting urban heat, or supporting food security.

There are lots of alternate definitions of Net Zero, which cause confusion among policymakers, activists, programme officials and politicians. Some definitions are very similar to that of carbon neutrality, for example, “*Net zero emissions’ refers to achieving an overall balance between greenhouse gas emissions produced and greenhouse gas emissions taken out of the atmosphere*”.⁶⁷ However, other definitions include a clear delineation from carbon neutral pledges. The sensible use of the term Net Zero means “*close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance*”⁶⁸. This recognises that not all industries and sectors can reduce their GHG cutting greenhouse gas emissions to as emission to absolute zero due to technological bottlenecks or unfeasible costs of retrofitting due to budget cuts. To achieve Net Zero emissions, the reporting company must reduce GHG emissions as much as feasible following the GHG Mitigation Hierarchy (see Fig 10). Companies should only offset what they cannot feasibly reduce before their target deadline. In the first instance, these offsets should be on company owned land. Where this is not possible, then offsets should be purchased from a carbon credit project as close to their office as possible. As a last resort, carbon credits should be purchased from a market-based carbon offset scheme.

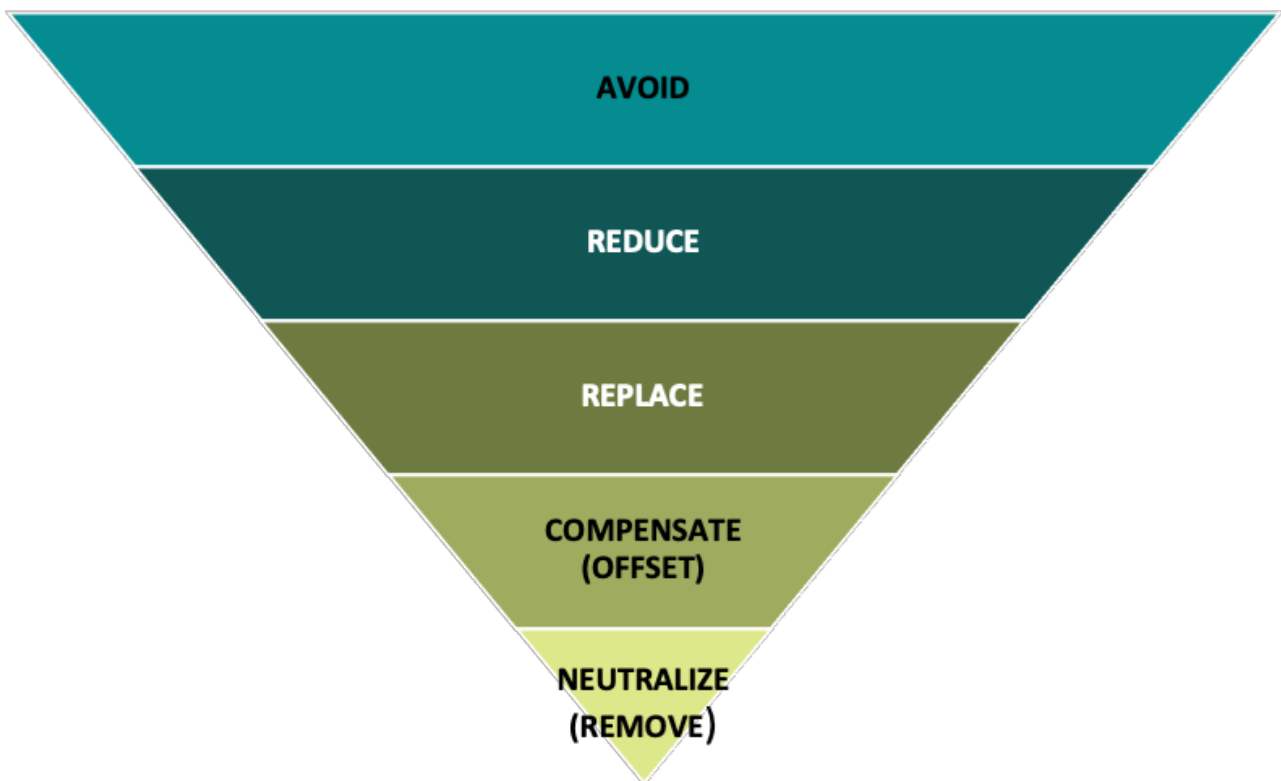


Fig 9 - Greenhouse Gas Mitigation Hierarchy. Credit: Sustainable Columbia⁶⁹

What is clear from the language around emissions reporting is that energy production and consumption is the central issue in relation to reducing emissions. A company that makes the transition from Internal Combustion Engine (ICE) vehicles to Electric Vehicles (EVs) can reduce its Scope 1 emissions but might increase its Scope 2 emissions if the electricity sourced for EV charging does not come from a renewable

source. Similarly, working from home mandates from a company may decrease Scope 1 and Scope 2 emissions through reduced heating and electricity consumption on-site, but these would be shifted to Scope 3 as the emissions are not being emitted on company-owned property (assets and estates) and instead on the individual/worker.

Most carbon neutral pledges are concerned with reducing Scope 1 and Scope 2 emissions. Scope 3 emissions have been included in the targets of several large companies, including Hewlett Packard, Unilever, Mars, and Walmart⁷⁰. Several organisations have noted the importance of including Scope 3 in emissions reporting and carbon reduction plan as they average around 75% and of anyone’s carbon footprint. For some sectors, such as financial services, it can be as high as 99.8%⁷¹. For example, if you purchased a tomato for cooking, your Scope 1 or 2 emissions in relation to using that tomato would be the heat source for cooking the tomato. If you include Scope 3, then you include many more variables, including emissions associated with the water and energy used in production, the transportation methods, and the method of disposal of any leftovers.

However, it is important to consider the environmental impacts that go beyond just reporting on carbon emissions. There has been a real tendency among corporates, governments and public sector organisations to narrowly focus on carbon emissions while avoiding making plans for other environmental and social factors. While reducing carbon emissions will align with these organisations meeting ‘Carbon Neutral’ or ‘Net Zero’ targets, it often comes at the expense of examining other factors that are causing harm in the environment. This is captured in Figure (10). Avoiding ‘Carbon Tunnel Vision’⁷² means taking a systems-level view of any interaction with the environment to ensure that activities are conducted that ensure environmental, economic, and social net-gain.

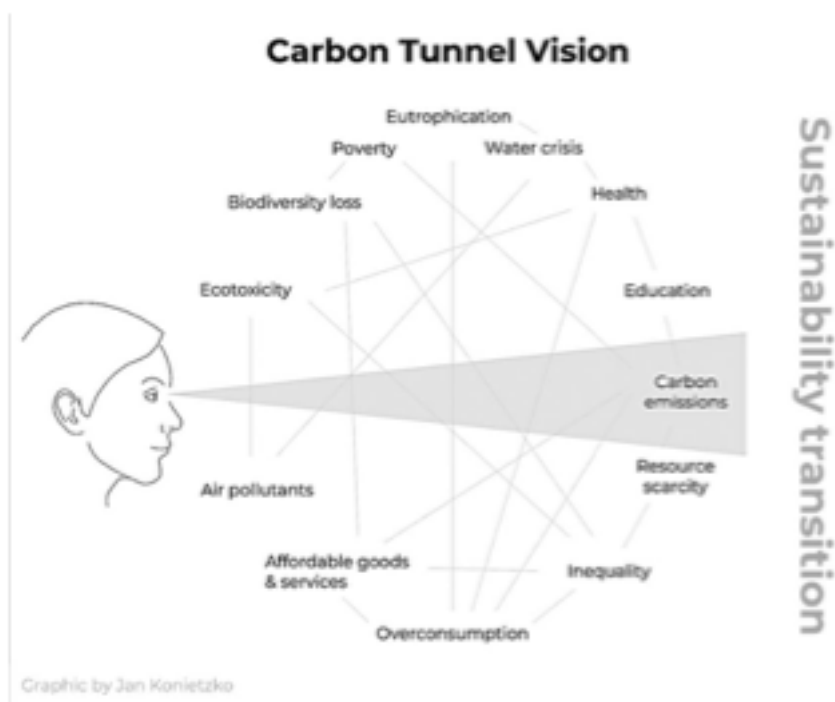


Figure 10 - Moving beyond carbon tunnel vision. Credit: Dr Jan Konietzko

Environmental concerns are increasingly being picked up by national governments through environmental policy directives. Two examples that are guiding planning and development principles are Biodiversity Net Gain (BNG) and Nutrient Neutrality. The United Kingdom’s Environment Bill (2021) has specific measures for planners and developers to provide a net- gain for biodiversity on any new sites. In the first instance, this must be achieved on-site. If that cannot happen, then they must achieve that off-site where it might make

more ecological sense, for example, expanding a wetland, recovering a peatland or increased woodland cover. When these are not possible, then biodiversity credits can be purchased through a biodiversity credit scheme, which is still in development. Nutrient Neutrality refers to the process of eutrophication which is when pollution from sewage, agricultural run-off and wastewater raises levels of nutrients like phosphorous and nitrogen in local rivers, which cause algae blooms, degrade water quality, and harm wildlife. At the systems-level, concerns about nutrient neutrality in the UK are causing new housing developments to be blocked until they can prove that the developments will be nitrate and phosphate neutral.

The other aspects to 'Carbon Tunnel Vision' point to more social elements, such as overconsumption, poverty, inequality, education, affordable goods and services, and health. There are explicit links here to VSO's practice areas which demonstrate how the sustainability and green transition must take into account reducing inequalities in access to healthcare and education. What this concept lacks, is the operationalisation of determining the relative importance of each element, which can be hard to implement as part of an action plan.

VSO should consider:

- Using the mitigation hierarchy when designing projects and programmes for green skills, jobs, and enterprises.
- All other aspects of environmental policy, such as biodiversity loss, eutrophication, pollutants, and water usage, when advising enterprises on business strategies and adopting environmental policies.

Climate Change Adaptation

UNEP define climate change adaptation⁷³ as “almost exclusively negatively affecting communities and societies around the world. Often, adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities”. Adaptation is effectively the recognition that the climate change is these are the poorest, most vulnerable and marginalised within society who are also the ones who have contributed the least amount to the climate crisis.

In recent years there has been considerable attention paid to nature-based solutions to climate change. Tree planting is a good example as it is both a mitigation and an adaptation initiative. As trees sequester and store carbon from the atmosphere, they are good mitigation measures when planted correctly and in large numbers. However, tree planting must use the “Right Tree, Right Place, Right Reason” philosophy, to avoid the creation of monocultural plantations which has devastating impacts on biodiversity and natural capital. As an adaptation measure, trees have a multitude of benefits: they can reduce the risk of flooding when planted along riverbanks, lower temperatures in urban streets and provide shade opportunities, they can improve water and air quality, and they can provide habitat for wildlife. Additionally, restoring forests (and wetlands) in water catchments can secure and regulate water supplies and protect communities and infrastructure from floods, soil erosion and landslide. This has the potential to reduce infrastructural damage by billions of dollars but, more importantly, has the potential to save lives and livelihoods.

Nature-based solutions can be incorporated into urban planning and design through creating green roofs and walls, planting trees in cities, expanding public parks, gardens, and green spaces. This not only has benefits for biodiversity and wildlife, but also for environmental justice. Access to nature is considered an environmental justice issue, with the majority of urban residents who have nearby access to green space coming from higher socio-economic backgrounds and neighbourhoods. Urban planning authorities should consider access to public green spaces as a right of citizens, with support targeting accessibility and inclusion for the most vulnerable and marginalised in urban areas.

Nature-based solutions are not a panacea to solving environmental issues and are not appropriate when they involve land grabs or infringe upon the rights of marginalised groups, especially Indigenous peoples. Instead, community plans should be developed collaboratively and incorporate both local and Indigenous Knowledge in ways that enhance biodiversity and natural capital, but also build the resilience of individuals and communities in climate change adaptation. Indigenous knowledge should be not be co-opted but rather acknowledged as the intellectual property of Indigenous communities and only reproduced with the Free, Prior, and Informed consent of communities.

The green skills needed for climate change adaptation are a mixture of specific, generic and transformative skills. These types of skills go alongside more technical skills that are needed for adaptation measures, for example, civil or mechanical engineering skills, planning skills and security skills. For specific skills there is a

need to include environmental and ecosystem management in TVET curriculums as a way for individuals and enterprise to understand how the environment is changing and the effects this is having on ecosystems and natural capital. Finance and data analysis skills are important in determining the cost and impact that climate change adaptation measures are having at the enterprise level and can be used in forecasting the projected impacts of certain business activities on the immediate environment.

The generic skills related to climate change adaptation include adaptability, communication, collaboration, critical thinking and reasoning, empathy, flexibility, participatory, resilience and teamwork skills. These are cross-cutting life skills that empower individuals and communities to seek out opportunities to enhance their resilience and their ability to respond to external pressures, shocks, and threats.

The transformative skills related to climate change adaptation include collective action, political agency and activism, valuing knowledge and Indigenous Knowledge, solidarity and coalition building. All these skills are aimed at transforming the unjust social and economic structures that contribute to the increased risk faced by these communities as a result of climate change. These skills correlate effectively with VSO's Core Approaches.

Five Categories of Adaptation and Resilience Jobs



Language from the American Society of Adaptation Professionals. Graph by Emma Johnson, EESI

Figure 11- Five Categories of Adaptation and Resilience Jobs. Source: EESI

There will increasingly be a need for new jobs to be created in climate change adaptation, some of which may have never existed before. Figure 11 above illustrates the five categories of adaptation and resilience jobs. Climate change adaptation and resilience jobs are wide and varied, falling along the spectrum of adaptation categories of action: measure and learn, plan, fund and invest, develop and deploy technology, communicate and engage, build physical infrastructure, shift management practices and recurring behaviour, and change policy and law⁷⁴. These are represented in Figure 12 below. For example, practitioners could be “construction workers incorporating resilience to extreme weather into the homes they build or people who plant urban trees to reduce extreme heat in cities”⁷⁵.

Adaptation Categories of Action

Measure and Learn	Monitoring changes in the climate system, gathering and analyzing data to build understanding of climate impacts and climate risk, and monitoring and evaluating actions taken to adapt to climate impacts.
Plan	Considering climate science, climate impacts, and climate risk in institutional planning.
Fund and Invest	Repurposing, leveraging, or obtaining public or private funds to finance or invest in adaptation actions.
Develop and Deploy Technology	Developing and deploying climate-resilient technologies, and technologies that enable climate resilience.
Communicate and Engage	Communicating with people and institutions the information they need to prepare for climate impacts, communicating information about adaptation actions being taken on their behalf, and engaging individuals and institutions in iterative processes, including through workforce development and trainings, to increase the effectiveness and equity of climate adaptation action.
Build Physical Infrastructure	Building new or improved physical infrastructure aimed at providing direct or indirect protection from climate hazards.
Shift Management Practices and Recurring Behavior	Incorporating climate adaptation considerations into land management, and day-to-day practice and behavior of professionals and laypeople.
Change Policy and Law	Revising, or creating new, law, policy, or regulation that requires or incentivizes adaptation action and penalizes maladaptation.

Language from the American Society of Adaptation Professionals' [Living Guide to the Principles of Climate Change Adaptation](#). Graphic by Emma Johnson, EESI

Figure 12- Adaptation Categories of Action. Source: EESI

This table makes clear that there will be jobs across many sectors, and some pre-existing jobs will involve building resilience and learning adaptive measures. For example, there will be jobs in sectors such as fisheries, forestry, agriculture and energy, as well as transformation, infrastructure, land-use planning, disaster risk management, tourism and recreation, public health, climate justice, socioeconomic development, culture and communities, as well as biodiversity, wildlife and conservation⁷⁶.

VSO should consider:

- Conducting analyses in country offices to understand the skills and jobs needed for climate change adaptation and resilience in that context
- Promoting the use of nature-based, as opposed to hard engineering-based, solutions in climate change adaptation
- Ensuring that local and Indigenous knowledge are utilised in community action plans while recognising the intellectual property of Indigenous peoples to their knowledge and ways of learning

Green Opportunities by Sector

Figure 8 illustrates GHG emissions by sector. The following sections of this chapter will examine the opportunities and challenges in each key sector for mitigating against climate change. It starts by examining some of the key challenges and opportunities in energy systems, before doing the same with transport, industry, and land-use. Some of these sectors are well-suited for VSO programmatic interventions due to a track record of working through volunteers with primary actors. Others are new and emerging industries that will shape the future of work and enterprise development in many countries, and offers an opportunity for VSO to build a track record of implementing circular economy and just transition based programming.

Energy

Energy in the form of electricity and heat make up 23% of direct global emissions but also cause indirect emissions in all other industries. Electrification in line with decarbonisation of building heating and transport systems is often seen as a panacea for reducing emissions but can only be done in tandem with making electricity as clean or as green as possible. There is a central role for implementing decentralised renewable energy systems in rural areas that promote energy security but also provide green jobs within the energy sector. Decentralised renewable energy contributes to increasing energy security in the face of climatic shocks that could destabilise and destroy centralised grid networks.

According to the definition of climate change mitigation, there is a considerable need to increase renewable energy production to enhance the electrification of energy grid networks. Transitioning everything from GHG emission sources to electric would, in theory, make calculating carbon emissions and associated environmental impact a lot easier as we would be concerned with electrifying energy sources from as clean as source as possible. For example, if an entire vehicle fleet switched from ICE to EV, then the only source of emissions are in Scope 2. If all vehicles were charged using renewable energy sources, then the only emissions associated with the company would fall in upstream emissions associated with production.

An important distinction here to be made is the differences between different forms of renewable energy sources and their associated environmental impact. Figure 11 illustrates different energy sources in the USA by how beneficial they are to the environment. Note that while large hydropower and municipal solid waste are considered renewable, they are not considered to be green energy sources due to their devastating environmental impact. Large hydropower schemes, in particular, have a significant social and ecological cost associated to them, including mass displacement of often marginalised and vulnerable individuals and communities.

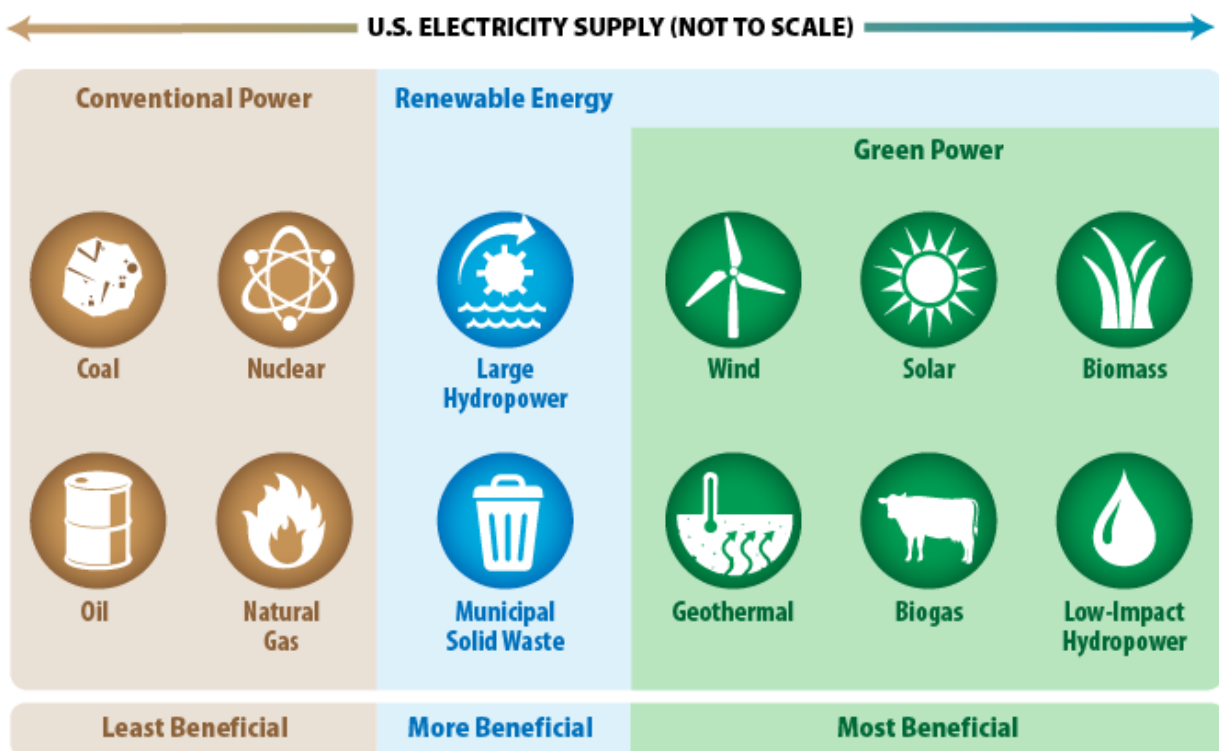


Fig 13- How the U.S. voluntary market defines green power based on its relative environmental benefits. Source: EPA

Even with green energy, there are considerable minerals needed for production of various energy sources. Minerals such as Copper, Nickel, Manganese, Cobalt, Lithium, Zinc and Rare Earth Metals are needed for both production of renewable energy from sources such as solar photovoltaic (PV) and wind (see Fig 13). However, this just considers the raw minerals needed to produce energy. It does not take into consideration or compare with the vast number of minerals needed to support other industries, such as technology and electronics, that also rely on mineral extraction.

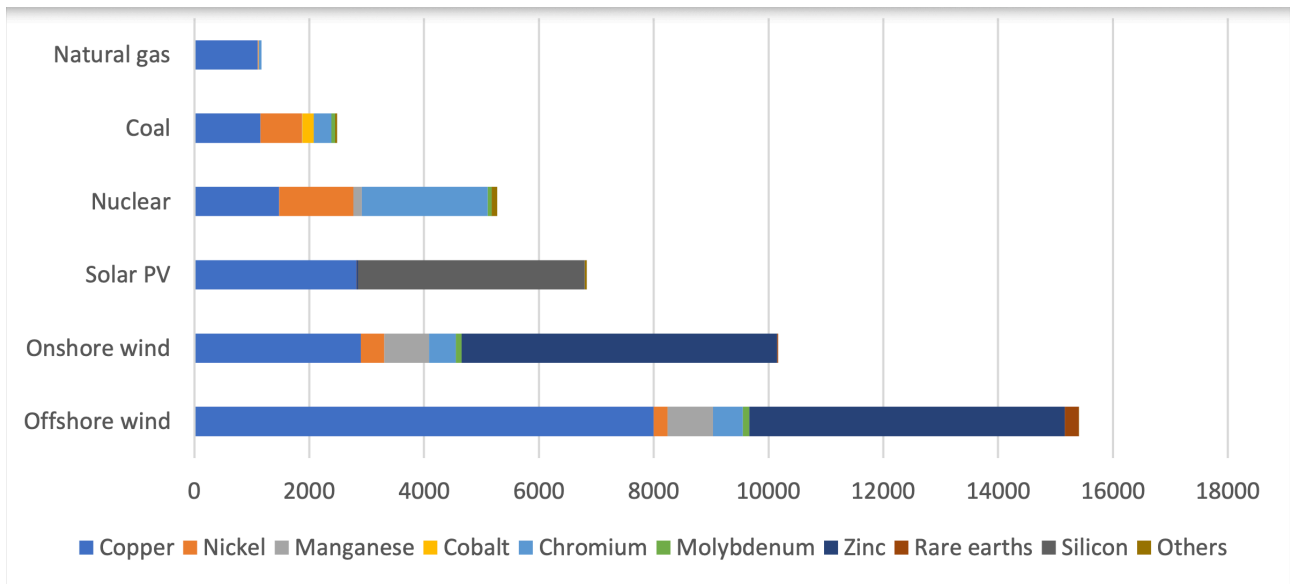


Figure 14- Minerals used in clean energy technologies compared to other power generation sources. Source: IEA⁷⁷

What this demonstrates is that there is still a need for extractive industries, especially mining companies, to extract these minerals to aid the green transition. VSO should consider this when designing projects to work with extractive companies to ensure that any mineral extractive activities do not cause harm to communities, especially already marginalised and vulnerable communities. Table 4 illustrates the mineral deposits in the East African Community that are needed in the transition to renewable energy.

Country	Precious Metal, Gemstones & Semi-Precious Metal	Metallic Minerals	Industrial Minerals
Burundi	Gold	Tin, Nickel, copper, cobalt, niobium, coltan, vanadium, tungsten	Phosphate, Peat
Kenya	Gemstones, gold	Lead, zircon, iron, titanium	Soda ash, flour spar, salt, mica, chaum, oil, coal, diatomite, gypsum, meers, kaolin, rear earth
Rwanda	Gemstones, gold	Tin, tungsten, tantalum, niobium, columbium	Pozzolana
Tanzania	Gold, diamond, gemstones, silver, PGMs	Nickel, bauxite, copper, cobalt, uranium	Coal, phosphate, gypsum, pozzolana, soda ash, gas
Uganda	Gold, diamond	Copper, tin, lead, nickel, cobalt, tungsten, uranium, niobium, tantalum, iron	Gypsum, kaolin, salt, vermiculite, pozzolana, marble, soapstone, rear earth, oil
South Sudan	Gold, silver	Iron, copper, tungsten, zinc, chromium	Oil, mica

Table 4 - Minerals found in the East African Community⁷⁸. Source: EAC Vision 2050 and South Sudan Development Strategy

Some of the barriers for adopting green energy sources include:

- **Upfront Cost:** there are considerable up-front costs associated with green energy sources such as solar PV and wind energy. While in the long-run it is cheaper due to the low-maintenance and free cost of securing the energy (it doesn't cost money for the sun to shine or the wind to blow).
- **Storage**
- **Market Forces**
- **Policy Interventions**

One of the biggest blockers to the successful roll-out of renewable and green energy solutions to the world has been the issue of storing energy for future use. Both solar PV and wind generate electricity at source which can be used simultaneously. However, storing the power generated from these sources has been a huge challenge and a barrier for more rollout, especially for off-grid rural communities around the world. While there are advances in technologies that focus on developing appropriate batteries for the green transition, there is still a need for increased investment into research and development of batteries from both the private and public sector. VSO should advocate for green technological sources to be open- source and available as a common good, especially in cases where public money has funded advancements.

However, there is considerable room for smaller enterprises to embrace green energy sources in the developing world. China dominates the production of solar PV modules, with an estimated 75% market share due to their ability to produce at scale. Importation of solar PVs is an option for enterprises to consider, especially enterprises that have the purchasing power. For micro- and small- enterprises, VSO should advocate for policies at the national level to support decentralised renewable energy production.

Transport

Transport comprises 15% of global GHG emissions, with 10% of global GHG coming from road vehicles and 1.1% from international aviation. An estimated 1.45 billion cars are currently on the roads worldwide, with that number expected to increase to 3 billion by 2050. In relation to the GHG emissions mitigation hierarchy, the preferable option is to avoid emissions wherever possible. For travel, this includes the development of active travel infrastructure that favours walking and cycling. Not only does this reduce carbon emissions, but it has the added benefit of improving air quality (when electing to walk or cycle instead of driving) and improving health and wellbeing of populations.

With many developed countries and regional blocs phasing out new sales of Internal Combustion Engines (ICE) vehicles by 2030, there will be a movement towards the purchasing and usage of Electric Vehicles (EVs). While these do not emit carbon at source, they do have carbon emissions associated upstream in the supply chain (mining of raw materials, manufacturing, and transportation). EVs need dedicated charging infrastructure (similar to petrol stations for ICEs) and there will be jobs needed to maintain and repair EV charging points as the networks expand. The batteries required for the transition to EVs requires considerably more minerals than conventional ICE engines (see Fig. 14).

The automotive industry in Africa is dominated by used vehicle imports from Europe and North America and are important to the circular economy transitions needed for the continent. Across the continent “there is a thriving culture of repair and refurbishment, aimed at keeping vehicles in use for as long as possible”⁷⁹. As part of a longer-term trend, Africa will see imports of used EVs for their markets, which require a different set of technical skills to repair and refurbishment.

There is currently a considerable worldwide shortage in vehicle technicians trained in repairing and maintaining EVs. This is already causing blockages in the systematic transition from ICE vehicles to EVs and is slowing down the uptake of EVs in various marketplaces. While the technologies in EVs are becoming more efficient all the time, there is still concerns about the range, charging time and reliability of EVs compared to ICE. However, these concerns are not stopping EVs becoming the dominant market actor in overall vehicles sales.

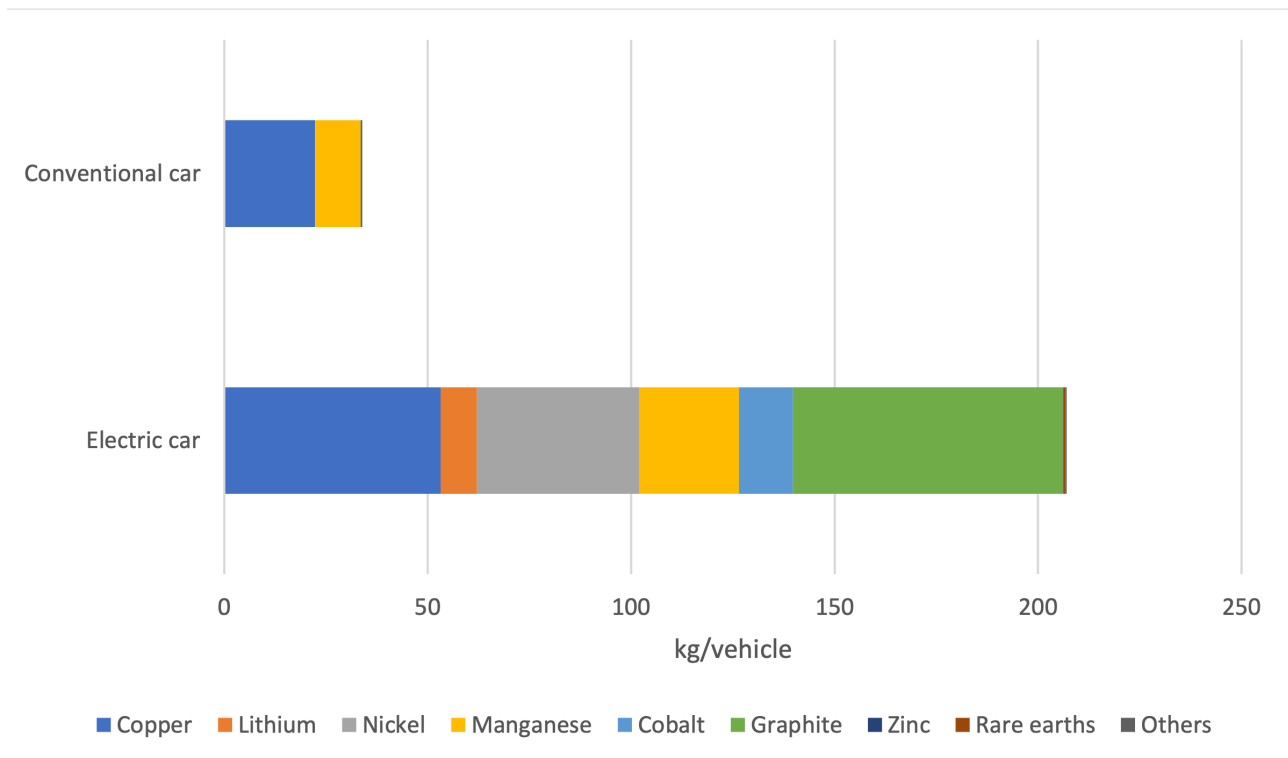


Figure 15 - Minerals used in electric cars compared to conventional cars. Source: IEA⁸⁰

Another innovation in the transport sector is the rise of vehicle-sharing technologies. This not only provides employment, but also reduces the number of personal vehicles on the roads. This helps to decrease congestion, which hinders personal mobility and trade, but also makes roads safer, cleaner and quicker. With increasing rural to urban migration and expansion of major cities across Africa and Asia, there are opportunities for policies to be developed which are more favourable to public transit and active travel modalities. African cities have the highest percentage of commutes made by foot or bicycle in the world, which enables policies and planning authorities to make the best out of the existing active travel culture and become leaders in the circular mobility transition⁸¹.

The Lead the Charge campaign encourages automakers to leverage the opportunities leveraged by the EV transition to radically transform their supply chain to be equitable, sustainable and 100% fossil free. This campaign was launched by a coalition of leading human rights, climate, and environmental organisations, including Cultural Survival, Sierra Club, Earthworks, Mighty Earth, Sunrise Project and First Peoples Worldwide. This campaign raises awareness of the human rights and Indigenous Peoples' rights, climate and environmental impacts that occur through automakers supply chain. It is an example of a rights-based campaign that focuses on a particular industrial sector that will play a big part of eliminating emissions from transport. However, it is noted that as the *“EV transition accelerates, the emissions profile of the auto industry shifts to supply chain emissions... the industry must tackle human rights abuses from mining, refining, and manufacturing in their supply chains”*⁸². This kind of campaign correlates strongly with VSO's Core Approaches, in particular Social Accountability.

For VSO to conduct programmes centred around the mitigation of transport related GHG emissions, they must consider:

- Utilising the GHG mitigation hierarchy in relation to transport; the first option should always be to avoid GHG emissions from transport use and to encourage active travel methods where possible. This not only has a emissions reduction election, but also contributes to improved mental health and wellbeing, cleaner air, reduced pollution and increased levels of physical fitness.
- Where this is not possible, then VSO should lobby and advocate for improvements to local transport plans that put forward effective public transport options that works for marginalised people, such as youth, women, and PWD, as part of a shift to a low-carbon economy. Improvements to public transport systems generates jobs that are considered green.

- The technical skills needed for vehicle types entering the market (EVs) differ from traditional ICE vehicles. VSO should work with TVETs to enable these technical skills to be taught to primary actors, including women, youth and PWD, to future-proof and get ready for the changes in vehicles.

Industry

Emissions from Industry are currently 24% of direct global GHG emissions but jump up to 34% when indirect GHG emissions are included (those from purchased energy sources). This is because many industrial processes use non-renewable energy which contributes to carbon emissions at source. There is a need for industry to implement resource efficiency measures which includes reducing the amount of energy and resources used to provide the same level of service of products.

Working with industry is a potential way to incorporate circular economy initiatives in programme design and implementation. The following industries are key for VSO to consider if they wish to influence emission reductions and encourage green skills and jobs in the localities in which they work.

Construction

Materials used in the construction industry represent 9% of total GHG emissions⁸³. The building sector represents roughly 40% of energy demand, with much of that stemming from the burning of fossil fuels. Greening energy supplies and advancing renewable energy grid connections only goes so far in making the construction industry greener. The construction industry has tended to use environmentally destructive practices such as using cement to make concrete. Concrete inhibits natural capital and adversely impacts on biodiversity where it is used. While it is the favourable and preferred choice of building material for large scale climate adaptation engineering projects (sea walls, riverbank defences, raised transit, etc), it can actually increase the physical risks from climatic events. For example, in a storm event, concrete inhibits the ability of water to be infiltrated and absorbed by soils. It leads to increased water run-off and contributes majorly to flood risk, especially in low-lying areas, with the potential to increase the intensity of the effects of that major storm event.

With population across Africa expected to hit 2.4 billion by 2040, 80% of population growth in Africa is expected to occur in cities. Of this growth, 70% of building stock expected for 2040 has yet to be built⁸⁴. This represents a huge opportunity for both formal and informal job growth across the continent which will form the employment status of the burgeoning youth population. To enable these jobs to become green, cities and countries must implement policies that promote alternative building materials and encourage the use of waste materials to be recycled and reused in new construction processes, as well as introduce progressive labour laws that protect workers from the demanding physical aspects and potential health risks associated with construction work.

A case study from UNDP⁸⁵ highlights how youth-led innovations are turning plastic waste into new construction materials in Sierra Leone. Youth Build, an NGO led by youth, piloted an innovative approach to waste management in the city of Makeni. The innovative aspect of this project was the reuse of the collected waste plastic, rubber, and sand into a product called e-stones. E-stones are a mixture of plastics, rubber and sand that can be moulded into a floor tile. The e-stones are weather resistant, stronger than cement bricks, and can be used for outdoor paving. Youth Build has created sustainable jobs for over 400 youths and vulnerable women and has produced over 15,000 e-stones with minimal amount of coal for heat. Prior to their employment with Youth Build, the 400 participants had no trained skills, no sustainable source of income and earned irregular daily wages averaging US\$1-US\$2 per week for casual labour. With this project they are assured of a weekly payment average of US\$10.50 from the NGO. These youth and women have benefited from being trained in waste management and have also contributed to the beautification of Makeni City by voluntarily paving public areas and supporting the council in cleaning areas on monthly basis. Since the inception of the project in Makeni, households have been gradually adopting the culture of depositing trash and household waste in trash bins, especially those that are actively involved with our project, because they are gradually seeing the benefits from the recycling of waste plastics in producing e-stones.

VSO should consider:

- Conducting a labour market analysis for the construction industry in country contexts that focuses on the types of people entering the market and the type of labour protections they hold.
- Work with MSMEs along the construction industry supply chain to utilise circular economy principle and repurposing of materials into construction materials

Fashion and Textiles



More than 300 million people worldwide are employed in the textile and clothing industry along the supply chain, with some developing countries employing 7% of their population in the cotton-industry alone⁸⁶. As an industry that is growing at a rate of 5% per year in sub-Saharan Africa, it is clear that the textile industry will continue to be a major employer and continue to provide opportunities for youth, women, and PWD. VSO have previously supported small-scale garment workers and tailors in enterprise development projects, and primary actors can be supported through TVET institutions to learn the skills necessary to compete in this expanding industry.

The textiles and clothing industry comprise 10% of global GHG emissions⁸⁷, with fast fashion being the main culprit behind the increasing emission sources. Other environmental impacts concerned with the textile industry are water pollution, water usage, agricultural production of raw materials and landfill. From this, it becomes clear that circular economy initiatives are vital in supporting primary actors to adopt efficiency measures and reduce water use in order to become green and decent jobs. The Ellen MacArthur Foundation⁸⁸ highlight four strategies that are key in implementing the circular economy within the fashion and textiles industry in Africa:

- Strengthening the existing circular skills and business models to tap into further income generation opportunities
- Eliminating waste and pollution in manufacturing to increase competitiveness and improve the environmental outcomes
- Growing a variety of fibres to rebuild soil health and increase yields
- Creating employment by eliminating waste and increasing materials circulation

Climate change will continue to affect the textile industry in numerous ways; one, however, is the availability of water that can be used in manufacturing processes. Drought is a major climate risk and is likely to affect precious water supplies across the world. The knock-on effects from drought would not only impact smallholder textile manufacturing, but also agricultural processes involving raw materials, as well as the lives of those living within those regions.

VSO should consider:

- Working with producers of raw textile materials to encourage greener practices, such as through regenerative agriculture and agroecology, and support them with certification
- Encouraging MSMEs who manufacture textiles to collectively purchase materials that are certified or that come from local sources that use greener or more environmentally friendly methods.

Waste Management

Waste contributes towards 3.3% of global GHG emissions, but the sector contributes 20% of global methane emissions⁸⁹. Like other sectors, there are huge discrepancies and inequalities between countries, with higher-income countries contributing more waste as compared to lower-income countries. Waste cuts across other sectors such as energy, agriculture, tourism, transport and food processing, and efforts to reduce waste ending up in landfill needs a policy-driven agenda at the systems level. As urban populations increase across the developing world, there is a considerable need for inclusive waste management policies to be created and enacted that benefit the health, wellbeing, and livelihoods of primary actors, especially those living in informal settlements. The associated health risks that arise from living close to waste management facilities are an environmental justice issue, as they disproportionately affect the most poor, vulnerable and marginalised members within societal structures.

There are considerable opportunities for job growth and enterprise development in the area of waste management, including for enterprises to develop waste management strategies that reduce the amount of waste ending up in landfill. Introducing recycling schemes for materials such as plastic, paper, cardboard and glass not only reduces the amount going to landfill, but also contributes towards fewer raw materials being used in producing the same products in future cycles. Waste sorting is a key part of this process to ensure that materials are sent to the correct place to be repurposed or reused. This is a key facet of the circular economy and requires the support of governments, local authorities and other private sector organisations to deliver meaningful and impactful change. Increasing attention is being paid to circular economy principles, and countries such as Ghana, Nigeria, Rwanda and South Africa are part of the growing Africa Circular



Economy Alliance. Formalisation and securitisation of jobs would lead to informal waste management jobs becoming classified as decent and green jobs.

Composting is a significant way to reduce emissions from food waste ending up in landfill. Food waste is a significant global issue and contributes 8% towards global GHG emissions. The Food and Agriculture Organization (FAO) estimate that globally each year, one-third of all food produced for human consumption never reached the consumer's table; contributing to a missed opportunity for the economy and food security, but also wastes the energy and natural resources used in growing, processing, packaging, transporting and marketing food⁹⁰. Cereals, vegetables, fruits and starchy roots are the main contributors to food waste, while meat, cereals and vegetables are the largest contributors to GHG emissions. The FAO state that "the further along the chain the food loss occurs, the more carbon intensive is the wastage"⁹¹. High-income countries are once again at fault for per capita food wastage due to wasteful food distribution and consumption patterns in high income countries. SDG 12 (Ensuring sustainable consumption and production patterns) contains an indicator and food waste reduction target. This target is "By 2030, to halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses". Food waste is a major component of environmental and carbon impacts from other industries such as tourism, hospitality and food processing.

Priorities areas for circular economy interventions include converting food waste to organic fertiliser to increase circularity in food systems, recycling plastic packaging to increase circularity within the packaging industry and the promotion of e-waste collection and recycling to increase circularity in the growing electronics sector⁹². Micro- and small- enterprises can be supported to access the right technologies to enable them to conduct waste management for settlements, and partnerships between municipal governments and financing institutions are key to scaling these enterprises up to the standard and level needed to combat a complex and growing issue. Considerable attention is being paid to waste-from-energy technologies and while they may contribute towards energy security for regional areas, they should not replace the need to reduce, reuse and recycle waste products before they are sent to landfill.

VSO should consider:

- Developing case studies that document waste management enterprises across programmatic countries
- Training MSMEs on the waste management hierarchy and the adopting of circular economy initiatives
- Supporting primary actors to start enterprises that address the issue of food waste within local food systems.

Tourism

The tourism industry contributes around 8% towards global GHG emissions. 49% of that is comprised of transport emissions from aeroplanes, boats, cars, buses and trains, with the other 51% split between food and beverages, services, lodging, construction and mining, and goods. The vast majority of emissions sources are generated by tourists and visitors from high-income countries and the tourism industry worldwide is seeing considerable growth, despite the impacts from the COVID-19 pandemic and travel restrictions. The tourism industry intersects with many other industries and sectors and is a key driver of economic development across Africa, accounting for 8.5% of GDP and 6.7% of total employment in 2018⁹³.

Construction in relation to the building of resorts often result in destruction of vital ecosystems and biodiversity hotspots. For example, mangrove forests, which have the capacity to store up to 4 times as much carbon that tropic forests, have been cleared to make way for tourist infrastructure such as resorts and beaches⁹⁴. Other aspects of tourism such as food and beverages are also large contributors to the sectors overall carbon footprint. Food waste from restaurants and buffet breakfasts is a big problem across the sector. Globally, less than half of hotels compost their food waste; when food waste ends up in landfill it creates and releases methane into the atmosphere.

Similar to other industries and sectors, advances in renewable energy production and batteries for EVs will contribute to reducing GHG emissions but will not capture all emission sources. There is a real need to promote green skills and jobs in this sector to ensure that MSMEs currently in or considering entering the tourism industry adopt greener practices. There are several global initiatives that lodging facilities (hotels, hostels, homestays etc) can take part in to demonstrate they are adopting greener practices, such as implementing energy efficiency measures, producing renewable energy on-site, cutting down on food waste, encouraging fewer daily cleaning services and towel replenishment, and promoting recycling from tourists

waste. These are important indicators as they allow tourists who pre-book accommodation and lodging to search for hotels that have adopted greener practices.

Eco-tourism currently comprises 7% of the global tourism industry but is rapidly growing as more tourists become more aware of the environmental and ecological impacts from their actions and seek to purchase from enterprises that have strong social, environmental and ecological values. Eco-tourism is considered to be responsible travel to natural areas that conserve the environment and improves the well-being of local people. As such, it is closely linked to natural and cultural capital, and it involves immersive experiences in wilderness, local culture, adventures and volunteering. Areas rich in natural capital and with good accessibility options are prime candidates for the eco-tourism market. For example, outdoor recreation activities in national parks, mountain trails and on lakes could be considered as ecotourism, as well as visits to wildlife hotspots and wilderness areas. As a growing subsector of an important industry, ecotourism represents an opportunity for green job growth for young people and the development of green skills in areas such as the circular economy.

There are opportunities for circularity to be incorporated into the tourism industry in destination contexts by enhancing the sustainable development impacts of tourism and generating new jobs along more inclusive local supply chains. There is potential for MSMEs to promote slow tourism, which involves the use of active travel modalities when tourists arrive at their destination. The Global Tourism Plastics Initiative⁹⁵ has six concrete and actionable commitments for tourism organisations:

1. Eliminate problematic or unnecessary plastic packaging and items
2. Take action to move from single-use to reuse models or reusable alternatives
3. Engage the value chain to move towards 100% of plastic packaging to be reusable, recyclable or compostable
4. Take action to increase the amount of recycled content across all plastic packaging and items used
5. Collaborate and invest to increase the recycling and composting rates for plastics
6. Report publicly and annually on progress made towards these targets

There remain opportunities for VSO to engage in the tourism industry. Business development volunteers can work with MSMEs to market and tailor products that appeal to the tourists visiting that country. Employability and entrepreneurship volunteers can provide training to youth, women and PWD to design business plans and strategies that either work in the local tourism supply chain (waste management, food production, etc) or to appeal to tourists directly. Community volunteers can raise awareness of issues surrounding tourism and advocate for change on behalf of communities.

VSO should consider:

- Conducting a tourist potential analysis in project locations to see if the industry is developing and the types of activities that may be needed
- Promoting environmentally friendly and green practices for MSMEs to both mitigate against any adverse impacts but also to market their business to prospective tourists
- Encouraging the use of composting for food waste in enterprises throughout the tourism industry

Agriculture, Forestry and other land-use

Emissions from agriculture, forestry and other land use currently comprise between 21% to 37% towards global GHG emissions and is integrated in energy use, transportation, industrial processes, supply chains, and land-use. These can be broken down into:

- 16% from land use for livestock



- 8% from land use for human food
- 21% from crop production for human food
- 6% from crop production for animal feed
- 31% from livestock and fisheries
- 4% from food processing
- 6% from transport
- 5% from packaging
- 3% from retail

However, large-scale agricultural practices have environmental and ecological impacts that go beyond raw GHG emissions. Agricultural practices, whether for crop production or rearing livestock, have traditionally been resource-intensive processes and require large volumes of inputs such as water, land and energy. Large-scale industrial processes have often adopted monoculture practices, in which the same crop is grown season-after-season on the same piece of land. This kind of practice depletes nutrients in the soils, which then are re-applied through chemical fertilisers. In addition, large-scale agriculture requires large amounts of open land; as fields have become larger, it reduces habitat connectivity and niches for species to thrive, contributing to a detrimental effect on biodiversity and wildlife. Furthermore, large amounts of pesticides applied to fields indiscriminately kill other insects and pollinators, which are key to the continuation of life for all species on the planet.

Brazil is the leading emission source from agriculture, followed by Indonesia, China, India, Democratic Republic of the Congo and the USA⁹⁶. However, the majority of emissions from Brazil and Democratic Republic of the Congo are from land use change, with the majority of emissions in the other country from farm-based activities. In this instance, land use change is caused by deforestation and peat fires, often to clear land for agricultural production. The prime rainforests were carbon sinks, but the land-use change for agriculture not only removes the carbon that was stored, but also locks in carbon through intensive agricultural practices.

In recent years, there has been an incentivising move in countries such as the UK to encourage farmers and landowners to turn over some of their farmland to more environmentally friendly purposes, such as woodland creation, habitat connectivity and pollinator corridors in an attempt to tackle biodiversity loss.

Land used for agriculture comprises 49% of the world's habitable land, but within this there are stark inequalities⁹⁷. Smallholder farms account for only 12% of the world's farmland, yet they provide an estimated 80% of the food produced in Asia and Africa⁹⁸. Agriculture accounts for 70% of the labour force on 33 million smallholder farms across Africa: women comprise roughly 62% of the agricultural labour force doing the bulk of the work to produce, process, and market their produce⁹⁹.

VSO is already implementing a global programme focused on women's economic empowerment, control over incomes and right to food. The approach VSO is taking in regards to that programme area is focused on agroecological principles. A key principle of agroecology is the organic diversification of farming systems through intercropping and agroforestry, with livestock integrated in to support the ecosystems above and in the ground. By being labour- intensive and community-oriented, agroecology raises agricultural productivity in ways that are green and socially uplifting¹⁰⁰. As agriculture is a major employer and contributor of livelihoods, these principles correlate with the green skills and jobs needed in the agricultural industry. This approach to agriculture also increases the resilience of food and farm systems to respond to climate stresses and shocks, in part due to the increased ability of soils to absorb water, retain topsoil and replenish nutrients.

VSO should consider:

- Continuing to adopt agroecological principles in relation to smallholder farmer development and climate change resilience.
- Adding in agroecological principles into carbon literacy training modules for VSO staff and volunteers.

- Advocating for the protection of virgin forests and working on tree-planting initiatives in areas that are vulnerable to intense climatic events, such as floods and storms.
- Supporting primary actors to start enterprises that address the issue of food waste within local food systems.

VSO's Track Record

This chapter sets out to outline the key projects that are currently operating or have recently been closed across VSO's country offices in green skills, jobs and enterprises. Semi-structured interviews were held with VSO staff in country offices in Bangladesh, Cambodia, Nigeria, Tanzania, Uganda, and Zambia, as well as with other VSO staff based globally. The purpose of these semi-structured interviews was to discover any programmatic interventions occurring in VSO country offices that were concerned with green skills, jobs, and enterprises. For those that had conducted projects with that as either a primary or secondary focus, the key lessons learned were extracted. Other questions were about the barriers faced by country programmes teams, the partners in the region that were leading on the work, and what the role of volunteers (and the blended volunteering model) is in implementing programmes centred around green skills, jobs, and enterprises.

Programmes

VSO have a long track record in agricultural programming that was frequently mentioned by VSO staff. In some of these programmes, for example in Bangladesh, there has been a focus on climate adaptive technologies being implemented in climate vulnerable areas for primary actors. The use of organics and technology were mentioned as being central to the inclusion of women in the transition to a more sustainable food production system. Activities were conducted in Bangladesh around biodiversity and agroecology.

VSO Tanzania highlighted three projects that have been implemented that contribute towards green economy outcomes. These are:

- Collective Action for Rights Realisation in Extractives Industry (CLARITY)
- Tanzania Local Enterprise Development (TLED)
- Youth Economic Empowerment (YEE- FCDO then Standard Chartered Foundation)

CLARITY (funded by the European Union) is a social accountability project that targets mining companies to adhere to ethical business practices. VSO focuses on raising the voice of primary actors when violations occur and providing legal services for victims of corporate malpractice and unsafe working conditions. The project supports the identification of informal workers and provides them with enterprise and business development trainings whilst helping them to access financial support. Women and youth are encouraged to venture out into green opportunities – for example, investing in tree planting through formation of a tree nursery and selling seedlings, land rehabilitation services for mining companies and alternative energy sources. Business development services provided by VSO volunteers offer guidance through green pathways. Community and youth volunteers raise awareness of social accountability and empower primary actors to gather evidence in rights claims. International and professional volunteers provide technical expertise in policy, business, and environmental analysis. Corporate volunteers are used to convene and broker conversations between the mining company and the primary actors and focuses on behaviour change at the institution level to adopt more environmentally friendly practices.

TLED (funded by Global Affairs Canada) had several indicators within the project that focused on environmental management, and this was spread out across the entire entrepreneurship ecosystem. Business development services focused on market, environmental and gender sensitive practices that informed business strategies of MSMEs. Almost all enterprises supported through TLED considered environmental gaps in their strategies, including adopting waste and pollution management plans. As a lot of businesses were in the food processing industry, there was a focus on the responsible disposal of liquid and chemicals. Businesses were supported in environmental management processes by volunteer advisors.

YEE (originally funded by FCDO and now funded by Standard Chartered Foundation) developed transferrable skills for young people through technical training, entrepreneurship training and business skills development. The project supports the promotion of green jobs through waste minimisation in various sectors such as energy, waste materials and agriculture. The incubation hubs and business-to-business support networks ensured youth enterprises were supported to adhere to environmental standards. These standards are statutory and stem from the National Environment Management Act, and standards are implemented across the industries that the youth chose to enter the market for.



VSO Uganda highlighted several projects that had a green economy focus. One of these is Driving Youth-Led New Agribusiness and Microenterprise (DYNAMIC). This project focuses on the market entry for young people in Uganda by improving the skills in relation to climate smart business plans. The Challenge Fund for Youth Employment (CYFE) project in Uganda has a strong focus on implementing circular economy solutions and waste recycling, in particular the recycling of plastic materials. Another project is ACTIVE, which focuses on community engagement and resilience building. Some activities included in this project include tree planting that benefit local schools and communities through regulating air quality and providing another source of food.

VSO Nigeria, the green focus has been on youth employment and women's economic empowerment. VSO Nigeria work on CYFE, delivered in partnership with Randstad and Palladium, aims to create opportunities for youth, particularly young women, to access green and decent jobs that deliver better prospects for personal development, is productive, offers a stable income, social protection and safe working conditions. In addition, VSO Nigeria are working on food security and agroecology through the training of farmers and support for small businesses. Other work has focused on climate change mitigation and adaptation. This is focusing on the loss and damage that arises from climate risks and disasters. Mitigation efforts have concentrated on trying to find alternative ways to stop tree felling, especially in areas prone to drought and desertification. Community-based adaptation efforts have concentrated on the promotion of Indigenous and Local Knowledge as tools to arm communities in the effort to fight climate change.

VSO Cambodia have two active projects considered that contain green economy elements. One of these is Rural Employment for COVID-19 Economic Recovery (RECOVER), funded by the European Commission) project has components that focus on horticulture, poultry farming, and TVETs. Primary actors are supported to access decent jobs and to develop sustainable, green skills. The other is Generating Resilient Environments and Promoting Socio- Economic Development of the East Tonle Sap Lake (GREEN) project, funded by the European Union, that works with fishing communities on a green economy initiative. This project focuses on behaviour change and the adoption of more environmentally friendly practices.

Other projects of note from VSO:

- Trash for Cash (Kenya)
- Solar Mamas (Malawi)
- Waste to Work (Kenya)

Volunteering Standards

The initial Global Volunteering Standard was launched in 2019 at IVCO's Annual Conference hosted by VSO in Kigali, Rwanda. The central pillars of the Global Volunteering Standards are Volunteering for Development (VfD), Responsible Volunteering and Impactful Volunteering. VSO have been leading the coordination of the Global Volunteering Standard on behalf of the International Forum for Volunteering in Development (Forum) since 2017.

The 2021 Global Volunteering Standard is an updated version that refers to five additional key areas: online volunteering, duty of care, environmental protection, volunteer diversity and community inclusion, and content accessibility. The area of environmental protection was highlighted at IVCO 2020 and aims to ensure that VfD activities support the Climate Action agenda. Additional content has been added to ensure that principles of 'do no harm' are extended to the natural environment. For example, in design and planning, action 1.5 is a core action and refers to "*the conservation of nature, reducing harm to the environment and promotion of climate resilience inform and guide project design and implementation*". Indicator categories under this action are:

1. Threats to the environment due to project implementation are identified and mitigation measures are design and implemented during project cycles
2. Projects must seek to enhance ecosystem service delivery using the ecosystem approach (e.g. nature-based solutions)

3. Organisations calculate carbon footprint of project implementation, as a minimum for all international travel and local transportation on a yearly basis; calculations are used to develop an action plan to reduce their carbon footprint where possible

While the Global Volunteering Standard encourages organisations to be more considerate of the environment through volunteering for development programming, they remain voluntary standards and are not considered mandatory. However, they do raise the consciousness of organisations to consider raising their individual commitments to climate action and developing ethical working practices that are more considerate of environmental impacts. Calculating the carbon footprint of project activities would be a valuable addition to the Global Volunteering Standard as they would provide a good starting point for organisations, and this can be delivered through carbon literacy training. This training encourages local solutions to globalised issues and should be implemented through key partners and stakeholders that can tailor the content to its appropriate local context. For example, communities in Zambia might not be able to relate to content produced in Canada, and so the training needs to be designed with the local context in mind. Nonetheless, there is core content that can be produced and run as a core aspect of carbon literacy training, and one that can be implemented for all types of volunteering organisations.

The development of climate action plans is another step for organisations to address GHG emissions but also to identify areas of strength that their particular model can have the biggest impact. Climate action plans developed by community-based organisations should reflect the key environmental challenges faced in that context, whether that be the issue of plastic pollution, poor air quality, land degradation, soil erosion, etc.

Donor Trends and Funding Opportunities in the Green Economy

The following is a snapshot of some of the donors and funding pots currently operating in the area of the green economy, including skills, jobs and enterprises.

UK – FCDO

The UK Government's 2022 [Strategy for International Development](#) makes reference to taking forward work on climate change, nature and global health as a core part of the international development offer. The strategy promises to double the International Climate Finance (ICF) contribution to at least £11.6 billion between 2021-2026, including investing at least £3 billion of ICF in development solutions that protect and restore nature. The aims of the sustained commitment are to:

- focus UK ICF on driving the rapid transformation and systemic shifts required to achieve the Paris Agreement goals and deliver on the Glasgow Climate Pact through helping countries to strengthen their energy security and provide affordable, reliable, and clean energy for all. The fund will ensure a balanced split between mitigation and adaptation finance, recognising that support for nature can deliver on both as well as addressing biodiversity loss
- employ the full range of the development finance toolkit, including British International Investment, and put the UK's capital markets, innovation, and expertise to work in mobilising more private finance to advance our climate and nature goals
- ensure that all new bilateral UK ODA aligns with the Paris Agreement in 2023. This means bilateral Official Development Assistance (ODA) spend drives progress towards mitigating climatic impact, and supports partners adapt to a rapidly changing environment. This builds on the 2021 commitment to ensure all new UK bilateral aid spending does no harm to nature by taking steps to ensure UK bilateral ODA becomes 'nature positive', aligning with the international goal to halt and reverse biodiversity loss by 2030, and the post 2020 Global Biodiversity Framework, once agreed
- develop innovative approaches to tackle climate change and protect nature – for instance, through the Ayrton Fund for clean energy innovation.
- support the Dasgupta Review recommendations on the Economics of Biodiversity, working with others to protect at least 30% of the ocean and 30% of land globally by 2030 and take forward the Glasgow Leaders' Declaration on Forests and Land Use, including through efforts to end deforestation and promote climate-resilient, sustainable food systems

UK PACT Green Recovery Challenge Fund

The UK Partnering for Accelerated Climate Transitions (PACT) [Green Recovery Challenge Fund](#) is a capacity-building fund to support low-carbon transitions and a green, resilient and inclusive economic recovery across ODA-eligible countries. As a partnership between the UK Government and ICF Consulting, it constitutes a £260 Million programme funded by UK International Climate Finance. The Green Recovery Challenge Fund supports innovative ideas that address specific low-carbon challenges, show measurable results, promote social inclusion and inspire future actions to increase climate ambition at scale while supporting countries to transition their economies. Demand-led themes include:

- MRV tools for forests, land use and agriculture (supporting emissions reduction efforts and generating economic opportunities by improving the sustainability of forest and agricultural practices)
- systems (mainstreaming climate-related financial risks and opportunities to unlock investments that contribute to achieving net zero goals and a just transition)
- Electrifying urban mobility (advancing more equitable, accessible and cleaner transport systems, with a focus on EVs)

- Clean energy transitions (new renewable energy policies, the transition of energy infrastructure and ensuring energy security)
- Nature-based solutions (economic alternatives that limit deforestation and promote uptake of agroforestry and regenerative agricultural systems)

Green Climate Fund

With over \$12 billion committed to climate change mitigation and adaptation projects, the Green Climate Fund (GCF) is the largest global fund dedicated to help fight climate change. The fund currently supports 216 projects and have increased the climate resilience of 912 million people while avoiding 2.5 billion tonnes of CO₂e. The GCF work through national partners and accredited entities to implement projects. Accredited entities can be private or public, non-governmental, sub-national, national or regional, as long as they meet the standards of the fund. The accreditation process assesses whether the applicant entities can effectively manage GCF's resources in line with the standards and policies for the scale and type of funding sought, and well as effectively managing environmental and social risks that may arise at the project level.

GCF invest across four transitions – built environment; energy & industry; human security, livelihoods and wellbeing; and land-use, forests and ecosystems – and employing a four- pronged approach:

- Transformational planning and programming (promoting integrated strategies, planning and policymaking to maximise the co-benefits between mitigation, adaptation and sustainable development)
- Catalysing climate innovation (investing in new technologies, business models, and practices to establish a proof of concept).
- De-risking investment to mobilize finance at scale (using scarce public resources to improve the risk-reward profile of low emission climate resilient investment and crowd- in private finance, notably for adaptation, nature-based solutions)
- Mainstreaming climate risks and opportunities into investment decision-making to align finance with sustainable development (promoting methodologies, standards and practices that foster new norms and values)

Conclusion and Recommendations

The transition to a green economy is one that must be just, equitable and considerate of the needs of vulnerable and marginalised individuals and communities. There are considerable opportunities that are within grasp for organisations eager to work on transitioning the economy from an extractive-based one to a more regenerative based one. There have been numerous approaches that have been considered internationally as a way to transform society in a way that is fair, just and equitable. This includes transitioning away from a make-use- dispose model of production and consumption and towards a more circular economy, in which resources have multiple uses in their lifespan. It also includes understanding natural capital approaches and how that can be used as a tool to protect nature, biodiversity and geodiversity, especially in areas which contain unique species that cannot be found in other parts of the world and are threatened by climate change. Additionally, the concept of planetary boundaries and doughnut economics are a way for economies and societies to consider the effect of actions upon ecological and geophysical limits. While this may not be directly related to VSO programmatic intervention, it frames other concepts such as the Just Transition and Circular Economy in acknowledging that the green economy can only be considered green if it remains within planetary boundaries.

It should be known that VSO are not the only ones working in this area and partnerships should be sought with other INGOs who have been conducting research and implementing programmes around climate change, green economy, circular economy and just transition. Most INGOs have focused on climate resilience and adaptation as a key focus of their programmatic interventions - the people who are most at risk of the effects of climate change are often the most vulnerable and marginalised populations in society, and they are ones that have contributed the least to climate change. However, there does remain opportunities to invest in developing programmes that work with youth-, women- and PWD-led enterprises across VSO country offices to support climate change mitigation and the reduction of GHGs.

The key sectors needed to be addressed in the transition are energy, transport, industry, land- use, and agriculture. Some of these are more suited to programmatic interventions than others. For example, implementing DRE schemes in rural areas in Africa and Asia is a good way of increasing energy security while contributing fewer GHG emissions into the atmosphere. It can contribute towards much-needed electrification in areas of the world which get either sporadic or no access to electricity. However, there is scope for VSO to be involved in implementing programmes across sectors such as energy, transport, land-use, agriculture, and industry as part of a holistic approach to the green economy. This can be done through analysing the environmental impacts of enterprises and activities, including the carbon footprint. Analysing where carbon emissions come from in activities is the first step to addressing and reducing emissions, and this is a key component of climate change mitigation.

The skills needed for the green economy are varied and multifaceted, and a combination of skill types are needed for a successful transition. Some skills are specific skills aimed at fulfilling the requirements of green jobs. These include business, finance, project management and entrepreneurship skills that primary actors are currently learning through VSO programmatic intervention. Other specific skills that should be considered as environmental and ecosystem management skills, ICT skills, data analysis skills and climate science skills. Climate science skills can be acquired in part through carbon literacy training. These should be delivered by professional volunteers (whether international or national) or through TVET institutions that primary actors can attend.

Other skills can be classified as green life skills which are the cross-cutting skills that serve technical and adaptive transformational ends. These include generic skills such as collaboration, communication, creativity, critical thinking and reasoning, flexibility and resilience. Many ICS alumni have spoken at length about the improvements in generic skills as a result of participating in the programme and can be a good entry point for community and youth volunteers to build the green life skills and capacity of primary actors. Other generic life skills, including adopting a growth mindset, situational adaptability, and interpersonal skills, may need more guidance from professional sources.

There are also skills needed for a green transformation. This goes beyond a transition and instead transforms economic and social aspects of society that are unjust and exclusive. These are adaptive skills that including analysis of unequal power structures, coalition building, collective action, political agency and activism, reflexivity, solidarity, and valuing knowledge and Indigenous Knowledge. These skills correlate with many aspects of VSO's VfD pathways and Core Approaches and should be considered as paramount in promoting the transformation to a green economy.

The recommendations for VSO to consider as an organisation are:

1. The principle of 'do no harm' should be extended to cover the environment and climate.
2. The Greenhouse Gas Mitigation Hierarchy should be adopted as a way to frame climate change mitigation-related interventions.
3. VSO should roll out carbon literacy training for VSO staff and volunteers. For staff, this should be designed with locality in mind so participants can engage in the key concepts of carbon literacy in the context they find themselves in. For volunteers, this should form part of essential pre-placement training.
4. VSO should adopt definitions of green skills, jobs and enterprises that capture the benefits for primary actors, including women, youth and PWD, as well as for future generations.
5. VSO should work closely with partners, including with other INGOs and private sector organisations, to share approaches and learning on the green economy

There are a series of recommendations for VSO to consider across the VfD framework's programme outcomes across domains:

Recommendations at the Individual Level

1. Primary actors engaged in vocational training and education should be offered the chance to take part in carbon literacy training as a way to learn and identify individual practices that have a smaller carbon footprint.
2. Skills that should be prioritised are green transformation skills, which are adaptation skills aimed at transforming unjust social and economic structures. These skills enable the inclusion of VSO's Core Approaches in skills training and development.

Recommendations at the Family and Community Level

1. Families and communities should continue to be supported in developing green life skills and green transformational skills that build resilience and political agency
2. Local and Indigenous Knowledge should be at the centre of community climate change mitigation and adaptation plans.

Recommendations at the System Level

1. VSO should seek to advocate for policies in national frameworks that support the just transition and implementation of circular economy within the context of planetary boundaries
2. Design and implementing training for Natural Capital and Ecosystem Accounting as part of a Green Skills Framework.
3. VSO should look to advocate for and adopt circular economy principles where possible, including supporting youth entrepreneurs to adopt circularity principles in business design and incubation, and to promote the 3Rs in programme design.
4. VSO should advocate for policies at the national level to support decentralised renewable energy production.

Recommendations at the Policy Level

1. VSO should seek for the adoption of national policies and frameworks within each country's context to push forward with circular economy, just transition and planetary boundaries.
2. VSO should advocate for 'Buy Clean' procurement policies that provide incentives for private sector organisations to adopt cleaner and greener business practices.

Proposed Next Steps

The following outlines the next steps to operationalise this document into VSO Resilient Livelihood's programmes:

- Identify a country office to pilot the development of a green skills framework that is embedded in national education and training policies.
- Conduct market-based assessment and green jobs analyses in each country office that are inclusive of women, youth and PWD (similar to approaches already taken by Nepal and Pakistan).
- Identify a country office or a project team to pilot a carbon literacy programme. This should involve both staff and volunteers and content should be tailored to the specific context
- Convene a learning workshop for countries seeking to implement green economy approaches. This should include the lessons learned from previous projects and an analysis of the policy frameworks that could determine funding availability for the initiation of green skills or enterprise training.

Appendix A- Green Skills Checklist (United Kingdom)

This table is from the Skills for a low-carbon and resource efficient economy report for the UK Government Department for Environment, Food and Rural Affairs (DEFRA) in 2008, and reproduced in the International Labour Organisation's 2011 report Skills for Green Jobs: A Global View, a synthesis Report Based on 21 Country Studies.¹⁰¹

Tier 1	Tier 2	Tier
1. Design Skills	Eco- design	Design for disassembly, design for recyclability, design for the environment, design for effective energy use, legislation and regulatory compliance
	Green Manufacturing	Legislation and regulatory compliance, integration of process waste
	Materials Specification	
	Life-cycle assessment/costing	
2. Waste Skills	Waste quantification and monitoring	Waste production calculations, mass balance, waste audit Material/substance
	Waste process studies	flow analysis, resource utilisation, mapping, life-cycle assessment
	Waste management systems	Objective setting, legislative and regulatory compliance, collection systems, segregation, waste cycle management, 3R implementation, hazardous waste management, landfill requirement, communications/ implementations campaigns
	Waste Minimisation	Industrial symbiosis; integration of process waste
	Waste Technologies	Recycling; Waste-to-energy

3. Energy Skills	Energy minimisation	Energy reduction programmes, heat recovery and re- use, energy-efficient technologies, energy-efficient practices, communications/ implementation campaigns, enhanced capital allowance technologies and schemes.
	Energy management systems	Objective setting, legislative and regulatory compliance, energy base loads and variable loads, energy audit, energy review, communications/ implementation campaigns
	Energy quantification and monitoring	Monitoring targeting and reporting, use of half-hourly data, use of sub-meters, computer-based data logging and energy management systems, energy data manipulation software systems
	Energy costs and trading	Energy markets and pricing, carbon trading schemes, climate change levy agreements, energy price trends, enhanced capital allowances, peak oil and impact on energy supplies and prices
	Renewable energy technologies	Solar, wind, biomass, combined heat and power, photovoltaic, ground source heat pump, air source heat pump, hydro, hydrogen, fuel cell, integration into energy supply
	Non-renewable technologies	Nuclear, incineration with energy recovery, clean fossil fuel technologies, carbon sequestration, waste-to- energy
4. Water Skills	Water use minimization and water re-use	Grey water, water harvesting, wastewater recovery, recycling, cascading, waste/water recovery, effluent treatment, sludge/slurry dewatering, leak detection
	Water management systems Water quantification and monitoring	Objective setting, legislative and regulatory compliance, water audit, water consumption review, communications/implementation campaigns

5. Building Skills	Building energy management	Monitoring targeting and reporting, use of half-hourly data, use of sub-meters, computer-based data logging and energy management systems, energy data manipulation software systems, building energy assessment
	Integration of renewable energy	Photovoltaic, solar, wind turbines, combined heat and power, fuel cell
	Energy-efficient construction	Insulation (cavity wall, loft, paperwork), regulatory compliance, passive heating, building regulations
	Facilities management	Building energy management systems, management and maintenance of water, waste management
	Calculating building energy efficiency and carbon ratings	U value calculations, building energy assessment, carbon rating
6. Transport Skills	Transport impact minimisation technologies	Hybrid vehicles, biodiesel, electric vehicles, fuel- efficient vehicle
	Transport impact minimisation processes	Alternative transport strategies, communication/implementation campaigns, car- sharing schemes, public transport planning, public transport implementation, cycle network planning, cycle network implementation, transport modelling
	Transport management in business	Transport modelling, route planning and management, distribution and collection system
7. Materials Skills	Sourcing	Sources of low-energy materials, sources of low- mileage materials, recyclates (secondary materials), energy-efficient raw material extraction, industrial symbiosis, transport mileage

	Procurement and Selection	Use and properties of low-energy materials and of recyclates, industrial symbiosis, low-carbon and resource-efficient procurement, cost impact of climate change on material procurement
	Material use and impact quantification	Material usage calculations, life-cycle assessment and costing Material use
	Management Systems	planning, material flow process design and implementation, energy-efficient process design and implementation
	Impact and use minimisation	Life-cycle assessment and costing, energy-efficient process implementation, material flows analysis
8. Financial Skills	Investment Models	Energy technologies investment models, carbon derivatives investment models, calculation of payback/return
	New/alternative financial models	on investment Carbon trading, EU Emissions Trading Scheme, UK Emissions Trading Scheme, enhanced capital allowances
	Quantification of climate change impacts	Impact assessment of climate change on business finances, impact of climate change on materials availability and cost, carbon neutrality and associated cost/opportunities (costs of doing nothing), risk/opportunity assessment models for adaptation and mitigation, insurance risks/opportunities of a low- carbon economy
	Principles of low-carbon and resource-efficient economies	Polluter pays principle, externalities
	Tools of low-carbon and resource-efficient economies	Climate Change Levy agreements, enhanced capital allowances, cost benefit analysis, low-carbon and resource-efficient procurement

9. Management Skills	Impact Assessment	Energy use calculations, water use calculations, waste production calculations, carbon foot printing calculations, emissions measurement
	Business Planning	RE planning, low-carbon planning, integration of RE and low carbon into business planning cycles, climate change risks, climate change adaptation and mitigation responses (as part of business risk management), understanding low-carbon and resource efficiency skills requirements and long-term planning
	Awareness Raising	Communication/implementation campaigns
	Opportunities Management	Identification of low-carbon and resource efficiency opportunities, cost–benefit analysis
	Risk Management	Identification of low-carbon and resource scarcity risks, cost–benefit analysis
	Day-to-day management	Low-carbon and resource-efficient procurement, integration of low-carbon and resource efficiency skills, due diligence, management systems, low-carbon and resource efficiency skills requirements for recruitment
10. Policy and Planning Skills	Built environment master planning and implementation	Low-carbon spatial planning, zero waste planning, resource-efficient planning, low-carbon and resource-efficient urban design, building regulations, public transport planning and implementation, cycle network planning and implementation
	Strategy development	Impact assessment and modelling, principles of low- carbon and resource efficiency
	Strategy implementation	Understanding of skills needs for HR managers, low- carbon and resource-efficient material sourcing and procurement, awareness raising/ communications skills

Appendix B- Green Skills Needs by Sector (United Kingdom)

This table is from the UK Government's Skills for a Green Economy paper published in 2011¹⁰².

Economic Sector	Summary assessment of skills needs
Business generic skills needs	<p>In addition to the sector or job-specific jobs described below (known as dark green skills), all businesses need generic or light green skills. These include:</p> <ul style="list-style-type: none"> • Business management skills such as lifecycle analysis/costing; carbon literacy for procurement; planning, impact assessment and risk management; leadership and management; sustainable procurement; resource efficiency skills; financial management etc • Scientific and technical skills such as modelling, interpreting, using and disseminating climate change projections and impacts etc.
Building services, engineering and property management	<p>In many cases traditional building skills can be easily adapted to energy efficiency, so in-depth specialist training for installation is not always required. But it has been suggested that the renewables sector would benefit greatly from a general upskilling in construction. More needs to be done to attract high calibre young people, and to refocus current Apprenticeships and certification. There is some practical training available in renewable construction, but more specific training is needed for architects and planners on the impact of new materials on sustainability.</p>
Building products, coatings, extractive and mineral processing etc	<p>Research suggests that re-skilling was important in carbon-intensive industries, to prepare existing employees for low carbon, resource-efficient business practices. There was support for extending training support to the over-25s. Multi-disciplinary skills were considered important in this sector. Clear incentives to train would be needed, along with public/private investment to develop conversion courses. There was insufficient recognition across the supply chain of the need for low carbon or resource efficiency skills. Building resource efficiency models into business and management training courses would help.</p>
Chemicals and pharmaceuticals, oil and gas etc	<p>For civil nuclear and new build nuclear, see Energy Supply and Utilities below. The UK oil and gas industry is mature and expected to decline gradually. But the retention/renewal of existing skills – chemical engineering, economics, finance, HR and broad science qualifications – will be necessary. There is likely to be some limited development in biofuels.</p>

Food and drink manufacturing and processing	There is a recognition in the food industry of the need to adopt new technologies and processes for sustainability, but this has yet to be translated into a demand for specific skills, or prioritised. To some extent, sustainability is being addressed through lean manufacturing training. More broadly, more food scientists, food technologists and engineers are needed.
Construction	Construction is affected by stringent new building standards such as BREEAM and advanced building management systems; new sustainable construction methods; and facilities management and maintenance. The Green Deal alone could see the numbers of people employed in insulation grow from 27,000 now to 100,000 in 2015 and 250,000 by 2025. New skills are needed for: environmental legislation targets; ecosystem services design and management; designing and managing multifunctional spaces; land use planning and development planning; developing and using computer-aided design and GIS; life cycle assessment/costing; carbon and water footprinting etc. There will be a need to train new staff and to upskill existing workers. For example, architects will have to: incorporate new products/ innovations in design; interpret and take account of new regulations etc; and design for predicted climatic change impacts. And local planners need to: interpret, implement and enforce legislation; build close relationships with energy suppliers; take account of demographic and economic changes etc.
Renewables	There are significant employment opportunities. For example, the offshore wind supply chain will need up to 70,000 more workers by 2020, from planning and development professionals through engineers and technicians to legal and financial specialists and admin and IT staff. There is an overall shortage of STEM in the next ten years at all levels, which is exacerbated by competition from other sectors. In addition, wind energy needs: postgraduate mechanical, electrical and structural engineers; turbine technicians; geologists; civil and aeronautical engineers; and project managers. In offshore wind, new skills are needed for sub-sea high voltage engineering and for coping with harsh marine environments.
Passenger transport industries	The necessary skill areas include: design, manufacture, construction and maintenance of the electrification infrastructure; advanced skills in power supply technology; new rail signalling and train traffic control systems; and management skills to integrate new skills and technology. More generally, skills are needed to support construction, e.g. minimising disruption caused by floods or extreme weather; new technologies; and maintaining and retrofitting existing networks etc.

Biomass/biofuel	The biomass industry could offer 15,300 jobs in the UK economy by 2020. In 2006, the Biomass Task Force identified skills shortages across the whole supply chain from production to the installation of systems. Also in 2006 Energy and Utility Skills UK and others produced an occupational and functional map on renewable energy and updated this in 2007. Areas identified as having further skills and training needs included: architects and builders; systems design; supply chain and production of biomass feedstock; planning; mechanical handling; and efficient fuel delivery and storage.
Anaerobic digestion	Anaerobic digestion is a relatively new area and there are therefore likely to be skills gaps. Energy and Utility Skills UK is identifying the sectors/ employers involved and the available job roles, training and standards. An assessment of the requirements for technical competence in this field will also be identified.
Carbon capture and storage	In the longer term, beyond 2020, there might be as many as 30,000 jobs in this sector. The evidence is that the skills needed are not new and can be found in the chemicals, oil and gas, process design and engineering construction industries, in all of which the UK already has strengths. But the extent to which these industries could divert resource is uncertain. Today's operators lack the skills to operate power plant with carbon capture and storage. But overall the industry could build on the chemical process training and qualifications being developed by the National Skills Academy for the Process Industries.
Waste and water	In the water industry, the need is to maintain and manage supply and to increase capacity and resilience (e.g. reducing leakage etc). The industry includes both the regulated water companies (say 20 per cent of the entire industry) and the non-regulated aspects of water company activities and consultants and contractors (perhaps 73,000 people work in these areas). The biggest skills issue is probably the replacement of expert engineers as the current workforce ages, but action to lower energy demand and costs will also require major investment in technologies/processes and the skills to deploy them. In waste, the priority is to minimise and manage waste and to prevent pollution. The sector needs technical competence – which changes as new technical processes such as anaerobic digestion emerge. In fact, skills are needed throughout the hierarchy of waste management. It should be noted too that waste skills cut across numerous sectors including agriculture and land management, processing and construction.

Energy supply and utilities	<p>There are employment opportunities and therefore skills needs in this sector. The civil nuclear industry now employs some 44,000 people and new build nuclear might mean 10,000 jobs a year. The workforce is ageing faster than the UK workforce as a whole and this will create a significant skills gap. New build nuclear will require Apprentices, scientists and engineers and experienced staff are at a premium. In marine energy, skills include: energy efficiency and use of micro-generation; smart meter installation and insulation; increasing generation capacity; retrofitting and increasing resilience; energy conservation and management. Wind energy requires postgraduate mechanical, electrical and structural engineers; turbine technicians; geologists; civil and aeronautical engineers; and project managers with engineering qualifications.</p>
Freight logistics industries	<p>Segmentation by supply chain and sub-sector is felt to be the key to understanding how the green economy agenda affects this sector. Jobs calling for green skills have emerged from across the sector but particularly at operative level. Businesses also recognise the need for increased, improved and relevant management skills in the future. Skills needed include: SAFED (safe and efficient driving); alternative fuels development; carbon accounting; data management; efficient equipment design and maintenance; water re- use/recycling; green purchasing; life cycle thinking; and refrigerated storage skills.</p>
Automotive industry (including manufacturing and retail)	<p>Ultra-low carbon vehicles (ULCV): specialist skills will be needed to develop and design advanced new materials and components and to maintain new vehicles. Management skills will be needed to oversee and embed these developments and to improve overall efficiency and sustainability. There is also a need for specialist skill sets in, for example, alternative fuels distribution; and hybrid/electric vehicles. There is evidence that raising employer confidence in the importance of the ULCV sector would strengthen the case for upskilling the workforce.</p>
Land management	<p>The farming industry estimates that it will need 60,000 new people between 2010 and 2020 to replace the current ageing workforce; and that these recruits will need a higher level and more varied skill set than the current workforce and also an understanding of farming in a changing climate. Land management calls on a wide range of skills including: business management; animal husbandry; crop and livestock nutrition; carbon management; climate change adaptation; conservation; flood management; agronomy and soil sciences; plant design, operation and maintenance; crop diversification; carbon capture and storage etc. Currently the demand is high for technical skills, but less so for business management.</p>

Other sectors	<p>These sectors understandably have less call for green skills, although there is some specific evidence of need. For example:</p> <ul style="list-style-type: none">• There is a need for lecturers, trainers and assessors to teach in some relevant curriculum areas• Financial services, accountancy and finance businesses need people with carbon and natural environment accounting skills. <p>However, it is worth noting that businesses and organisations in all these sectors will need staff with light green skills.</p>
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Appendix C- Doughnut Economics for East African Countries

In the Doughnut plots below, dark green circles show the social foundation and ecological ceiling. Blue wedges show social performance relative to a threshold associated with meeting basic needs. Green wedges show resource use relative to a biophysical boundary associated with sustainability. Red wedges show shortfalls below the social threshold or overshoot beyond the biophysical boundary, while grey wedges show indicators with missing data.

The doughnuts have been created for various East African countries (Ethiopia, Kenya, Tanzania, Uganda) with other countries included for reference (The Netherlands, UK and USA). The purpose of this is to demonstrate the countries living within the ecological ceiling (planetary boundaries) and meeting the social foundation necessary to sustain a good quality of life and wellbeing.

For further reading and to examine other countries doughnut plots, see Fanning, A.L., O'Neill, D.W., Hickel, J., and Roux, N. (2021). The social shortfall and ecological overshoot of nations. *Nature Sustainability* in press. <https://doi.org/10.1038/s41893-021-00799-z>. (available to read open-access [here](#)).

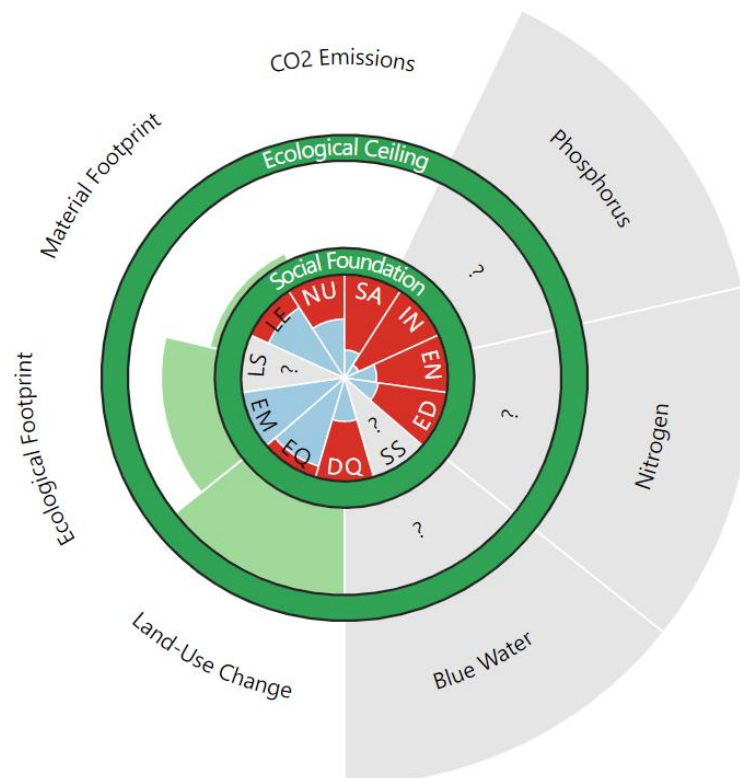
Legend

LS - Life Satisfaction
SA - Sanitation
ED - Education
EQ - Equality

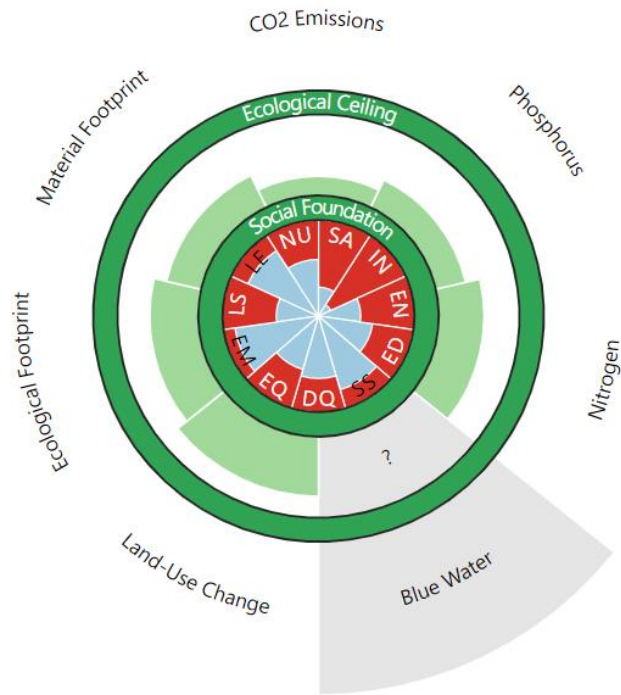
LE - Life Expectancy
IN - Income Poverty
SS - Social Support
EM - Employment

NU - Nutrition
EN - Access to Energy
DQ - Democratic Quality

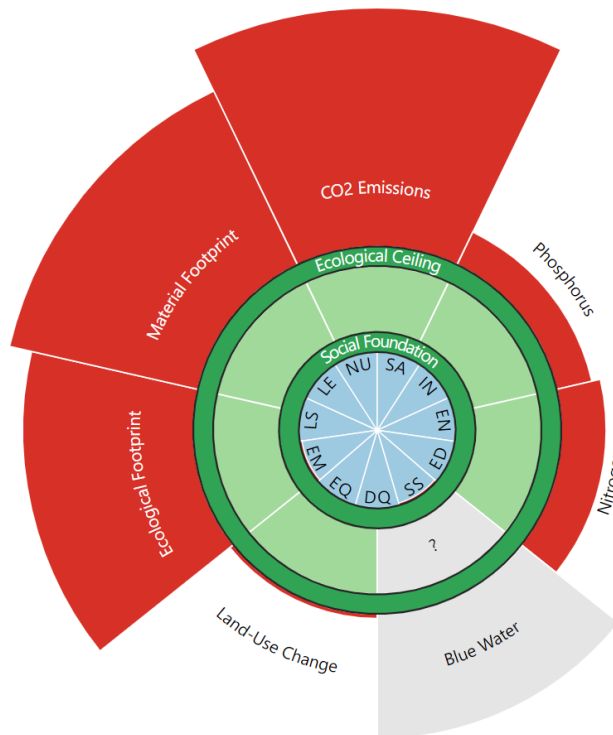
Ethiopia



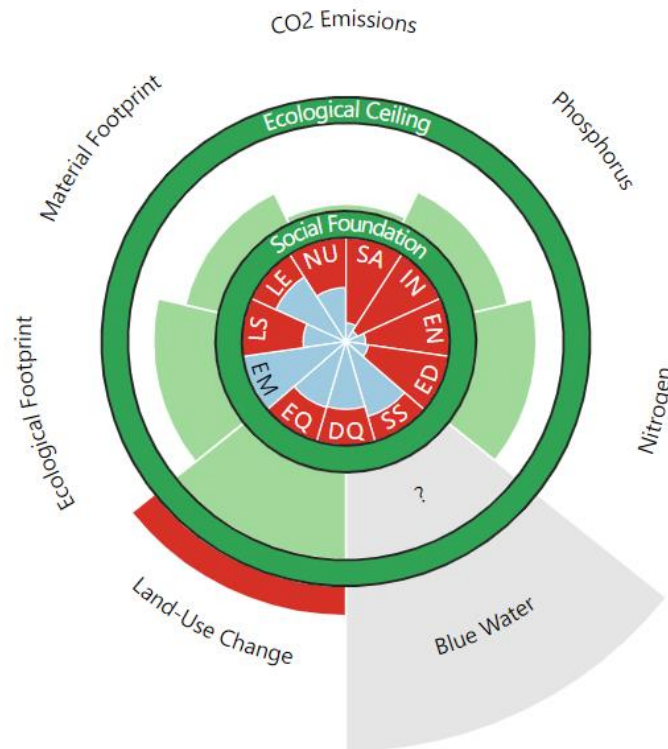
Kenya



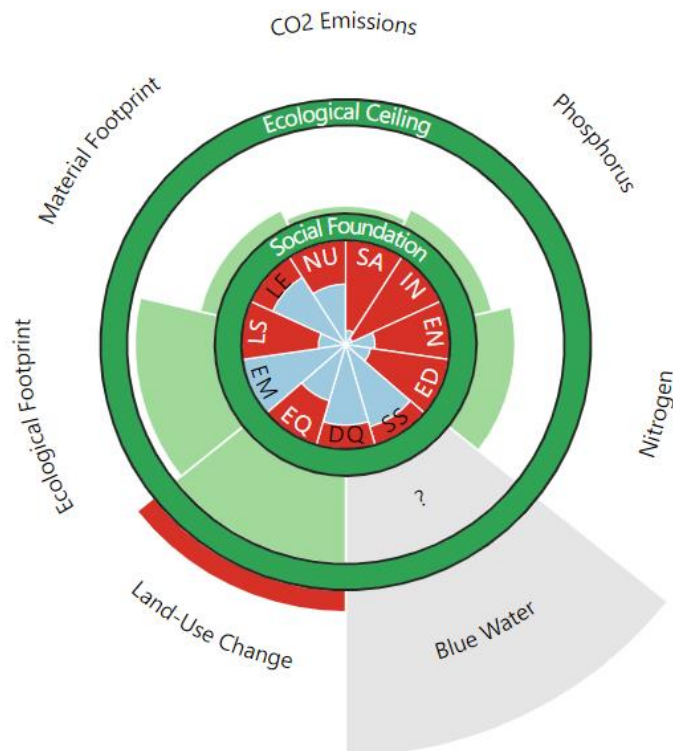
The Netherlands



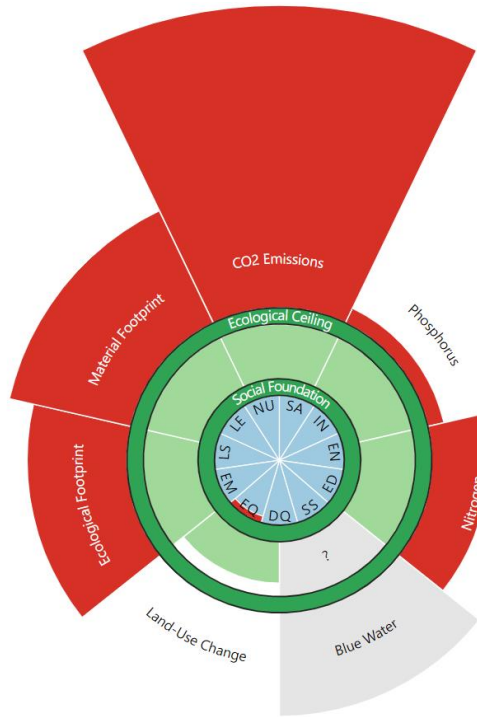
Uganda



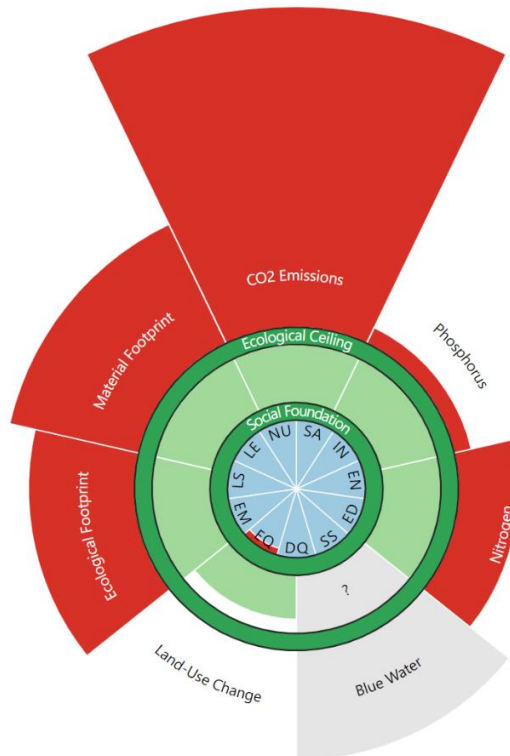
Tanzania



United Kingdom



United States of America



Appendix D- Suggested Further Reading

The following papers are select references and suggested further reading for those who are interested in examining case studies in more detail.

Green Skills

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