



First published in December 2011 by the United Nations Environment Management Group.

© 2011 United Nations

All rights reserved worldwide

This publication may be reproduced in whole or in part in any form for educational or non-profit purposes without special permission from the copyright holders, provided acknowledgement of the source is made. The United Nations would appreciate receiving a copy of any publication that uses this publication as a source.

No use of this publication may be made for resale or for any commercial purpose whatsoever without prior permission in written form from the copyright holders. Permission requests should be sent to [permissions@un.org](mailto:permissions@un.org) or [emg@unep.org](mailto:emg@unep.org). The use of information from this publication concerning proprietary products for advertising is not permitted.

#### **Disclaimer**

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning delimitation of its frontiers or boundaries. Mention of a commercial company or product does not imply endorsement by the cooperating partners. The views expressed do not necessarily represent the decision or the stated policy of the United Nations nor does citing of trade names or commercial processes constitute endorsement.

Printed on recycled paper.

# **Working towards a Balanced and Inclusive Green Economy:**

A United Nations System-wide Perspective

Prepared by the Environment Management Group



United Nations Geneva



# Table of Contents

Foreword	6
Preface	7
Executive Summary	8
Introduction	25
<b>Part I –</b>	
<b>Conceptual and institutional framework for action</b>	<b>29</b>
<u>Chapter 1: The green economy as concept</u>	31
<u>Chapter 2: Institutional support from the global to local level</u>	43
<b>Part II –</b>	
<b>Investment in physical infrastructure and dynamic growth</b>	<b>51</b>
<u>Chapter 3: Green stimulus and beyond</u>	53
<u>Chapter 4: Infrastructure in a green economy</u>	61
<u>Chapter 5: Green and inclusive growth strategies</u>	71
<b>Part III –</b>	
<b>Investment in human capital and societal infrastructure</b>	<b>83</b>
<u>Chapter 6: Making the green economy work for the poor</u>	85
<u>Chapter 7: Investing in social capital</u>	93
<u>Chapter 8: Investing in human capital</u>	101
<b>Part IV –</b>	
<b>Enabling policies and measures</b>	<b>111</b>
<u>Chapter 9: Private finance</u>	113
<u>Chapter 10: Multilateral public finance</u>	121
<u>Chapter 11: Full-cost pricing</u>	131
<u>Chapter 12: Regulatory instruments</u>	137
<u>Chapter 13: Sustainable trade and green markets</u>	147
<u>Chapter 14: Innovation and technology</u>	153
<u>Chapter 15: Indicators of transformation</u>	163
<b>Chapter 16: Conclusions</b>	<b>171</b>
<b>References</b>	<b>177</b>
<b>Annex 1: Agency programmes, initiatives for green innovation and technology</b>	<b>182</b>
<b>Annex 2: United Nations programmes, initiatives on the social dimensions of a green economy</b>	<b>190</b>
<b>Annex 3: United Nations regional programmes, initiatives on the green economy as Rio+20 theme</b>	<b>196</b>
<b>Abbreviations and Acronyms</b>	<b>198</b>
<b>Acknowledgements</b>	<b>200</b>

## Foreword by the United Nations Secretary-General

In the past four years, multiple crises – financial, economic, food, energy – have caused governments and other bodies to look more critically at systemic and structural issues related to national and global economies. Responses include a revived debate on the meaning of economic growth and the necessary measures to more effectively and broadly improve the quality of life of citizens. Civil society and the private sector alike are eager to be involved in this debate and in public decision-making.

The agencies, funds and programmes of the United Nations System, including the Bretton Woods Institutions, are ready and qualified to support governments and others in identifying and pursuing long-term answers. Operating from the global to local level, we are well-positioned to facilitate the exchange of knowledge on current trends, the drivers behind them and the innovative solutions that are emerging from different regions.

United Nations entities are keenly aware of the resource challenges that countries face in meeting the needs of a growing and urbanizing world population. The human and economic toll of natural disasters and the volatility of commodity prices reflect worrying trends in global climate change, the growing scarcity of some natural resources and the decline of many ecosystems.

This report highlights how these challenges can and must be addressed as part of integrated development models that focus on poverty and human well-being. Only such an integrated approach will lay lasting foundations for peace and sustainable development. I welcome the contributions from throughout the United Nations System, and the commitment to work with governments and others to improve integrated delivery in support of sustainable development.

The Rio+20 United Nations Conference on Sustainable Development in 2012 is a generational opportunity to act on commitments made two decades ago, while adapting our approach to current realities. I thank all United Nations entities for their contributions to meeting this responsibility, and I invite governments and others to work with us in making Rio+20 a success that will benefit all. Economic recovery has to be based on sound, sustainable foundations. Green growth solutions are illustrative of what such an action-oriented path to sustainable development may look like.



*Ban Ki-moon*  
**Ban Ki-moon**  
United Nations Secretary-General

## Preface by the UNEP Executive Director

Developing an inter-agency report on the green economy has challenged members of the United Nations Environment Management Group (EMG) to define their contributions to an approach that is not predicated on just the environmental pillar but all three pillars of sustainable development. It continues to challenge the agencies, funds and programmes of the United Nations System, including the Bretton Woods Institutions (BWIs), to reflect strategically about the way in which their work programmes address basic developmental and resource challenges confronting economies worldwide.

This report builds on the statement of June 2009 by United Nations entities on the “Green Economy: A Transformation to Address Multiple Crises” and provides a common reference for United Nations agencies on the meaning and implications of a green economy approach including the possibilities such an approach brings in terms of improved public-private collaboration.

It highlights key messages from our evolving understanding of what is required to meet current economic and resource challenges. This includes the message that a green economy has to be a people-centered economy. The sustainable use of our natural resource base is inherently about improving the daily lives of billions of people, including those living in poverty, those who are unemployed, the working poor and youth.

Conserving and reinvesting in the world’s ecological infrastructure is not simply a goal in itself. It is about the pragmatic realization that our current models are undermining the very resource base of our societies. There is ample evidence today that business as usual is simply not an option for the decades and generations to come.

The report also highlights the fact that policies and policy mixes need to be reoriented and implemented better. The need for regulatory reform is evident, ensuring that market signals are better aligned with the sustainability imperative.

This report, the work of 40 entities, is a key contribution from the EMG to the preparations for the United Nations Conference on Sustainable Development 2012 or Rio+20. It is above all a practical guide for improving internal coordination, joint planning, financing and integration of work programmes in order to promote a transition to an inclusive Green Economy in respect to sustainable development and poverty eradication.

I encourage readers and decision makers in public and private institutions to make use of its analysis and findings alongside the overview of green economy-related services provided by the United Nations and BWIs.



*Achim Steiner*  
**Achim Steiner**

United Nations Under-Secretary-General  
Executive Director of the United Nations Environment Programme  
Chair of the Environment Management Group

## Executive Summary

### Introduction

In September 2009 the United Nations Environment Management Group agreed to establish an Issue Management Group on Green Economy. This group was tasked to prepare a report to assess how the United Nations system could coherently support countries in transitioning to a green economy. The report is expected to facilitate a common understanding of the green economy approach and the measures required for the transition. The report is also envisioned to contribute to the preparatory process for the 2012 United Nations Conference on Sustainable Development (UNCSD or Rio+20) where “the green economy in the context of sustainable development and poverty eradication” is one of the two themes; the other is “the institutional framework for sustainable development”.

A green economy is an approach to achieving sustainable development. It requires breaking away from resource-intensive growth models, a transformation of consumption and production into more sustainable patterns and increased value added created and reinvested in resource-rich supplier communities in the developing world. The context for this approach is the increasing resource intensity of consumption in developed countries even though their production is becoming less resource intensive, which implies the shifting of environmental impact to other countries through international trade. At the same time, the resource intensity of both consumption and production in developing countries may increase in absolute terms in their industrialization process. These trends tend to exacerbate resource constraints and break the planetary boundaries.

A broader context is the projected population growth, which further raises the stakes in poverty reduction efforts. These efforts depend on higher consumption and production. Without appropriate policies in place, population growth will further significantly increase pressures on all natural resources. The likely growth of the world population from 7 billion today to over 9 billion by mid century requires a considerable increase in economic output to ensure food security, reduce poverty, raise living standards and create full, productive and remunerative employment for the populations (UNDESA 2011). Demographic change and urbanization not only heighten the need for a swift transition to a green economy, but also call for policies to address population dynamics within a human-rights-based framework. These policies, most notably, include universal access to reproductive health care and family planning as well as the empowerment of women and appropriate investments in education, especially for girls and women, who are too often left behind.

In these contexts, a green economy requires the inclusion of the marginalized in all development processes. It also requires the reduction of gaps between developing and developed countries and regions in labour productivity and in the capacity to generate and have access to technology and scientific knowledge. It requires bolstering the capacity of developing countries to develop, review, and implement science, technology and innovation policies that are oriented towards green solutions to the climate, food and energy crises. This includes strengthening science education, enhancing research and development capacities, and fostering innovation through South–South Cooperation, North–South

Cooperation, and public-private partnerships. It is particularly important that commodity-dependent countries have access to new green opportunities to diversify their economies.

Specifically, in a transition to a green economy, public policies will need to be used strategically to reorient consumption, investments and other economic activities – in line with domestic development agendas and contexts – towards:

- Reducing carbon emissions and pollution, enhancing energy and resource efficiency and preventing the loss of biodiversity and ecosystem services, including the development of efficient, clean and low environmental impact technologies, buildings and transport infrastructure; investments in renewable energy; application of the life cycle approach<sup>1</sup>; promotion of environmental goods and services; sustainable sourcing of materials; and the maintenance and restoration of natural capital consisting of land, soil, forests, freshwater, the oceans, marine resources, wild fauna and flora and other biodiversity components.
- Improving access to energy, food, freshwater, biological resources, sanitation services, public health and health care, new jobs, labour protection, social protection systems, information and communication technologies (ICTs) and training and education including education for sustainable development and the promotion of sustainable consumption.

Priorities should be given to developing public policies that meet social, environmental, and economic objectives, that focus on sustainable livelihood approaches, that increase access to services for the marginalized and that bring about the required structural change associated with a green economy transformation. But a green economy is not a one-size-fits-all path towards sustainable development. From its dynamic policy toolbox, decision makers – local or national – can draw ideas coherent with their specific sustainable development agendas and contexts.

Proper incentives provided through economic instruments, regulations, sound framework conditions for innovation and technology diffusion, distributional policies and voluntary initiatives can help channel investments – public and private – towards targeted sectors and enhance the effectiveness and fairness of such investments. They can also affect incentives and public awareness, and thereby contribute to behavioural changes in production, consumption and lifestyles. The mix of public policies for a green economy will differ across countries based on their specific socio-economic conditions, institutional settings, resource endowments and environmental pressure points (OECD 2011a). All countries, however, stand to gain from pursuing a green economic transformation, achieving direct economic gains through enhanced resource productivity and new sources of growth and jobs from innovation and the emergence of green markets and activities. In certain economies, a major development benefit of moving towards a green economy is manifested in greater human health and well-being as a result of lower pollution.

---

<sup>1</sup> In the context of environmental protection, the life cycle approach means considering and addressing the environmental impacts of a product throughout different stages of its life, from design to disposal.

## **Investing in physical infrastructure and target sectors**

The call for a green economy comes during a global financial and economic crisis to which many governments have responded with stimulus packages including particular provisions for infrastructure development. As governments seek to scale up the implementation of their provisions, these stimulus packages and their green components are paving the way for longer-term policy reform and infrastructure development. They hold the potential to design new growth paths and to avoid locking capital into inefficient and polluting technologies.

Ongoing systemic problems such as global climate change give the greening of infrastructure additional importance. In developing countries, the need for investments in greening infrastructure could reach US \$264-\$563 billion by 2030 with an additional US \$30-\$100 billion for climate adaptation (World Bank 2010a). If these investments are made, it could mean new jobs, new incomes and better health while reducing households' and countries' energy bills in the long run, lessening the fiscal burden from unemployment and health payments and providing new business opportunities. The Green Climate Fund agreed in Cancun in December 2010 (with an expected launch in 2013) and the developed country commitment to a goal of jointly mobilizing US \$100 billion in public and private funds per year by 2020 as financial support for developing countries can reduce the infrastructure funding gap once operational.

Because of the valuable services they provide, healthy ecosystems – both terrestrial and marine, wild fauna and flora – and the underlying biodiversity play the role of infrastructure as well. Though often unacknowledged, that role is all the more critical in cities and city-regions where the majority of humans live and the fastest economic growth continues to occur. Their maintenance or restoration – including for ecosystem-based climate adaptation and species management – should be considered as a priority for investments.

The greening of infrastructure – including the buildings, energy and transport sectors, which are significant consumers of resources and emitters of greenhouse gases (GHGs) – is urgent as emerging economies and developing countries will build the bulk of their infrastructure in the next few decades. Strategic planning in city-regions is critical for piloting innovations and delivering infrastructural transitions at an increased scale. Given the substantial inertia and “committed emissions” of infrastructure investments, which would lead to the lock-in of unsustainable fossil fuel consumption patterns, delaying action in developing countries by 10 years could result in doubling the amount required to mitigate GHG emissions and make climate adaptation very costly (World Bank 2010a).

Investing in the greening of infrastructure, however, must leverage funding for broader investment needs in developing countries estimated at US \$1.0–\$1.5 trillion per year, only about half of which has been met.<sup>2</sup> In the absence of adequate funding for adequate infrastructure, the deployment and use of individual power generators and

---

<sup>2</sup> This represents 5-8 per cent of developing countries' Gross Domestic Product today, a rough estimate of what developing countries need to spend annually on infrastructure to move towards universal coverage and to deliver the infrastructure service needed for economic growth. For a full discussion of the difficulties of estimating infrastructure investment needs and the methodologies to do so, see Fay and others (2010).

batteries, unregulated wells and open drains carries significant social, environmental and economic costs. Tackling these issues requires scaled-up and accelerated international cooperation, innovative technologies, financing mechanisms, integrated city-regional spatial planning and delivery models including decentralized power generation sourced from solar and wind, which could generate multiple benefits at a relatively low cost. By transitioning now, developing countries have the potential to avoid costly retrofits.

Beyond infrastructure, the greening of agriculture, industry (including mining or extractive industries) and services is also crucial for satisfying demands of an urbanizing global population for higher living standards while adjusting to increasing environmental constraints. In the agriculture and food sectors, investments should aim at improving food and nutrition security and livelihoods while reducing emissions and other negative environmental impacts along the entire food chain through:

- Reducing farm-to-table transport distances
- Sound soil and nutrient management, including reduced use of chemical fertilizers and pesticides and promotion of organic agriculture
- Efficient harvesting and water use
- Reducing the environmental impacts of animal husbandry
- Enhancing production system resilience and associated biodiversity functions such as pollinators and natural pest predators
- Enhancing vulnerable community resilience through livelihood protection, development and productive safety nets interventions
- Strengthening market and risk management opportunities for the most vulnerable
- Intensifying transformational landscape interventions including through climate-smart agriculture approaches
- Conserving genetic resources
- Reducing post-harvest losses
- Improving processing
- Sustainable diets
- Reducing food waste at final sale and consumer levels.

Making these investments employment-intensive will benefit workers, communities and local enterprises. Some of the priority areas requiring policy attention include: increasing productivity in a sustainable manner, in particular by according a higher priority to research and development, innovation, education, extension services and information; ensuring that well-functioning markets provide the right signals and, in particular, that prices reflect the scarcity value of natural resources as well as the positive and negative impacts of their use; establishing and enforcing well-defined property rights so as to ensure sustainable use (OECD 2011b); and enhancing access by the poorest to agricultural inputs, including credit and insurance, as well as to food and nutritional security at an affordable price.

In the industry sector, investments in renewable energy technologies and more resource- and energy-efficient production processes could generate multiple benefits, but distributional effects need to be taken into account with an emphasis on improving access to cleaner technology and employment opportunities. Apart from renewable energy, investments in the broad category of environmental goods and services sector ranging from clean production processes, low impact logistics and material-saving packaging to natural products and services from ecosystems including the often neglected oceans also have a potential for generating multiple benefits.

The global environmental markets were projected to reach US \$688 billion in 2010 and just under US \$800 billion by 2015 (DEFRA 2006). As demand for environmental services, equipment and technologies has been increasing, mainly pushed by regulatory demands in developed countries, the environmental industry has become a dynamic growth pole in OECD countries. This market provides important opportunities for small and medium-sized enterprises (SMEs).<sup>3</sup> The greening of industry holds the potential for opening up vast new markets such as services in the prevention and management of waste and markets created through the application of life cycle approaches.

In the service sector, ICTs as applied, for example, to intelligent transport networks and smart grids can become enablers of resource efficient development. While intelligent use of ICTs can help industries and consumers to do more with less, the sound management of electronic waste poses new risks and opportunities. A growing number of transport sectors are also scaling up their responses to climate and related risks and opportunities. In the aviation sector, substantial investments are needed to scale up the production of fuels from sustainable biomass or renewable oils to commercially viable levels for meaningful uptake by the sector while reducing the emissions of GHGs, particulate matter and fuel sulphur content.

Payments for ecosystem services (PES) is a tool used by many sectors, notably agriculture and forestry, to promote the management of land resources and provide the necessary incentives for restoring rural livelihoods and for rehabilitating damaged ecosystems. It aims at adapting to and mitigating against climate change and at preserving biodiversity or reducing its loss. It is also increasingly used for income generation in rural areas and, thus, can support the transition to a green economy. Standards can be voluntary through, for example, environmental labels that are in demand by environmentally aware consumers willing to pay price premiums for quality and environmental friendly products.

---

3 See for example UN-ESCWA (2011).

## **Investing in human capital and societal infrastructure**

At the heart of the green economy approach is the desire to improve human well-being and social equity, which implies targeted investments in human and social capital on top of investments in natural capital and green physical capital (e.g., clean technologies). A green economy must contribute to the United Nations Millennium Development Goals (MDGs), which are likely to be pursued beyond their 2015 target year with a continued focus on enhancing the access of the poor, women and other vulnerable and marginalized segments of society to services, resources and opportunities, as well as supporting necessary social transformations. The United Nations Millennium Project projected the cost of meeting the MDGs in all countries to amount to US \$121 billion in 2006 and US \$189 billion in 2015 (in 2003 US dollars).<sup>4</sup> In the global transition towards a green economy, these financing gaps must be addressed in synergy with the investments needed for the greening of infrastructure and other economic sectors. Poverty reduction policies should be formulated with a view to encouraging sustainable consumption and production patterns and establishing a green path for future development.

Transitioning to a green economy requires a fundamental shift in the way we think and act. For this to happen, investments in people's capacities and the fulfilment of their entitlements are needed. With greater education, training, information, awareness, understanding and participation in decision-making processes comes greater ownership and responsibility to take action at a grass roots level and change individual and collective behaviour and production/consumption patterns. Investments and technological progress are important in moving towards a green economy, but equally important are awareness, motivation and empowerment of individuals and communities.

To break the cycle of poverty and over-exploitation of resources, a firm commitment is needed to make long-term investments in quality education and training. Education for Sustainable Development (ESD), including climate change education, is a particularly important part of quality education. It provides people at all levels of education, in particular youth, with the skills, competencies and knowledge needed to prepare for green jobs and to change unsustainable consumption and production patterns. It must, therefore, be integrated into educational curricula at all levels and in all educational settings. Communication and media, including the generation of information on sustainable use of resources for poverty reduction and access to such information is also important. Exclusion and inequalities linked to wealth, gender, ethnicity, language, location and disability are holding back progress in providing people with basic education. Girls are disproportionately affected.

In addition, culture must be an integrated part of a green economy transition. Sustainable tourism, cultural as well as creative industries and heritage-based urban revitalization are powerful economic sectors that generate green employment, stimulate local development and foster creativity. Local and indigenous knowledge systems and environmental practices must also be taken into account as they provide valuable insight and tools for tackling ecological challenges, preventing biodiversity loss, reducing land degradation and mitigating the effects of climate change.

---

<sup>4</sup> See UN Millennium Project, Investing in Development, Chapter 17, United Nations (2005). The investments considered in the MDG needs assessments are hunger, education, gender equality, health, water supply and sanitation, improving the lives of slum dwellers, energy and roads.

A green economy and green jobs present a significant opportunity to overcome poverty and inequality by creating more and better jobs. This can be a major contribution to inclusive growth. A transition to a green economy can lead to net gains in employment, not only in green jobs but across the economy compared to the unsustainable conventional growth path (UNEP 2011). It is thus not necessary to choose between the environment on the one hand and employment and economic growth on the other. In order to address the root causes of poverty and inequity, however, any green economy initiatives should include supporting social policies and measures, in particular for the provision of access to better quality social protection. Coherence between social, environmental and economic policies is needed to maximize opportunities and buffer the social cost of the transition. A transition to a green economy needs to project a vision of a greener as well as a fairer economy and society.

Addressing the unemployment challenge through a green economy approach requires increased investments in sectors with high potential for the creation of productive employment opportunities. It also requires exploiting the potential synergies between different policy objectives. Labour market policies could support targeted investments by focusing on improving the skills of the most vulnerable – women, youth, informal workers, small farmers and the unemployed – with particular attention to imparting skills of value in a green economy.

Measures to support the most vulnerable groups such as access to a social protection floor and social safety nets are essential to achieve social inclusion, to deal with the restructuring towards a greener economy and to adapt to climate change as well as to lift marginalized people out of the poverty trap and include them in a green development path. They are also needed to protect groups that might be negatively affected by a transition towards a green economy as may be in the case of workers in the fossil fuel sectors. Such investments include access to nutritious food, health services, education, training and retraining and unemployment benefits. It requires an improved and sound social and physical infrastructure as well. A just transition also requires social dialogue and civic participation in identifying the employment impacts of green economy policies and to charter the way to economic diversification that generates green jobs.

## **Enabling the transition towards a green economy**

### *Mainstreaming: Environmental and social integration*

A fundamental challenge the green economy poses to all public institutions is to converge, align and integrate work across the social, environmental and economic dimensions of sustainable development. This is in part a failure of institutional collaboration and coherence of policy approaches between different United Nations entities at the international and national levels. The green economy approach requires a new level of mainstreaming that goes beyond business as usual. The linkage of “green” and “economy” with human well-being and social equity as core goals requires renewed commitment to measure and value human and natural assets more appropriately, and to put them at the centre of economic development. It also requires more inclusive and pro-poor growth.

Investments in efficient transport systems, housing, energy efficiency improvements, sustainable sourcing of biological resources and environmentally sustainable agricultural practices, among other priorities, have the potential to generate significant social benefits. For example, household energy investments to replace inefficient biomass/coal stoves with improved stoves and cleaner fuels as well as household waste-for-biogas production could improve the sanitation and health of 3 billion people and the well-being of women in particular (WHO 2010). These linkages point to the need for an integrated approach, which should provide a basis for prioritizing investments in a green economy. Those investments that generate both environmental and social benefits should be the priorities.

### *Public and private financing*

A global transformation towards a green economy will require substantial financial resources and coherent criteria for their use. Subsidy reforms and ecological taxes can unlock a substantial amount of funds to support a balanced and inclusive green economy transition. If, for example, industrialized countries were to use carbon taxes or auctioned emissions permits to reach the GHG emission targets they pledged in the Cancun Agreements, they could raise as much as 0.6 per cent of their GDP or about US \$250 billion in revenues per year by 2020 (OECD 2012). In addition, other forms of carbon finance, PES, green stimulus funds, micro-finance, social responsibility investment funds, green bonds and other local financial innovations have emerged in recent years and can open up the space for large-scale green financing. To further scale up the financing for a green economy, public-private innovative financing mechanisms are needed to tap institutional investors' capital.

The private sector is a major driving force in many national and local economies alongside farmers, foresters and fisher folks. With its capacity to invest and innovate, the private sector is uniquely positioned to create solutions that can reduce emissions and resource use while generating growth and employment opportunities including for the poor. The bulk of green investments will come from the private sector.

The role of the public sector, however, is indispensable for influencing the flow of private financing and for triggering a green economy transition. Public spending is important for setting the appropriate investment context, institutionalizing more sustainable

consumption and production patterns, and building the necessary capacity for the transition. Governments, including at the local level, could develop PES schemes, focus on greener public infrastructure and access to food, water, sanitation and energy services as well as on poverty eradication, gender equality and biodiversity and ecosystem conservation and sustainable use. Governments should also use their resources, including through public procurement, to leverage financial flows from the private sector towards green and socially beneficial economic opportunities including at the local level.

Effective green investments and innovation and the adoption and dissemination of green methods of production require good governance. Corruption is a key bottleneck for investments as are the absence of the rule of law, clear regulations, transparency and predictability. A level and transparent playing field will be necessary for a green economy to deliver as required. Governments should involve the private sector in jointly identifying impediments to a green economy and establishing clear, stable and coherent policy and regulatory frameworks to facilitate the integration of social, environmental and governance issues into investment decision-making. At the same time, given the importance of international investment as a vital source of finance and a powerful vector of innovation and technology transfer, governments are encouraged to continue monitoring their investment treaty practices with regard to green economy objectives to ensure that they encourage green investments without leading to green protectionism (OECD 2011c).

The United Nations system and the multilateral development banks have an important role to play in supporting investments in resource efficient development and advancement of sustainable consumption and production. They can provide technical advice and capacity support to governments in the following areas:

- Policy and project design and implementation
- Carbon market development
- The greening of strategic value chains
- Helping countries catalyse investments in energy efficient and climate change mitigation and adaptation by the private sector
- Using a range of instruments to support and fund development of climate-smart agriculture and greener and more resilient infrastructure.

To support the kind of governmental decision-making that will underpin a balanced, inclusive and green transition, however, entities of United Nations system and international financial institutions will need to work together more coherently based on their respective mandates and comparative advantages. To truly contribute to a green economy transition, investments and interventions need to be environmentally sound and socially inclusive to ensure that they are neither harmful to the environment nor disadvantageous or harmful to the poor and that the continued flow of funding towards education, health and social protection activities is guaranteed.

### *Full-cost pricing*

Full-cost pricing, which includes full social and environmental costs, is an essential tool for changing investments as well as consumption and production patterns and for motivating innovations. Apart from reflecting social and environmental costs in prices through taxes, full-cost pricing also implies the phasing out of harmful subsidies, such as those on fossil fuels, fisheries, forestry, water use, land use and agriculture. These subsidies not only encourage carbon emissions, resource depletion and environmental degradation, but can also cause trade distortions and strain public finance. Developing and emerging economies are currently providing subsidies to fossil fuel consumption in an estimated amount of US \$409 billion per year while OECD countries provide US \$45-\$75 billion in support to fossil fuel production and use (OECD 2011d). In comparison, government support to electricity from renewable and biofuels globally was estimated to amount to US \$57 billion in 2009 (IEA 2011).

Full-cost pricing contributes to a more level playing field between established, “brown” technologies and newer, greener ones. Distributional consequences, especially the impacts on the poor and marginalized should be duly considered when designing and implementing subsidy reforms. United Nations entities can help governments and others to find the most appropriate ways of phasing out harmful subsidies while combining that with the introduction of new incentive schemes to encourage positive steps forward.

Governments need to stimulate inter-ministerial collaboration to communicate the societal implications of under-pricing to all concerned and collectively design fiscal and tax policies as well as policies on how to use the newly generated revenue. Consultations with major groups including trade unions, employers’ organizations and women’s associations on the various policy options for implementing full-cost pricing need to take place in order to decide on options that enjoy the broadest societal support. Such consultations will also help strengthen these groups and facilitate participatory policy dialogues especially where social organizations are weak. Any adverse effects of changes in prices of goods and services vital to the welfare of vulnerable groups must be compensated for and new livelihood opportunities provided.

At the international, subregional and regional levels, there is a need for policy coherence and financial and technological cooperation, as countries may not be willing to adopt full-cost pricing unilaterally or in isolation for fear of losing international competitiveness. In spite of this potential collective action problem, which should be addressed at global and regional levels, it is still beneficial for countries to take full-cost pricing measures independently as in the case of the European carbon emission trading system. As commodity prices including fossil fuel prices are generally expected to continue to rise, countries can benefit from the development of resource-efficient technologies and renewable energies even if others continue with business as usual.

### *Regulatory approaches*

To support the transition to a green economy, governments can employ mandatory technical regulations, voluntary standards and information-based instruments. Often, regulatory frameworks are required to support the greening of sectors that rely on natural resources. At the international level, global conventions including, but are not confined to, Multilateral Environment Agreements (MEAs), can foster global commitments and promote coordinated activities on key aspects of the green economy agenda.

In some cases, legislators may choose to adopt domestic regulatory frameworks to further these global objectives. The role of international non-environmental agreements such as on labour standards and human rights in a green economy, however, requires further research.

Regulatory approaches are often taken to support price-based measures or when a ban or binding limitation is deemed necessary to stop certain damaging activities or to bring about behavioural changes. Regulations can also provide enabling conditions and incentives, establish the needed market signals and certainty for businesses to make investment decisions, deploy green technologies, accelerate green innovation and foster clean technology development and diffusion. Information-based instruments, such as labelling schemes and voluntary reporting, which show the environmental and social implications of goods and services coupled with appropriate pricing, can alter consumption habits and promote demand for green and socially responsible goods and services while stimulating suppliers to design and produce such products and services and improve their environmental and social performance.

The success of regulatory approaches hinges on the certainty of policies as well as the quality and credibility of regulatory institutions and their compliance mechanisms, including justice systems. Regulatory institutions need to be transparent, accountable, efficient and designed with a view to minimizing additional costs for business and consumers. Effective compliance mechanisms should be put in place in order to achieve the desired outcomes. Fostering regulatory approaches to support a green economy requires strengthened integrated institutional frameworks and governance. To avoid the proliferation of national regulations and standards, the use of relevant international standards is essential.

In this regard, a number of United Nations entities have been involved in developing international regulations, standards or guidelines to be used as a basis for national regulations or standards to support green economy objectives. Examples are the mandatory emission targets under the Kyoto Protocol, the mandatory measures introduced to reduce GHG emissions from international shipping – the first global mandatory GHG reduction regime for an international industry sector – and the framework developed to reduce GHG emissions from international aviation – the first sector with a shared global commitment to increasing fuel efficiency and stabilizing its GHG emissions in the medium term. It is important that regulations and standards to promote the green economy do not become a source of green protectionism, in line with Principle 12 of the Rio Declaration on Environment and Development. In this respect, the World Trade Organization (WTO) Agreement on Technical Barriers to Trade, while recognizing the important role of standards and regulations for the achievement of legitimate policy objectives, seeks to ensure that they are not discriminatory and do not create unnecessary barriers to trade.

The United Nations system and the Bretton Woods Institutions (BWIs) have an important role to play in supporting the transition to a green economy in the area of regulatory approaches. They can encourage the ratification of relevant international agreements, assist the Parties to implement and comply with related obligations, develop relevant international standards and guidelines, promote good regulatory practice and build capacity, including that of legislators at national and subnational levels to prepare and ensure compliance with regulations and standards in supporting the transition to a green economy.

### *Sustainable trade*

Trade can expand the markets for green goods and services and diffuse clean and resource-efficient technologies and production methods. It can also transmit the growing environmental and social preferences of firms and consumers. An open, rules-based and non-discriminatory multilateral trading system that provides predictability, security and stability is essential for enabling green investments, innovation and technological change, and for preventing trade protectionism disguised as green economy measures.

Positive steps are needed to take the Doha Round negotiations forward, which could contribute to a transition towards a green economy. These include negotiations on the removal of trade distortions, in particular of harmful subsidies including in fisheries and agriculture, and the elimination or reduction of tariff and non-tariff barriers to environmental goods and services. Support is needed to assist developing countries, especially their low-income producers and SMEs, to identify green export opportunities, develop capacity in the production and export of related goods and services, facilitate access to information, training and education, finance, technologies, and markets and increase their competitiveness. International and regional organization have an essential role to play in this regard.

Freer trade should be tied to important human values, welfare goals and inclusive growth, assisting those developing countries that are marginalized in the global trading system. Trade policy also needs to be accompanied by policies in both the social and environmental spheres.

### *Innovation and technology transfer*

Technological innovation in product design, production processes, service systems and organizational management is essential for reducing negative environmental and social impacts and improving resource efficiency. It is also essential for the development of new products, services and technologies that promote decent work, benefit society and support economic diversification and productivity-enhancing structural change.

Changing user behaviours in resource demanding sectors such as food, housing and mobility, however, requires innovation not only in hard technologies but also in knowledge, management systems and incentive mechanisms, all of which are important attributes of social innovation. The use of ICTs can help generalize access to relevant information in decision-making, anticipate and manage potential risks from new technologies and optimize sustainability and cost-efficiency in all economic sectors, including in workplaces through workers–management collaboration and dialogue. United Nations entities need to scale up support for education and training, small business development, continual improvement in resource efficiency and access to innovative financing. In addition, they should provide practical tools that support intellectual property rights and the critical complementary know-how to enable the transfer, adaptation and widespread use and dissemination of green technologies. It is critical that local actors have ownership of the innovative process and new technologies and that local and indigenous knowledge is part of the change.

The United Nations system and the BWIs have indeed actively supported technological and social innovations in developing countries. Their activities range from policy advice and policymaking tools to technical and managerial engagement with industries on resource efficiency and cleaner production, financing and marketing support, skill and capacity development and facilitating the development of knowledge networks and platforms. There is, however, a need for improving the delivery of joint, interagency initiatives as well as mainstreaming programmes on the introduction and effective implementation of new technologies and standards including North–South and South–South technological transfer and cooperation that a green economic transition requires. International policy coordination, e.g., through adherence to MEAs and technical and scientific capacity-building in the receiving country are also key for inducing technology transfer and ensuring that markets for innovations are not fragmented across different countries (OECD 2011e).

### *Assessment and indicators*

An integrated policy assessment framework including improved accounting systems and indicators to capture relevant information and measure/monitor progress is an essential part of making the green economic transition towards sustainable development. The policy framework – based on a wide range of assessment approaches and tools – should include the participation of all relevant stakeholders.

On accounting systems and indicators, an important starting point is the United Nations System of Environmental-Economic Accounting (SEEA), which will become an internationally agreed statistical framework in 2012. It is important that policy makers begin to use this system systematically, taking into account the effects of economic activities on all forms of capital when making policy decisions. It should be noted, however, that the SEEA is not designed to fully capture the social implications of economic activities. Dedicated efforts are needed to standardize and publicize social indicators and use them in public policies in conjunction with other indicators.

Building on the SEEA and other relevant initiatives such as the work on resource indicators by the International Resource Panel, the Wealth Accounting and Valuation of Ecosystems, the Economics of Ecosystems and Biodiversity and the work on monitoring progress towards green growth, three interrelated groups of indicators may be considered:

- Indicators that measure the green transformation of key sectors including environmental investments, environmental goods and services and green jobs
- Measures of decoupling economic productivity and human well-being from resource and emission intensity, including eco-efficiency, re-use and recycling, doing more with less, substitution and material flow indicators
- Overall measures of well-being with a particular focus on natural capital, poverty, social equity and social inclusiveness – indicators of how well a green economy has delivered on human-centered development.

United Nations entities need to improve their ability to contribute to the further development of the SEEA, including programmatic support to institutions in developing economies to improve their capacity to collect, organize, interpret and communicate the relevant data. Public institutions can also learn from experience gained by responsible businesses in defining and applying “core and additional” indicators in their reporting systems and how non-financial information is increasingly linked with financial information in emerging models of integrated reporting. Efforts should also be made to build any new indicator on the basis of existing macro-level indicator sets such as the Human Development Index and indicators for sustainable development. In addition, and importantly, the system of green economy indicators should allow flexibility for countries to develop their own set of indicators that reflect their particular national and industrial circumstances.

## **The way forward for the United Nations system**

### *Mobilizing expertise*

It is important to organize the expertise of the United Nations system including BWIs in a targeted and integrated manner when providing green economy related services to countries. It is also important to ensure that this expertise is delivered in a coherent manner and in accordance with nationally and locally identified challenges and priorities. To accomplish these tasks, it is necessary to sensitize policy and research staff as well as operational staff, at United Nations entities’ headquarters and in their regional and country offices, to the green economy approach, and to develop their capacity to align this approach to countries’ policy frameworks and priorities. In some cases this may require the creation of special units within United Nations entities with expertise in economic analysis to support other experts in defining the economic case and supporting the mainstreaming of environmental and social goals in economic policy programmes.

At the global inter-agency level this expertise is being mobilized through inter-agency mechanisms such as the High-Level Committee on Programming, the Environment Management Group and in a synthesized way directly targeting the work of United Nations Country Teams (UNCTs) and the United Nations Development Group (UNDG). At the regional level the UNDG Regional Directors Team pool resources needed to support UNCTs in their regions.

Regional and subregional cooperation should be enhanced further to support replicating, up-scaling and advancing green economy initiatives, which have been successfully applied in various countries. In this regard, the United Nations Secretariat through the Regional Commissions provides a unique platform for regional dialogues and consensus building. In addition, the Regional Commissions, as the Chairs of the United Nations Regional Coordination Mechanisms, also have the opportunity to mobilize the expertise of the entire United Nations system as well as regional and international institutions and research community outside of the United Nations system.

### *Consolidating country assistance frameworks and strategies*

Given the intersectoral and inter-agency nature of the green economy transition, it is important that any green economy policy development and programme support by a United Nations entity is demand-driven and coordinated with the work of other agencies through the UNCTs and the cycle of the United Nations Development Assistance Framework. The “Delivering as One” approach being piloted in eight countries and applied in another 24 countries offers opportunities that are particularly noteworthy for the transition to a green economy by ensuring that support to countries in the transition to a green economy is delivered in an integrated manner and through a dialogue with all relevant parts of the host government. The ongoing challenge of improving integration across the three pillars of sustainable development is also one of improved inter-agency collaboration across the global, regional and national levels.

### *Generating green, efficient and effective financial support at scale*

Public resources are getting increasingly scarce, calling for a greater focus of public funds to catalyse larger scale private investments in supporting a transition to a green economy. In many cases private sector investment flows await regulatory reform and the introduction of new measures that facilitate the opening up of new markets in environmental goods and services and the in mitigation of risks. Private sector financial flows seek adequate financial instruments – that incorporate an acceptable risk/return proposition – for investing in the green economy. Promoting country ownership and the alignment of the United Nations system’s programmes and projects with national priorities will be critical. Countries also need support in developing capacities to attract and drive green investments. In addition, there is a need to identify and develop at scale new sources of international funds that support the global transition towards a green economy. Efforts need to be made to explore the potential for an innovative use of Special Drawing Rights,<sup>5</sup> other international reserve assets and pools of concentrated assets to serve the aim of financing green economy investments with attractive social as well as private returns and increasing the provision of global public goods.

### *Nurturing green innovation and mobilizing green technologies*

Technology has historically provided the means by which humanity has addressed social and environmental challenges. Policymaking needs to strike a balance between incentivizing investments in new technologies and giving access to the social and environmental benefit of new technologies. Such incentives help mitigate the risks associated with private sector investments in developing new technologies to enable a shift towards a green economy. But these incentives must also be cognizant of the need to maximize the benefit of these new technologies to society as a whole.

---

5 “The Special Drawing Right (SDR) is an international reserve asset, created by the IMF in 1969 to supplement its member countries’ official reserves. Its value is based on a basket of four key international currencies, and SDRs can be exchanged for freely usable currencies.”

See: <http://www.imf.org/external/np/exr/facts/sdr.htm>

The United Nations system must continue to support Member States in their efforts to achieve this balance. It must also continue to provide assistance in the building of innovation infrastructure in developing countries as well as partnerships and capacity to transfer, adapt and disseminate green technologies. Support for efforts to facilitate the use of the global technology database provided by the patent system through the disclosure of technologies in patent applications and tailored search tools such as “IPC Green” can provide an inventory of green technologies that helps both innovation and technology transfer.<sup>6</sup> Support should also be provided for initiatives that create an efficient marketplace and platform for the sustainable transfer of green technologies, making available both intellectual property rights and associated know-how needed to implement a technology.

### *Contributing to the global economic recovery and the success of Rio+20*

The world has not recovered from the financial and economic crisis that broke out in 2008–2009. Recent developments indicate a renewed setback in the recovery driven by the unsustainable debt levels of many industrial economies. The lingering crisis is causing damage to the world economy at large with serious implications for poverty, social equity and social stability as well as commitments to environmental sustainability in all countries. Investments in renewable energy and energy efficiency, sustainable transport, sustainable agriculture and other areas, however, hold a great potential to contribute to global economic recovery. By fundamentally restructuring public spending and leveraging private investments towards environmental and social investments, indebted industrial countries can expect to find new growth paths that support fiscal consolidation while contributing to a green economy.

At a global level, Rio+20 provides an important policy opportunity in the near term for the United Nations system to make commitments to support countries, including Least Developed Countries, in their efforts to move towards a balanced and inclusive green economy. Agreement among United Nations entities on core elements of strategy, policy and programmatic services in support of governments’ green economy initiatives will send a powerful signal to governments, businesses and civil society of the determination of the United Nations system to “Deliver as One” on a green economy transformation for sustainable development and poverty eradication.

---

6 The International Patent Classification (IPC) facilitates searches for patent information. The IPC Green Inventory was developed by the IPC Committee of Experts in order to facilitate searches for patent information relating to environmentally sound technologies.



© Shutterstock / Pedro Salaverría

View of a beech forest in the natural park of Moncayo, Spain.

## Introduction

In September 2009, the Senior Officials of the United Nations Environment Management Group (EMG)<sup>7</sup> agreed to carry out an inter-agency assessment report on how the United Nations system and Bretton Woods institutions could more coherently support and assist countries in transitioning to a green economy model. They also expected this assessment report to capture a common understanding of the green economy and to frame a coherent approach to appropriate measures needed to support green economic transitions at the international and country levels. The EMG also created an Issue Management Group on the green economy, which was tasked to oversee the production of an inter-agency report on the green economy.

The decision by the Senior Officials was made in the context of an evolving global financial and economic crisis, accompanied by ongoing challenges related to food, energy, climate, health and natural resource scarcity, among others. It was also based on an earlier inter-agency initiative on the green economy as part of the Joint Crisis Initiatives launched by the United Nations Chief Executives Board. In June 2009, 22 agencies signed a joint statement on the green economy, outlining common positions on the investments and policies needed for countries to respond to multiple crises. Entitled “Green Economy: A Transformation to Address Multiple Crises”, the statement spoke of a “new economic foundation” with new growth poles.

In addition to the above, the prospect of an international conference in follow-up to the Rio 1992 United Nations Conference on Environment and Development as well as the 2002 World Summit on Sustainable Development gave the preparation of this inter-agency report special importance. In December 2009, the United Nations General Assembly adopted Resolution A/RES/64/236, deciding to return to Rio de Janeiro, Brazil, in 2012 and hold the United Nations Conference on Sustainable Development (UNCSD), also known as “Rio+20”. One of the two overall themes for UNCSD is “Green Economy in the Context of Sustainable Development and Poverty Eradication”. At a time of financial and economic crisis, this signaled special interest in the green economy approach as a pathway towards sustainable development and poverty eradication.

This assessment report therefore also aims to contribute to Rio+20, providing an overview of relevant activities by EMG members and a framework for common understanding and mutual support in their work programmes. In parallel to ongoing deliberations among governments and other stakeholders, and in support of the Rio preparatory process, the agencies, funds and programmes of the United Nations system, including the BWIs, have endeavoured to make a joint contribution on how to make the transition to a green economy as one of several inter-agency contributions to the UNCSD. This report captures the various perspectives of the United Nations system and associated institutions involved, helping to define a shared understanding, coherence in approach as well as potential areas for improved coordination and inter-agency collaboration.

---

<sup>7</sup> The EMG is a United Nations System-wide coordination body on environmental issues, established in 2001 pursuant to General Assembly resolution 53/242 in July 1999. Its membership includes the specialized agencies, programmes and organs of the United Nations System, including the secretariats of multilateral environmental agreements, as well as the Bretton Woods institutions and the World Trade Organization.

The report is organized into four main Parts, covering (i) concepts and institutions; (ii) investing in physical infrastructure and target sectors; (iii) investing in people and human capital and the societal infrastructure; and (iv) enabling policies and measures for the transition.

Part I addresses the framework for action to illustrate the current conceptual and institutional landscape. Chapter 1 covers conceptual issues related to a green economy. It includes an overview of concepts such as green growth, green industry, green jobs and sustainable consumption and production. It also shows the linkage with related concepts associated with core agency mandates, concepts such as human development, health, education and a rights-based approach. Chapter 2 introduces different levels of intervention by United Nations entities, BWIs and regional development banks in pursuing the relevant concepts and goals involved, including ways of improving inter-agency collaboration and integration across economic, social and environmental dimensions.

Part II covers investment in physical infrastructure and target sectors for dynamic growth. Chapter 3 focuses on the green stimulus packages that have been introduced by many governments in response to the financial crisis, in particular their components earmarked for green investment programmes such as the development of appropriate infrastructure. Chapter 4 provides an update on infrastructure needs in developing countries and the urgent need for longer-term investment to deal effectively with services such as the supply of cleaner energy and water. Chapter 5 considers inclusive growth strategies that governments can introduce in order to place their economies on greener and more sustainable growth paths.

Part III focuses on the importance of investing in people and human capital and the societal infrastructure of communities. Chapter 6 explores a new multidimensional approach to poverty and ways of enabling inclusive and pro-poor growth. This includes recognition of the role that the Millennium Development Goals have played in shifting the focus of development to investments in social sector outcomes, while considering shortcomings in the prevalent economic development model. Chapter 7 addresses social capital, including various aspects of health and other socio-economic benefits that follow from investment in cleaner technologies and systems to avoid and reduce pollutants. It also covers the role of culture and the media, including lifestyles and socio-economic benefits from tourism and related activities to protect world heritage sites. Chapter 8 on human capital goes from the societal to the level of individual citizens, addressing their education and ability to participate productively in the economy. This includes the quality of working conditions, social dialogue, social protection and training in making a just transition towards greener industries and green jobs.

Part IV reflects an emerging understanding of policies and measures that are essential for enabling a transition in national economies. Chapter 9 addresses expectations for private finance, including the role of the investment, banking and insurance community. It considers the scale of financing estimated to address challenges such as climate mitigation as well as the catalytic role that public finance can play in higher risk and public interest areas. Chapter 10 highlights activities of the BWIs and regional multilateral financial institutions in facilitating public financing in new thematic areas.

It signals efforts by global and regional finance institutions to apply new criteria in their investment and lending decision-making. Chapter 11 introduces the role of economic and fiscal instruments, with special focus on full-cost pricing. This includes consideration of how the removal of harmful, trade-distorting subsidies can constitute a triple win for trade, the environment and development. Chapter 12 addresses the use of regulatory approaches, including voluntary standards and information-based instruments. Relevant international standards and multilateral agreements that provide a basic reference for the development of national regulations and standards are also featured.

Chapter 13 examines the role of trade in opening new markets for green goods and services as well as for the development and diffusion of green technologies. It highlights the importance of an open, rules-based and non-discriminatory multilateral trading system, together with good governance and policy coherence. The development and diffusion of cleaner technologies is the subject of Chapter 14, along with an exploration of different modes of innovation. Whatever mandatory or voluntary programmes governments pursue, a green economy transition requires integrated accounting and reporting at the national, economic sector and organizational levels. Chapter 15 focuses on indicators for the measurement and communication of progress, including improved methods for measuring the condition of national economies and tracking progress in human well-being and equity. It covers new systems for analysing and communicating relevant information, and emerging standards set by frameworks such as the United Nations System of Environmental-Economic Accounting.

Chapter 16 provides conclusions, and highlights possible areas for improvement by agencies. Detailed descriptions of relevant activities by United Nations agencies, funds, programmes and Regional Economic Commissions as well as BWIs are provided in the Annexes. These descriptions includes highlights from some of the 40 institutions that contributed to the preparation of this report. The EMG has provided a platform for bringing together these institutions with diverse mandates and focuses to present a broad picture, taking into account multiple dimensions and different sectoral perspectives.

Readers should note that the content of the report does not represent a consensus position, and should not be attributed to the governing bodies of any institution. The report aims to garner the collective expertise and experience across the United Nations System, providing a framework to share relevant information and analysis, promoting common understanding and synergy in approach, as well as new partnerships in exploring the green economy as a pathway to sustainable development. The compilation of the report with full support of Senior Officials from EMG members is testimony to the readiness of the United Nations family to make a coherent response to the challenges that will be addressed at the UNCSD in June 2012 and beyond.



INSTITUTIONAL



LOCAL

GLOBAL



GLOBAL





# Part I

## Conceptual and Institutional Framework for Action





© FAO / Giuseppe Blizzarri

Urban and peri-urban agriculture to improve nutrition and livelihoods of poor families, Venezuela.

# Chapter 1:

## The green economy as concept

### 1.1 Green economy: Origins and definition

In the 20 years since the term “green economy” was first coined, interest in green economic principles and actions has evolved and intensified. As of 2008 the global market and financial crisis triggered calls in the global policy arena for a Global Green New Deal (GGND). This was the focus of a report commissioned by the United Nations Environment Programme (UNEP) in 2009.<sup>8</sup> Implementation of green economic principles was described as a long-term strategy for moving national economies out of crisis. The GGND set out three concrete objectives: (i) economic recovery; (ii) poverty reduction; and (iii) reduced carbon emissions and ecosystem degradation. The document proposed a framework for green stimulus programmes as well as supportive domestic and international policies, including support to least developed countries.

Despite continuing concern over global economic and environmental developments in many countries, the pace of the implementation of green stimulus packages and green investments in critical sectors, such as public transport, remains painstakingly slow. United Nations entities are thus called upon to identify concrete opportunities for green economic development, as well as the positive and proactive role that the United Nations can play in facilitating such development.

At the visionary level, UNEP (2011) considers the green economy as: “An economy that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.”

At the operational level, the green economy is seen as one whose growth in income and employment is driven by investments that:

- Reduce carbon emissions and pollution
- Enhance energy and resource efficiency
- Prevent the loss of biodiversity and ecosystem services.

These include investments in human and social capital, and recognize the central position of human well-being and social equity as core goals promoted by growth in income and employment. By definition, green economic objectives need to be aligned with the sustainable development agenda, highlighting a concern with the balance of risks and scarcities faced by peoples across the globe. Affirming sustainable development as overall or end goal, the green economy also represents an attempt to mobilize more action-oriented, mainstream and bottom-up pathways to sustainable development. The approach is based on sound economic analysis of current trends, risks and opportunities as well as on taking stock of national experiences in applying more integrated policy tools effectively.

<sup>8</sup> The report was authored by Professor Edward B. Barbier, who in the 1980s co-authored along with David Pearce and Anil Markandya the ground-breaking report “Blueprint for a Green Economy” (Earthscan 1989) for the United Kingdom of Great Britain and Northern Ireland Government. See Barbier (2009) and UNEP (2009).

## 1.2 Sustainable development and its objectives

*“Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.”* - Principle 1 of the Rio Declaration on Environment and Development, at the United Nations Conference on Environment and Development (UNCED 1992).

The concept of sustainable development was thrust onto the global stage by the Brundtland Commission in *Our Common Future - Report of the World Commission on Environment and Development* (1987) and defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

The report’s framing of the concept of sustainable development twinned environmental action with poverty reduction, and helped set the stage for the 1992 Earth Summit and Rio Declaration. The concept recognized the value of the environment, extended the time horizon and emphasized the role of equity. The Commission (1987: 43) noted that sustainable development embodies two key themes:

- The idea of needs, in particular, the essential needs of the world’s poor, to which overriding priority should be given
- The idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs.

Mindful of the message from the *Limits to Growth* (1972) report by the Club of Rome in the 1970s, the Commission recognized that limits are not always absolute but also reflect states of technology and

organization, which in turn impact on the ability of our biosphere to absorb the effects of human activities. In addition, environmental impact is determined by the sheer size of populations as well as by their geographic distribution, living standards and consumption patterns. Projected population growth will raise the stakes in poverty reduction efforts, pushing higher consumption and production levels, and absent appropriate policies will further increase pressure on resources.

The likely growth of the world population from 7 billion today to over 9 billion by mid-century requires a considerable increase in economic output to ensure food security, reduce poverty, raise living standards and create full, productive and remunerative employment for all. Demographic change not only heightens the need for an alternative economic paradigm, but also calls for policies to address population dynamics within a human rights-based framework that serves to empower, among others, women and girls.<sup>9</sup>

As governments today seek ways to lead their national economies out of financial and economic crisis, the revival of growth, and the optimal nature or quality of such growth, remain topics of intense debate. This is reflected in the findings of the Commission on the Measurement of Economic Performance and Social Progress, chaired by Joseph Stiglitz (2009), which examined the need to move beyond the common yardstick of Gross Domestic Product (GDP).

Meeting essential needs remains critical, as measured by progress in achieving the MDGs. At the same time, persistent gaps in the health and growth of developing regions remain. These raise perturbing questions in terms of how the world can best address resource scarcity, including through more equitable and efficient

<sup>9</sup> Cf. historical messages in this respect from the International Conference on Population and Development (ICPD) of 1994 ([www.un.org/ecosocdev/geninfo/populatin/icpd.htm](http://www.un.org/ecosocdev/geninfo/populatin/icpd.htm)) and the World Summit for Social Development (WSSD) of 1995 (<http://social.un.org/index/Home/WSSD1995.aspx>).

exploitation and sharing of resources. The concept of the green economy addresses this challenge with a substantively new and different approach. It aims to deepen our understanding of, and support for, risk-assessment and decision-making that more effectively merge environment and economics.

Against this historical context, and with the above more action-oriented components in mind, the green economy describes an action-oriented pathway taken by any country, region or the global community to implement sustainable development policies – whose ultimate aim is human health, well-being and productivity, in the spirit of Principle 1 of the Rio Declaration.

### **1.3 Mandates and goals in the context of the green economy**

The United Nations System includes more than 30 agencies, programmes, regional commissions and funds covering different aspects of sustainable development – from humanitarian-, to business- and trade-related. Most of these activities interface, often on a day-to-day basis, with the national economic realities, priorities and decisions of its member states.

Considering the ways the United Nations work can support the greening of national economies in concrete and practical terms is a natural outgrowth, then, of all of the other aforementioned United Nations resolutions and initiatives, not to mention the specific goals and objectives embraced by individual member institutions. Some of these key linkages (between institutional mission and green economic principles or objectives) are outlined thematically in the sections below.

The discussion above noted the concepts of human well-being, needs, social equity, future generations, risks and scarcities.

Showing means of addressing these, reference has been made to economic development (growth, jobs), resources (food, energy, water), human development (health, education), infrastructure, technology and behavioural patterns (both in consumption and production). Consideration of human well-being and poverty, human needs and equity raises the goals of human development, health and education.

#### **1.3.1 Human development, health and education**

In the twentieth anniversary edition of its Human Development Report series, the United Nations Development Programme (UNDP) affirmed its definition of “human development” as follows:

- Human development is the expansion of people’s freedoms to live long, healthy and creative lives; to advance other goals they have reason to value; and to engage actively in shaping development equitably and sustainably on a shared planet (UNDP 2010a).

The United Nations Development Programme has added that people are both the beneficiaries and the drivers of human development, as individuals and groups. The report sees as critical to advancing and sustaining progress in human development the identification of principles for how governments can promote sustainability, equity and empowerments that are mutually reinforcing. The report also identifies the critical role investment in health and education – promoting gender equity – and development cooperation in these areas have played over the past four decades in advancing human development even where growth has faltered.

The advancement of health is integral to human development. As stated by the World Health Organization (WHO) charter, “health is a state of complete physical, mental

and social well-being, and not merely the absence of disease.” Not only is health improved with advances in human development, but improved health promotes human development insofar as a healthy population is more productive overall.

Environmental degradation and ecosystem disruption also takes a human health toll by contributing to the emergence of new diseases and resurgence of known contagious diseases.<sup>10</sup> There is thus mounting evidence that green economic activity can have many clear and quantifiable global health benefits – reducing the burden of disease overall and particularly among the poorest and the most vulnerable.

Equity is an essential building block to a more holistic concept of health – one which addresses the root environmental causes of disease with preventive actions that also support sustainable development. The World Health Organization states that “health development” is directed by the ethical principle of equity: Access to life-saving or health-promoting interventions should not be denied for unfair reasons, including those with economic or social roots.<sup>11</sup> This reflects the rights-based approach promoted by the United Nations High Commissioner for Human Rights. Commitment to the principle of equity ensures that WHO activities aimed at health development give priority to health outcomes in poor, disadvantaged or vulnerable groups.

For the United Nations Educational, Scientific and Cultural Organization (UNESCO), the equity principle drives the organization’s work to provide equal

access to “Education For All”. Exclusion and inequalities linked to wealth, gender, ethnicity, language, location and disability are holding back progress to human development, particularly in least developed countries. Incentives are also needed to get more girls into school and to retain them in school, particularly in developing countries where gender parity has still not been achieved at all levels of education.<sup>12</sup>

### 1.3.2 Decent work and green jobs

Initiatives to address employment and the quality of working conditions highlight the goal of decent work as promoted by the International Labour Organization (ILO). The ILO Director General’s Report to the International Labour Conference in 1999 provided an early definition of what is meant by the concept of “decent work”:

- Productive work under conditions of freedom, equity, security and dignity, in which rights are protected and adequate remuneration and social coverage are provided (ILO 1999).

Since then, the ILO has attributed the following characteristics to decent work:

- It is productive and secure work; ensures respect of labour rights; provides an adequate income; offers social protection; and includes social dialogue, union freedom, collective bargaining and participation.

<sup>10</sup> Currently, WHO (2009) estimates that approximately 25 per cent of all deaths and disease globally are due to environmental pollution, including urban outdoor pollution; indoor smoke from the burning of solid fuels and biomass in poor countries; unsafe water, sanitation and hygiene; chemical exposure; and climate change itself. Most of this burden of disease is borne by poor countries (cf Pruss-Ustun 2005).

<sup>11</sup> See <http://www.who.int/about/agenda/en/index.html>

<sup>12</sup> Encouraging young people, particularly young women, to become scientists and engineers is critical in the green economic transition. For example, an estimated 2.5 million new engineers and technicians will be needed in sub-Saharan Africa alone to achieve improved access to clean water and sanitation (see UNESCO, 2010).

Collaboration between UNEP and ILO in follow-up to the World Summit on Sustainable Development (WSSD) has led to a work stream focused on green jobs. The Labour and Environment Assembly (WILL 2006), hosted by UNEP and ILO with the International Trade Union Confederation and International Employers Organization paved the way for new research that resulted in publication of the Green Jobs Report in 2008. The report defined “green jobs” as:

- work in agricultural, manufacturing, research and development, administrative, and service activities that contribute substantially to preserving or restoring environmental quality.

In a more recent analysis, the ILO Institute for Labour Studies has produced a refined definition:

- Green jobs are those jobs maintained or created in the transition process towards a green economy that are either provided by low-carbon intensive industries (enterprises) or by industries (enterprises) whose primary output function is to green the economy (IILS 2011).

The Green Jobs report of 2008 recognized that there are “shades of green”, considering, for example, ripple effects that impact the provision of support services and that create jobs that are indirectly green. Greening holds the prospect of, among others, improving the health of the workforce and creating jobs in the environmental and pollution abatement sectors. Greener economic development can also help reduce and avoid occupational and environmental diseases and injuries that seriously hinder workforce productivity both in industrialized and agricultural economies. Acknowledging the fact that different industries, old and new, are likely to go through their unique transitions, the report identified different

ways in which employment is likely to be affected as economies become green and oriented toward greater sustainability. This reflected the facts that new jobs will be created, some substituted, some eliminated and some transformed. Faced with this scenario, calls have emerged for a fair and just transition in which those harmed by change are adequately assisted and newly created opportunities are shared by specific groups of workers, social constituencies and communities. Social dialogue is a critical component of the just transition, especially in the workplace. This entails an important role for joint labour–management committees and similar bodies.

A key message from the 2008 report was that green jobs need to reflect decent work – productive jobs under conditions of freedom, equity, security and dignity in which rights are protected and adequate remuneration and social coverage are provided. Evidence shows, however, that green jobs do not automatically constitute decent work, depending on how “green” is defined. Some of these jobs may be dirty, dangerous and difficult and do not qualify as green if the concept also embodies labour standards. The dismantling and recycling of electronic parts by workers under conditions that do not meet recognized occupational health and safety standards, for example, would not qualify as green.

Developing the workforce for transformed or new green jobs requires a new set of skills and knowledge different from those promoted in the past. This requires reorienting current formal and non-formal education at all levels to mainstream sustainable development issues, as promoted by UNESCO as the lead agency for the Decade on Education for Sustainable Development. It also requires technical and vocational education and training to train and retrain the existing workforce.

### 1.3.3 Green industry, goods, services and their sustainable trade

The United Nations Industrial Development Organization (UNIDO) has for years sought to promote sustainable industrial development and the goal of producing more with less as captured by the Brundtland Commission in its analysis of industry in the 1980s. In its mission statement, UNIDO states that it aspires to reduce poverty through sustainable industrial development, adding, “We want every country to have the opportunity to grow a flourishing productive sector, to increase their participation in international trade and to safeguard their environment.”

The UNIDO statement highlights the concepts of growth, productivity, trade liberalization and environmental care. This includes trade as a facilitator for greening markets across the world. The preamble to the 1994 Marrakech Agreement that established the World Trade Organization recognizes sustainable development as well as the protection and preservation of the environment as fundamental goals of the organization. The WTO provides a framework of disciplines to facilitate global trade and serves as a forum to negotiate further trade openness. Freer trade is not an end in itself. It is tied to crucially important human values and welfare goals captured in the WTO founding charter. Among these goals are raising living standards, ensuring full employment, using the world’s resources sustainably and protecting the environment.

The WTO members thus established a clear and explicit link between sustainable development and disciplined trade liberalization in order to ensure that the opening of markets goes hand-in-hand with environmental and social objectives. Ministers also addressed this topic in the 1994 Decision on Trade and Environment. They acknowledged the Rio legacy and expressed the view that there should not

be, nor need be, any policy contradiction between upholding and safeguarding an open, non-discriminatory and equitable multilateral trading system on the one hand, and acting for the protection of the environment and the promotion of sustainable development on the other.

In recent years, Asian interest in the concept of green growth has led UNIDO to sharpen its focus on green industry, and to describe green industry as having a two-pronged agenda:

- To assist existing and emerging industries to reduce their energy, water and materials consumption and to reduce their emissions to water, air and land in an agenda for the greening of industries meant to ensure that all industries produce more while using fewer resources and generating fewer emissions, year after year, as a continuous improvement process over time
- To establish a vibrant and innovative environmental goods and services sector that includes providers of waste management and recycling techniques and services, producers of environmental technologies, providers of energy efficiency and renewable energy techniques and suppliers of environmental monitoring services (Yumkella 2010).

The UNIDO agenda raises the distinction between brown and green sectors, between the greening of existing goods and services and the development of new markets in goods and services that are explicitly green and labelling as such. The earlier work by UNEP and ILO on green jobs and more recent work on green economy recognizes the reality of greening as a process. It includes practices and goods that are not green by definition, but part of greening as an ongoing process of progressively making improvements in reducing pollution and in using natural resources more efficiently.

This approach is complemented by the work of United Nations agencies such as the International Civil Aviation Organization, the International Maritime Organization or the International Telecommunication Union (ITU), which are engaging specific sectors and industries to promote innovation, improve their environmental footprint and help the greening of other sectors. For instance, the development of new green technology standards in the areas of information and communication technologies, smart grids or intelligent transport systems is laying foundations for a low carbon future.

The green economy suggests an economic system that is dominated by investing in, producing, trading, distributing and consuming not only environmentally friendly but also environmentally enhancing goods and services.<sup>13</sup> In this sense, green conditions should no longer be seen as constraints on an economy but rather as forces that generate new economic opportunities. This is about expanding and reshaping, not reducing, the scope for economic development and poverty reduction.

### 1.3.4 Green growth<sup>14</sup>

Concepts similar to green economy that have been promoted in recent years, particularly in Asia, include that of green growth and the circular economy. The use of the word “growth” suggests the particular importance many countries attach to the quantitative expansion of their economies to accommodate the growing population and rising development aspirations. According to the United Nations Economic Commission for Asia and Pacific (UN-ESCAP and others

2010), “green growth” refers to, “economic progress that fosters environmentally sustainable, low-carbon and socially inclusive development.”<sup>15</sup>

There are three things to note here. First, “growth” as used in this concept is not the same as output growth, which is the standard meaning of growth in economics. Rather, it is elevated to cover economic progress. Second, “green” appears to be equal to environmentally sustainable, which refers to using natural resources efficiently and respecting the carrying capacity of ecological systems. Third, low-carbon and social inclusion are the objectives of green growth.

According to the Organisation for Economic Co-operation and Development (OECD 2011a), “green growth means fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies.”<sup>16</sup>

Applying holistic and life cycle principles at the national level, the concept of the circular economy, written into legislation in China, refers to an economy that reduces the consumption of resources and the generation of wastes, and reuses and recycles wastes throughout the production, distribution and consumption processes. This resonates with the 3R concept as promoted for instance in Japan, signaling a waste mitigation hierarchy of reduce, re-use and re-cycle. Investment in resource-efficient technologies and preventative waste management are expected to generate new sources of income and jobs, building a resource-efficient society.

<sup>13</sup> The term “environmentally friendly” refers to causing no harm to the environment, such as low-impact logging. The term “environmentally enhancing” refers to strengthening ecosystem functions such as the restoration of degraded land.

<sup>14</sup> Partly drawn from Sheng (2009).

<sup>15</sup> See also UNESCAP Environment and Development Division, Green Growth website <http://www.greengrowth.org/>

<sup>16</sup> The OECD has argued that green growth means improving health prospects for populations and strengthening energy security through less dependence on imported fossil fuels, adding that investment in the environment becomes a driver for economic growth. See [www.oecd.org/document/41/0,3746,en\\_2649\\_34893\\_43783465\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/41/0,3746,en_2649_34893_43783465_1_1_1_1,00.html)

The relationship between human well-being and the amount and type of available goods and services for consumption is left for individuals, households and other economic agents to determine. Traditional economic models of the relationship assume that more is better. Today, this assumption is questioned by the drive for resource efficiency, sustainable lifestyles and the call for more with less. The concept of the sufficiency economy promoted in Thailand builds on similar principles taken from Buddhist teachings.

References to movement from the waste or throw-away society to the resource-efficient society raise the question of sustainable consumption and sustainable lifestyles. This poses again the ideas of needs and limitations as highlighted by the Brundtland Commission in defining sustainable development. Sustainable consumption and a healthy, green lifestyle have different meanings in different communities, rich and poor, and different national conditions within which United Nations agencies operate worldwide. This has been reflected in Roundtables on Sustainable Consumption and Production convened in follow up to WSSD as part of the Marrakech Process overseen by the United Nations Department of Economic and Social Affairs and UNEP.

### 1.3.5 Sustainable consumption and production

At the 2002 WSSD summit hosted in Africa, countries agreed that, “Poverty eradication, changing unsustainable patterns of production and consumption and protecting and managing the natural resource base of economic and social development are overarching objectives of, and essential requirements for, sustainable development.”<sup>17</sup>

The Johannesburg Plan of Implementation (JPOI) dedicated full chapters to the themes of poverty, health, the natural resource base (cf. ecosystem services as defined by the Millennium Ecosystem Assessment<sup>18</sup>) and unsustainable patterns of consumption and production. Recognizing that consumption patterns often undermine progress made in improving resource efficiency in production, the text put the term “consumption” ahead of the term “production” and used the concept sustainable consumption and production (SCP). This also sought to recognize the interrelation between production and consumption, between supply and demand and the need to move from a tendency to treat these aspects in isolation from each other. The JPOI described SCP as a shift:

To promote social and economic development within the carrying capacity of ecosystems by addressing and, where appropriate, delinking economic growth and environmental degradation through improving efficiency and sustainability in the use of resources and production processes and reducing resource degradation, pollution and waste.<sup>19</sup>

17 Johannesburg Plan of Implementation (2002), paragraph 2, available at: [www.un.org/esa/sustdev/documents/WSSD\\_POI\\_PD/English/POIToc.htm](http://www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/POIToc.htm)

18 The UN Convention on Biological Diversity determines ecosystems as a component of biological diversity. Accordingly, the Millennium Ecosystem Assessment (MA 2005) identified an ecosystem as “a dynamic complex of plant, animal, and microorganism communities and the non-living environment interacting as a functional unit.” The main contribution of the MA was the elaboration of the concept of “ecosystem services”, which it defined simply as “the benefits people receive from ecosystems.”

19 Johannesburg Plan of Implementation (2002), paragraph 15.

Importantly, the above raises the idea of decoupling of economic growth from resource use and environmental degradation. It highlights key elements of SCP, namely:

- The promotion of social development and economic development and growth, but growth that is within the carrying capacity of ecosystems and decoupled from environmental degradation
- Increased resource efficiency and cleaner technologies, reducing material use and eliminating waste and pollution.

Sustainable lifestyles and consumption patterns are key agenda items addressed by United Nations agencies such as WHO, UNEP, UNDP, the World Food Programme, ITU and UN-HABITAT insofar as they are closely related both to trends in health and quality of life as well as to human and sustainable development overall. Integral to cleaner production are economic concepts such as eco-efficiency; using less material; costing for environmental externalities (the polluter pays); and payments for ecosystem services, as well as the principle of precaution. These principles have been promoted in work with industry by UNEP, UNIDO, the International Finance Corporation and others since the 1980s.

The words “production” and “consumption” point to activities at the level of organization, company, household and individual consumer. These microeconomic dimensions have been addressed by a range of environmental policies implemented by governments. The green economy as work area focuses on macroeconomic analysis of the trends that result from these activities, and how economic and other policies pursued by governments can influence these to scale

up progress towards sustainable development. The green economy and SCP can therefore best be described as two sides of the same coin, covering macro and micro interventions that require changes in policy and regulatory instruments, investment and business operations, as well as behavioural change in society.

#### **1.4 The five capitals as enablers**

The United Nations Environment Programme (UNEP 2011) has highlighted that a green economy is expected to deliver three types of outcomes. They are (i) new sources of income and jobs; (ii) low carbon emissions, reduced use of resources and reduced generation of waste and pollution; and (iii) contributions to broader societal goals of sustainable development, social equity and poverty reduction. The optimal contribution of a green economy to social goals is, however, not automatic. Specific policies and institutions must be attached to green economy activities. These include effective education and training programmes, instruments that send appropriate price signals and incentives, as well as supportive trade and investment agreements.

This tie-in of goals and impacts in the economic, social and environmental domains raises the role of catalysts and incentives to improve integration across the three pillars of sustainable development. It is a challenge that affects all agencies in the delivery of their mandates. This chapter has given an overview of how agencies define the green economy and related concepts such as human development, health and education, SCP, green jobs, green industry and green growth. It has highlighted how different agency mandates lead to differences in approach ranging from humanitarian concerns to a focus on the economic case.

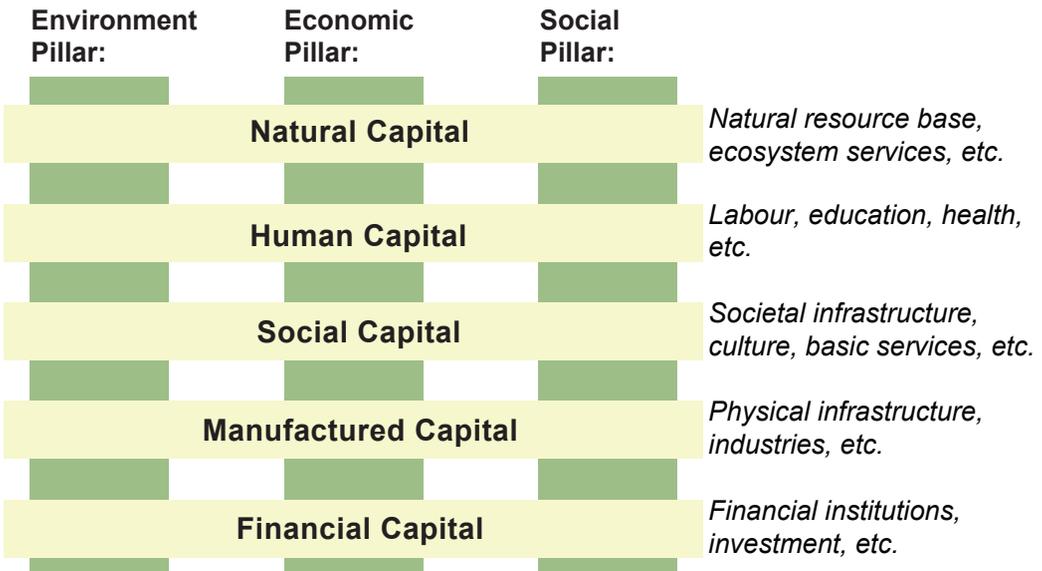
Comparing the core concepts and goals of what sustainable development sets out as a vision, the question follows: What is really different in approach when activities are initiated under the heading of green economy? One shortcoming of the way in which sustainable development has been operationalized over the last two decades has been the tendency to operate activities under the so-called three pillars in isolation from each other. The world's approach to dealing with the three pillars of sustainable development has led many to juxtapose these rather than to integrate them. New thinking related to the green economy seeks to address this, highlighting that what really matters is not the arithmetic among the three pillars (added or subtracted as convenient) but rather the algebra among them (how the variables relate and affect one another in context, how they combine towards the equation of sustainable development).

Seeking to improve the effectiveness and scale up the impact of activities for sustainable development, approaches such as that of the green economy focus on enablers that cut across the three pillars of environment, economic and social development. These enablers refer to resources or different types of capital that are employed to advance implementation of sustainable development and deliver results in its three principle domains. This more integrated approach does not require any change to the established definition of sustainable development.

Nor does it seek to substitute the three pillars. Rather, it requires attention to the way in which the relationship among the three pillars is conceptualized and how as a result resources or capital are allocated in decision-making with an integrated perspective that cuts across the three principle domains.

This approach has special interest in using indicators that integrate environmental, economic and social dimensions. It focuses on environment as a driver for economic growth, and ecosystem services that can be valued in economic terms. Using the idea of five capitals as enablers that cut across the three pillars of sustainable development, the approach can be presented schematically as shown in Figure 1.

Figure 1 signals core work areas for many United Nations agencies, programmes and regional commissions, including mandates related to environment, labour, education, health, industrial development and investment. The positioning of five capitals that enable results in the domains of environmental, economic and social development signals an action-oriented approach. It reflects a new approach in which the green economy is about mainstreaming across the three pillars and an action-oriented pathway for achieving sustainable development. It requires new forms of integrative collaboration and joint management among different United Nations agencies as well as among different ministries within governments.

**Figure 1.** Drivers for green growth

*Note:* Five “enablers” that cut across the three pillars of sustainable development to deliver “results” in each of the environmental, economic and social domains.

In a green economy, natural capital – comprising the biosphere as a whole, including biodiversity and ecosystems – is an enabler of economic growth and human well-being. Rather than being seen as a passive receptor of wastes and pollution generated by economic activity or as one of many substitutable factors of production, the environment in a green economy is seen as a determining factor of economic production, innovation, value creation, stability and long-term prosperity.<sup>20</sup>

The green economy model seeks a more balanced portfolio of investment of social, human, natural, financial and physical capital. It recognizes the value of markets, but is not tied to markets as the sole or best solution to all problems. It better includes and uses the productive power of natural capital, especially in devising livelihood solutions for those living in poverty and who depend on nature for a large part of their livelihood. Since the poor are most dependent on the natural resource base for their livelihoods and least able to shield themselves from a degraded environment, movement towards a green economy is seen as a means of promoting equitable and inclusive growth.

<sup>20</sup> The Millennium Ecosystem Assessment (MA) shows how ecosystems and their services contribute to human well-being. For the full MA series of reports published under United Nations auspices from 2001 onwards, visit: [www.maweb.org/en/Reports.aspx#](http://www.maweb.org/en/Reports.aspx#)



© United Nations Environment Programme (UNEP)

UN official clearing a spot for tree planting at a school in Ogoniland, Nigeria.

## Chapter 2: Institutional support from the global to local level

### 2.1 Introduction

The United Nations system, as the most inclusive multilateral framework for policy and action, has an essential role to play in supporting efforts to pursue sustainable development, including efforts through the avenue of a green economy. Relevant experience and a range of programmes are in place that can be further developed and tailored to the green economy approach with local needs and relevant context in mind. Being vertically integrated, the United Nations is present at global, regional, national and in some cases also at local levels. The United Nations can play a role in generating a shared analytical methodology and framework to assess investment, policies and measures in support of a green economy transformation and improved pathways to sustainable development.

The same applies to the Bretton Woods family of institutions and multilateral development banks at the regional level. United Nations agencies, multilateral finance institutions and other international agencies are all challenged to find the appropriate combination of top-down and bottom-up initiatives. Programmatic action at country and regional levels can for example be used to provide tailored and coherent responses through a locally driven, bottom-up approach and possible tools defined by national and local stakeholders. This chapter provides a brief overview of the relevant presence of the United Nations and multilateral finance institutions at different levels of action, ready to support national green economy transitions in different parts of the world.

### 2.2 Supportive action by the United Nations system globally

The United Nations collectively raises awareness on key issues at the global level through international summits and conferences such as the legacy of key events on sustainable development, notably the United Nations Conference on Environment and Development (UNCED 1992), the World Summit on Sustainable Development (WSSD 2002) and the United Nations Conference on Sustainable Development (Rio+20 2012). Noteworthy because of their focus on sustainable development are the three Rio Conventions agreed in 1992, namely the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC), and the United Nations Convention to Combat Desertification (UNCCD).

The United Nations provides the platform for agreeing on principles, norms and standards in treaties relating to, among others, human rights, labour, environment, climate change and anti-corruption. United Nations agencies, programmes, funds and regional commissions collaborate also with non-governmental actors in these areas, including the private sector as is done through initiatives such as the United Nations Global Compact of the United Nations Secretary-General. The normative function at the global level will be key to ensuring that a green economy is framed in the context of sustainable development and poverty eradication, employing relevant norms and standards that truly serve to make sustainable development a reality in markets and societies worldwide. In this regard,

expertise is being mobilized through such inter-agency mechanisms as the High-Level Committee on Programming, the Environment Management Group, UN-Energy, UN-Water and UN-Oceans and the United Nations Development Group (UNDG), which also pools together resources needed to support the United Nations Country Teams (UNCTs) in their respective regions. These mechanisms aim at enhancing system-wide coherence of agendas and issues in various contexts ranging from the MDG Summit to Conferences of the Parties.

In line with conference outcomes and international agreements, the United Nations System provides support to Member States in meeting their sustainable development goals. Coming together around the MDGs, the United Nations System has contributed substantively to the strengthening of particularly the social pillar. The comprehensive plan of action called “Agenda 21”, adopted at the UNCED 1992 and reinforced at the WSSD 2002, is being implemented globally, nationally and locally by various organizations of the United Nations System, governments, and Major Groups.<sup>21</sup> This is reflected in the agenda of almost all United Nations entities as documented in the “Note on Environment in the United Nations system”<sup>22</sup> prepared by EMG members in 2011.

What has yet to happen on a greater scale is stronger focus on socio-economic aspects and the integration or convergence among the pillars of sustainable development as

noted by the United Nations Secretary-General (2010) in his report to the first PrepCom held for the UNCSD (Rio+20).<sup>23</sup> The opportunity offered by Rio+20, with green economy in the context of sustainable development and poverty reduction as a core theme, is the chance to advance the application of a range of economic instruments to impact investment choices and consumer behaviour to ensure such integration and transformation of national development takes place.

This sense of opportunity is reflected in the joint statement “Green Economy: A Transformation to Address Multiple Crises” that 22 heads of agencies from the United Nations, the World Bank and WTO issued in June 2009.<sup>24</sup> It offers a common perspective from multilateral institutions on how, inter alia, actions such as green investment, financial support, fiscal reform, phasing out perverse subsidies, trade liberalization, education, green jobs, capacity development and integrated environmental-economic accounting can help countries onto a greener and more inclusive development path.

Today, agencies need to explore new ways of pursuing these actions through initiatives such as the Green Economy Initiative and related programmes of international agencies from the global to local level. These can complement initiatives by different Major Groups from the non-governmental world, including the Green Economy Coalition and the Vision 2050 initiative of the World Business Council for Sustainable Development.

21 For the full text of Agenda 21 online, visit [www.un.org/esa/dsd/agenda21/](http://www.un.org/esa/dsd/agenda21/).

22 The text is available as Information Document UNEP/GC.26/INF/23 prepared for the 26th Session of the UNEP Governing Council <http://www.unep.org/gc/gc26/information-docs.asp>, February 2011. The note was developed with input from all EMG members.

23 The report warns that “the overall picture is one of divergence” and adds that “progress to date is also threatened by the series of crises that affected the global economy starting in 2008” (UNSG 2010). The full text of the report and other SG reports for the Rio+20 PrepComs are available at: [www.uncsd2012.org/rio20/index.php?menu=44](http://www.uncsd2012.org/rio20/index.php?menu=44)

24 The statement was issued at the United Nations General Assembly Conference on the World Financial and Economic Crisis and its Impact on Development, held in New York from 24-26 June. It is available from [http://www.unep.org/pdf/press-releases/Green\\_Economy\\_Joint\\_Statement.pdf](http://www.unep.org/pdf/press-releases/Green_Economy_Joint_Statement.pdf)

## 2.3 Supportive action at the regional level

The United Nations Secretariat, through the Regional Commissions, provides a unique platform for regional dialogues and consensus building, which often leads to the coordination of regional and subregional activities. In addition, the Regional Commissions as the Chairs of the United Nations Regional Coordination Mechanisms have the opportunity to mobilize the expertise of the entire United Nations System as well regional and international institutions and research community outside of the United Nations System. Approaches to green economy policies and actions have already been addressed at this level, most comprehensively in the Asia and Pacific Region.

In 2005, the Fifth Ministerial Conference on Environment and Development in Asia and the Pacific adopted the green growth approach as a key strategy to achieving sustainable development in the region. The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) has since conducted a range of activities to promote green growth. Notable progress made includes a partnership with the Global Green Growth Institute in the Republic of Korea, along with the development of a “Low Carbon Green Growth Roadmap for East Asia”. The 2010 UN-ESCAP Ministerial Conference adopted the Astana Green Bridge Initiative, which will promote an innovative partnership between Europe and Asia and the Pacific for the implementation of the green growth approach. Its Regional Implementation Plan and Ministerial Declaration set a framework for Member States of Asia and the Pacific to achieve sustainable development, including the MDGs and poverty eradication through green growth.

Relevant instruments have been developed in other regions as well. The United Nations Economic Commission for Europe (UNECE) Protocol on Strategic Environmental Assessment (2003) and the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (1998) precede recent green economy initiatives but remain particularly relevant. The Aarhus Convention links environmental rights and human rights, government accountability and environmental protection. Importantly, it underlines that sustainable development can be achieved only through the involvement of all stakeholders. This also applies to the participation by European countries in the further development by the OECD of its Green Growth Strategy.

In Latin America and the Caribbean, the United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC) is studying the creation of an institutional mechanism such as a subsidiary body of the Commission that would periodically convene ministries of industry, development, finance, environment and social affairs in order to promote the integration of sustainable development into government strategies. This would become an important mechanism in advancing a holistic approach and in improving alignment in planning between ministries such as those of the Environment and Finance.

This was the spirit of a Ministerial Statement by African Ministers at an Annual Meeting of the African Union Conference of Ministers of Economy and Finance and the United Nations Economic Commission for Africa Conference of Ministers of Finance, Planning and Economic Development in March 2011 when they stated: “We will play our part to spearhead the transition to a green economy in Africa, inter alia, by supporting the necessary systemic and institutional transformations to ensure that green economies contribute to sustainable development

and poverty reduction objectives... We call on all development partners to accompany Africa in this journey.” When African Ministers of the Environment issued the Bamako Declaration on Environment for Sustainable Development in June 2010, they urged the African Ministerial Conference on the Environment member states to fully explore opportunities for building green economies, among others through the development of cleaner technologies, renewable energies, water services, green transportation, waste management, green buildings and sustainable agriculture.

## **2.4 Delivering as a team at the national level**

Providing sound advice and support to governments for their development policies, strategies and actions will be essential to achieving a national transition to a green economy. Responding to country demand, United Nations agencies as service providers and implementing agents can assist in advancing national green economy initiatives through the United Nations Resident Coordinator System and the United Nations Development Assistance Framework. This country-specific planning framework for the development operations of the United Nations System lays the foundation for cooperation with governments and other development partners.

United Nations Country Teams (UNCT) have in recent years scaled up their assistance to governments to support low-carbon and climate-resilient development. In 2009, 65 UNCTs reported capacity-building efforts on climate change, linked especially to policy development and implementation, to support obligations under existing legal frameworks, including 17 joint programmes targeting climate

change.<sup>25</sup> While these efforts can clearly be seen as an integral part of United Nations support for transition to green economy, there is at present no consolidated overview of the extent to which green economy is being specifically targeted through joint efforts by UNCTs and through actions in parallel to joint UNCT efforts.

The expertise in support of the UNCTs is being mobilized, at a global inter-agency level, through inter-agency mechanisms such as the High-Level Committee on Programming, the Environment Management Group and in a synthesized way directly targeting the work of UNCTs, the United Nations Development Group. At the regional level the UNDG Regional Directors Team pool resources needed to support UNCTs in their regions.

Subject to country demand, the Delivering as One approach could help such efforts. The approach is being piloted in eight countries and in 24 so-called self-starters. The overall objective of the approach is to maximize existing synergies, eliminate duplication and overlap and optimize the impact of the collective effort of the United Nations system. While the overall experience of Delivering as One countries has been diverse, the lessons emerging suggest that UNCTs in those countries are engaged in more coherent planning, prioritization and programming. The approach has supported greater national ownership and leadership of the development agenda, and participant countries have improved access to the full range of the mandates and expertise of United Nations agencies.

The Delivering as One experience holds important lessons for future country-level collaboration among United Nations agencies as they participate in national green economy advisory services as provided by, for example, UNEP. Advisory

<sup>25</sup> Reported through the Resident Coordinator Annual Reports (RCAR) available on the UNDG website ([www.undg.org](http://www.undg.org)) including through the synthesis of the RCARs.

services include the provision of platforms for national dialogue and consultation; analytical and research support through macroeconomic and sectoral assessments of green economy opportunities and options; capacity enhancing activities; and sharing of international experiences and best practices. Since 2010, the UNEP Green Economy Initiative has been providing advisory services to more than 20 governments around the world, with an active engagement in 15 countries.

## **2.5 Engaging at the local level with cities, rural communities and others**

Green economy approaches can also be applied at the subnational level, for example, at the level of cities and rural communities. Rapidly urbanizing communities in industrializing countries have pressing problems related to their daily quality of life and environment, their health and their employment. On the other hand, rural communities in poor countries have their own set of unique but relevant economic problems associated with, for example, their access to education and direct dependence on natural resources.

The potential contribution to sustainable development at this level requires capacity development and supporting tools in areas such as sustainable land use, building standards, green cities, public transportation, infrastructure and energy efficiency, sustainable agriculture and rural livelihoods. Local authorities can be a substantive contributor to the achievement of green economy objectives. The local level offers ample opportunities for collaboration and consultation with civil society, research centres, think tanks, community-based groups and grassroots organizations.

Various parts of the United Nations already support efforts at this level. For example,

under the UNDP-Global Environment Facility Small Grants Programme a number of green economy approaches have proven successful at the community level, and sustainable livelihoods have been an entry point to engage communities in green economy development processes in areas such as certification and revenue generation based on local produce. The Seed Initiative of UNDP, UNEP and the International Union for Conservation of Nature (IUCN) has a growing database of local level, multi-stakeholder partnerships through which local entrepreneurs are advancing MDGs on the basis of green business development.

In its work with cities, UN-HABITAT is taking action in two key areas, namely (i) assisting national and local governments in reviewing and updating building laws and regulations; and (ii) revitalizing urban planning. The first of these aims to promote the use of climate-friendly building materials, renewable energy sources, as well as energy efficient design criteria and standards. Through appropriate urban planning, a powerful tool to curtail urban sprawl, the intention is to promote sustainable public transport systems and influence the management of future energy supply and demand.

## **2.6 Facilitating the provision of public-private financing at all levels**

Programmatic action in support of green economy goals at all levels requires private capital and targeted public finance to catalyse new ways of managing economies, businesses, projects and technologies. The World Bank and International Monetary Fund (IMF) as well as the Regional Development Banks have all made sustainable development a core component of their policy and operational practices, and are exploring ways in which these can be aligned with new green economy approaches.

The role of the multilateral development banks (MDBs) in fostering a transition towards a green economy needs to consider carefully their distinctive capacities in both public and private lending. The MDBs play different roles in this respect. Yet overall resource efficient and low-carbon development has become a priority in all MDBs. It is increasingly integrated and mainstreamed in their development and operational strategies, as has the development of various practices to mainstream resource efficiency and climate change considerations in all their financing activities.

Like United Nations agencies, the MDBs can support borrower countries in a number of ways to address the challenges of the green economy. With respect to climate change in particular, they can do this through:

- The use of a broad range of instruments to fund climate change interventions
- Catalysing energy efficient and climate change investments by the private sector
- Providing technical advice and capacity support to borrower governments
- Support for project implementation and sustainability
- Support for carbon market development.

Concerted action related to climate change is illustrative. In their Joint Statement of December 2009 at the Copenhagen Climate Conference, the Heads of the MDBs and IMF pledged to build upon their respective mandates,

expertise and resources to help developing countries and their public and private sectors respond to the challenge of climate change while achieving the MDGs. The Climate Investment Funds are a joint instrument for five MDBs (including their private sector arms) to assist developing countries in scaling up financing that is needed for the transition to a green economy. Contributions of US \$6.5 billion have been pledged by 13 countries. The Clean Technology fund has endorsed 14 investment plans for a total of US \$4.5 billion leveraging US \$37 billion in co-financing.

A range of sectors benefit from the above, with notable results in renewable energy and energy efficiency. The initiative includes projects with investments in the natural resource sector, both national and multi-country regional activities. Since the MDBs operate on a country demand basis, their portfolios reflect increasing demand from different stakeholders in developing countries for developing sustainable policies and practices. Hence the emphasis on green growth and green economy is timely and relevant.

While transitions to a green economy are increasingly the driving force in all the Bretton Woods Institutions and Regional Development Banks, their collective response to date has focused particularly on climate change. Initial emphasis on action to reduce GHG emissions is increasingly accompanied by action to improve climate resilience in countries. The MDBs are also collaborating with United Nations agencies in initiatives such as the Climate Finance Options knowledge platform, which is managed jointly by UNDP and the World Bank. The platform addresses information needs on the multitude of funds available for climate action in developing countries.<sup>26</sup>

---

26 Based on the UNFCCC framework, the platform is composed of two complementary domains created to help catalyse financial and investment flows to more effective and efficient climate measures (mitigation and adaptation). See [www.climatefinanceoptions.org](http://www.climatefinanceoptions.org).

## **2.7 Improved collaboration between UN system partners and others**

Work delivered at the global and regional levels is mainly in support of the work delivered at the national and local levels. The United Nations and multilateral fund offices at the national level are the front-line with the governments, who are the drivers of development.

With its main focus on the national economy, the green economy is an issue that lends itself very well to stronger inter-agency

cooperation and demand-driven partnerships at the national level. It requires the network and expertise of the United Nations and multilateral finance partners, including stronger collaborative mechanisms that help to integrate and mobilize the enabling capitals across the three pillars of sustainable development. Likewise, international agencies are well advised to work not only in an inter-agency context, but also in close collaboration with civil society, research centres, business, labour, consumer groups and community-based and grassroots organizations, particularly for transformative action at the local level.





## Part II

# Investing in Physical Infrastructure and Dynamic Growth





© Shutterstock / Oleksiy Mark

High speed train in motion.

## Chapter 3: Green stimulus and beyond

### 3.1 Introduction

In response to the financial and economic crisis of the last four years a number of countries, both industrialized and developing ones, launched fiscal stimulus packages. Altogether these were estimated to amount to US \$3.1 trillion of committed spending in 2009 (UNEP 2009a). At least 15 per cent of this spending – over US \$445 billion – was allocated to sectors and activities such as infrastructure, in particular, railways, electric grids, high-speed broadband networks, water and waste, energy efficiency, renewable energies and low-carbon vehicles that build on and enhance the Earth's natural capital or reduce ecological scarcities and environmental risks (Robins 2009). These sectors, in addition to other innovative and energy-efficient goods and services, can therefore broadly be considered green.

Government stimulus packages included not only committed government spending, but also tax relief and tax incentives for the private sector. An overview of specifically committed government spending in eight countries from different regions is provided in Table 1.

**Table 1- Sizing Green Stimulus Packages**

Country	Package	Period (year)	Total Fund (US\$ billion)	Green Fund (US\$ billion)	Renewable	CCS* / Other	Building EE*	Lo C* Vech+	Rail	Grid	Water/ Waste	
<b>Asia Pacific</b>												
China	NDRC* Stimulus Package	2009-2010	586.1	200.8	-	-	7.31	1.5	98.65	70	23.38	
Indonesia	Stimulus Plan	2009	5.9	0.1	0.07	-	-	-	0.03	-	-	
South Korea	Green New Deal	2009-2012	76.1	59.9	1.8	29.05	6.41	1.8	7.01	-	13.89	
<b>Africa</b>												
South Africa	Budget 2009-2010	2009-2011	7.5	0.8	-	-	0.1	-	0.61	-	0.1	
<b>Europe</b>												
European Union	Economic Recovery Plan-Only EU	2009-2010	38.8	24.7	0.65	12.49	2.85	3.88	-	4.85	-	
Germany	Stimulus Plan	2009-2010	104.8	13.8	-	-	10.39	0.69	2.75	-	-	
France	Revival Plan	2009-2010	33.7	6.1	0.87	-	0.57	-	0.39	4.13	0.19	
<b>Americas</b>												
Mexico	Aggr for Home Economics & Emp	2009	7.7	0.8	-	-	0.75	-	-	-	-	
United States	Emergency Economic Stabilization Act	10 Years	185	18.7	10.25	2.6	3.34	0.76	0.33	0.92	0.52	
	American Recov and Reinvestmt Plan	10 Years	787	94.1	22.53	3.95	27.4	4	9.59	11	15.58	

\* NDRC = National Development and Reform Commission CCS = carbon capture and storage EE= energy efficiency LoC = low carbon

Source: Adapted from HSBC, 9 March, Delivering the Green Stimulus.

### **3.2 Assessing impact to date**

There is indication that green stimulus spending triggered a significant expansion of economic activity in targeted green sectors. The Chinese State Grid Corporation has announced that 2009 was its highest-ever investment in grid development, in part due to an increase in railway infrastructure (Robins 2010).

In the United States a record high of 9.9 GW of wind installations was added in 2009. The US Department of Energy indicates that the stimulus in the renewable sector will leverage US \$43 billion of private capital in 2012. Spending by the US Department of Energy has been matched by an estimated US \$27 billion of private capital, totalling approximately US \$65 billion in projects (approximately equivalent to 0.5 per cent of total GDP). Public-private partnerships were made possible through government grants, as well as soft and facilitated loans. As a direct result of the American Recovery and Reinvestment Plan, the State of Massachusetts in 2009 awarded funding solely for projects that move towards the development of zero net energy buildings (MNN 2009).

Infrastructure, in particular, rail infrastructure, has received the biggest boost from green stimulus packages. Investment in rail and water infrastructure, grid expansion and improved building efficiency has been particularly high, totalling 85 per cent of the allocation of green stimulus packages or US \$379 billion. For example, almost half of China's US \$218 billion green stimulus package has been allocated to railway infrastructure. About US \$23 billion (15 per cent of the total) has been channeled to the construction of water infrastructure that benefited 14.6 million people. (Robins 2009, 2010)

In 2009 South Africa activated plans for the government and its utilities to spend US \$96.7 (787 billion rand) over the next three years on building and upgrading infrastructure for power supplies (UNEP 2009b). Other investments promoted by governments include investment in informational technology infrastructure. In the US this has taken the form of a plan for improving access to high-speed broadband networks to more than 100 million households, aiming to advance national goals for education and health care (US Government 2010).

Overall, green stimulus appears to have secured green jobs at risk and created new ones around the world. In a number of countries, a large portion of the fiscal stimulus has been geared towards securing jobs and providing social safety nets, with varying degrees of success. At the same time, the injection of massive spending in specific sectors resulted in a rapid transition in labour markets within and among countries, requiring policy intervention to manage such a transition in a fair manner (ILO 2010a). Infrastructure investment is one of the main means of restarting growth and creating jobs, the reason why a significant part of fiscal spending went to construction, transportation and energy-related infrastructure. Part of this includes green infrastructure such as works for flood control, irrigation schemes, insulation of buildings and changing transport from road to rail.

The American Recovery and Reinvestment Act has saved or created some 52,000 clean-energy jobs and supported another 11,000 jobs (Robins 2010). The Republic of Korea's Green Growth Strategy is expected to create 1.47–1.18 million jobs in green industries (Korea 2010). The bulk of Indonesia's US \$5.9 billion fiscal stimulus launched in February 2009 was spent to prevent worker layoffs and improve Indonesian business competitiveness.

Nonetheless, there have been concerns about the sustainability of jobs created through stimulus packages. According to certain studies, just one in ten of the newly created green jobs became a permanent job (Álvarez and others 2009). It must be noted that very little analytical work has been devoted to this issue in the literature. Therefore, the results emanating from the few studies available should be interpreted with caution. More generally, the rising level of informality in the global economy constitutes a major challenge to all job growth, including green job growth. Spain, for example, experienced one of

the highest increases in unemployment among young adults after the global financial crisis. Despite efforts to revive the economy, unemployment rates have stagnated. As a result, Spain's informal economy has grown, lowering wages and government revenue (European Employment Observatory 2010).

The effort to advance decent work and pro-poor sustainable development as a single and integrated strategy is critical to building green jobs across the developing world. One way to reduce the risks associated with green jobs would be to increase social safety nets in various countries. The Green Jobs Initiative of the ILO and its partners seek to mobilize governments, employers and workers to engage in dialogue on coherent policies and effective programmes leading to a green economy with green jobs and decent work for all.

### **3.3 From stimulus to long-term policy reforms towards a green economy**

There is empirical evidence today that targeted government spending can start a transition to a low-carbon economy. The Green Economy Report (UNEP 2011) found that investing 2 per cent of global GDP per year in ten economic sectors between 2010 and 2050 can kick-start a transition towards a low-carbon, resource-efficient economy. Currently, 2 per cent of global GDP amounts to approximately US \$1.3 trillion. In comparison, all of the green stimulus packages only amount to US \$521 billion (Robins 2010).

Several countries have expanded investment in specific sectors beyond the green stimulus packages. For example, Germany announced a number of plans that can be seen as shifting the economy towards a green path, building on some of the initiatives under the stimulus package. One component is the Renewable Energy

Sources Act, which entered into force in 2009. Germany's goal is to increase the share of renewable energy in total electricity consumption to at least 30 per cent by 2020, a doubling of the current share of almost 15 per cent (Germany 2010).

Mexico is one of the first developing countries to commit to a voluntary carbon reduction target by pledging to halve GHG emissions by 2050 (WRI 2009). Mexico also plans to put in place a domestic cap-and-trade system by 2012 (Burtraw and others 2010). Among other significant measures, the government enacted the Special Program for Climate Change 2009-2012 (PECC). This programme lays out a long-term vision for combating climate change while establishing the sectoral level interventions that will result in emission reductions. It also creates a framework for monitoring improvements and establishes a blueprint for emission reduction initiatives. Through the PECC, Mexico is evaluating the vulnerability of the country to climate change and conducting an economic valuation of the priority measures for intervention (WB 2009a).

Moreover, governments have moved into macroeconomic policy reform, specifically using fiscal policy to mitigate climate change. The South African government is considering the introduction of a long-term, escalating carbon tax to help curb GHG emissions, particularly from coal-fired power plants (UNEP 2009b).

Green investments are also being integrated into medium- to long-term development plans in certain countries. This expansion of short-term countercyclical measures into spending as part of the regular budgeting process for 2010 characterized some countries. Others even developed full-fledged medium-term development plans with a significant component on themes related to promoting a green economy. The Republic of Korea adopted in July 2009 a Five-Year Green Growth Plan (2009/2013) to serve as a medium-term plan for implementing

a low-carbon, green growth vision. Under the plan, US \$83.6 billion, representing 2 per cent of GDP, will be spent in the area of climate change and energy, sustainable transportation and the development of green technologies. For example, around US \$1.8 billion was allocated to the promotion of low-carbon vehicles in the Korean stimulus plan. This five-year plan is expected to stimulate production in the amount of US \$141–160 billion. (Robins 2010, UNEP 2009b)

During the twelfth five-year plan period starting 2011, China is expected to invest US \$468 billion in greening the economy with a focus on three sectors: waste recycling and reutilization; clean technologies; and renewable energy. China's environmental protection industry is expected to continue growing at an average of 15–20 per cent per year and its industrial output is expected to reach US \$743 billion during the new five-year period, up from US \$166 billion in 2010. The multiplier effect of this emerging sector is estimated to be 8–10 times larger than other industrial sectors (China Development Bank Corporation 2010).

The 2010 budget of the US Government outlines several green priorities under a programme for creating jobs and investing in long-term economic growth. This includes a proposal to create a Clean Energy Economy – a comprehensive energy and climate change plan to invest in clean energy, decrease dependence on oil, address the global climate crisis and create new jobs.

Recent studies on the prospects of green investments in the long run point to a possibly tripling of the market to US \$2.2 trillion per annum by 2020, with an annual growth rate of 11 percent (Robins 2010). The encapsulation of short-term stimulus packages into long-term policy frameworks, targets for investment, and green economy strategies, as discussed above, appear to give reason for a significant growth of green investment in the next decade.

Some important changes could take place, both in sectors offering brighter prospects for investments and in the dynamics of markets. For example, energy efficiency in the car industry with the uptake of low-carbon vehicles such as plug-in hybrid and full electric vehicles is expected to surpass efficiency improvements in the power sector as a major investment opportunity. Similarly, the uptake of smart grids will deeply transform the relationship between energy supply and demand, especially at the household level, introducing significant reductions in GHG emissions and promoting the creation of green jobs. In general, smart grids may introduce savings of 10 to 25 per cent in electricity demand (ITU and others 2011). The low-carbon market in China would overtake the US, but not Europe.

There is, however, concern about the timing of governments' plans and targets for green investment. Despite positive economic growth, the labour market has yet to recover with unemployment figures particularly high for young adults in developed countries. As a result of the

global financial crisis, many people have been left struggling to find stable employment, adding pressure on governments to address social demands related to unemployment benefits, especially in developed countries. In most OECD countries, the youth-unemployment rate increased by 4.9 per cent between 2007 and 2009, to 18.4 per cent. By the second quarter of 2010 it had risen to 19.6 per cent (Economist 2010). This coupled with budgetary constraints seem to have led to austerity even in developed countries during 2010.

Nonetheless, environmental spending appeared to be resilient in the wake of budget cuts. While governments cut spending, particularly in Europe, it is worth mentioning that green spending received relatively limited cuts despite budgetary constraints in most countries. For example, in the UK, environment spending was cut 5–8 per cent compared to an average of 20 per cent in all sectors (Robins 2010). This confirms a growing understanding that greening investments become a core part of the national strategy for longer-term economic recovery.





© FAO / Giulio Napolitano

Rickshaws in the Old Town section of Dhaka, Bangladesh.

## Chapter 4: Infrastructure in a green economy

### 4.1 Introduction

Despite some progress in the last decade, especially in the telecommunications sector, infrastructure needs remain enormous in developing countries. This applies to both the goal of meeting universal access needs and the goal of supporting rapid growth and job creation. Understanding the urgency of these needs as well as the budget constraints faced by developing countries in addressing them is essential when thinking about how to address the challenge of a transition to a green economy. Addressing them also requires being mindful of how human-made infrastructure ultimately relies on the supplies of a healthy ecological infrastructure, both providing public goods and services.

The case of climate change action is illustrative of the difficulty of mobilizing national economies in response to a global public good problem. The climate challenge raises fundamental issues related to energy infrastructure and efficient use of existing and cleaner sources of energy in infrastructure: the use of energy and fossil fuels in particular has ripple effects throughout the economy.

For infrastructure investments to contribute to green growth with appropriate social development impact requires careful management of possible tradeoffs that may arise between environmental, economic and social goals, between shorter- and longer-term returns, and finding optimal win-win solutions. The latter exist in, for example, the case of water and sanitation, where environmental, social and economic goals all broadly point towards similar investment choices. A win-win dynamic also characterizes urban public transport interventions that improve local air quality, reduce emissions and make cities less congested, hence more efficient and competitive. In the

energy sector, however, trade-offs between economic and environmental goals (local or global) can appear significant. The higher costs of cleaner technology imply a trade-off with expansion of service. In addition, many developing countries face severe financing constraints that appear to require a choice between "building right" (which may make both economic and environmental sense) and "building more" (which may be what is required socially). This is a particularly vexing problem in the case of renewable technologies, which are characterized by substantially higher capital costs upfront and lower recurring costs.<sup>27</sup>

As such, investments in the transition to a green economy must be evaluated with due consideration to this developmental dilemma of apparent trade-offs between goals and time frames. This is particularly important for investment needs related to climate change adaptation and mitigation, as they are the ones most often discussed in abstraction without regard to the relevant domestic context. To date there has been remarkably little interaction between the traditional infrastructure finance community and climate finance specialists.

The two sets of debate on how to finance the enormous infrastructure investment needs of developing countries and how to address the (much smaller yet substantial) additional financing needs associated with climate change continue to occur in parallel. There is a real urgency in dealing with this issue. As developing and emerging economies build their infrastructure and cities, they may create a path dependency into a low-efficiency economy that will prevent major energy savings for decades. While the additional cost of "building right" is limited today, the cost of retrofitting this new infrastructure for environmental reasons in a few decades would be enormous.

<sup>27</sup> It may also be the case for a number of adaptation interventions that will pay off in the future but may impose immediate additional costs.

## 4.2 The existing infrastructure funding gap

More than a quarter of developing-country households have no access to electricity (see Table 2). The situation is particularly dire in Africa, where nearly 70 per cent of the population is unconnected. Access to water has increased and the world is on track to meet the MDG of halving the proportion of people without access to

improved water. Yet 884 million people are still without access to an improved water source. The sanitation situation is much worse, with 2.6 billion people lacking access to improved sanitation, making the achievement of the MDG sanitation goal very unlikely.<sup>28</sup> Connectivity also remains low, particularly in the rural population, where only 70 per cent have access to an all-weather road (33 per cent in Africa).

**Table 2** - Household access to infrastructure in developing countries

	All developing countries	Africa	Non-Africa low-income countries
Percent of households with access to electricity	63	29	56
Improved water source	84	60	79
Improved sanitation facilities	52	31	48
<hr/>			
Percent of rural population with access to an all-weather road	70	33	49
<hr/>			
Telecom: mobile and fixed lines per 100 inhabitants	64	36	42

Source: Reproduced from Fay and others (2010).

Note: Electricity and road access figures are for 2006 or the latest year available up to that date; telecoms, water, and sanitation data are for 2008. Figures are weighted by country population. The road access indicator measures the share of rural population that lives within two kilometers of an all-season road.

The only significant infrastructure success of the last two decades has occurred in telecommunications, where 73 per cent of the population has access to a telephone today. This is a massive increase since the early 1990s when it hovered around 3 per cent. Two reasons explain this: (i) a new technology (cellular telephony), which has enabled massive leapfrogging and allows for low-cost provision even in remote, low-density areas; and (ii) the acceptability of full-cost pricing, which means it can be fully funded by users (rather than taxpayers)

and can therefore be fully financed by the private sector. Information and communications technologies (ICTs) are critical to green growth, as they are key to improved management of resources through, for example, smart grids, smart transport systems, improved water resource management and early warning systems for natural disasters.<sup>29</sup> The relevant public intervention needs are critical but limited – provide a good regulatory and competition framework, and help structure minimal core network investments.

28 WHO-UNICEF (2010) projects that by 2015 the share of people without improved water will have fallen to 9 per cent on current trends, exceeding the target of 12 per cent. In contrast, the share of individuals without access to improved sanitation is expected to be around 36 per cent, much higher than the 23 per cent target.

Very rough estimates suggest that capital investments in the order of US \$1.0–\$1.5 trillion are needed annually for developing countries to close the development gap and support rapid growth (Fay and others 2010). These needs represent some 6–9 per cent of developing country GDP and are not inclusive of operation and maintenance costs. Rough estimates place annual infrastructure investments in developing countries at about US \$600 billion – or roughly half of what is needed.

In Africa, where estimates were carefully constructed country-by-country and sector-by-sector, infrastructure spending needs amount to some 15 per cent of the region's GDP. Only about one third of this is currently financed. (To place this in perspective, the national budget amounts to 10–20 per cent of GDP in a typical low-income country.) Efficiency gains could cover another third, but new and additional funding of some US \$30 billion annually would still be needed (Foster and Briceno-Garmendia 2010).

These estimates do not include the many missing critical protective investments. Many coastal cities do not have the coastal protections that would be needed to cope with even relatively frequent storm surges (Nicholls and others 2007) or the irrigation and water storage facilities that will be needed with increasingly unpredictable precipitation patterns. These estimates are also exclusive of urban public transport systems and other large urban public works that are impossible to estimate at an aggregate level, but are obviously critical for sustainable development.

In this context of insufficient funding, many countries select least-cost technology for their infrastructure investments even when environmental impacts (from climate change to local pollution) are significant. Moreover, in the absence of adequate infrastructure, people rely on alternative service provision arrangements such as individual power generators and batteries for electricity, unregulated wells for irrigation water or open drains for sanitation and drainage. The environmental consequences of these alternative approaches are often worse than infrastructure-based provision, with higher GHG emissions and significant local air, water and soil pollution. These approaches also have important negative public health consequences, and their costs can be substantially higher (diesel generators, purchase of potable water).<sup>30</sup>

The economic cost of alternative service technologies is typically much higher than that of adequate infrastructure. Electricity from power generators and water from remote wells is more expensive than network-provided electricity and water. Without flood risk reduction infrastructure, the human and economic cost of disasters increases. The lack of infrastructure funding has thus both an environmental and socio-economic cost.

29 ICTs are absolutely critical for green growth as they enable green management of many infrastructure services (smart grids in electricity, smart transport and congestion management) and generally permit much more efficient management of resources (e.g., water use).

30 The implication is not, of course, that only grid provision is appropriate, but it tends to be substantially more efficient (economically and environmentally) except for isolated, low density communities or for specific uses (e.g., solar water heaters). Renewables are often the most desirable source of energy for remote communities, but they tend to require government support (financial and logistical).

### 4.3 Meeting the needs for local and global public goods

Aligning economic and social needs with environmental concerns is easier when dealing with the local environment, with short-term and visible impacts on welfare and economic activity. For instance, there are clear incentives to favour solutions with lower negative consequences on air and water quality and on health. Some

infrastructures are even implemented with the main objective of improving local public goods. Drainage and sanitation infrastructure aims at limiting the amount of wastewater emitted into the natural environment. The welfare and economic gains are immediate and visible in terms of water treatment costs, health costs and labour productivity. In such a case, objectives associated with the three pillars of sustainable development are consistent and synergies can be exploited.

#### Box 1. Ecological infrastructure: Benefits and investment needs of protected areas (PAs)

Natural capital is the ecological infrastructure that provides the many goods and services that sustain all life. It is estimated that ecosystems deliver essential services worth between US \$21–\$72 trillion per year as compared to the 2008 World Gross National Income of US \$58 trillion (Nellemann 2010). Ecosystems within protected areas provide a multitude of global benefits. Nearly 1.1 billion people worldwide depend directly on protected areas for a significant percentage of their livelihoods (UN Millennium Project 2005). Yet benefits from protection are often broadly disbursed, long-term and non-market, while the costs of protection and the earning potential from non-protection choices are often short-term and locally concentrated. Policy actions are therefore needed to address the distribution of benefits and costs and to leverage the investments needed to establish comprehensive, representative and effectively managed systems of national and regional protected areas.

The establishment of marine protected areas is a matter of particular urgency as these can play an important role in supporting the maintenance and recovery of fish stocks, as well as a wide range of other services. Financing needs and gaps for protected areas are listed below. The ecological infrastructure is also critical in cities and city-regions where the majority of humans live and the fastest growth continues to occur. The maintenance or restoration of the ecological infrastructure – including ecosystem-based adaptation and species management – should be considered an investment priority. While it is typically cheaper to maintain, conserve and sustainably use ecosystems than to restore them, it is increasingly recognized that the restoration of degraded ecosystems in urban areas or elsewhere can also bring high rates of return across a range of biomes. This is particularly the case when the value of nature's goods and services are properly accounted for.

Baseline for PA investments	Financing gap	Source
US \$6.5 billion/yr	US \$45 billion/yr x 30 yrs	Balmford et al. 2002
US \$7 billion/yr	US \$23 billion/yr x 10 yrs	Bruner et al. 2004
US \$402 million/yr (Lat Am & Caribb)	US \$314–700 million/yr	Bovarnick et al. 2010
US \$36–38 billion/yr	US \$24–135 billion/yr	Parker & Cranford 2010

Problems are more complicated when global public goods are concerned, when environmental impacts occur over the long term only, and when investment decision-making implies a trade-off between short-term costs and long-term benefits. Additional water withdrawal creates immediate economic gains for irrigation, industry or domestic use, while the negative impact on ground water availability and quality and on many ecosystems lays far in the future. In this case alternative solutions are more expensive and can only be justified using a long-term perspective, an approach difficult to apply with highly constrained resources in the immediate term. This has to be weighed against the higher longer-term costs that will follow from an eventual restoration of ecosystems (see Box 1).

This dilemma of shorter- versus longer-term returns is evident in the case of climate change mitigation. The objective of maintaining climate change below 2°C was recognized by the Major Economies Forum on Energy and Climate in L'Aquila in July 2009 (MEF 2009), was explicitly included in the Copenhagen Accord and is present in the final text adopted in Cancun in December 2010. Reaching such a goal requires global GHG emissions to decrease at least by 50 per cent below 2000 levels by 2050. By 2030, this could represent absolute emission reductions of about 30 Giga-tons carbon dioxide equivalent per year (IEA 2009).

Even if Annex I countries were to eliminate or offset their emissions by 2030, the global mitigation challenge of 30 GtCO<sub>2</sub>e per year by 2030 could not be reached. Emission reductions in developing countries are therefore essential. Studies about the still mostly under-tapped mitigation capacity in developing countries conclude that 50–70 per cent of the global mitigation potential could be located in non-Annex I countries (UNFCCC 2007). Adding the emission reduction effort of developing countries

could yield up to 25 GtCO<sub>2</sub>e of reduced emissions annually.

In the case of climate change, trade-offs between immediate economic gains and long-term objectives are obvious when infrastructure decisions need to be made. Building dense cities that consume less energy and can more easily rely on public transportation requires implementing land-use regulations that are costly to enforce (both economically and politically). New land use regulations can accelerate the growth of housing costs, which are already a concern in many developing-country cities. Also, providing electricity for all is already a challenge in many countries. An increase in investment expenditure to reduce carbon emissions would translate into reduced access to energy, and potentially reduced economic growth and poverty alleviation.

Transforming the global economy will require action locally (e.g., through land use planning), at the national level (e.g., through energy-use regulations) and at the international level (e.g., through technology diffusion). Actions will have to be taken by households and individuals (e.g., investing in home insulation), businesses (e.g., change in production process), and public institutions (e.g., standards and regulation). Some of these actions will get implemented naturally, as income increases in developing countries. Other actions, however, involve difficult trade-offs, making them impossible to implement in the current situation.

Only the implementation of a set of diverse instruments – including pricing and taxation, regulation, research and development programmes and public and private investment – can make such a transition possible. In the short to medium term, developing countries are unlikely to implement economy-wide climate policy. Much can be gained, however, from early actions on investment patterns.

## 4.4 Climate investment needs

Reducing GHG emissions will require large investments in energy, building, transport and end-use equipment. Mitigation costs in developing countries could reach US \$139–175 billion per year by 2030 with associated financing needs

of US \$264–563 billion (table 3). The difference between net costs and total financing needs is due to the fact that many efforts concern energy efficiency or renewable energy projects with higher upfront costs but lower operational costs that can offset at least part of the higher initial investment.

**Table 3.** Annual net cost and financing needs to limit warming to 2°C in 2030

	Net cost	Financing need		
		Total	Infrastructure	
	\$ billion	\$ billion	\$ billion	%
IEA	-	565	324	57.3
IIASA	-	264	-	-
MiniCam	139	-	-	-
McKinsey & Co.	175	563	-	-
PNNL	-	384	-	-

Source: World Bank (2009b).

**Table 4.** Average annual incremental adaptation cost by 2050

	Total	Infrastructure	
	\$ billion	\$ billion	%
UNFCCC (2007)	28-67	2-41	-
Parry et al. (2009) *	-	15.9-63.2	-
World Bank (2010b) **	-----		
NCAR scenario	90	30	33
CSIRO scenario	78	14	17

\* Including housing and infrastructure. \*\* Delta-p only.

Source: World Bank (2010b).

An additional US \$30–100 billion will be needed for adaptation (table 4). Adaptation costs are estimated as the incremental costs brought by changed climatic conditions, that is, the additional cost of bringing new investments to the new standards required by the changing climate as well as the increased maintenance and operation costs on existing assets.

Environmentally driven action on infrastructure is particularly urgent as emerging

and developing countries will build the bulk of their infrastructure in the two next decades, and infrastructure is characterized by substantial inertia. Most infrastructure assets have a lifetime of more than 30 years (table 5). For transport and energy infrastructure and urbanization patterns to contribute to reduced climate vulnerability, a lower environmental footprint, as well as lower energy consumption and GHG emissions by 2050, changes in investment choices are required with no delay.

**Table 5.** Priority sectors, considering timescale and environmental impacts

Sector	Time scale	Sensitivity
Water infrastructure (e.g., dams, reservoirs)	30–200 yr	+++
Land-use planning (e.g., in flood plain or coastal areas)	>100 yr	+++
Coastline and flood defenses (e.g., dikes, sea walls)	>50 yr	+++
Building and housing (e.g., insulation, windows)	30–150 yr	++
Transportation infrastructure (e.g., ports, bridges)	30–200 yr	+
Urbanism (e.g., urban density, parks)	>100yr	+
Energy production (e.g., nuclear plants)	20–70 yr	+

Source: Hallegatte (2009).

China offers a striking quantitative illustration of the magnitude of the inertia issue for mitigation. Although its emissions are currently on par with those of the US, China's committed emissions (computed on the basis of its existing installed infrastructure and world infrastructure lifetime average) already account for 37 per cent of global emissions commitments (Davis and others 2010). This is due to the massive and very recent expansion in its infrastructure – the mean age of power plants in China today is 12 years as opposed to 32 for the US and 27 for the European Union – and the fact that coal accounts for most of its power generation capacity. If one takes into account the inertia in assets location and energy-services demand drivers, this only increases the amount of committed emissions in emerging countries (Guivarch and Hallegatte 2011).

A failure to start acting now may result in environmentally damaging development patterns – energy and water consuming technologies, low-density cities poorly suited to mass-transit, fossil-fuel electricity production and water-hungry ways of life – that would be difficult and costly to reverse. The stakes are high, since infrastructure directly contributes 41 per cent of GHG emissions, mostly from transport and power, without accounting for their indirect contribution. Further, delay in action will be costly: by one estimate delaying developing countries' measures to adopt green infrastructure by 10 years would result in a doubling of the estimated costs of mitigation reported in table 3 (Edmonds and others 2008).<sup>31</sup>

31 Modellers optimize, assuming that mitigation actions take place whenever and wherever they are cheapest.

Further, current patterns of infrastructure development increase vulnerability to natural hazards. Most economic impacts of natural disasters arise from losses of infrastructure-related services such as water and energy provision, and transportation capacity (Tierney 1997). Vulnerability to heat waves depends largely on building characteristics and urbanization patterns and pre-existing air quality issues. Droughts and reduction in water availability can be exacerbated if water infrastructure (water reservoirs, treatment plants) becomes inadequate.

Tackling environmental issues requires profound and immediate transformations in how infrastructure is planned, designed, managed and maintained. The choices made now in what is built, where and how, determine future options and vulnerabilities. There is thus a narrow window of opportunity to shift development strategies to more sustainable paths (Shalizi and Lecocq 2009) by mobilizing upfront investments in energy, building, transport and end-use equipment. This shift, however, must recognize that the funding required for infrastructure due to environmental concerns is additional to the pre-existing funding gap. Efficient climate action cannot be implemented without tackling the infrastructure challenge.



© Shutterstock / Tracing Tea

Man draws water from a pump above a mountain stream in Warduj, Afghanistan.

## **4.5 More effective matching of core and additional funding objectives**

Climate-oriented financial support corresponding to the additional cost of developing infrastructure with reduced GHG emissions and increased climate resilience would not be sufficient to allow basic infrastructure to be built, unless it has a strong leverage effect. In a country where most of the population is not connected to an electricity grid and thus relies on power generators, funding only the additional cost of producing low-carbon electricity would not permit the development of the needed grid and a reduction in power-generation emissions. A poor country that cannot finance any dike system to protect its coastlines would have little use for a funding source that would pay for upgrading costs, unless this additional funding is paired with other resources.

An efficient funding scheme for mitigation and adaptation in developing countries cannot focus solely on additional cost, but must aim to leverage other sources of funding – including domestic sources, private capital and official development assistance – and thus close the financing gap for broader infrastructure needs. This calls for a rethinking of climate funding in developing countries, considering infrastructure objectives for growth and poverty alleviation. These would need to be integrated, along with a rethinking of infrastructure finance in which climate objectives are mainstreamed.

Current flows of mitigation and adaptation finance pale in comparison to the needs (World Bank 2009). Even though the resources flowing through the Clean Development Mechanism (CDM) have steadily increased since 2005, they only amounted to about US \$23 billion over 2002–2008 (UNEP 2010a). With each dollar of carbon revenue leveraging on average US \$4.60 in investment and possibly up to US \$9.00 for some renewable energy projects, some US \$95 billion in clean energy investment benefited from the CDM over 2002–2008 (World Bank 2009).

Additional funding has been made available through organizations such as the Global Environment Facility (GEF), which commits about US \$250 million per year in grants for climate investments. Other donors have created climate funds that participate in the funding of infrastructure. But those fragmented initiatives are still far from closing the financing gap adding up to some US \$8 billion a year, far less than what is needed. Moreover, this fragmentation is a source of inefficiency and violates the principles of the Paris Declaration on Aid Effectiveness.

The creation of a Green Fund was agreed upon in Cancun in December 2010, with the objective of mobilizing US \$100 billion per year from 2020. The implementation of this fund could help close the infrastructure funding gap provided that eligibility and funding rules are designed to do so. A move away from the “additionality” criteria adopted for the CDM to a financial gap approach would also help provide developing countries with the resources needed to close their infrastructure gap, and to do it in a climate-smart way.



© International Maritime Organisation (IMO)

Container cargo ship at sea.

## Chapter 5: Green and inclusive growth strategies

### 5.1 Introduction: Structural factors in present growth dynamics

Continuing on the path of the current energy- and material-intensive growth model which defines our global economy is no longer possible, since it is strongly correlated with increasing CO<sub>2</sub> emissions, overexploitation of natural resources and damage to the Earth's ecosystems, threatening the prospect of sustained economic growth at the global scale. Progress in poverty eradication has been very uneven and wealth inequalities have been widening across the globe. A new approach will have to be devised for ensuring that economic progress goes hand in hand with human development and environmental protection. Moving the global economy away from a growth path based on fossil fuels and materials consumption will necessarily involve profound changes in economic systems, in resource efficiency, in the composition of global demand, in production and consumption patterns and a major transformation in public policymaking.

Structural factors underlying the present global growth picture have translated into a persistence of large social, technological, economic and environmental asymmetries within countries and between developed and developing countries. Among the underlying structural determinants of present growth patterns that need to be taken into account by countries embracing a green and inclusive economy are the following (cf. López 2009).

World economic growth outpaced growth in commodity consumption for most commodities since 1975, but after 1992 the trend reversed in the case of metals, largely due to a steep rise in investment in industry and infrastructure in China.<sup>32</sup>

There has been relative decoupling of resource consumption from GDP growth since 1980 as material productivity has risen, but the strong economic growth has overwhelmed these improvements so that absolute amounts of materials and fossil energy consumption have continued to rise (cf. International Resource Panel 2010).

Since the early 1990s, the long-term trend of declining raw materials prices has been reversed, with steep rises in certain commodity prices in recent years. This reflects growing scarcities as evidenced, for example, by declining ore grades in the case of metals.

In developed countries a key feature of economic growth has been a continuous decline in the share of primary commodities and manufacturing in GDP and the rise in the share of services and human capital and technology-intensive activities. This has occurred especially over the past three decades and has meant a persistent decline in the use of material inputs in production.

In contrast to production, developed countries have not significantly reduced material consumption. This group of countries accounts for a very large share of global consumption, with the United States alone being responsible for 40 per cent and the OECD for 78 per cent of world consumption in 2009 (World Bank 2010c).

<sup>32</sup> This has been mainly due to rapid increase in commodity-intensive manufacturing since 1993 in China. After declining for years, the commodity intensity began to rise gradually toward the beginning of the 1990s and then sharply accelerated around 1998. See World Bank (2009c).

The combination of reducing material in production and little change in material content of consumption implies that developed countries have been shifting the environmental impact associated with producing the goods they consume to other countries through international trade (Ghertner and others 2007).

A number of labour-abundant developing countries have benefited from the growing markets and increased trade in industrial goods arising from the reduction of material in production in the developed countries. In this context, the labour-rich developing countries were in a better position to gain directly from this demand than the resource-rich developing countries. The latter have supplied raw materials, until recently at low cost. In these resource-rich countries, the enclave-based expansion of commodity extraction, with weak backward and forward linkages to the rest of the economy, has in most cases been insufficient to promote economic growth based on principles of sustainable development and equity (Barbier 2005).

The incorporation of highly populated developing countries such as China and India into the global growth process is a positive phenomenon but also a challenge for a transition to a green economy. Being at an early stage of development, their consumption and production processes are still very material-intensive.<sup>33</sup>

Demand in emerging economies for industrial goods, notably consumer durables and agricultural products with high environmental impact, such as meat, has increased at a pace that has often exceeded growth of per capita GDP. In addition, consumption patterns linked not only to GDP growth but also to the

dynamics of world population (growing from 7 billion to over 9 billion by 2050) are expected to change, particularly in South Asia and sub-Saharan Africa. In fact, projections based on world population growth and food consumption patterns indicate that agricultural production will need to increase by at least 70 percent to meet demands by 2050 (FAO 2010). Population dynamics are therefore a key variable, particularly if we expect everyone to enjoy a healthy and productive life free of poverty in the coming decades.

Furthermore, the elasticity of certain emissions, notably GHGs, in growth of these emerging industrial economies is high, which means that their continued rapid economic growth will imply increases in their emissions. More importantly, this means that world economic growth is now even more closely linked to carbon emissions than during the late twentieth century (López 2009).

Resource-rich exporting countries have benefited from rising commodity prices, but this has also increased the risk of “Dutch disease”<sup>34</sup> and the risk of being out-competed by the emerging industrial exporters, complicating the prospects of a transition to a green and inclusive economy for a number of the commodity exporters.

Economic growth has been fueled by, among other factors, the availability of relatively inexpensive energy. The depletion of fossil fuel resources and a soaring energy demand represent new constraints. These, combined with environmental concerns, notably related to climate change, are expected to steer energy systems towards a transition to alternative energy resources.

33 For example, from 2000 to 2007, Chinese demand accounted for 20 per cent of world export growth in metals, 11 per cent for copper, 55 per cent for iron and 58 per cent for soy. Since the crisis, while global demand for these same commodities decreased, Chinese demand for them doubled (Gallagher 2010).

34 The “Dutch disease” makes manufactured goods as well as services less competitive by raising the value of the currency.

The above underlying structural factors are at the core of the present global growth problem, and should be dealt with when identifying what kinds of dynamic growth strategies are needed for making the transition to a greener and more inclusive global economic system. Overall, there are two pressing issues that emerge from the structural factors mentioned above: (i) the need to change resource-intensive consumption patterns in developed countries; and (ii) a need to promote efficient resource-saving technological and structural changes in production systems in developing countries, so that global growth is “decoupled” from environmental impact and becomes less commodity-intensive and environmentally damaging.<sup>35</sup>

## **5.2 New engines of productive and efficient growth**

As mentioned earlier, the nature of economic growth in the coming decades will have to be fundamentally different from the resource-intensive growth of the past and it will need to be assessed against the criterion of whether it satisfies demands for higher living standards for a larger global population, while adjusting to tightening environmental and natural resource constraints. This will mean much greater efficiency in resource use, stronger environmental protection and a shift in the composition of consumption away from resource-intensive goods towards less resource-intensive goods and into services. In effect, it will require a serious rethinking of lifestyles in developed countries and of the expectation that

globalization will extend those lifestyles and consumption patterns to developing countries. It will require technological progress that boosts not only material and energy efficiency but also labour productivity.

The transition to a green economy will also have to consider the need to narrow two main gaps between developing and developed countries – the technological gap and the productivity gap. The technology choice of economic agents is crucial for achieving low material and low carbon intensity in the productive structures, and will have to go hand in hand with increasing labour productivity.<sup>36</sup> Labour productivity is key for an inclusive green transition because it reflects not only efficiency in production, but also the potential of the labour force to obtain better wages and reach higher living standards. Raising labour productivity is therefore recognized as a critical factor for increasing economic growth and reducing poverty levels, and low levels of education are among the main obstacles for reaching higher productivity in many developing countries.

The evolution of labour productivity in different groups of developing countries has varied. In Latin America, GDP per worker increased up until 1978 and has declined ever since.<sup>37</sup> East Asian economies have been steadily improving their labour productivity relative to the US. Strong growth in labour productivity explains in part why a number of highly populated and historically poor countries have been successful in their growth process and in narrowing the income gap with developed countries.

<sup>35</sup> The nature of consumption is also important in developing countries, and continued structural change and technological progress is relevant in developed countries as well. It is important to make the distinction between relative and an absolute decoupling. Relative decoupling refers to a situation where resource impacts decline relative to GDP but nevertheless continue to rise. The situation in which resource impacts decline in absolute terms is called absolute decoupling. If the green economy is to tackle environmental scarcities, then absolute decoupling is needed.

<sup>36</sup> Labour productivity is defined as GDP per hour worked.

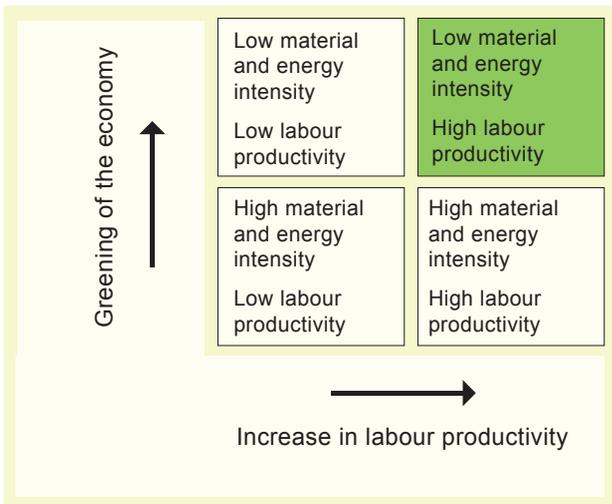
<sup>37</sup> If the sectors in which productivity rises account for a small proportion of total employment, then only a few workers with more advanced skills will benefit from higher wages, while the rest will continue to be employed in sectors where wages and productivity are lower. In Latin America and the Caribbean, high-productivity sectors account for a rather small portion of all employment (8.1 per cent in 2008). See the assessment by UN-ECLAC (2010).

This can be explained in part by the transfer of large numbers of people in Asia from low productivity rural employment to jobs in factories, a process that will eventually run its course as it did some time ago in Latin America. Then, sustaining labour productivity growth becomes more challenging.

The argument for closing both the technology and labour productivity gaps with developed countries as basis for a green and inclusive economy is summarized in very broad terms in the following matrix

(see figure 2). The green quadrant – low material and energy intensity and high labour productivity – corresponds to the twin criteria of green and inclusive. A high material and energy intense growth model characterized by low labour productivity (lower left quadrant) is not desirable from either an environmental or a social perspective and reflects the situation of many developing countries. But there are also cases of countries characterized by high labour productivity, where the economy is not sustainable (lower right quadrant).

**Figure 2.** Green economy matrix



Public policies will need to be used strategically to orient the process of economic growth towards such a sustainable pathway, and issues of fairness in income distribution and social investment as well as planning for long-run energy and resource efficiency need to be included in the redefined set of economic policy goals.

This approach requires a systemic shift rather than incremental improvements alone. It involves not only steering the market through the use of sound micro-economic policies, such as internalizing

externalities and getting prices right, or targeting the greening of certain sectors, but it also requires major changes in economic policymaking. In fact, scaling up successful examples of best practices on greening the economy is important but insufficient for addressing the scale of environmental and equity problems that the world is facing today. The approach should therefore not be restricted to sector-level analysis, because green buildings, more efficient transportation or moving into more sustainable agricultural production systems will not, in themselves, lead us to sustainable development.

The fundamental redirection required for a green and inclusive economy cannot be achieved without a decisive reorientation of macroeconomic policy to advance the required major changes in present economic growth models and the drastic adjustments in consumption and production patterns. To encourage sustainable consumption and production requires the internalization of negative externalities through a range of instruments such as fiscal incentives and disincentives, carbon trading schemes, rules and regulations and product standards. These policies will influence consumption, investment and other relevant economic aggregates.

Redesigning macroeconomic policies is key when focusing on a new approach to economic growth. In fact, macroeconomic policies not only affect the dynamics of economic activity, income distribution, investment and employment, but they can also bring about the required structural economy-wide changes associated with a green economy transformation.

A breakdown of the major sectors of aggregate demand<sup>38</sup> is useful in thinking about a new economic growth path for individual countries and regions. The idea is that we should distinguish between those macroeconomic aggregates that should be strictly limited, such as resource intensive consumption, investment in energy-intensive infrastructure and transport and government spending on fossil fuel subsidies,<sup>39</sup> and those that could

expand over time because they do not generate significant negative environmental impact. Indeed, energy-saving and natural capital investments, as well as human capital investments, are urgent from the points of view of both social well-being and environmental sustainability. The latter would include investments health care, food and nutrition security and education, as well as cultural activity and information services.<sup>40</sup> Investments in transforming agricultural production systems are also desirable to ensure higher productivity and food security, not only because of growing population but also because agriculture represents the biggest employer globally and the major income source especially for the poor. Growth in agriculture is often more effective than growth in industrial sectors at reducing poverty for the poorest people in society.

Naturally, however, in evaluating the environmental and resource impacts in different sectors, indirect effects through input-output linkages and the entire life cycle of the goods and services produced should be considered. For example, as food systems are becoming more globalized and complex, greening in the agriculture sector has to be achieved through the whole food chain. Excessive agrochemical production and use, water use, processing, packaging, transport, retail and waste are all major factors that make agriculture and food production one of the sectors with a significant impact on the environment and natural resources.

38 This can be expressed by balancing the well known aggregate demand equation of  $Y=C+I+G+X-M$ . For further details see Harris (2008).

39 According to the joint report prepared by OECD, IEA, World Bank and OPEC (2010) for the G20 Summit of June 2010, fossil fuel subsidies exceeded US \$650 billion in 2008, in addition to the US \$400 billion subsidies on agriculture in OECD countries.

40 It is of course true that the world economy as a whole cannot specialize in services and that services cannot replace essential agricultural and industrial products, but we can still imagine a transition to more service-intensive and less material-intensive consumption and production patterns.

### 5.3 Opportunities in agriculture, manufacturing and services

Agriculture accounts for about 14 per cent of GHG emissions (about 33 per cent when including the forestry sector), and is one of the major causes of land cover/use change, including deforestation. Sustainably managed agriculture, however, can also become a key sector in the development of a green economy, as it is able to achieve multiple benefits with relatively low capital investments, including food security, environmental sustainability, carbon sequestration and opportunities for green jobs and livelihoods.

Sustainable agriculture has the potential to enhance ecosystem services through actions such as restoring water catchment areas, reforestation and forest restoration, improving soil quality, sustainable management of animal husbandry, biodiversity conservation and creating habitats for pollinators and natural pest predators. Well-functioning ecosystem services will make production systems more resilient in the face of disruptive events, and will bring positive impacts on food security.

Investment is required in transforming both commercial and subsistence agricultural systems. In commercial systems, investments should be aimed at sustaining efficiency while reducing emissions and other negative environmental impacts. In subsistence agricultural systems, investments should be aimed at transforming smallholder agricultural systems through sound soil and nutrient management, water harvesting and efficiency in use, increasing production system resilience, conserving genetic resources, reducing post harvest losses, improving processing and reducing time to market. This in turn requires significant investments in small farmers' human capital, including investments in their food and nutrition security

through social safety nets and other social protection services that enable them to make investments in the sustainable management of natural resources.

Bioenergy potentially offers developing countries many advantages: (i) it offers opportunities for enhanced energy access and increased energy security by reducing the dependence on fossil fuel imports; (ii) it potentially creates a new market for producers; (iii) it can create significant new employment; and (iv) it potentially contributes to the reduction of GHGs. Depending on the underlying feedstock, biofuel production and use can generate very different GHGs gas savings. While ethanol from sugarcane is estimated to reduce GHG emissions by 80 per cent over the production and use lifecycle, other feedstock such as sugar beets, wheat and vegetable oils offer substantially lower savings in emissions. Corn, a key feedstock for ethanol in the United States, has the lowest (<30 per cent) estimated savings (OECD 2008).

Some important concerns have been raised in relation to negative impacts of biofuels on world food security, rural development and the environment.<sup>41</sup> At a global or national level, the diversion of food to new markets, such as biofuels, can have ripple effects throughout food markets. The International Food Policy Research Institute and the World Bank simulations show a potential significant impact on food prices through competition for land and inputs, especially for ethanol. The rapidly increasing demand for biofuels is largely determined by the subsidies and mandates provided in many developed countries. The possible impacts of biofuels on land use, deforestation, water resources and food prices will vary with feedstock, the method and location of production and the management of the sector. Sound bioenergy policy development that reduces the competition between energy and food needs must be

<sup>41</sup> The development of second-generation biofuels (produced from cellulosic feedstock) and third-generation biofuels (produced from algae) offer the prospect of fewer negative food and environmental impacts.

the outcome of a context-specific analysis. In the manufacturing industries, there are significant opportunities for growth and employment in renewable energy and resource-efficient technologies. A larger contribution of so-called green industry to GDP not only has positive economic and social effects, but it can also be highly beneficial for the environment in the long term and provide locally critical improvements in livelihood conditions and employment opportunities.

The development of China's solar photovoltaic industry since 2002 is a case in point. China has become one of the top global solar cell manufacturers and more than 95 per cent of domestic cell and panel production has been exported. Demand for solar cells has been driven to a great extent by the renewable energy policies of Europe, including renewable energy mandates and feed-in tariffs. Manufacturing of wind turbines is also growing rapidly, and domestic demand for wind power is growing rapidly in China. China's wind market was virtually nonexistent 20 years ago and has grown to be the fourth-largest market in the world, behind the United States, Germany and Spain.

Another case in point is the environmental goods and services (EGSs) industry. As demand for environmental services, equipment and technologies has been increasing, mainly pushed by regulatory demands in developed countries, the environmental industry has become a very dynamic growth pole in OECD countries. The EGSs market has been projected to reach US \$688 billion by 2010. Developed country producers are the major participants in this global market. A number of developing countries have a significant export interest in certain environmental goods. For example, five developing economies are among the top ten exporters of the entire renewable energy category of goods: China; Hong Kong, China; Mexico; Singapore;

and Thailand (WTO and others 2009).

An adequate transfer of technologies and a focus of policies on education, technical training, investment and enhancement of local skills would allow developing countries to create endogenous capacity and develop a competitive new economic sector. This goes hand in hand with environmental protection, economic growth and employment creation, while reducing knowledge and technology gaps.<sup>42</sup>

In the services sectors, the globalization of services with low environmental impacts provides alternative opportunities for developing countries to find markets beyond manufacturing and commodities where they can specialize, scale up and achieve high economic growth. Diversification into services can be complementary to efficiency improvements in manufacturing, displaying how intelligent use of services in both manufacturing and commodity production can result in more effective resource planning and use.

Services in information and communication technology are having a significant and continually evolving impact on economic growth. They allow for new ways of organizing production, consumption and markets, giving rise to important productivity gains across sectors. Information and communication technologies also hold high potential in the development of intelligent transport networks and smart grids, two new applications enabled by high-speed broadband networks that are expected to be future enablers of low-carbon development (GeSI 2010).

42 This was revealed by the results of assessments on market potential for environmental goods and services done by ECLAC and GTZ for Argentina, Mexico, Chile and Colombia. For more information see: [www.eclac.cl/dmaah/proyectos/pymes/index.htm#](http://www.eclac.cl/dmaah/proyectos/pymes/index.htm#)

A number of modern services have become transportable, tradable and scalable and can be transacted across borders over the Internet. India is a good example, displaying rapid growth in exportable services with low environmental impact over the past two decades while generating income and facilitating growth. India is revealing strength in skill-intensive services, including software development, ICT-enabled services, product/project engineering and design, media, entertainment and healthcare (Altenburg and others 2008).

In the area of tourism, enormous growth in numbers of middle-income consumers in emerging market economies is adding significantly to the size of a global tourism business traditionally catering mostly to OECD-country consumers. This augments an already big challenge of managing tourism activities sustainably. Ecotourism innovations and the promotion of responsible business through tourism trade are as yet only a partial response to the challenge.

Pursuing all the sector-specific opportunities highlighted above will require new workforce and managerial skills that in turn require substantial investment in education and training. The important role of education as a means of increasing workforce skills and generating knowledge for innovation suggests that it should have a permanent place on growth agendas. Government policies that provide the right incentives for investing in green sectors and technologies should generate demands for the kinds of skills needed to build, manage and operate green economies and attain green growth.

Investments in human capital and more particularly in developing the skills demanded of a green economy can be seen as part of a set of mutually reinforcing investments. Deployment of new

technologies in developing countries will be critical for green growth. Transfer of such technology depends on the recipient countries' absorptive capacity, which is related to infrastructure, adequate levels of human and physical capital, investment in research and development and institutional quality. All of these are important ingredients of growth. Thus, growth and greening go hand in hand (cf. OECD 2010).

## **5.4 Public policy and strategic positioning**

Government policy plays a crucial role in determining which growth path will be followed. The transition to a green economy in the context of sustainable development will not come about without active government intervention. As mentioned before, given the scale of environmental problems that the planet is facing, public policies will need to be used strategically to orient the process of economic growth towards a sustainable pathway and to focus on the specific goals of employment and equity.

Although environmental sustainability can partly be accomplished through incentives – taxes and subsidies – aimed at internalizing environmental costs and promoting environmentally beneficial sectors, there is also a need for investment in societal and low-carbon infrastructure as well as long-term development strategies. Governments have a critical role in providing social protection as part of the investment in human capital. Fiscal policy also plays a key role, as it can shift incentives towards less environmentally damaging activities and target interventions towards particular socially and environmentally beneficial investments. Shifting the burden of taxation from economic “goods” such as income and jobs to ecological “bads” such as pollution and resource depletion should be central in the transition.

## 5.5 Private sector innovation

China provides a good example of combining investments and public policy incentives to encourage major advances in the development of cleaner technologies. Chinese support for domestic industry has always considered markets outside of China. The country has strategically integrated itself into world markets in order to gain access to technology and finance, following a dual track policy. The policy consists of liberalizing foreign direct investment and inflow of imported inputs to selected industries while supporting technology acquisition and absorption by domestic enterprises in those sectors to the point where they are ready to face competition with imports and even overseas (Gallagher and Porzecanski 2010).

The case of resource-rich developing countries is particularly challenging, as the motivation for a transition to a green economy is not obvious. The additional revenues generated by commodity exports, however, could be used to invest in upgrading environmental performance of technologies and adding value in existing resource-intensive sectors as well as in human, infrastructural and social capital to facilitate industrial competitiveness and diversification into new sectors. National high-speed broadband networks, which enable the uptake of green applications such as smart grids, could be promoted.<sup>43</sup> The effective fiscal strategy would not be to keep natural resource revenues in sovereign funds heavily invested in foreign equity markets. Rather, a more effective strategy would be to use the revenues for financing domestic or regional low-carbon infrastructure and other projects that facilitate economic development and structural change for the transition to a green economy (Lin 2009).

The transition to the green economy, like any process of structural change, is made difficult by the fact that some of the established companies, which may be among the losers, have considerable policy leverage. Yet rather than opposing or delaying structural change, leading businesses should seek to embrace and seek to benefit from first-mover advantages. This strategy is one being followed in the Republic of Korea, where government has defined green growth as a national strategy and aligned major private companies behind it.

Resource-efficient and cleaner production unleashes the potential of industries and enterprises to produce more with less, and to reduce their environmental footprint while at the same time delivering value-added goods and services and creating jobs. Eco-industrial parks, green clusters and eco-cities can be instrumental in reconfiguring traditional one-way industrial systems into circular, closed-loop systems. Resource efficiency is promoted and waste is transformed from a liability into an asset that yields economic benefits.

Further benefits can be attained by green process and product design, designing out pollution and wastes at their source. Such approaches not only enable the reduction of the use of virgin materials and waste by the design of products that are non-toxic and can be reused, repaired or recycled, but can also stimulate economic growth and create local employment opportunities and can be a driver in the establishment of sustainable communities or eco-cities. At the industry level, innovative models such as industrial symbiosis, green industrial clusters with industries from the same value chain and eco-industrial parks provide collaborative opportunities to reduce waste and

<sup>43</sup> For further examples see ITU, UNESCO and the Broadband Commission (2011).

pollution, efficiently share resources (such as information, materials, water, energy, infrastructure and natural resources) and help achieve socio-economic gains while improving environmental quality.

What these models have in common is that they reduce costs and generate new sales for the companies involved, as well as creating significant environmental benefits such as reduced landfill, water pollution and greenhouse gases. The economic activity generated also has further social benefits with the creation of new businesses and jobs. Experience shows that eco-industrial parks, industrial symbiosis and green clusters can contribute to the critical mass needed for an increased deployment of green technology and services.

Through such green hubs, new growth drivers can be created for regions to enhance their competitiveness and revitalize economic activity. Such cooperation can also constitute a core element for the establishment of eco-cities. These are cities where urban planning, urban and peri-urban agriculture, industrial zoning, and environmental management approaches are integrated to pursue synergies in resource utilization, industrial and urban development. Urban and peri-urban agriculture can have important benefits for food security and safety by providing growers with food for their own consumption; a source of income generation; and local markets with an immediate supply of fresh and micronutrient-rich food at competitive prices. Further social benefits include better health and nutrition, increased income, employment, food security within the household and enriched community life. The success of such market gardens is attributed to the use of few external inputs, the application of agroecological principles and the reliance on locally available resources.

Other innovative approaches that could fundamentally change production and consumption systems and decouple material consumption and value creation include product service systems and Payment for Ecosystem Services. Product service systems such as Chemical Leasing offers concrete solutions for sound management of chemicals and reduction of emissions to the environment.<sup>44</sup> In the case of PES, experience from Uganda shows how individual farmers can be rewarded for meeting targets for establishing and maintaining woodlots. Their payments are funded by corporations eager to earn carbon credits, a diverse range of companies such as Tetra Pak, Nedbank and African Safaris.<sup>45</sup>

## **5.6 A new, dynamic growth pathway**

The nature of economic growth in the coming decades will have to be fundamentally different from the resource-intensive growth of the past and it will need to be assessed against the criterion of whether it satisfies demands for higher living standards for a larger global population while adjusting to the tightening environmental constraints. A number of structural factors underlying the global growth picture need to be addressed by the international community in any proposals about a green and inclusive economy.

A breakdown of the major sectors of aggregate demand in different countries is important in defining a new economic growth path. Policymakers will need to distinguish between (i) those macroeconomic aggregates that should be strictly limited, such as resource intensive consumption, investment in energy-intensive infrastructure and transport, and (ii) those that could expand over time, such as

<sup>44</sup> In the United Nations System, UNIDO plays the leading and coordinating role for the implementation and further development of Chemical Leasing systems.

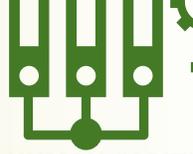
<sup>45</sup> See [www.agriculturesnetwork.org/magazines/global/trees-and-farming/payments-rewards](http://www.agriculturesnetwork.org/magazines/global/trees-and-farming/payments-rewards) and Mwaloma (2011).

energy-saving and natural capital investments, as well as human capital-intensive services such as in areas of health care and education.

Public policies will have to be used strategically to orient the process of economic growth towards a green economy pathway, and issues of fairness in distribution and social investment, such as education and health, as well as planning for long-run energy and resource use need to be included in the redefined set of economic policy goals. Care has to be taken, however, that even if growth promoting policies are put in place and are successful, initial conditions of inequality in access to productive inputs, education and land,

may result in the most vulnerable sectors not being able to share in the gains from green growth.

The urgency of the global environment and equity problems requires countries to share skills, best practices, technologies and methods in resource efficiency in order for poverty reduction and industrial development to be sustainable. For the private sector, the existence of an integrated framework of incentive structures, policies and regulations to encourage the development of green industries that generate green jobs will be crucial as a driver for moving the economy along a green and inclusive growth path.



HUMAN CAPITAL



LOCAL

GLOBAL



SOCIAL CAP



PROGRESS





## Part III

# Investing in Human Capital and Societal Infrastructure





© FAO / Giuseppe Bizzarri

Farmers control soil erosion through crop cultivation. Rural Development in Southern Lempira, Honduras.

## Chapter 6: Making the green economy work for the poor

### 6.1 Introduction

Despite significant gains in many countries, poverty remains a key challenge across the developing world and affects more than one billion people (UN 2010). Apart from income poverty, other indicators of well-being such as nutrition, maternal and child health, women's empowerment and inequality are also ongoing matters of concern. The task of improving well-being along these multiple dimensions is only expected to become harder as the impacts of climate change and ecosystems decline become more acute, with largely negative consequences predicted for millions of poor and vulnerable people in developing countries.

While it cannot be assumed that progress towards a green economy will improve on the rate of poverty reduction achieved by conventional developmental paths, there are ways to maximize the potential for this to happen and avoid trade-offs. As illustrated earlier in this report, a green economy is one where growth in income and employment is driven by investments that:

- Reduce carbon emissions and pollution
- Enhance energy and resource efficiency
- Prevent the loss of biodiversity and ecosystem services.<sup>46</sup>

What are the links between poverty reduction and a green economy? The concept discussed in this report shows that human well-being and equity are core goals of greening the national economy. How could this become a reality in different countries? There is widespread consensus today on how poverty and inequality can be reduced within and across generations. These include the following:

- Sustained economic growth, which is necessary but not sufficient for poverty reduction.<sup>47</sup>
- Economic growth in specific sectors that provide employment, production and entrepreneurship opportunities to the poor. These include sectors where the poor are more likely to find their livelihoods, such as agriculture, fishing, forestry and other natural resources, construction, transport infrastructure and other primarily urban sectors, as well as others where unskilled and manual labour is important. In addition, a growing body of evidence suggests that access to energy by the poor can lead to benefits across multiple dimensions ranging from income to education and health outcomes and the well-being of women (UNDP 2010b).

<sup>46</sup> Ecosystems services are the benefits (goods and services) to human well-being provided by ecosystems, and include provisioning, regulating, supporting and cultural services (Millennium Ecosystem Assessment, 2005).

<sup>47</sup> For example, a joint report on MDG progress by the African Development Bank, African Union Commission and United Nations Economic Commission for Africa (2010) finds that despite recent strong and persistent economic growth in the region, the joblessness of growth remains a major impediment to reducing poverty. Cross-country studies confirm that, on average, growth tends to be positively correlated with improvements in the incomes of poor people overall (World Bank, 2005). Growth also tends to be positively correlated with improvements in food supply and protein and calorie intake (Haddad, 2003). Averages, however, conceal the fact that the poor often gain proportionally less.

- Redistribution of the benefits of growth through public spending in the provision of equitable, quality services (in, e.g., health, education, water and sanitation) and social protection for the poor that helps improve their – and their children’s – skills and productivity. In turn, the poor boost growth when they are equipped with assets and resources to take part in the development process.
- Proactive focus on women, the excluded, and hard to reach population groups who may need special help to gain access to employment and quality services. These may have important multiplier effects, positively affecting several dimensions of well-being. Educated mothers, for example, tend to have better nourished and educated children.
- Empowering the poor and marginalized – including women – to play an effective role in the decisions that determine their long-term well-being. In some countries this includes refugees, some of whom are refugees due to ecological insecurity or resource conflict and who would benefit from employment generation if governments would allow them to participate fully in the labour market.
- Providing protection against negative shocks – including those arising from global crises such as those due to high food prices – so as to avoid slowdowns or reversals in poverty reduction.

Comparing these with the three priority investment targets of a green economy – reducing carbon emissions and pollution; enhancing energy and resource efficiency; and preventing the loss of biodiversity and ecosystem services – it is clear that the relationship between the green economy and poverty reduction is not straightforward, but can be expected

to exhibit possible tradeoffs and possible synergies. Understanding and balancing these overall goals would require accurate assessments as well as carefully calibrated policies and measures.

As it is the poor who are predominantly dependent on ecosystem services, green economy initiatives to prevent the erosion of these services can be important in reducing poverty levels to the extent that they also safeguard the livelihoods of the poor who draw upon them. On the other hand, investments to reduce carbon emissions and pollution need not generate jobs in sectors that employ the poor, even though reducing polluting impacts that often have the worst impact on the poor. Clearly, improved health and quality of life due to avoided pollution needs to be accompanied by improved income and quality of life due to direct and formal employment. In some economies, green investments could also help offset any potential increases in emissions and pollution as a result of growth in sectors that actually employ the poor, thus enabling the economy as a whole to move to a greener path while achieving poverty reduction objectives.

In general, a green economy that works for the poor might be expected to display the following characteristics:

- It maintains growth and reduces emissions for the economy as a whole, while promoting the creation of jobs and other economic opportunities in sectors that predominantly employ the poor.
- It generates adequate amounts of public revenues to allow investment in social protection and quality services with equitable access by the poor.
- It retains biodiversity and ecosystem services, while seeking to maintain in sustainable ways the livelihoods of the poor who are directly dependent on them.

- It enhances energy and resource efficiency in the economy, including through the equitable access to energy by the poor and the promotion of its efficient use.
- It ensures resilience to environmental (and other) risks through developing adaptive capacities.

Achieving these objectives will require governments to weigh apparent trade-offs and dilemmas of short- versus longer-term investment returns, identifying alternative policies and measures. Maintaining biodiversity and ecosystem services might, for example, limit the number of sustainable livelihoods that can be supported, thus requiring the consideration of other forms of economic opportunity for the poor. Possible policies and measures might also provide opportunities for developing synergies. As an example, South Africa's Working for Water initiative started during the 1990s to advance a public employment approach by employing the poor in the highly labour-intensive work of clearing invasive alien vegetation to restore stream flows and water availability. The resultant improvements in land productivity and biodiversity enhanced the provision of ecosystem services, while also strengthening the livelihoods of those dependent on them.

The externalities associated with some of these green economy initiatives may require the active use of well-designed policy instruments to maintain appropriate incentives. For example, the protection of forests in one place to improve carbon sequestration and mitigate climate change would have global benefits. Yet lower levels of income might accompany this in the short term for those whose livelihoods are tied to the forest, requiring some form of transfer from beneficiaries in other locations.

The movement to a green economy will take place against a backdrop of other longer-term transitions, such as increasing urbanization, altering demographic structure and structural change in developing country economies. These transitions are taking place concurrently, albeit at different rates and in different ways, in each country. They present both challenges and opportunities. Policies and measures that promote a green economy with lower levels of poverty would need to recognize and be responsive to these.

## **6.2 Helping a green economy to work for the poor**

Several policy and programme approaches in recent years have been proven to be effective in promoting a pro-poor economy, one that also has green foundations. These include:

- Low carbon, sustainable agriculture to maintain growth, address poverty, food security and ecosystem services: A majority of the poor live in rural areas and depend on farming for their livelihoods (World Bank 2008). Low carbon, sustainable agriculture has the potential to promote growth, employment and food security while assisting with nutrient cycling and maintaining ecosystem services. This potential can only be realized if poor men and women farmers can be helped to access the relevant knowledge, technologies and green markets. Similar examples exist for sustainable ecosystems management in sectors such as fisheries and forestry, with real potential for growth, employment and poverty reduction. In addition, opportunities also exist in the urban environment. Urban and peri-urban agriculture is important for delivering food in critical areas, supporting small-scale farmers through improved access to formal and informal markets and reducing farm-to-table distances.

- Improved off-grid, green energy sources. These sources have good potential to provide poor people access to energy, with correspondingly large multiplier effects in employment creation, small enterprise generation, poverty reduction, the achievement of health and education outcomes and improvements in the well-being of women.<sup>48</sup> In well-designed systems, the increase in emissions can be small and reduced to zero (in aggregate terms) through a proportionately greater reduction in emissions from other parts of the economy. Enabling the access of the poor to credit and skills can help these to deliver their full benefits.
- Creating green jobs – for poor men, women and youth – that align poverty reduction and employment creation in developing countries with a broader set of investments in ecosystems conservation and rehabilitation to preserve biodiversity, restore degraded land, combat erosion, and remove invasive species, as well as recycling and waste management in urban areas (UNDP 2009). There is also tremendous potential to generate jobs for the poor through developing climate resilient infrastructure and adaptation investments, especially in the urban building and transport sectors, to sustain growth. In most cases, the assets created or refurbished through these jobs continue to deliver benefits that can be harnessed by the poor for continued improvements in their well-being. Examples can be found in many public employment initiatives, such as South Africa’s Working for Water, India’s National Rural Employment Guarantee Scheme and the creation of green microenterprises in ecotourism in Kenya.
- Fiscal mechanisms for pro-poor environmental change. Environmental fiscal reforms offer the potential of internalizing the costs of ecosystems degradation and resource-intensive use through the use of green taxes and user fees, as well as removing environmentally harmful subsidies (e.g., in agriculture and energy). Environmental fiscal reforms have been applied in a number of developing countries and have achieved triple wins in terms of revenue generation, environmental improvement and poverty reduction (OECD 2005). Public resources generated have been used to invest in the provision of quality services to the poor. These can also be used for social protection expenditure to cushion the loss of jobs and to provide training in new green job areas along with investment in renewable energy, energy infrastructure, energy efficiency and related energy services.
- Enabling business to innovate, adopt and disseminate green methods of production. The private sector is the driving force in most national economies and plays an important role in influencing sustainable production and consumption patterns. With the capacity to invest and innovate, the sector is uniquely positioned to create solutions that reduce emissions and resource use, while at the same time generating growth and employment opportunities for the poor. An example from Ghana is Toyola Energy Limited, which produces cooking stoves and lanterns that target rural dwellers who largely depend on firewood and charcoal for their domestic cooking and on kerosene for lighting. Toyola provides cleaner, healthier and cost-effective means to meet the energy needs of the poor, and has expanded products, generated new jobs and offset carbon emissions (UNDP 2011a).

<sup>48</sup> See UNDP (2010). Multifunctional platforms in Burkina Faso, Ghana, Mali and Senegal have created income-generating opportunities for women, while reducing the time they spend on collecting firewood and water.

- Building the resilience of the poor. Climate change scenarios present new challenges to the poor and food-insecure by altering ecosystems and their services (despite where access is provided or ecosystems maintained). It brings the risk of disrupting growth and livelihoods, reducing food production and access to food, changing disease patterns, increasing vulnerability due to climatic shocks and the occurrence of environmental refugees. This necessitates protecting the poor from shocks as well as building their assets to increase resilience. Ethiopia's Productive Safety Net Programme, for example, provides transfers to chronically food-insecure people while helping create assets at the community and household level through public works (soil and water conservation, feeder roads, water supply, small-scale irrigation, etc).
- Catalysing climate finance and mainstreaming pro-poor green economy in national development plans. There is tremendous potential to raise climate finance through the Reducing Emissions from Deforestation and forest Degradation (REDD) initiative, carbon markets, climate adaptation finance and supplemental government resources to pursue pro-poor, green economy goals through national development plans. Increased public financing will be vital to address upfront investment costs associated with the transition to a green economy. It will also be vital to ensure that such financial mechanisms include social and environmental safeguards that protect and promote the interests of the poor, so as to fully realize this potential. Safeguards for biodiversity and indigenous and local communities are being developed under the Convention on Biological Diversity.
- Decentralized approaches. There are a number of successful decentralized ecosystem management initiatives around the world that have worked to generate incomes and lift people out of poverty. The UNDP GEF Small Grants Programme has supported many such efforts, but these cases often remain islands of success. Where they have been taken to scale, such as community-based forest management in Nepal, evidence suggests that the more affluent take control and that, at a national level, political groups and parts of the government are keen to extract a share of the profits. The challenge lies in establishing effective governance mechanisms for the poor to play a role in making the links between national and subnational planning, and in decentralizing budgets to allow local authorities to be effective contributors to the achievement of sustainable development.

### **6.3 The role of international agencies in making green economies work for the poor**

It is important to recognize that a transition to a green economy can exacerbate poverty and inequality (jobs could be lost, for example) if not managed properly. Therefore, a pro-poor and inclusive approach needs to prioritize and sequence measures that guard against this by protecting the poor during the transition through social protection programmes. Moreover, the transition to a green economy with pro-poor impacts as priority will require a two-pronged approach: climate/environment-proofing growth and poverty reduction, while poverty-proofing climate/environmental protection responses.

Table 6 summarizes some key strategic and policy issues associated with national transitions to green economies, and outlines the possible roles of international agencies such as those of the United Nations and the Bretton Woods Institutions. It highlights a place for work that ranges from the global normative to country level support with implementation, from research to activation, from

improved coordination to dealing with cross-cutting aspects such as gender and youth. A range of highly relevant agency mandates and institutional capacities at all levels is available to strengthen support to governments and others in all regions. This also requires improved integration in approach and planning of goals across the economic, social and environmental dimensions of sustainable development.

**Table 6.** Key strategic and policy issues and the role of United Nations and Bretton Woods Institutions

Strategic issues	Policy issues	Role of United Nations and BWIs
Shaping the shift to a global pro-poor, green economy approach	Global policy coherence on green economy, climate and MDGs agenda	Help ensure synergies between the green economy, MDGs and climate change agendas in different global settings.
Measuring progress towards a pro-poor green economy with appropriate indicators	Define pro-poor green economy targets and indicators to guide and motivate policy decisions and achieve results	Support efforts at defining green economy indicators and ensure that they are sensitive to measuring pro-poor and equitable outcomes.
Supporting countries to shift to a green economy	<p>Overall key policies for pro-poor green economy drawn by linking up pro-poor growth debates and green growth debates. For example:</p> <ul style="list-style-type: none"> <li>- Green redistributive policies – to pro-poor sectors (health, education, water supply)</li> <li>- Support for specific sectors which are crucial for the poor (agriculture, fisheries and forestry)</li> <li>- Green tax-financed social protection to protect and build assets</li> <li>- Community participation opportunities (off-grid power with renewable energy)</li> <li>- Green job creation via development of the finance sector and increased investments in ecological and physical infrastructure</li> <li>- Pro-poor forest and land use policies</li> <li>- Differentiated policies for the rural and urban poor, recognizing their different contexts</li> </ul>	<p>Provide capacity and policy support to developing countries on nationally led pro-poor green economy actions:</p> <ul style="list-style-type: none"> <li>- Institutional arrangements and reform, including coordination structures and alignment for national policy coherence</li> <li>- Integrated assessments to link and assess the impacts of climate risks and ecological scarcities on growth and multidimensional poverty</li> <li>- Prioritizing pro-poor green economy policy response and innovative options</li> <li>- Costing and budgeting of policy responses and identifying and accessing a variety of climate and environmental financing mechanisms</li> <li>- Identifying and addressing implementation bottlenecks</li> </ul>

<p>Supporting countries to address the nexus between gender, green economy and sustainable development</p>	<p>Ensure that women and men participate in and benefit equally from the green economy.</p> <p>Identify and respond to the specific impacts on women and men in the transition to green economy.</p>	<p>Provide capacity and policy support to government to incorporate gender issues in the green economy's policies, programmes and budgets.</p> <p>Support civil society organizations working on women's economic empowerment in relation to the green economy.</p>
<p>Supporting implementation through aid coordination and improved development effectiveness</p>	<p>Strengthen poverty reduction objective in measures to progress towards green economy.</p> <p>Ensure that REDD options are pro-poor.</p> <p>Support access to climate financing for pro-poor development.</p>	<p>As climate finance increases, the United Nations and BWIs can help ensure that it is coherently linked to official development assistance to ensure synergies and that its implementation learns from past work on aid effectiveness to promote ownership, alignment, harmonization, managing for results and mutual accountability.</p>
<p>Strengthening the interface between research and policy-making</p>	<p>Improve knowledge on integrated approaches to poverty eradication in the context of climate change and ecosystems decline.</p> <p>Build evidence based on impacts of sustainable agriculture on poverty, food security and environmental sustainability, its feasibility and how to scale it up.</p> <p>Build evidence based on impacts of energy reform on poverty and related institutional reform.</p> <p>Integrated assessment tools for interlinking climate change and human development.</p>	<p>The United nations and BWIs to enter into strategic partnerships for development research and analysis to ensure that policy guidance and implementation are founded upon, and feed into, empirical evidence building and the elaboration of sound conceptual frameworks.</p>



© World Health Organisation (WHO)

Hospital operating theatre with surgery team.

## Chapter 7: Investing in social capital

### 7.1 Basic human rights as point of departure

Improving human well-being and equity are at the centre of the green economy. The rights of human beings are both negative (freedom from) and positive (right to), individual and collective. To honour these rights requires the careful assessment of the impacts of economic growth in the shorter and longer term, and the assurance that individuals and communities have the necessary capabilities to participate in determining the direction of growth and to share its benefits.

This chapter examines opportunities at the level of society, and considers public health, lifestyles and culture. A green economy should effectively invest in the social and human capital dimensions of sustainable development, helping communities and individuals build capacity in areas such as health, education, culture and employment. A green economic model will need to prove its ability to enable all human beings to fulfill their basic needs in food, housing and mobility.

Achieving sustainable development requires going beyond the transformation of national economies to transforming societies. Building inclusive, green societies requires a shift to sustainable production as well as consumption, the latter highlighting the need for a shift in patterns of behaviour, attitudes and lifestyles. This is especially critical as rapidly urbanizing communities with growing levels of income in developing countries change their habits and increase demand for products and services that cause increasing pressure on the natural environment.

Changes in current consumption and production patterns will cause some sectors to decline and others to flourish. While far more jobs will be created in the transition than jobs lost, the challenge is to ensure that the process is fair and just.

Moving away from the conventional “grow first, clean up later” path of development by increasing investments in human and social capital can help to firmly establish a green path for future development. Investing in social sectors is fundamental to achieving resource-efficient growth and strongly linked to environmental policy goals. For example, improved access to safe drinking water and sanitation could improve school attendance, reduce a wide range of health risks and reduce the number of work days lost. Therefore, ensuring policy coherence and integration in delivering balanced outcomes in the social, economic and environmental pillars of development will be crucial to achieving a successful transition.

Empowerment of the world’s poorest and most vulnerable through the promotion of human rights in policy making recognizes the fact that the poor have both needs and rights, entitlements – enshrined in law – that give rise to obligations on the part of others.<sup>49</sup> The application of a human rights approach to a green economy model implies the treatment of individuals and groups as active agents of change and not merely as passive victims. A human rights-based approach is a conceptual framework that is normatively based on international human rights standards and operationally directed to promoting and protecting human rights. It seeks to analyze obligations, inequalities

49 See for more information a background paper on human rights, poverty reduction and sustainable development: health, food and water (2002), available from <http://www.ohchr.org/Documents/Publications/HRPovertyReductionen.pdf>.

and vulnerabilities, while redressing discriminatory practices and unjust distributions of power that impede progress and undermine human rights. The human rights-based approach demands policies and programmes that are anchored in a system of rights and corresponding obligations established by international law. This helps to promote sustainability and empower people as right-holders – especially the most marginalized – to participate in policy formulation and hold accountable those who have a duty to act.<sup>50</sup>

To take human rights fully into account, the process of formulating green economy strategies and measures must include the following elements and principles:

- Identifying and prioritizing action to improve the conditions of the poorest
- Analysing the underlying power relations and the root causes of discrimination
- Ensuring that the process and targets are consistent with international human rights standards
- Ensuring close links between macroeconomic policy design, sectoral initiatives, governance components and principles such as transparency and accountability
- Ensuring basic standards of civil and political rights guarantees for active, free and meaningful participation, including freedom of information, of association and access to remedies
- Identifying indicators and setting benchmarks so that the progressive realization of socio-economic rights can clearly be monitored.

In practical terms, a human rights-based approach can be used to guide the fundamental principles and approach behind various policies and measures in advancing green economies. It can inform impact assessments and strengthen processes, ensuring access to essential information, effective participation, and the provision of access to justice. States should consider in what ways, and to what extent, anticipated changes towards a green economy will promote economic and social development and environmental quality at relevant levels, including consideration of human rights and social equity.

## 7.2 Human health and social well-being

The first principle of the 1992 Rio Declaration states, “Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.” Scenarios for projected population growth in the coming decades depend on policies that governments are implementing today, especially with respect to sexual and reproductive health care and family planning. Without such policies, population growth may well exceed current medium-variant projections. In addition, the quality of life of increasing numbers of citizens will depend on economic policies and investments that have direct implications for the health of both humans and the environment. Economic analysis shows clearly that increased investment in sustainable and more efficient transport systems, housing energy efficiency improvements and greener agricultural practices can yield significant co-benefits for human and environmental health. Consider the following areas:<sup>51</sup>

50 More information about a human rights based-approach to development cooperation is available from <http://www.ohchr.org/Documents/Publications/FAQen.pdf>.

51 In order to assess these health co-benefits and (where relevant) risks more systematically, WHO is comprehensively reviewing evidence on, and mapping, health co-benefits of green economic development in key economic sectors. The WHO Health in the Green Economy initiative covers housing, transport, household energy, agriculture and health facilities.

- Health, transport and the built environment. Transport-related health risks currently affect millions of people. Urban air pollution and traffic injuries together kill about 2.5 million people every year, mostly in low- and middle-income countries. Active transport (walking and cycling) can help prevent a significant proportion of the 3.2 million deaths annually attributable to physical inactivity. Green transport strategies that would yield the greatest health co-benefits include investments and policies to support (i) active transport; (ii) rapid transit; and (iii) improved urban land use. The inherent subsidiarity of local governments puts them in an ideal position to lead this transition. And while vehicle and fuel efficiencies have so far received the most emphasis in climate mitigation analysis, behavioural change and shifts in modalities must accompany increased efficiency to avoid rebound effects in which efficiency gains provoke increased consumption.

In the urban environment, mutually supportive climate and health gains require spatial planning that favours compact settlements with dedicated infrastructure for non-motorized transport. Health gains from transport strategies that emphasize active transport, public transport and more pedestrian and transit-friendly land use include: reduced cardiovascular and obesity-related diseases due to physical activity gains from active transport; reduced respiratory and cardiovascular disease from less air pollution; and reduced exposure to traffic injury risks from more transit and pedestrian-friendly land use.

- Healthy and green household energy in developing countries. The health of an estimated 3 billion people can be dramatically improved by replacing simple biomass or coal stoves with improved stoves and cleaner fuels.<sup>52</sup> These interventions also reduce climate change

pollutants significantly, in particularly sooty particles containing black carbon, one of the most powerful shorter-lived climate pollutants. They would also produce substantial co-benefits for poverty reduction and development.

- The greening of health care facilities. Many health care facilities in developing countries suffer from serious forms of energy poverty. Health sector adoption of (clean) onsite energy co-generation, together with use of renewable technologies such as solar power, can both save energy and ensure more reliable energy supply to the health sector.<sup>53</sup> Access to health care can also be enhanced through green, renewable energy systems. Particularly in remote, resource-poor settings, small renewable energy sources can supply basic electricity for life-saving procedures that might not otherwise be feasible, such as maternal deliveries, basic suturing and night-time emergency procedures, blood bank and vaccine storage and basic laboratory equipment. Enhanced use of natural ventilation strategies in health facilities can significantly help reduce both energy costs as well as risk of infectious disease transmission. Furthermore, health risks to health workers, patients and communities will be reduced by improved management of the health care water supply and waste stream. Some 15–25 per cent of health care waste is infectious waste. Scavenged needles and syringes from dump sites represent health threats, as do dioxins, furans and other toxic pollutants emitted by poor incineration. Better management of solid, liquid and gaseous health care products, as well as emissions from infectious, chemical and radioactive agents, can reduce exposure to risks of hepatitis B/C and HIV infections as well as to reproductive problems and cancers.

52 For more information, see [www.who.int/indoorair/publications/fuelforlife.pdf](http://www.who.int/indoorair/publications/fuelforlife.pdf)

53 See WHO (2010) on co-benefits to health from climate change mitigation opportunities in the health sector.

- **Healthy housing.** Cities' inherent agglomeration advantages and large number of dwellings mean that housing upgrades – whether measures for increased energy efficiency, shared energy sources or climate change resiliency – can be undertaken at advantageous economies of scale. Greener housing policies can help reduce health risks from extreme weather and thermal stress, from household-related respiratory diseases such as asthma and pneumonia; from vector-borne diseases such as dengue or malaria; from home injuries; and from diarrheal diseases due to insufficient access to safe drinking water and sanitation.
- **Health, agriculture and the environment.** More sustainable agriculture systems can improve health in a number of ways, including by reducing excessive use of fertilizers and pesticides, integrated vector control management, improved food safety management, improved nutrition and preserving water resources, biodiversity and ecosystem services upon which long-term food production depends. Soil carbon sequestration strategies offer important short-term benefits for climate mitigation while also potentially increasing yields and improving ecosystem services, a double win for health and environment. Healthier patterns of food consumption in higher-income countries and higher-income population groups may also help reduce environmental pressures that arise from livestock production. These include the conversion of forests and rainforests to livestock grazing and/or cultivation of crops for livestock consumption on farmland that could otherwise be dedicated to human consumption. Excessive use of antibiotics in livestock production, as well as poor management of animal waste together pose a range of human health problems that require careful management.

Agricultural workers, the majority of them in developing countries, often work in conditions that make them particularly vulnerable to environmental risk factors (e.g., the effects of temperature changes, such as heat stress, dehydration, UV exposure and extreme weather events) in addition to occupational risk factors (such as exposure to pesticides). More sustainable agricultural strategies also need to consider health equity and food security issues relevant to low-income and subsistence farmers in developing countries, paying special attention to their food security, livelihoods and access to health services.

Green economy opportunities need to be communicated more powerfully in mainstream United Nations debates about public health, health-related MDG achievement and the prevention of communicable and non-communicable diseases. The health benefits of greening require mainstreaming in the key health-related actors in the donor community. Conversely, health, food and nutrition security issues also require mainstreaming in the environmental and climate change discourse. Health and nutrition security is a powerful argument to support climate change mitigation and greening efforts more generally. The health benefits of such measures are very often immediate, personal and local/communal – rather than deferred and diffuse.

Health is also a cross-cutting issue and inextricably linked to environment and development objectives. The health sector can provide evidence-based arguments of exactly how green economies are also healthier and food secure. In many cultures, health professionals are regarded with respect and can provide inspirational leadership on preventive health measures and lifestyle measures that are best buys for health and environment, and can be delivered affordably by using currently available technologies.

Mainstreaming the green economy approach also requires more policy-oriented research (qualitative and quantitative) within the health sector and intersectoral collaboration on the health co-benefits of the green economy. In addition, more donor support is required for pilots that showcase and systematically scale up health gains due to health sector access to renewable energy sources, gains such as reduced mortality from more reliable electricity access in health facilities, reduced morbidity from poor water and sanitation in health facilities. Research can also be used to assess, pilot test and scale up adaptive mitigation or green adaptation strategies in developing countries to demonstrate how a suite of green economy measures can bring integrated benefits.

### **7.3 Culture and lifestyles**

Culture in all its diversity has an important – yet often underestimated – impact in attempts to address current ecological challenges, including climate change, biodiversity loss and resource scarcity. Cultural factors influence lifestyles, individual behaviour and consumption patterns, values related to environment stewardship and the ways in which we interact with our natural environment. The rebound effect of more efficient technologies leading to intensified resource use due to increased consumption is a reminder of the importance of addressing the demand side, user and consumer aspects of any attempt at the greening of economic activity.

Three fundamental components of lifestyles worldwide – food, mobility and housekeeping – have great impacts on environments and societies (cf. UNEP and MTF 2011). For example, personal and commercial transport consumes about 20 per cent of the global energy supply, 80 per cent of which comes from fossil fuels.

There are now more than 700 million cars in use globally. It is anticipated that by 2050 the global car fleet will triple. More than 90 per cent of this growth will take place in non-OECD countries.<sup>54</sup> At home, daily life habits such as heating, cooling or lighting require extensive energy and cause large amounts of GHG emissions. The dietary habits of young and urbanizing populations in emerging markets also add to the strain that consumers from the OECD world have historically placed on the natural environment.

As cities seek green urban solutions, they are well advised to consider historical innovations that can be found in rural areas. There is much to learn from the environmental management skills embedded within rural or indigenous peoples, including multi-use strategies of appropriation, small-scale production with little surplus and low-energy needs, as well as a custodial approach to land and natural resources that avoids waste and resource depletion. Culturally based knowledge and indigenous know-how are core resources for sustainable development. Not only are biological and cultural diversity linked to a wide range of human–nature interactions, but they co-evolve, are interdependent and mutually reinforcing.

Culture is also a vehicle for pro-poor, green development and the generation of jobs. Global cultural industries account for more than 7 per cent of global GDP. In Mali, for example, the culture sector accounted for 5.80 per cent of employment in 2004 and 2.38 per cent of Mali's GDP in 2006, including the informal component (accounting for 57 per cent of the national economy; UNESCO 2011). Worldwide cultural heritage destinations, especially UNESCO World Heritage sites, produce revenues from visits and sales of local crafts, music and cultural products, generating employment for communities. The same applies to intangible cultural heritage,

<sup>54</sup> On the growth in transport globally and related climate neutral initiatives, see [www.unep.org/climateneutral/Topics/Transport/tabid/154/Default.aspx](http://www.unep.org/climateneutral/Topics/Transport/tabid/154/Default.aspx)

which sustains living cultural expressions and traditional know-how, as well as the performing arts. Museums and other cultural institutions significantly contribute to economic benefits. Investment in tourism stimulates investment in infrastructure and helps to boost local development.

In the framework of the World Heritage Convention, UNESCO is fostering green livelihoods jobs in the least developed countries. In Ethiopia, UNESCO has helped to create local labour opportunities through the training and capacity-building of local workers in traditional building conservation skills, as well as local crafts people and tourism guides in the Lalibela region where the Lalibela Rock Hewn Churches are located. Lalibela is one of the poorest regions of Ethiopia, but one of the richest in terms of architecture, religion and liturgical music. In the town of Lalibela, cultural assets are a primary source of income.

Green jobs in the cultural industries can only be developed sustainably when cultural entrepreneurs have access to key resources for meeting growing market demands. Providing training services to cultural entrepreneurs on how to access microcredit loans, and on entrepreneurship and marketing could help to capture the opportunities cultural enterprises offer as a tool to alleviate poverty. Promoting awareness among craftsmen, designers and other creators and manufacturers on using sustainable materials and energy sources, and providing training and access to ICTs, could help to put cultural entrepreneurs in direct contact with interested customers. Where the latter buy green products directly from the producers, local communities will receive greater benefit as well.

Identifying appropriate policies and measures for transitioning to a greener economy, needs to consider local cultural realities and the needs of the local

populations. Green job objectives will require the provision of capacity-building and training in least developed countries in areas such as biodiversity conservation, cultural tourism, eco-tourism and cultural heritage conservation. The private sector need also be engaged along with civil society organizations to strengthen local creative and cultural industries for development in poor countries, including creative industries related to tourism. A key aim of this would be to broaden the access of developing countries to regional and international markets for cultural industries, with relevant technical assistance provided.

## **7.4 The media and network communication opportunities**

The last decade has seen a virtual democratization of the media market with individual citizens feeding in content online from all corners of the Earth. As readers, listeners and viewers face potential information overload, finding and presenting relevant information becomes all the more challenging. This includes information and analysis on recent crisis events and how this impacts markets and consumers worldwide. While undergoing revolutionary changes itself, media in all its forms can play a major supporting role in helping decision makers, managers and consumer-citizens make informed choices for a green economy transition. Building the capacity of media professionals to investigate and report on sustainable development issues is an essential component of improving the awareness among the public and decision makers of where business as usual is leading.

In many developing countries, journalists lack the analytical skills to interpret green economy issues and report on sustainable development trends. Reporting on

the green economy also requires the ability to deal with empirical data, statistics and economic analysis, something that not all reporters are familiar with. Comprehensive journalism education, which focuses on how to cover issues in a credible manner and employ economic analysis must therefore be included at the tertiary level, and through trainings for media professionals. Some journalists investigate environmental malpractices such as illegal logging, land clearing, biodiversity destruction, hazardous waste mismanagement and corrupt permitting, and often face life-threatening encounters. It is therefore also important for states to guarantee the freedom and safety of journalists, so that the media can be an effective partner in investigating and educating on relevant issues.

Efforts to enhance the role of the media in educating citizens and raising awareness about the green economy should include focused research on media coverage of relevant issues as a way of uncovering and addressing capacity gaps in journalistic practice and education. Access to relevant information and visibility of issues related to the green economy should be ensured with both media professionals and the citizenry in mind.

An independent and pluralistic media based on Media Development Indicators<sup>55</sup> should be promoted through capacity-building for specialized reporting on matters such as renewable energy, water scarcity, sustainable consumption and other challenges of the green economy. This would need to involve journalism education curricula focused on green economy issues as part of programmes in education for sustainable development. The UNESCO Model Curricula for Journalism Education, for example,

incorporates a syllabus on specialized journalism that addresses the conceptual and practical strategies for reporting on issues related to greening. This includes the science and economic analysis behind it, as well as relevant economic policies and instruments.

Information and communications technologies provide wide-ranging opportunities for enhancing citizen participation, particularly by encouraging user-generated content that can be used by conventional media. Online media can also be used to promote access to scientific and public policy information, facilitating more informed coverage of green economy issues and policy debates. Journalism education and training can be complemented by media fellowships to support specialized journalism on green economy issues.

Open Educational Resource Platforms such as that of UNESCO can be expanded online with targeted information and expert analysis related to the green economy, including its relevance in the midst of global economic, financial and resource crises. Multi-stakeholder initiatives such as the ITU-UNESCO Broadband Commission for Digital Development can be used to advocate improved use of ICTs for the dissemination of information on green economy trends and opportunities. This includes due consideration of key market segments, including policy decision makers, industrialists, scientists, employee representatives, consumers and youth groups.

<sup>55</sup> Media Development Indicators provide a framework for assessing media development at the country level. They are promoted through the UNESCO Programme for the Development of Communication. See [www.unesco.org/new/en/communication-and-information/resources/publications-and-communication-materials/publications/full-list/media-development-indicators-a-framework-for-assessing-media-development](http://www.unesco.org/new/en/communication-and-information/resources/publications-and-communication-materials/publications/full-list/media-development-indicators-a-framework-for-assessing-media-development).



© Shutterstock / Joel Shawn

Mother and her baby in Sacred Valley, Peru.

## Chapter 8: Investing in human capital

### 8.1 Introduction

Transforming the national economy into one that is resource-efficient and that produces optimal socio-economic results requires targeted policies and investments not only at the level of society, but also at the level of individual citizens and their ability to be employed productively in the economy. This chapter explores risks and opportunities at the level of the individual as student, trainee, employee or unemployed. It highlights ongoing challenges not only in providing jobs to new market entrants and the unemployed, but also ensuring that those who are employed work under appropriate conditions.

Consider, for example, that an estimated 60 per cent of those employed in least developed countries also live in extreme poverty, and that 80 per cent of the population in least developed countries suffer from vulnerable employment (ILO, 2011). According to the United Nations Population Fund (2011) estimates, at least one quarter of those who work are underemployed. As the population of these countries double in coming years, including significant growth in the youth population, the employment challenge in these countries will increase. This comes at a time when many countries struggle to maintain per-capita spending on health and education.

Providing relevant education and training opportunities for a new, green workforce will be critical to achieving a successful transition, as will be developing mechanisms to support the most vulnerable population segments of society. Major social crises could be addressed, including the 1.3 billion working poor who cannot lift themselves and their dependents above the poverty line of US \$2 per day, the 190 million who are unemployed, the 500 million new young job seekers until 2020 and the 5.3 billion without any social security coverage.<sup>56</sup> Access to and extended coverage of social protection systems can help facilitate the transition to an inclusive economy and industries that operate on sound ecological principles.

To sustain positive transformation, green policies and investments will need to address gender equality and the needs of marginalized segments such as the poor, indigenous people, migrants and youth. To start with, the seeds of a longer-term transformation need to be planted at the level of educating young people, equipping them with the necessary skills and knowledge they will need in a more interconnected and resource-constrained world.

<sup>56</sup> See ILO response to the Survey on United Nations System organizations, IFIs and other stakeholders on Experiences, Success Factors, Risks and Challenges with Regard to Objectives and Themes of UN Conference on Sustainable Development (UNCSD), available at [www.uncsd2012.org/files/responses-un-system/Questionnaire-Email-submission-%20ILO.pdf](http://www.uncsd2012.org/files/responses-un-system/Questionnaire-Email-submission-%20ILO.pdf)

## 8.2 Education and training to meet new realities

Research on green jobs has shown that different economic sectors and industries, old and new, are likely to go through their own unique transitions towards greener operations and markets. The Green Jobs report (UNEP and others 2008) has identified four ways in which employment is likely to be affected as economies green and become oriented toward sustainability:

- i. In some cases, additional jobs will be created – as in the manufacturing of pollution-control devices added to existing production equipment
- ii. Some employment will be substituted – as in shifting from fossil fuels to renewables, or from using landfills and waste incineration to recycling
- iii. Certain jobs may be eliminated without direct replacement – as when packaging materials are discouraged or banned and their production is discontinued
- iv. Many existing jobs (especially plumbers, electricians, metal workers and construction workers) will simply be transformed and redefined as day-to-day skill sets, work methods and profiles are greened.

These transitions have important implications for both the education of new entrants to the job market as well as building the expertise, skills and capacity of existing employees through training and other programmes including lifelong learning. Greening the national economy requires a set of short-, medium- and long-term policies and approaches for

new development paradigm, one in which Education for Sustainable Development (ESD) will be a core foundation. ESD helps to encourage changes in individual behaviour, attitudes, lifestyles, consumption and production patterns. It advances the teaching of relevant skills, competencies and research capacities in all segments of society, considering the educational needs of individuals at different stages of their career development.

The ESD concepts must be fully integrated into learning and teaching processes in all types, levels and settings of education, ranging from early childhood care and education to higher education, as well as in the non-formal system and through lifelong learning and teacher training. Curricula and learning materials will need to be revised through the integration of internationally recognized standards and guidelines for education on global sustainability challenges. New course materials would include interdisciplinary education for climate change as well as for responsible consumption and lifestyles. ESD seeks to impart trans-disciplinary understanding of social behaviour, cultural attitudes, sustainability principles and ethical values.

ESD is contingent upon a vision of the world where everyone, particularly girls and women has the opportunity to benefit from quality education and to gain the knowledge and skills required for sustainable development and positive societal transformation. It looks holistically at the interdependence of the environment, the economy, society and cultural diversity at the local to global levels. The aim is to nurture a common understanding of sustainable development and how daily activities in the economy have significant, long-term material consequences for humans and the environment.

Education is also a prerequisite for breaking the cycle of poverty. The fact that millions of people are denied access to basic education is a major obstacle to building sound economies and achieving sustainable development. A firm commitment is needed to provide for long-term investment in education, an investment that has the potential to offer high returns including accelerated development. Each year of additional schooling could increase individual earnings by 10 per cent, empowering people to lift themselves out of poverty. Exclusion and inequalities linked to wealth, gender, ethnicity, language, location and disability are holding back progress. Girls are disproportionately affected by these trends. To reach out to the marginalized and engage them in the development of inclusive green societies and economies will require creating inclusive education systems. Social protection measures such as school feeding can help to ensure the education of the poorest and most vulnerable segments of society, especially girls.

Overall, the green transition requires innovation in education, helping to create the relevant knowledge, expertise, skills and values by increasing public awareness and understanding. It requires transforming education and learning systems, including formal education, training, professional development, non-formal and informal learning – and placing all of these within a framework of lifelong learning. This implies systems that are inclusive in meeting the needs of different age groups as well as disadvantaged groups, reaching the marginalized and enabling them to be active participants in green economic activity and sustainable development processes.

More inclusive education and learning systems require governmental institutions to improve access and affordability for excluded groups by lowering cost barriers, bringing schools closer to marginalized communities and developing second-chance programmes. This needs to be complemented by initiatives to improve the learning environment by deploying skilled teachers equitably, targeting financial and learning support to disadvantaged schools and providing ESD in different languages. Equal opportunity needs to be ensured by enforcing laws against discrimination and providing social support programmes, and by developing disaggregated data collection systems to identify marginalized groups and monitor their progress.

The content of existing curricula needs to be revised to integrate relevant green aspects and ingrain the requisite attitudes, knowledge and values needed for responsible eco-citizenship. This also requires assessments to define new skills and expertise required to meet emerging requirements of green markets. In light of transitional arrangements required, formal and informal education and training needs to be provided to train or retrain employees for green jobs, supporting their ability to innovate and adapt. Effective mechanisms need to be in place to link the evolving needs of green labour markets in particular pressing technical and vocational training needs, with the offer provided by educational programmes. With respect to the skills of those presenting revised curricula, teacher training programmes need to be updated to advance teachers' ability to promote awareness and understanding, and to teach about green economic and low-carbon growth options.

At the higher education level, national capacities in science, research, technology and advisory services in key areas of the emerging green economy (e.g., green technologies, ecosystem services, green finance, green accounting) need to be strengthened. Advancing applied science in relevant contexts needs to go hand in hand with enhancing the application of scientific and technical knowledge to address development challenges such as integrated resource management and to stimulate eco-entrepreneurship. Promoting new educational and training programmes will also need to take special care in engaging ministries of education, labour, environment, industry, agriculture, tourism and others and securing complementary policies. Equally important is the engagement of national education and training institutions in country-driven capacity self-assessments, which can be an important starting point to catalyse strategic action to strengthen human resources and relevant skills.

### **8.3 Employment risks and opportunities**

The world of work is impacted in different ways by environment problems (e.g., climate change) and policies to address these problems (e.g., adaptation and mitigation measures). Similarly, significant transformations will take place in companies and labour markets as a result of the changes in the current production and consumption patterns that are needed to achieve sustainable development. Institutions should adapt to support and cope with these changes, in particular by responding to the resultant need for new skills for green jobs. Employment impacts can be summarized under the following categories:

- Reduced incomes and employment opportunities due to environmental challenges: climate change, scarcity of water resources, chemical pollution and biodiversity loss, in sectors such as agriculture, fisheries and tourism
- Employment creation and new business opportunities as a result of policies to address these challenges in, for example, agriculture, forestry, energy, construction, water infrastructure or tourism
- Job substitution within and among sectors of the economy.

Evidence shows that coherent and holistic climate action and transition policies can be designed to maximize social benefits and therefore improve living standards. Clear synergies exist in, for example, energy-poverty, energy-efficiency and energy-security. If renewable energies are more intensively utilized, green jobs and income will be generated and poverty tackled in an environmentally friendly manner. What used to be the prohibitive price of renewable energy is approaching parity with traditional energy sources whose dwindling stocks provide an incentive for an earlier, cheaper transition to more sustainable jobs in the long term.

In Kenya, feed-in tariffs designed to give energy access to the rural poor are expected to increase rural electrification rates massively. An additional capacity of 1,300 MW in the next 20 years is expected to generate positive effects on health, gender, housing, education, income and employment (UNEP 2010b). In Germany, ecological tax reform that put a price on GHG emissions while reducing non-wage labour costs is resulting in an estimated 250,000 additional full-time jobs since the year 2000 (Kohlhaas 2004). It is estimated that in 2010 there were 320,000 green jobs in the German renewable energy sector alone.

Other resource use areas and efficiency improvements provide further examples of how greening economic activity can deliver clear socio-economic benefits. An example is sustainable as well as organic agriculture, an economic sector on which least developed countries from Africa remain highly dependent. In Uganda, a government-supported programme has led to the increase in the number of organic farmers from 20,000 to 400,000 over the last decade. This has led to reduced unemployment, reduce poverty, and increased export and income through premium prices.

The creation of and transition to green employment opportunities is crucial for the success of a green economy. Diversifying the economy and focusing on the most vulnerable, including women, youth, informal workers and the unemployed will lead to sustainable development and inclusive economic growth. Green jobs have been created in all categories of countries, including the developed and least developed. Two of the most promising areas for new jobs are green building and retrofitting buildings as well as transport infrastructure. The vast majority of buildings and transport works are in cities that are absorbing the most rapid increases in population. This requires infrastructure expansion and increased job provision, both of which necessitate explicitly green employment strategies.

The government of Brazil in consultation with ILO designed an urban social housing programme, My House, My Life, as a way to tackle poverty, unemployment, inadequate housing and carbon emissions. The International Labour Organization reports that over 500,000 new social homes equipped with solar water heaters will provide adequate housing for poor families, decrease their energy expenditures and increase their budget for food, education and health. An estimated 18,000 new jobs

in solar water heater installing and servicing will be created. In addition, reduced electricity demand during peak hours will reduce carbon emissions.<sup>57</sup>

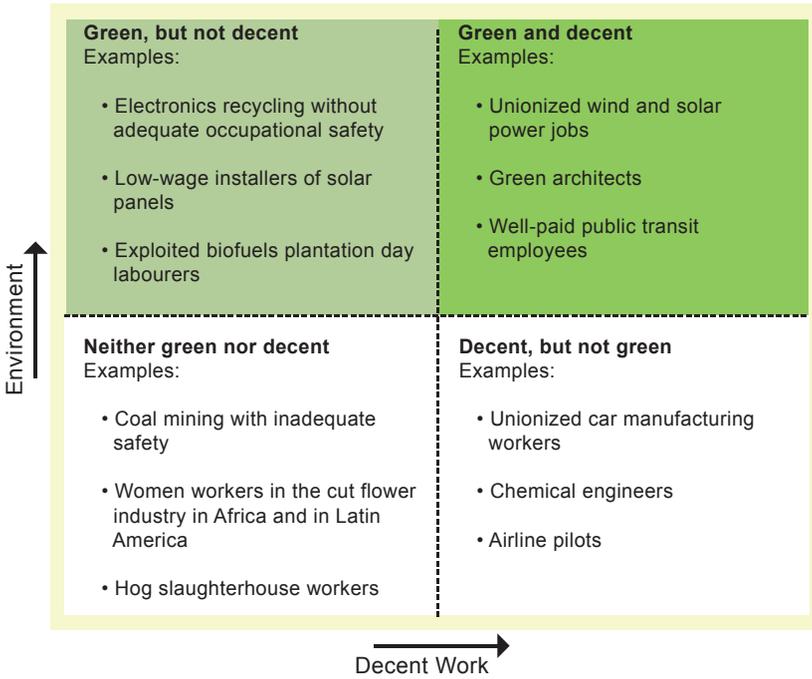
Public investment in infrastructure is essential, as a green economy requires major structural changes in areas such as energy, water and transportation. In the developing world these investments must in particular be pro-poor, allowing vulnerable groups to gain access to basic services. Employment intensive initiatives such as the South African Working for Water programme and the Indian National Rural Employment Guarantee Act programme combine investments in greening the economy, building much needed infrastructure (transport, buildings, water-related) and alleviating poverty by creating employment and development.

Measures to foster the creation of green jobs for young people can learn from the Youth Entrepreneurship Facility of the ILO in East Africa. Youth account for 28 per cent of the population in sub-Saharan Africa, making it the youngest region in the world. The youth unemployment rate is 33 per cent in Kenya. The facility seeks to address this issue through the promotion of green entrepreneurship and small business development targeting the youth (ILO 2010b).

The jobs secured, transformed or created should involve occupational activity that meets the requirements of being environmentally sound as well as decent. Figure 3 gives some illustrative examples for employment that can be described as either green or decent or both. While technologies and local conditions continue to evolve, the examples are indicative of key aspects to consider when assessing the direct, indirect and induced impacts of green economic measures at enterprise and industry level.

<sup>57</sup> The Government of Brazil announced in 2011 that it will invest US \$44.2 billion in building 2 million homes in the second phase of the My House, My Life program by 2014. See [http://www.brasil.gov.br/news/history/2011/05/13/my-home-my-life-program-to-invest-more-than-r-71-billion-in-2-million-homes/newsitem\\_view?set\\_language=en](http://www.brasil.gov.br/news/history/2011/05/13/my-home-my-life-program-to-invest-more-than-r-71-billion-in-2-million-homes/newsitem_view?set_language=en).

**Figure 3.** Tracking the environmental soundness and decency of occupations



Source: UNEP and others (2008)

Giving rights to workers serves to ensure the full support and sustained participation of those who will eventually drive the green economy. Ultimately, it will enable the transition of economies and mindsets to respect and protect the environment and the services it supplies. For policies to advance social development and foster a green economy, they need to:

- Respect and promote the implementation of ILO labour standards
- Ensure active participation of employers' and workers' organizations as well as labour ministries and related institutions through social dialogue
- Promote decent work opportunities for all
- Be based on socio-economic impact, vulnerability and opportunity assessments

- Include not only an economic and environmental assessment but also a social cost-benefit analysis, with due consideration to those vulnerable groups.

Measures to be introduced include active and passive labour market policies. Active labour policies in particular aim at strengthening the capacity of labour market institutions to match demand and supply in the labour market and improve workers' skills through training. This is particularly important during periods of crisis and structural change. As an example, the USA Green Jobs Act includes training elements for workers and entrepreneurs in green sectors such as energy efficiency, renewable energies and sustainable construction. This forms part of the American Recovery Act of 2009.<sup>58</sup>

58 The US Congress passed the American Recovery and Reinvestment Act in February 2009. A direct response to the economic crisis, the Recovery Act has three immediate goals: (i) create new jobs and save existing ones, (ii) spur economic activity and invest in long-term growth, and (iii) foster unprecedented levels of accountability and transparency in government spending. See <http://www.recovery.gov/>.

Assessments are key in understanding the social dimensions of a green economy. Two types of assessments are relevant. First, an assessment of social impacts, vulnerabilities and development opportunities will help to identify winners, losers and policies for a just transition. Second, cost-benefit analysis of specific policies and measures will allow for realistic choices and programmes. A study commissioned by ILO (2010c) and conducted by the Chinese Academy for Social Science on Low Carbon Development and Green Employment in China provides an example of a realistic stock-taking of likely winners and losers and the scale of direct and indirect impact involved to identify net gains. It has found that while 800,000 workers in small coal power plants are likely to lose their jobs due to climate mitigation actions, some 2.5 million jobs can be created in the wind energy sector by 2020.

Social dialogue between governments and civil society including workers' and employers' organizations is a powerful tool for collective action towards a green economy and meaningful industrial restructuring. At the national political level, examples are the French dialogue Grenelle Environnement and the Spanish roundtables to implement Kyoto protocol measures (ILO 2010d). Agenda 21 is clear that success at all levels of action will require the active and informed participation of people in the design, development, financing and implementation of development activities.

Spatial planning is also crucial for ensuring that policies and measures actually reach those who need them locally. The configuration of development heavily

predetermines the modes and reach of the transportation networks, and therefore access to employment and services. Work that requires daily commuting whose time and financial costs significantly erode income is not decent work. The quality of life that city-regions with well-planned, green, public infrastructure offer is therefore just as important a component of livelihood as the jobs themselves. Cities are also hotbeds of innovation. Local authorities should actively facilitate the development of green industry clusters that leverage local academic institutions to provide training aligned with emerging labour supply and demand.

Overall, green economy policies and measures require a just transition framework to manage the transition in a manner that mitigates negative impacts and boosts green employment opportunities through the promotion of a decent work agenda. If structural changes arising from the transition to a green economy are to be beneficial for enterprises and workers in line with the basic pillars of decent work, a just transition framework is essential. This framework should cover four areas. It needs to include an assessment of risks and opportunities of the transition to a low-carbon economy. The assessment should include an analysis of potential job losses, job transition and job creation. Its results will support economic diversification and the minimization of job and income losses through social protection. It also needs to provide for social dialogue as the principal mechanism for facilitating a just transition. And finally, it needs to cover programmes to build the capacity of workers, employers and public institutions in a coherent manner.

## 8.4 Social protection: A safety net for change

The transition to a green economy is best understood as a process of structural change. Climate change, natural disasters, desertification and other environmental problems are powerful drivers of poverty, unemployment, food insecurity, gender inequality and negative impacts on human health. These environmental factors exacerbate existing conditions of vulnerability associated with local socio-economic circumstances. Social protection systems as main risk management mechanisms should therefore be designed and implemented to cope with different drivers of vulnerability.

The net impact of a green transformation will be more jobs (cf. UNEP 2011), but the challenge is to ensure that the transformation is fair and just. Previous crises have proven that sound social protection systems serve as powerful socio-economic stabilizers, helping to alleviate the negative consequences of disasters. They help to address financial needs, social problems as well as socio-economic adjustments.

Nearly 80 per cent of the world's population currently lives without any access to social protection (ILO 2008). This implies no access to health services, child education, unemployment coverage, pensions and food provision when it is needed. The lack of social protection not only directly affects individuals and the standards of living of a large portion of the population, but through aggregate demand, its

absence also slows down or significantly delays economic recovery following economic shocks. Experience from various countries shows that those with sufficient social protection coverage for their citizens have been able to recover faster, more efficiently and in a more cost-efficient way from social, economic and environmental crisis than those countries with poor social protection systems. South Africa, India, Brazil, China, Ethiopia and Thailand are some examples of successful cases where this “prevention is better than cure” approach has been followed.

Social protection therefore needs to be at the core of a just transition to an environmentally friendly and climate-resilient economy. Investing in a national social protection floor has positive economic effects, as societies are able to move towards developing their full productive potential. It represents an investment in a country's social infrastructure and is no less important than investments in its physical infrastructure. Social protection systems are fundamental in two main ways. Their investments help to create a population that is sufficiently healthy, well nourished, educated and more employable in the formal economy. They also contribute to effective recovery from situations that affect people's health, incomes, food security and proper shelter, whether it is due to environment, financial and economic or social-related causes. In addition, social protection as safety networks also boosts the risk-taking and entrepreneurial activity that a green economy requires.





GREEN MARKET



CHANGE

TRADE



PRIVATE FIN



MOBILIZING







Digital bulletin board with quotes at stock exchange.

© Shutterstock

## Chapter 9: Private finance

### 9.1 Introduction

There is no complete estimate yet of resources needed to make the transition to a green economy. The highest estimate for climate mitigation action over coming decades suggests required financing of some 5.5 per cent of global GDP by 2050. This amounts to no more than 0.15 per cent of global GDP per year over the period 2010–2050. Estimates by the private financial sector underline the scale of the challenge. The World Economic Forum (WEF 2010) and Bloomberg New Energy Finance calculate that clean energy investment must rise to US \$500 billion per year by 2020 to restrict global warming to 2°C. HSBC estimates the transition to a low carbon economy will see a total growth in cumulative capital investments of US \$10 trillion between 2010 and 2020 (Robins 2010).

The Green Economy Report (UNEP 2011) assumes the investment required to kick-off the transition to a green economy globally to be in the region of 2 per cent of global GDP or US \$1.3 trillion per year at the current level of global GDP over the coming 40 years. The report highlights that addressing the misallocation of capital in public finance and spending can raise substantial capital. This will require actions such as subsidy reform and the use of green tax policies to unlock and raise capital. Yet rising public debts (increase in debt/GDP ratio) will necessitate a greater share of capital from private sources, in certain areas up to 80 per cent of the required capital. If insufficient action is taken, the environmental and social cost is likely to exceed the amount of financing required.

### 9.2 Transformation in mainstream finance

Opportunities exist to meet the long-term financing needs of a green economy at the required scale. A range of public and private green financial and investment instruments such as carbon finance, green stimulus funds, microfinance, thematic funds (e.g., cleantech funds, green infrastructure and real estate funds, socially responsible investment funds) and green bonds have emerged in the 2000s and can potentially open up the space for large-scale financing. In addition, essential infrastructure and instruments that facilitate finance and investment flows into markets underpinned by valued biodiversity and ecosystem services have evolved as important mediums that facilitate capital flows towards greening. These instruments include payment for ecosystem services, emissions trading schemes and investable climate or sustainability indexes. Microfinance has a potentially important role at the community level to enable the poor to invest in resource management, agricultural production and trade and energy efficiency as well as increased resiliency to the risk of droughts and floods.

A number of United Nations programmes have set up specialized financing facilities, projects and industry initiatives that are contributing significantly in creating the enabling environments for green economy opportunities.<sup>59</sup> Scaling up these initiatives is essential in mobilizing additional or supplementary funding to assist developing countries in the fight against climate change. Their scaling up is also critical to foster greater application of what investors refer to as environmental, social and governance (ESG) criteria, supported by greening investment strategies at the global level.

Long-term public and private institutional investors (such as pension funds, their asset managers and insurance companies) have increased their interest in acquiring portfolios that minimize ESG risks while capitalizing on emerging green technologies. This trend has led to greater interest in green assets and hence the creation of industry initiatives such as the UNEP Finance Initiative (FI); United Nations-backed Principles for Responsible Investment (PRI); P8 public pension funds group; International Investors Group on Climate Change; and Investors Network on Climate Risk.<sup>60</sup> These initiatives seek to mainstream the integration of social responsibility criteria in the investment process, understand green investment opportunities, build up and share expertise in emerging green asset investment strategies and foster improved dialogue with policymakers to bring down barriers to green investments.

Launched in 2006 by UNEP FI, the United Nations Global Compact and industry partners, the PRI today has over 900 investment institutions from 49 countries

as signatories, representing assets under management of over US \$30 trillion, or 20 per cent of global capital. Its membership is made up of asset owners (236, including the United Nations Joint Staff Pension Fund), investment managers and professional service partners. Actual integration of ESG factors into investment criteria today stands at 7 per cent of the total global market of assets under management, and integration within the PRI signatory base stands at approximately US \$10.7 trillion (PRI 2011). The growing take-up of the principles in the mainstream investment community, including engagement with problematic investee companies through the PRI clearinghouse mechanism, represents a highly significant trend in the greening of investment worldwide.

Current green capital flows are, however, still small compared to overall investment needs and they rapidly need to be scaled up if the transition to a green economy is to take off in the near term. Concentrated pools of assets such as those controlled by institutional investors; pension systems and insurance companies with combined industry assets of some US \$40 trillion; the US \$39 trillion-plus controlled by the high net worth community of private equity; and the growing assets of sovereign wealth funds, will all need to be drawn upon in support of a green economy in the coming decades.

With limited public funds at their disposal, governments vying to scale up finance and investing may wish to establish enabling environments that allow green economy projects to tap into concentrated pools of capital at scale, first and foremost through a reorientation of existing investment. But

59 Examples of financing facilities include the Global Environment Facility and the ongoing work for the Green Climate Fund. The United Nations has set up industry initiatives that engage financial institutions to understand the impact of the environmental, social and governance issues in the investment, lending and insurance activities. Such initiatives include the UNEP Finance Initiative, United Nations-backed Principles for Responsible Investment, Principles for Sustainable Insurance (forthcoming) and The Sustainable Stock Exchanges initiative.

60 For more information on these initiatives see: [www.unepfi.org](http://www.unepfi.org), [www.unpri.org](http://www.unpri.org), [www.cpsl.cam.ac.uk/Leaders-Groups/P8-Investment.aspx](http://www.cpsl.cam.ac.uk/Leaders-Groups/P8-Investment.aspx), [www.iigcc.org/](http://www.iigcc.org/), and [www.ceres.org/incr/](http://www.ceres.org/incr/).

smart financing mechanisms and focused incentives will be needed to leverage capital at scale from institutional investor segments. Equally important, policy and regulatory changes and incentives are needed to ensure that markets are better structured and governed to incentivize sustainable business behaviour by funding their activities.

### **9.3 A financial system for the green economy**

The financial system is the central nervous system of the economy. Its components – intermediaries, capital markets, infrastructure and the body of standard-setters – enable the allocation of capital to end-users. Currently, however, the way the capital is allocated to corporate activity largely undermines investment in green business and cleaner industries. As evidenced at the onset of the financial crisis, investment decisions are largely underpinned by short-term thinking. Hence the incentive structures along the investment food chain are not fit to award green business activities with a longer-term focus. Incentive structures, therefore, will need to be rethought and designed to reward socially responsible businesses that contribute to the achievement of a green economy through equity and other types of funding.

The inclusion and mainstreaming of ESG considerations into traditional investment decision-making, adoption of integrated reporting frameworks and mandatory disclosures – initially based on a comply-or-explain approach – are integral to an enabling environment for aligning institutional investors' investment strategies and capital allocations at large with green economy investments needs. To this effect, it is essential to:

- Make the application of appropriate ESG criteria common practice in all components of the financial system, including intermediaries (such as banks and insurance companies), capital markets (such as investors and their fund and asset managers), infrastructure (such as stock exchanges and rating agencies) and the body of related stand-setters and industry networks.
- Require accountable disclosure in the form of sustainability and integrated reporting by financial institutions (banks, investors, insurance) and their clients from all economic sectors, encouraging use of relevant indicators as can be found in the Global Reporting Initiative guidelines and integration approaches as defined by the International Integrated Reporting Committee,<sup>61</sup> as well as application of these tools in collaboration with stakeholders and regulatory bodies such as stock exchange authorities.

Full assessment, pricing and accounting of environmental and social externalities are key factors for internalizing the respective costs in investment and financing activities. Governments, therefore, should put in place clear, credible and coherent regulatory frameworks to enable the pricing of environmental and social costs, their proper reflection on companies' balance sheets and on individual asset prices, facilitating the integration of ESG issues into financial and investment decisions. Governments should involve the private sector in identifying systemic barriers to green investments and the ways and means to bring down those barriers jointly.

To this end several United Nations initiatives work together with the global financial sector to promote the internalization of externalities in the investment decision-making, bridge knowledge gaps

<sup>61</sup> See [www.globalreporting.org](http://www.globalreporting.org) and [www.theiirc.org](http://www.theiirc.org) for more information on the relevant sustainability, financial and integrated reporting standards.

and encourage greater financial sector participation in the achievement of green economy goals at the global and national levels. Better understanding of systemic issues that impede proper pricing of environmental and social costs will be required in order to design a global financial architecture that is aligned with green economy goals. This includes the use of incentives and revised valuation tools to deal with dilemmas in balancing short-term pressures with longer-term results, including results from investment in infrastructure, natural resource exploitation and other economic areas with intergenerational consequences.

Addressing the full spectrum of systemic issues identified above is an imperative for unlocking finance at large for business activities that contribute to the development of green markets and achievement of a green economy. In this sense, re-fitting (or aligning) the structures, management and investment practices and governing standards of the financial system components in ways that significantly contribute to efficient allocation of investments towards the green economy presents a challenge that requires bold commitments and systematic action by governments, the financial sector and the international community. Building on its experience with the international financial sector, United Nations agencies through their private sector and industry initiatives are well positioned to advance the incorporation of ESG considerations into international policy and financial sector standard-setting processes. An example is the Sustainable Stock Exchanges initiative of the United Nations Global Compact, the United Nations Conference on Trade and Development (UNCTAD), UNEP FI and PRI.<sup>62</sup> Involving industry partners such as the International Securities Commissions, this initiative builds on the experience of stock exchanges such as those of Johannesburg and Sao Paulo in setting ESG requirements and hosting their own sustainability indexes.

## 9.4 Building a green economy through project investment and public-private collaboration

At the project level the challenge is the lack of incentives for investors to channel financial resources towards greening. The Equator Principles, applied to project financing by private banks to projects of over US \$10 million and based on standards developed earlier by the International Finance Corporation (IFC), has made good progress with over 70 signatory financial institutions today.<sup>63</sup> Still, concerns related to effective application of principles and take-up in the broader finance community remain. Relevant investment targets for a green economy scenario will not be achieved without incentives, credible policy frameworks and regulatory certainty that stimulates funding from institutional investors towards green economy goals. It is crucial to introduce focused incentives for the scaling up of green investments and to design financing mechanisms to overcome existing investment barriers. The gap in required funding is reinforced by the lack of adequate public financing. This poses funding limitations for green and socially inclusive infrastructure projects, especially in developing countries.

Financing mechanisms that mitigate risks associated with, for instance, climate policy and regulatory uncertainties will be needed to leverage institutional investors' capital for green economy investments. Creating public-private mechanisms and pooling capital and expertise from international and national public finance institutions and private sources through the use of public financing mechanisms (PFMs) could be effective in mobilizing funds for green and socially inclusive infrastructure projects in developing countries.

62 See [www.unpri.org/sustainablestockexchanges](http://www.unpri.org/sustainablestockexchanges).

63 See [www.equator-principles.com](http://www.equator-principles.com) for more information on progress with implementation of its principles by participant banks.

Overall, the role of the public sector is indispensable for triggering a transformation and in catalysing the required flow of private finance. Although public resources are significantly smaller than those of private markets, public spending can primarily focus on specific public goods such as access to water and sanitation, biodiversity promotion and poverty alleviation. Governments should also use their own resources – through a combination of PFMs and financial instruments – to leverage financial flows from the private sector and channel them towards green and socio-economically beneficial opportunities. As important as the public investments are, the public policy frameworks, the fiscal systems, the rules and regulations, green public procurement and similar public leadership initiatives that help establish the rules of the game create a credible and predictable policy environment, and reduce the uncertainty surrounding the potential returns to socially responsible investment.

Under the auspices of the United Nations-backed PRI, over 20 governments work today with the United Nations to identify enabling conditions for green investment opportunities and formulate country or sector-specific development strategies that take into account ESG issues. Building on its expertise, the United Nations can assist countries in more effectively building environmental and social dimensions into national development strategies through a participatory approach. The United Nations in conjunction with other international agencies can assist countries in the design of appropriate fiscal instruments to raise capital and engender behavioural change in the marketplace. This will need to be accompanied by implementation and capacity support to ensure these instruments are operationalized effectively in the macroeconomic management process.

At the international and regional level, multilateral development banks have an important role to play to support the investments required (see next chapter). They can use a range of instruments to fund climate change interventions, catalyse energy and resource efficient investments by the private sector and provide technical advice and capacity support to governments in areas such as project implementation and green market development. The heads of the MDBs and the International Monetary Fund have pledged to build upon their respective mandates, expertise and resources to help developing countries and their public and private sectors respond to the challenge of climate change while achieving the MDGs.

Development Finance Institutions (DFIs) beyond the United Nations system and BWIs can play a complementary role in supporting key elements of the emerging green economy. Issues such as climate change, energy security and food security were key considerations in the decisions of shareholder governments to provide significant capital increases to the multilateral development banks in the last two years. These DFIs play a critical role in funding macroeconomic policies, sectoral policies, major infrastructure projects and private sector development. Their contribution to the greening of national economies is already significant. They fund major sectors such as water, renewable energy, forestry and agriculture. Development Finance Institutions have been instrumental in mainstreaming micro-finance and supporting the development of private industries in risky green sectors at early stages of development. But their role could be strengthened further, taking advantage of the prominent position they occupy in the funding of domestic investment programmes. Steps in this direction would include better identification of green

economy aspects in their strategic targets, greater share of their activities devoted to these aspects, improved cooperation among themselves and the sharing of best practices. Donor governments are in a position to task these institutions to support green economy developments, backed by concrete goals and targets.

While private capital is many times more than the financial resources available from the public sector, many developing countries have limited access to it. Therefore, MDBs in conjunction with national and local DFIs can play a key role in catalysing private green investments at scale through the use of risk-mitigating instruments, grants and innovative financing

mechanisms. Deployment of innovative financing mechanisms alone will, however, have limited impact if regulatory, technical, institutional and information barriers are not addressed a priori or taken into account upstream in the finance value chain.

A global transition towards a green economy will require substantial redirection of public and private investment to increase funding at scale for key priority areas, the bulk of which will need to be mobilized through financial markets. Public financing is, however, essential for the transition to a green economy, and more than justified by the positive externalities that would be generated.





Financial district in Paris, France.

## Chapter 10: Multilateral public finance

### 10.1 Introduction

The roles of lending, investment, insurance and public finance all remain critical in greening different economic sectors and establishing more resource-efficient societies. While global official development assistance, typically processed by government-owned development finance institutions, was estimated to be around US \$108 billion in 2010,<sup>64</sup> annual private finance goes into the trillions. The critical role for public finance lies in being a catalyst, early stage investment provider, co-sharer of risk and guarantor of public infrastructure and services. This is the approach followed by agencies such as UNDP in promoting climate finance, providing advice to governments on the design and establishment of national funds to achieve climate change priorities.<sup>65</sup>

Over recent years the multilateral development banks and Bretton Woods Institutions have responded to this challenge with a special focus on climate change mitigation and adaptation, considering relevant policies, regulatory frameworks, technical assistance and special financing instruments in, for example, project development and the development of carbon markets. Experience with climate financing has also been used increasingly for developing new thematic funds and markets in areas such as ecosystem services and the greening of industry.

What is required today is a mainstreaming of ESG criteria and the development of green economy service packages that do not treat different aspects or pillars of sustainable development in isolation. Supportive initiatives in this transformation would be tools such as the Green Growth Knowledge Platform of the World Bank Group and its partners as well as its development of a new vision of a Green, Clean and Resilient World for All.

<sup>64</sup> See [www.un.org/millenniumgoals/global.shtml](http://www.un.org/millenniumgoals/global.shtml).

<sup>65</sup> UNDP has published a guidebook with step-by-step guidance on how to select and deploy an optimal mix of public policies and financing instruments to assess and catalyse climate finance in line with national development priorities. See UNEP (2011a and 2011b).

## 10.2 The World Bank Group

Helping developing countries obtain the finance required and implement reforms necessary to move along a green economy path are priorities for the World Bank Group, including channels through which green or environmentally sustainable growth can operate. This includes running ongoing assessments and technical support to help reduce inefficiencies from uncorrected environmental and resource market failures, as well as other market failures related to technology and investment in research and development.

There are opportunities for improving both development and environmental impact by assessing the role of natural capital in growth and more systematically integrating consideration of natural capital in development strategies. One way this is being done in the World Bank is by promoting the use of comprehensive wealth accounting and adjusted net savings, which integrate natural capital into the national accounting framework used by Ministries of Finance, planning agencies and other institutions. The Wealth Accounting and Valuation of Ecosystem Services program of the World Bank is an important contribution on metrics to the Rio+20 process. It seeks to demonstrate ways of incorporating natural capital, including ecosystem services, in national income accounts. It will also support collaboration with the United Nations Statistical Division, UNEP, OECD and others on green economy and green growth metrics.

A wide range of tools and instruments are used by the World Bank Group to promote green growth. Country Environmental Analysis, conducted in 40 countries to date, has had some success in linking the environment with broader development priorities by engaging national

stakeholders from key ministries, such as finance and planning, to civil society. Through Strategic Environmental Assessments (SEA), efforts have been made to strengthen institutional capacity to manage negative effects as well as take advantage of the positive. The Bank is also using Poverty and Social Impact Analysis and related approaches to identify and manage the distributional impacts of green policy reforms.

In the field of climate change, research has been done on the economics of adaptation and low carbon growth. Work has also been conducted on wealth accounting and different types of capital. The Pollution and Prevention Abatement Handbook has been taken to a new phase over the past two years. Its technical guidelines for over 63 industry subsectors have been revised under leadership of the IFC. The policy part is being updated to go beyond regulation by environmental agencies to embrace a broader set of stakeholders, from large companies and their supply chain, financial institutions' requirements from their clients in industry, the trade regime, the judiciary and active citizenry and public disclosure.

The Green Growth Knowledge Platform will facilitate continued work on closing knowledge gaps and implementing green growth policies in developing countries. The knowledge platform is also a mechanism to develop partnerships and join conversations with an emerging community of practice involving academics, think tanks, policymakers, and other concerned individuals and institutions in developed and developing countries. This is being developed in partnership with UNEP, OECD and the Global Green Growth Institute that was established by the Government of the Republic of Korea in 2010.

Financial tools employed by the Bank include development policy lending and investment lending. The former includes support to countries to help them better integrate environmental considerations in sector policies, to strengthen country environmental management frameworks and to support countries to strengthen policies and institutions so they can respond to climate change. This greening of investments has resulted in the following outcomes in the Environmental and Natural Resource Management (ENRM) portfolio:

- In fiscal year 2010, the World Bank approved 78 projects with ENRM content amounting to US \$4.3 billion million in commitments. On average, ENRM activities have accounted for about 9 per cent of total new Bank lending over the past six years.
- The largest recent lending project with an ENRM theme was a Framework for Green Growth Development Policy Loan in Mexico (total amount: US \$1.5 billion) that addressed the development of a regulatory, monitoring and financial framework for reduced GHG emissions in the transport and energy sectors.
- As of the end of fiscal year 2010, the total active portfolio of projects with ENRM activities amounted to US \$15.2 billion. This represented about 10 per cent of the total Bank portfolio during the same period. Of this, the core ENRM portfolio (projects with more than 65 per cent ENRM content) amounted to US \$6.2 billion in commitments.

The World Bank Group's FY2010 marked an all-time record in renewable energy and energy efficiency financing, as well as a new record in the Group's low-carbon financing. There was a 62 per cent increase in low carbon commitments to US \$5.5 billion compared to FY2009, and low-carbon energy financing accounted for 42 per cent of the all FY2010 energy commitments. Additionally, 30 out of 34 country assistance and partnership strategies prepared in FY2010 address climate change. The World Bank Group has also made a commitment to reduce the impacts from its daily operations through a comprehensive programme to measure, manage, reduce and report on GHG emissions.

The World Bank Group is assisting a number of client countries – including Brazil, China, India, Indonesia, Mexico and South Africa – in developing low-carbon studies. Support is given to identify opportunities and related financial, technical and policy requirements to move to a green growth path. This initiative is currently being expanded to Morocco, Nigeria and Poland.

### **10.3 International Monetary Fund**

In line with its mandate and expertise, IMF work on the green economy addresses the macroeconomic, fiscal and financial challenges of environmental issues and policies. Climate change is a key focus of this work, which centres on providing advice and technical assistance to member countries in which climate change can have a significant impact on economic and financial stability, and on conducting research on related issues. The Fund also aims to take forward understanding of the difficult issues of international fiscal policy cooperation and the financing of responses to climate change in developing countries.

The Spring 2008 World Economic Outlook sets out the macroeconomic challenges posed by climate change, emphasizing that policies to mitigate climate change can have wide-ranging macroeconomic consequences. Pricing emissions of greenhouse gases is necessary to control the problem, but could affect countries' economic growth, saving and investment. Simulations in the *World Economic Outlook* show how these costs can be made manageable by well-designed policies. In particular, policies should be long-term and credible, yet flexible enough to be able to adjust to emerging information and changing economic conditions, and be implemented as broadly as possible, while being sensitive to the need for an equitable distribution of costs. The Fund has also stressed that current macroeconomic difficulties do not justify inaction on climate issues.

Climate change will directly affect countries' tax bases and spending requirements. Beyond this, deploying the fiscal instruments (taxes or cap-and-trade schemes) required to mitigate emissions raises conceptual and implementation problems, requiring worldwide efforts and solutions. Public expenditure for adaptation will need to include better infrastructure, coastal protection, education, health and water services. The Fund secretariat will continue to analyze these issues, and to explore how subsidies on food and fuel products affect efforts to address climate change.

There is broad agreement that sustainable growth in developing countries requires large-scale, long-term investments in adaptation and mitigation, for which substantial additional financial assistance is needed. As a contribution to the debate on how to achieve this, the Fund proposed a Green Fund, which could give developed countries the coordinating, commitment and burden-sharing mechanism needed to assist developing countries' efforts on

climate change adaptation and mitigation. Efforts can also be made to explore the potential for an innovative use of Special Drawing Rights to serve the aim of financing green investments.

Climate change is not the only environmental issue of direct macroeconomic significance. Others include local pollution, the management of forests and other renewable resources and the appropriate structure of environmental tax systems. Wherever environmental issues are significant to macroeconomic performance, the International Monetary Fund seeks to identify and help address them.

## **10.4 Regional Development Banks**

### **10.4.1 The African Development Bank**

Recognizing that the estimated annual net economic costs of climate change impacts in Africa are very high, at about 2.7 per cent of GDP each year by 2025 (or around US \$40 billion per year), but also that opportunities exist for mitigation and for developing a low-carbon economy by harnessing the continent's vast renewable energy potential, the African Development Bank (AfDB) has endorsed as a corporate priority the promotion of a climate-resilient and low-carbon development in Africa.

The AfDB emphasis in the next 5 years – as established in its Climate Change Action Plan – will be on expanding access to renewable energy and implementation energy efficiency initiatives in the continent; supporting REDD+ initiatives through sustainable land use and forestry management interventions; assisting African countries to design, develop and implement Nationally Appropriate Mitigation Actions; supporting the development of sustainable and low-carbon transport; and implementing sustainable urban systems.

The provision of advisory services, support to policy reform, knowledge generation and competency building will be a central cross-cutting component in delivering investments in priority sectors. Africa has an enormous potential for clean energy development and much higher levels of energy efficiency. But green growth needs to go beyond this, as significant potentials exist in the agriculture sector or innovative tourism concepts. Hence, AfDB intends to explore the potential of existing green technologies to spur economic growth and contribute to poverty reduction across the continent.

The African Development Bank is leading the development of new financing tools to support climate change actions in Africa. Examples are the Sustainable Energy Fund for Africa, the ClimDev-Africa Special Fund, the Fund for Private Sector Assistance and the Africa Green Fund. In addition, it is catalysing private sector support to generate additional resources for green economy investments through the launch of clean energy bonds and through carbon finance. Moreover, it is participating in the implementation of programs and projects funded by global funding platforms, such as the Climate Investment Funds.

The African Development Bank has joined UNDP, the Asian Development Bank (ADB) and OECD in a consultative process to see how the principles of Aid Effectiveness apply to climate finance. Case studies show that climate finance is poorly tracked and/or reflected in national budgets and planning. As a response to these shortcomings, a Climate Fiscal Framework has been devised as tool to link climate change priorities with expenditure and taxation decisions through the budgeting process, using domestic and external finances most effectively. Case studies have been conducted in six African countries over recent years and a regional roadmap for an accountable and effective country-led approach to climate finance is under preparation.

## 10.4.2 The Asian Development Bank

Asia and the Pacific are home to the world's most dynamic economies but also the greatest number of people at risk from climate change and the fastest growing emissions of GHGs. Much of the world's new energy and urban infrastructure will be built in Asia over the coming decades, locking in the region's greenhouse gas emission pattern for another 30 to 50 years. As a result, the Asian Development Bank is increasing efforts to help developing member countries move onto low-carbon paths and promote greener economies. As a financial institution, ADB focuses on innovative finance and financing for innovation. Put succinctly, the ADB climate change programme addresses the priority issues facing Asia and the Pacific, specifically:

- Expanding the use of clean and renewable energy. The Asian Development Bank is massively scaling up clean energy investments, reaching more than US \$1.6 billion in 2008 and setting an annual target of at least US \$2 billion in clean energy investment by 2013. The program also includes an increasing focus on energizing the poorest in the region through the Energy for All Initiative.
- Encouraging sustainable urban and transport development. The ADB Sustainable Transport Initiative helps ensure that future transport projects take into account expected effects of climate change. The Cities Development Initiative for Asia works with cities, development partners and the private sector to implement needed investments for sustainable urban development. The Clean Air Initiative for Asian Cities promotes reduction in vehicle emissions through improved fuel quality, vehicle maintenance, emission control technology, alternative fuels, promotion of public transport, better traffic management and other sustainable initiatives.

- Promoting climate-resilient development. The Asian Development Bank provides policy and technical guidance to address climate change and variability issues in agriculture, infrastructure, transport, health, water and other sectors. Water sector initiatives are designed to cope with the impacts of climate change by reducing water losses and applying integrated water resources management to improve the resilience of communities and economies to climate change.
- Managing land use and forests for carbon sequestration. Projects in East and South-East Asia are developing capacity to tap financing under REDD, and support protection and sustainable use of forests for the benefit of communities and regional development while capturing benefits from carbon sequestration, biodiversity conservation and ecosystem services.
- Strengthening policies, governance and capacities. All ADB actions are supported by policy analysis and the strengthening of capacity, including governance systems. For example, through support to the Greater Mekong Subregion Economic Cooperation, ADB is promoting the use of Strategic Environmental Assessments and Environmental Impact Assessments to mainstream green growth into country development plans.
- Strengthening partnerships. The ADB financing partnership facilities serve as platforms for cooperation, the exchange of ideas and information, exploration of new approaches and technologies and alignment of common strategies toward achieving shared goals. The Clean Energy Financing Partnership Facility (CEFPF) was established to help finance transition to low-carbon economies through cost-effective investment in technologies and practices that result in GHG mitigation, without compromising energy security. By the end of 2009, CEFPF had supported 37 projects in 34 developing member countries, leveraging US \$528 million in clean energy investments, and is expected to mitigate 3.8 million tons of CO<sub>2</sub> annually and generate 1.1 terawatt-hours of energy savings.
- Mobilizing finance. Through its in-house private sector department, ADB is establishing mechanisms to facilitate and leverage direct investments by the private sector in sustainable investment projects. Support for carbon market development is available through the Carbon Market Initiative, which includes the ADB Future Carbon Fund. The latter provides more than US \$100 million in upfront financing to projects extending beyond the current Kyoto Protocol commitment period to support continued regional commitments to green growth. As of September 2010, the ADB Clean Energy Partnership Facility had supported a total of 67 projects amounting to US \$58 million.

The Asian Development Bank has identified enabling mechanisms that make it possible to effectively deliver assistance in these priority areas:

- Knowledge dissemination. The Asian Development Bank will continue to meet demands for timely knowledge, policy advice and capacity enhancement by further developing such knowledge products, including economics of climate change studies for Central and West, East and South Asia as well as the Pacific.

#### **10.4.3 The European Bank for Reconstruction and Development; The European Investment Bank**

The European Bank for Reconstruction and Development (EBRD) founding agreement commits the Bank to promoting environmentally sound and sustainable development in the full range

of its activities. This important aspect of its core mandate is carried through into policies, strategies and operations in a number of mutually reinforcing ways. Environmental and social considerations inform country strategies and sector-specific operational policies. They are important factors in the transitional impact and additionality of Bank investments, particularly in key sectors such as infrastructure, transport, energy, agribusiness and financial markets. The Bank consults widely with civil society organizations at both a local and international level on draft country strategies and policy revisions.

Each investment and technical cooperation project is scrutinized to ensure that environmental and social issues are taken into account at the planning, financing and implementation stages. This appraisal and monitoring is a formal part of the project cycle, as set out in the EBRD 2008 Environmental and Social Policy. Each project is also assessed for its contribution to a core Bank mandate of supporting transition to efficient and open market structures. The Bank has explicitly recognized in project assessment that a transition to a low-carbon economy is an important ingredient of a transition to a well functioning market economy.

The European Bank for Reconstruction and Development finances efficient energy use that cuts demand and imports, reduces pollution and mitigates climate change through carbon emission reductions. Financing is the key to achieving the targets for climate mitigation. It has to be large-scale, targeted yet flexible and easy to use, and it has to be deployed quickly if we want to be able to meet the challenging targets. Spanning across several sectors, EBRD has already achieved an important impact in a number of countries.

In May 2006, EBRD launched the Sustainable Energy Initiative (SEI) as a strategic vehicle to address climate

change, with a particular focus on energy efficiency. It responds to the specific needs of energy transition in the EBRD countries of operations, as well as to the call of the G8 at the 2005 Gleneagles Summit for the international financial institutions to scale up climate change mitigation investment. The SEI pursues climate investments across all sectors in which EBRD is active.

By September 2010, a milestone of 300 SEI projects since 2006 with a total investment of €5.2 billion had been reached. The total project volume was around €30 billion, and annual carbon emissions reductions had reached 30.5 mtCO<sub>2</sub>, equivalent to twice the volume of Slovenia's annual emissions. The SEI is recognized as a core tool for achieving positive environmental impacts in the medium-term strategy of the Bank.

The European Bank for Reconstruction and Development experience in climate mitigation finance shows what can be achieved by maintaining a strategic focus. The global nature of the challenge has now led to EBRD working much more closely with the other international finance institutions, donors and governments to address climate mitigation. This collaboration is nascent, but is already delivering results on the ground, for example, in the form of a US \$250 million energy efficiency and renewables credit line in Turkey, or the joint establishment of a green growth fund in south-east Europe. Over the coming years, EBRD will continue to deepen this collaboration with the aim to achieve the transition of its region to grow in a sustainable way.

While EBRD seeks to foster the transition towards open market-oriented economies and promote private entrepreneurship in the countries of Central Europe and Central Asia, its sister bank the European Investment Bank (EIB) and the European Investment Fund (EIF) are focused on the promotion of integration, development,

economic and social cohesion as well as support for small business development within the European Union (EU). The European Investment Bank and EBRD collaborate in, among others, projects that meet the EU priority of financing major infrastructure. Among the core lending priorities of EIB in support of sustainable development are the protection and improvement of the natural environment and the promotion of sustainable communities, contributing to the MDGs. From a general policy perspective, EIB ensures that its corporate objectives, targets, principles and standards are aligned with the EU and evolving international environmental policy.

The sector lending policies of EIB include an appropriate emphasis on reducing greenhouse gas emissions, in particular as far as energy, water, transport, waste, forestry, research, development and innovation are concerned. Projects financed by EIB have to satisfy three criteria: they must comply with EU environmental and social principles and standards in support of EU policies; they should protect and improve natural and urban environments and foster human well-being in the interests of sustainable development; and they should have a minimum environmental footprint, consistent with the project's purpose.

The proportion of loans for environmental protection and sustainable communities has been on average between 30 per cent and 35 per cent of the overall lending of the Bank, both inside the EU and in non-EU countries. Despite the financial crisis, this principle was respected in 2009 with a volume of €25.3 billion for environmental loans, up from €18.0 billion in 2008.

The fight against climate change has also gained momentum in recent years and as a result a new climate change indicator has been developed and included for the first time in the operational plan in 2010, to report on projects supporting climate change mitigation and adaptation.

Indicative targets ranging between 20 and 25 per cent of total lending for the period are also included. Almost €17 billion in loans in 2009 for projects contributed to a reduction in greenhouse gas emissions, including renewable energy (€4.2 billion) and energy efficiency schemes (€1.5 billion), research and development for cleaner transport (€4.7 billion), investment in urban transport (€ 5.5 billion) and projects outside the EU addressing climate change. Adaptation is another area of work of the Bank, for instance through scaling up technical assistance and lending for projects that help countries tackle the inescapable impacts of climate change through sustainable access to water, protection of coastal zones flood risk management.

Another area of action concerns the development of financing instruments and technical assistance for renewable energy and energy-efficiency projects and in particular for SMEs and municipalities. The European Investment Bank has widened the range of facilities available for energy efficiency, in order to accept a slightly higher risk profile than that of ordinary EIB loans. The Bank has also integrated energy as a key objective in its operational plan, and has widened the range of financial instruments available. It has substantially stepped up its energy lending, reaching €10.2 billion in 2008 and €14.7 billion in 2009.

The European Investment Bank plays a major role in the mobilization and leveraging of private sector finance for low-carbon growth in developing and middle-income countries. This implies both energy efficiency and renewable energy investments, including the transfer of European technologies that reduce costs and increase reliability. In addition, EIB is expanding its product range in order to enhance its role in support of the carbon market. In collaboration with EBRD, KfW, the World Bank, CDC Development Solutions and other public and private partners, EIB has established a diversified selection of carbon funds.

#### 10.4.4 The Inter-American Development Bank

The recent capital increase by the Inter-American Development Bank (IDB) mandates the Bank to be better equipped to assist the region in its transition to a green economy. The goal is that by 2015, 25 per cent of all IDB lending will be geared towards climate change, promotion of renewable energy and environmental sustainability. This is a significant increase from a baseline of 5 per cent during 2006–2009. This lending target mandates the Bank to be better equipped to assist the region in its transition to a green economy, including the development of the institutional and regulatory frameworks to allow investments in areas such as sustainable transport, renewable energy and energy efficiency. It will help the region adapt to climate change impacts, particularly in sectors such as water supply, agriculture and energy.

The Inter-American Development Bank has pursued three main lines of activity directed towards the objectives of a green economy: (i) developing and strengthening institutional and regulatory frameworks to foster investments; (ii) providing technical assistance; and (iii) providing financing instruments for public and private sector operations.

The Inter-American Development Bank is setting up sectoral efforts to help Latin America and the Caribbean (LAC) countries in transitioning towards a low-carbon economy. For example, with the financial sector, IDB has various initiatives to strengthen the capacity of financial institutions, both private and public, to scale up investments in energy efficiency and renewable energy. In transport, IDB is strengthening its competence through the formulation and implementation of the Regional Environmentally Sustainable Transport Action Plan, which provides guidance for a low-carbon transport sector

in LAC countries. In the first three years of operation, the REST-AP is expected to generate a total of US \$745 million in new finance in the region.

In the energy field, IDB is strengthening its sustainable energy portfolio through lending and technical assistance in: (i) energy efficiency; (ii) renewable energy by supporting wind, solar, small hydro, geothermal and bio-energy while addressing the financial challenges and institutional barriers; (iii) biofuels; (iv) switching towards lower emitting fossil fuel in energy generation; and (v) the promotion of innovative financial instruments for the adoption of sustainable energy solutions, such as green financial products for financial intermediaries. In agriculture and rural development, the Bank objective is to aid countries to weaken the link between agricultural production and GHG emissions from deforestation and food production.

In trade and regional integration, IDB intends to strengthen research and knowledge regarding the impacts on trade of a movement towards the greening of national economies and to disseminate its findings within regional and sub-regional initiatives. The Inter-American Development Bank will also support the integration of green economy and trade negotiating objectives in multilateral forums and in regional integration platforms, while clarifying objectives for future negotiations. It will scale up investments and leverage private sector investments through the following: (i) promotion of carbon cooperatives designed to help producers participate effectively in carbon trading; (ii) support to the establishment of public-private partnerships intended to tap the sophistication and technology of global firms as well as providing a conduit for their exports; and (iii) support to the private sector to implement standards and new accounting requirements.



© Shutterstock / Zbynek Jirousek

Power plant seen from an agricultural field.

## Chapter 11: Full-cost pricing

### 11.1 Introduction

Pricing policies are a central element in the transition towards a greener economy. During the past decades, many governments have introduced environment-related taxes and charges to put a price on pollution, for example, on carbon emissions, nitrogen and sulfur oxides or waste disposal. A closer look at these policies, however, reveals that they are often poorly designed. Carbon pricing, for example, generally has a narrow scope and is often imposed on final products rather than on inputs, thus foregoing cheap emission reduction possibilities. In other countries, governments still subsidize polluting behaviour, such as fossil fuel use, usually for social reasons. Setting prices right on the principle of full-cost pricing appears to be difficult, and the road towards it is full of obstacles. Common problems relate to social implications, fears for competitiveness and political resistance due to vested interests.

It is possible, however, to overcome these obstacles by employing a rich set of complementary instruments when introducing full-cost pricing. For instance, new or existing policy instruments can be used to protect vulnerable groups, mitigate competitiveness effects or ease the implications during the transition phase. Moreover, international cooperation between developed, emerging and developing countries is necessary to obtain efficient pricing in global environmental issues such as climate change. This calls for leadership of developed nations and support and guidance. International organizations such as the United Nations are vital to facilitate the necessary coordination.

### 11.2 The case for full-cost pricing

Full-cost pricing<sup>66</sup> is a powerful way to support the transition to a green economy. Prices guide people's decisions on what, when and where to buy, and on what, how and where to produce and invest. Market prices, however, will not properly reflect the true social costs of transactions if production or consumption causes environmental damages. In that case, decisions are misguided by market prices. Full-cost pricing means that prices are corrected for the external costs of transactions, and ensures that consumers and producers face the right price, one that restores socially efficient decision-making.

Full-cost pricing ensures that least-cost alternatives are exploited, implying that the green economy is achieved efficiently. At the margin, agents will equate the social cost of each mitigation option to the price of pollution. With carbon pricing, for instance, there is a whole range of options: power generators may seek new technologies for fuel substitution (e.g., from coal to renewables); electricity consumers will switch to power-saving technologies and buy fewer power-intensive products; transportation will decline (less car use, holidays closer to home); and new fuel-efficient modes of transport will be developed (fuel switching, smaller cars, more efficient engines). One carbon price would ensure that the marginal cost of each alternative is equalized, so that the total cost of emission reduction is lowest. Pricing is generally preferred to regulation, as the latter might not reduce emissions efficiently.

<sup>66</sup> In this chapter the term "full-cost pricing" is used to refer to pricing that reflects the full social cost of transactions that involve environmental damages, i.e., the marginal private costs and the marginal external costs.

Full-cost pricing goes a long way to set the right incentives for emissions-saving technologies. Establishing a credible future path for these prices is vital for technological development, since investments often have a long time horizon and involve a large sunk cost. Credible pricing ensures a continuing search for the least-cost technological options and innovations to curb emissions. Green innovation may redirect growth towards a sustainable path. Pricing, however, may not be sufficient if innovators are not rewarded for the spillover benefits to other firms. In that case, actively stimulating technology development may be a desirable tool, as a complement to pricing.

Full-cost pricing can be implemented through alternative instruments, such as taxes or cap-and-trade schemes. Whereas taxes directly impose a price on damaging activities, a cap-and-trade regime generates an equivalent price through the market for emission permits. In principle, both regimes can thus yield the same outcome in terms of emissions and costs. If there is uncertainty about costs or damages, however, equivalence fails. In the case of carbon, uncertainty about the price is particularly distortive for long-term investments. This makes a case for carbon taxing as the preferred instrument compared to cap-and-trade schemes.

The full-cost price of carbon is equal to the monetized damage from emissions, referred to as the social cost of carbon (SCC). The SCC includes changes in agricultural output, harm to human health, damages from increased flood risk and the reduced value of ecosystem services. There are several studies estimating the SCC, with an equally large variation in outcomes. A meta study by Tol (2008) based on 211 estimates reports an average of US \$23 per ton of carbon. To put this number into perspective: a price of carbon of US \$23 per ton would be equivalent to US \$3 per barrel of oil, or 7 cents per gallon of gasoline. In the future, the SCC is likely to rise due to increased damages from extra emissions. Hence, efficient carbon pricing should follow a

gradually increasing path to address the growth in damaging externalities.

The ability to raise substantial amounts of public revenue in an efficient way is an important side benefit of full-cost pricing. For instance, with global emissions of 8.5 billion tons of carbon a year, a global tax of, say, US \$23 per ton of carbon would raise approximately US \$200 billion, or 0.4 per cent of world GDP. It is important that governments spend such revenue wisely, such as by reducing public debt, reducing other distortional taxes or by increasing productive public spending. Governments should not forego the revenue, for example, by grandfathering emission permits free of charge or by granting tax-free allowances, as this would substantially raise the social costs of the environmental policy. Indeed, grandfathering tends to create windfall profits to existing firms by leaving scarcity rents in private hands. It would be much more efficient for the government to capture the scarcity rents to spend in a productive manner.

Full-cost pricing can be applied much more broadly than just to carbon, but pricing is not always desirable or sufficient. For example, in agriculture the use of pesticides and fertilizers reduces habitat diversity and harms soil and water quality. In fisheries, property rights are often ill defined, leading to overexploitation and depletion of stocks. Local pollution or waste disposal can harm the quality of soil, reduce biodiversity and hurt ecosystems. In all these areas, pricing policies are generally more efficient than regulation to achieve environmental objectives. Pricing is only feasible, however, when damaging activities can be effectively monitored. Moreover, such policies are particularly attractive when pollutants are heterogeneous and widely dispersed. If emissions are difficult to measure or in the presence of severe administrative problems, regulation may be more appropriate. It can also be desirable to complement full-cost pricing with other policies, such as green public investments.

### 11.3 Existing policies and full-cost pricing

Despite its appeal and conceptual simplicity, applying the principle of full-cost pricing is generally not well understood. An examination of current pricing instruments in countries, most notably carbon pricing, shows that they are often ill-designed and usually far apart from the application of full-cost pricing.

A number of developed countries tax carbon implicitly, but the design of these pricing policies does not generally align to carbon content. Countries in the OECD, for example, raise more than US \$400 billion a year through taxes on fossil fuels, excluding general consumption taxes. Governments implement these fuel taxes for a variety of reasons – as a general source of public revenue, as benefit taxes to cover the cost of infrastructure or as an incentive to encourage energy-saving behaviour.

The design of fuel taxes, however, is generally inconsistent with appropriate carbon pricing. Coal tends to be underpriced relative to its carbon content in many countries, while natural gas tends to be overpriced. Some countries tax electricity consumption but do not distinguish with respect to whether it is generated by coal or renewables. It thus gives no incentive for fuel substitution in electricity production, one of the key mechanisms for carbon reduction. Cars are generally taxed, for example, on the basis of the average carbon emissions generated by their engines. Yet such pricing policies do not affect driving behaviour.

Where explicit carbon pricing has been introduced, coverage is generally too narrow. The Scandinavian countries, the United Kingdom and the Netherlands have introduced explicit carbon taxes, sometimes even exceeding the estimates for the SCC, but carbon taxes in these countries generally exempt large emitters and thus do not exploit all options for emission reductions. In 2005, the EU introduced an

emissions trading scheme (ETS) for large carbon emitters. In 2011 the trade price was around US \$18 per ton of carbon, and it has been fluctuating substantially over the years. Today the ETS covers less than half of all carbon emissions in Europe, does not cover non-carbon GHGs, and the majority of permits are grandfathered on the basis of previous emissions. Estimates suggest that governments thus forgo between 0.3 and 0.6 per cent of GDP in revenue. Hence the scheme is still a long way from efficient, full-cost pricing.

Several countries spend considerable amounts of public resources on inefficient fossil fuel subsidies. The International Energy Agency estimates that fossil fuel subsidies in developing and emerging countries amounted to US \$409 billion in 2010. A recent OECD (2011b) study identified over 250 (tax) expenditures that support fossil fuel use in 24 OECD countries, adding up to US \$47–\$75 billion per year. Although these numbers fluctuate substantially year-by-year, the figures indicate that many countries do the opposite of full-cost pricing. For instance, coal subsidies – supporting the most carbon-intensive fossil fuel – create substantial inefficiencies in the fuel mix and considerably raise global carbon emissions.

In most emerging and developing countries, subsidies for kerosene, coal or electricity are motivated on equity grounds: they give poor households access to basic needs. Yet studies suggest that the benefits of most fuel subsidies in emerging and developing countries accrue mainly to higher-income households (Coady and others 2010). A number of countries have recently announced plans to phase out fossil fuel subsidies. These include China, India and Indonesia, Russia. Such efforts will free public resources for other purposes and improve efficiency of the fuel mix. Model simulations suggest that phasing out all fossil fuel subsidies between 2011 and 2020 could reduce global CO<sub>2</sub> emissions by 6.9 per cent by 2020.

Outside the area of fossil fuels, countries spend hundreds of billions of dollars on subsidies that damage the environment, especially in agriculture, fisheries and water. In 2008, OECD countries spent US \$400 billion on agricultural subsidies. Many countries also subsidize fisheries and water supplies. Subsidies that stimulate production by lowering costs or increasing prices, however, damage ecosystems and biodiversity. They lead to the depletion of fish species and over-exploitation. Water subsidies can cause wastage of water and intensify water stress in vulnerable areas. Phasing out such harmful subsidies is essential for the transition to a green economy. This has been recognized by governments in the Strategic Plan for Biodiversity 2010–2020, where Parties have committed to reform, eliminate or phase out subsidies that harm biodiversity.

Pricing is difficult in international sectors such as transportation. As governments are concerned about competitiveness and carbon leakage, they tend to be reluctant to move towards full-cost pricing in sectors that are internationally highly competitive. Pricing emissions from international transportation sectors can only be done under large-scale coordination. The International Maritime Organization (IMO) has started to undertake global efforts to reduce CO<sub>2</sub> emissions through mandatory efficiency standards for vessels. While constructive and important, efficiency initiatives for airplanes and vessels can have only limited environmental effectiveness and will need to be supported by carbon pricing schemes. The IMO is also considering market-based instruments to encourage investment in more fuel-efficient ships and technologies as well as more energy efficient shipping operations. Such pricing could be organized through contribution schemes or emissions trading, with a rebate mechanism to accommodate the impact on developing countries.

## 11.4 Towards full-cost pricing: Following the three E's

The gap between current practice and full-cost pricing reflects the ample obstacles to the implementation of full-cost pricing. Yet these obstacles can be overcome if governments are dedicated to embrace the concept of full-cost pricing and able to employ a rich set of complementary instruments. In designing reforms, governments should respect three principles, each starting with an *E*: Environmental effectiveness, Efficiency and Equity. When guided by these principles, full-cost pricing should be a feasible way going forward.

Environmental effectiveness requires that policies target all emissions. In addition, the full-cost price should be set at the appropriate level. If policies are formulated in terms of emission reductions – common in international climate agreements – the appropriate price should be set so as to achieve these objectives.

Efficiency requires that all agents face the same price. An upstream tax on the emissions ensures that agents exploit all possible options for abatement. And by setting one price for all emitters, agents will continue with their abatement efforts until the marginal cost equals the price. Government should not forgo revenue from full-cost pricing, but spend revenue wisely to minimize the social cost. Earmarking revenues, for example, for green investment tends to hamper efficiency as this forgoes efficient public investment decisions based on proper cost-benefit analysis, but earmarking can be justified temporarily to the extent that it helps to overcome resistance against full-cost pricing and to ease the transition.

Equity considerations are critical to gain public support. Full-cost pricing will affect the household income distribution. Such distributional effects can generally be offset through targeted measures. For instance, increased fossil fuel prices will likely have a regressive impact. But developed countries have access to a variety of instruments to offset these adverse effects on equity, such as conditional transfers in cash or in kind. The cost of compensation will generally be less than the revenue raised by carbon pricing. Subsidy removal requires government's commitment to compensate vulnerable groups.

In developing countries, the absence of effective governance and social protection systems raises concerns that price increases could have dramatic effects on people's lives. A transition toward full-cost pricing in these countries requires other reforms that include scaled-up social protection systems aimed at protecting the most vulnerable. This should enable a transition to a green economy, without endangering human security in vulnerable countries and regions.

The same three principle *E*'s can be applied to international agreements on full-cost pricing, and international organizations such as the United Nations can play an important role to enable the necessary coordination to make this happen:

- Global effectiveness. In the case of cross-border problems such as climate change, international cooperation is necessary to obtain efficient pricing policies. As long as carbon is priced only by a subset of countries, this also induces carbon leakage – a shift of emissions to nonparticipants. To the extent that carbon pricing by a subset of countries reduces the world price of fossil fuels, this would also increase emissions by non-participants. International cooperation is therefore necessary to ensure effective achievement of a greener economy.
- Global efficiency. The social damage from polluting emissions is the same, wherever in the world they arise. Efficiency requires that marginal abatement costs are also the same. This calls for identical (e.g., carbon) prices. If this is not feasible, countries may commit to a minimum price to be imposed by, for example, a carbon tax or cap-and-trade scheme. Incomplete participation could cause significant inefficiencies as the costs of reducing emissions differ markedly across countries, implying substantial gains from trade by free riders.
- Equity between countries. International transfers may be necessary in sustaining cooperation and in including less developed countries in global agreements. Indeed, the fastest growth of carbon emissions in the coming decades will come from rapidly industrializing developing countries.



© UNEP / Hassan Partow

Regional Green Economy workshop held in Kigali, Rwanda, November 2011.

## Chapter 12: Regulatory instruments

### 12.1 Introduction

Regulatory approaches are among the elements in the policy toolkit<sup>67</sup> used by policymakers to support the transition to a green economy, approaches that at times require revision as societies and markets evolve. Governments can employ mandatory technical regulations and voluntary standards, including information-based instruments, to achieve desired green outcomes, promote greener production and consumption, curtail unsustainable use of resources and enhance greener markets.

Such regulatory approaches may be used to fulfill legitimate objectives such as pollution prevention and abatement, waste management, energy efficiency, emissions reduction, sustainable resource management, biodiversity and wildlife conservation, decent work or related green economy objectives. Regulatory approaches can be taken particularly to support market-based measures or – when a ban or binding limitation is deemed necessary – to stop certain damaging activities or bring about behavioural change in favour of a green economic transition.

Command-and-control regulations and technical standards require updating and revision to stay relevant. Their application needs to avoid the pitfalls of stifling innovation, losing track of new technological developments and constraining market activity across national economies.

It is also important that mandatory regulations and standards to promote the green economy do not become a source of green protectionism, respecting Principle 12 of the 1992 Rio Declaration. Good regulatory practice, conforming to relevant international trade rules, is essential. Relevant multilateral environmental agreements (MEAs), international standards and guidelines should be used as a legitimate reference for national regulations and standards.

The multilateral system offers the potential to promote the mutual supportiveness of environmental, economic and social dimensions of the green economy on a level playing field and in an equitable way. Within this context, the United Nations system and the Bretton Woods Institutions have an important role to play in supporting the transition to a green economy, for instance, by encouraging the ratification and implementation of relevant MEAs, developing relevant international standards and guidelines, promoting good regulatory practice at the international and national level and building national capacity for the preparation and enforcement of relevant regulations and standards. The contribution of social norms, standards and regulations is an area that deserves particular attention in making a green economy transition.

<sup>67</sup> Alongside command-and-control regulations, the toolkit includes economic and market-based instruments to internalize environmental costs, as well as financial instruments and voluntary initiatives (such as environmental information disclosure) to promote, e.g., the development and deployment of environmentally friendly goods and services.

## 12.2 Complementary regulatory approaches and tools

Regulatory frameworks are needed to support the greening of certain key sectors or activities and, in particular, in sectors that rely directly on natural resources (e.g., agriculture, forestry, transport and energy) for more sustainable production methods and goods. Compliance with regulations may necessitate changes in production processes, switching to different inputs and fuels or alternative technologies. Some regulations are tied to operating licenses for production. For instance, many countries enforce maximum limits for GHG emissions and the release of hazardous substances across the various industrial sectors. Waste and its associated emissions or releases is an important area for the green economy, one where governments need to enforce modernized regulations on waste management and recycling.

There is also considerable potential for regulation to advance increased energy efficiency in the building, transport, industry and agriculture sectors. Increasingly, mandatory requirements are used in countries to promote the use of energy-efficient equipment and appliances, thereby reducing the GHG emissions associated with their usage. Moreover, various standards and certification schemes are in place to promote good agricultural practices.

Regulations can help provide enabling conditions and incentives, establishing the required market signals and certainty for business to make investment decisions to deploy green technologies, accelerate green innovation and foster cleaner technology development and diffusion. For instance, regulations that set emissions performance standards for vehicles provide the incentive for business to invest in new technology to ensure that emissions

for all new cars are below the permitted levels. The same applies to regulatory framework and emission targets in the energy sector that send a signal for research and innovation in renewable energy. Regulatory however, uncertainty can stymie investment.

To alter consumption habits and promote demand for greener goods, services and technologies, information-based instruments such as eco-labels can play an important role in raising consumer awareness of the environmental impacts and the availability of cleaner alternatives. Labelling schemes that take into account the environmental consequences of products allow consumers to make more rational purchasing decisions and be more aware of non-wasteful consumption while stimulating manufacturers to design and develop more environmentally performing products.

A growing number of countries have adopted mandatory or voluntary labelling schemes to promote energy-efficient appliances and organic food products. Other information-based tools, such as pollutant release and transfer registers, make environmental information publicly available. These can be used for benchmarking purposes, and along with public advocacy can deliver better environmental outcomes. A regional example of this is the Protocol on Pollutant Release and Transfer Registers under the UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters.

The use of strategic environmental assessment and the adoption of SEA legislation can also contribute to environmental mainstreaming. The United Nations system and other international agencies provide support for countries' efforts in the use of SEA aimed at establishing institutional processes within governments at the national and local levels and the wider stakeholder

community to ensure decision-making that is better informed of the emerging risks associated with business-as-usual.<sup>68</sup> The United Nations associated Protocol on SEA to the Espoo Convention on Environmental Impact Assessment in a Transboundary Context is an example of an instrument that is global in reach.<sup>69</sup>

### **12.3 Relevant international agreements**

International law including multilateral environmental agreements under the auspices of the United Nations remains a key reference for the development and enforcement of national laws and regulation in support of a green economic transition. There are today over 500 international treaties and other agreements related to the environment. Over 320 of these agreements are regional and some 60 per cent have been negotiated since 1972 (cf. UNEP 2001). This signals what some refer to as the increasing density of international environmental law. About 40 of the agreements are core MEAs of global significance, including close to twenty framework conventions such as the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. The core MEAs are clustered into the following five groups: atmospheric, biodiversity, chemicals and hazardous wastes, land and regional seas.

The three Rio Conventions (CBD, UNCCD and UNFCCC) are noteworthy in that they centrally place the overall goal of sustainable development. Such MEAs as these can be compared with agreements in other issue areas. As an

example, the ILO Labour Conventions and Recommendations, together with the ILO Declaration on Fundamental Principles and Rights at Work (1998) and the ILO Tripartite Declaration of Principles Concerning Multinational Enterprises and Social Policy (1977/2006), constitute the most authoritative international guidance on labour practices and related social issues. Governments need to carefully consider these when defining green jobs and seeking complementarities in the implementation of international agreements.

The MEAs reflect current international understanding for collective action on global environmental issues such as climate change, land degradation, biodiversity, hazardous substances and waste. Each requires countries as Parties to develop implementation mechanisms to fulfill their obligations. Every country is different, and measures will need to be tailored to the national context. In some cases governments choose to adopt special laws and regulations to further MEA objectives.

Among the core MEAs to support the transition to a green economy is the United Nations Framework Convention on Climate Change and its Kyoto Protocol. To meet their agreed emission targets, countries *inter alia* adopt regulations and standards to promote renewable energy supply, improve energy efficiency or reduce GHG emissions in products and their production processes. The Kyoto flexibility mechanisms assist Parties in meeting their targets in a cost-effective way and help stimulate additional green investment. This includes the use of emissions trading and crediting schemes, an area in which substantial international experience has been gained in the last two decades.

<sup>68</sup> Such support is provided by, for example, the OECD Development Assistance Committee, the World Bank and the UNEP/UNDP Poverty Environment Initiative.

<sup>69</sup> For more information see [www.unece.org/env/eia/sea\\_protocol.htm](http://www.unece.org/env/eia/sea_protocol.htm)

Also in the cluster of atmospheric conventions along with the UNFCCC, the Vienna Convention targets adverse effects resulting from human activities that modify or are likely to damage the ozone layer. Its Montreal Protocol on Substances that Deplete the Ozone Layer was adopted to establish controls on ozone-depleting substances, including phase-out schedules for the production and consumption of such substances. Relevant regulatory frameworks have been established in most countries, having direct impact on diverse industries such as manufacturing, mining and agriculture. Implementation has been supported by a Green Customs<sup>70</sup> capacity-building initiative and international network of ozone officers in national governments facilitating the exchange of learning experiences.

The Convention on Biological Diversity sets goals and establishes general principles to achieve conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the utilization of genetic resources. Its Protocols on Biosafety and Access and Benefit Sharing provide global frameworks for the safe handling, transport and use of living modified organisms resulting from modern biotechnology, and for the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. Its Strategic Plan for Biodiversity 2011–2020 commits countries to eliminate, phase out or reform harmful subsidies and promote positive incentive measures such as payments for ecosystem services or promotion of markets for biodiversity-based goods. In addition to such measures, many threats to biodiversity can be tackled through regulatory frameworks that establish environmental standards and liability regimes to eliminate harmful activities. These are explicitly based on principles such as the polluter pays and full cost recovery. The related Convention on International Trade

in Endangered Species of Wild Fauna and Flora regulates international trade in wildlife for conservation and sustainable use purposes. Governments adopt regulatory measures to ensure that trade is not detrimental to the survival of wildlife species and traded specimens are not obtained in contravention of national laws for the protection of fauna and flora.

The Rotterdam Convention, focused on international trade of hazardous chemicals to protect human health and the environment, creates legally binding obligations for the implementation of Prior Informed Consent procedures. The Stockholm Convention on Persistent Organic Pollutants (POPs) requires member states to take regulatory measures to eliminate or reduce the release of POPs into the environment. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal requires its members to control and reduce transboundary movements of wastes, prevent or minimize their generation and manage them in environmentally sound ways. All three of these conventions from the chemicals cluster clearly deal with human health and environment issues associated with the development of global industries and their supply chains.

Multilateral environmental agreements whose scope is mainly regional, such as the regional seas conventions, also have a role to play in fostering the green transition by addressing region-specific problems such as degrading ecosystems and engaging industries – marine and other – most active within the region. In Europe, the Convention on the Protection and Use of Transboundary Watercourses and International Lakes, and the Convention on Long-range Transboundary Air Pollution provide examples of longstanding agreements that support political and economic collaboration on a regional scale.<sup>71</sup>

<sup>70</sup> See [www.greencustoms.org](http://www.greencustoms.org) for more information on its work to train customs officials to trace illegal trade and smuggling of ozone depleting substances between countries with different commitments under the Convention and its Protocols.

The United Nations system has an important role in assisting Parties to implement and comply with international obligations, including monitoring, reporting and verification provisions. It engages in capacity-building, education and advocacy efforts to raise awareness of the relevant issues. It helps to mobilize and improve the targeting and coordination of national, bilateral and multilateral financial and technological resources in order to increase their impact and effectiveness.

It promotes cooperation among relevant international instruments, within clusters and processes to enhance policy coherence. It ensures that other international processes support the implementation of agreements in a manner consistent with their respective frameworks. This provides the opportunity of ensuring that resources are pooled effectively at relevant regional and global levels, considering economic risks and opportunities faced in different parts of the world.

---

<sup>71</sup> While the Convention is not yet open to non-UNECE Member States, its Protocol on Strategic Environment Assessment, which recently entered into force, is a global instrument.

## 12.4 Relevant international standards or guidelines

A number of United Nations agencies have been involved with other international organizations and stakeholder groups in the development of international norms, standards or guidelines to be used as a basis for national regulations or standards to support greening (e.g., in the agricultural, forestry, industrial and transport sectors). The Johannesburg Plan of Implementation (JPOI 2002) also recognized the role of institutions such as the International Organization for Standardization (ISO) and Global Reporting Initiative in developing and promoting standards for improved social and environmental performance by industry, advanced via voluntary tools such as environmental management systems, codes of conduct, certification and public reporting (JPOI: 18).

International labour standards developed by ILO based on its labour conventions can contribute to ensuring that green growth provides benefits to all. These standards are engrained in the ISO 26000 standard on Social Responsibility, one to which United Nations agencies contributed. They are aimed at promoting opportunities for women and men to obtain decent and productive work, in conditions of freedom, equity, security and dignity. Their effective enforcement worldwide is a matter of ongoing concern, and includes the need to ensure that green jobs created today also reflect the standards of decent work.

The field of food production needs new standards that consider a full food value chain from the farm to the fork. Within the framework of the Joint Food Standards Programme established by the Food and Agriculture Organization (FAO) and the World Health Organization, the Codex Alimentarius Commission promotes coordination of all food standards work undertaken by international governmental

and non-governmental organizations. In view of the growing production and international trade in organically produced foods, the Codex Committee on Food Labelling developed the Guidelines for the Production, Processing, Labelling and Marketing of Organically Produced Foods to facilitate trade and prevent misleading claims. The Guidelines include sections on labelling and claims; rules of production and preparation, including criteria for the substances allowed in organic production; inspection and certification systems; and import control. They help to harmonize requirements for organic products and may also provide assistance to governments wishing to establish national regulations.

Consumer concerns about forest management, conservation and illegal logging have driven the growth in private certification schemes such as the Forest Stewardship Council. The increased demand for forest products and services and the reduction of the forest resource base also raise concerns over whether demand can be met in a sustainable manner. International guidelines on sustainable forest management and on sustainable forest harvesting have been developed by FAO. Its Code of Practice for Forest Harvesting aims to improve harvesting practices, support implementation of sustainable forest management and promote forest productivity and maximum economic return from the forest. It can also be used as a guideline for conservation measures for flora and fauna. This is of particular relevance as regulators and industries start to consider use of new market instruments such as payment for ecosystem services and goals such as Net Positive Impact.

Today both government and industry worldwide are challenged to put in place systems for improved energy and water efficiency, including appropriate standards for measurement, accounting, disclosing and monitoring progress.

Industrial energy management makes good economic sense, leading to cost reduction and improved reliability, thereby contributing to greater productivity and improved competitiveness. The United Nations Industrial Development Organization and ISO collaborate on implementation of the ISO 50001 Energy Management Standard, a tool for long-term energy management in industry. It recognizes that a successful programme in energy management begins with a strong corporate commitment to the continual improvement of energy performance through energy efficiency and energy conservation and the increased use of renewable energy. The United Nations Industrial Development Organization is scaling up its efforts through its technical assistance programmes and is working in cooperation with specialized agencies and other stakeholders to assist developing countries to develop energy efficiency programmes.

In the area of transport and manufacturing, the UNECE World Forum for the Harmonization of Vehicle Regulations has served for over 50 years as a platform for developing harmonized global regulations for vehicle construction and performance. The World Forum currently administers three Agreements, including the 1958 Agreement which provides procedures for establishing uniform prescriptions for new vehicles and equipment, and the 1998 Agreement which aims *inter alia* to decrease environmental pollution and the consumption of energy. The World Forum previously adopted amendments to UNECE regulations to limit the maximum admissible level of vehicle emissions for various gaseous pollutants. These have resulted in substantially abating the emissions levels of new private cars and

commercial vehicles. The United Nations Economic Commission for Europe regulations have also been amended to include electric and hybrid vehicles as well as vehicles with engines using cleaner fuels. Within its environmental mandate, the International Maritime Organization has developed and adopted 21 international instruments to address marine pollution arising from international shipping, the most important being the International Convention for the Prevention of Pollution from Ships. Under this convention IMO recently adopted mandatory measures to reduce GHG emissions from international shipping, creating the first ever global and legally binding GHG reduction regime for an entire economic sector. In addition, a range of mandatory and voluntary guidelines and codes have been developed and adopted to provide international standards for the safe transport, storage and handling of harmful substances.

The International Civil Aviation Organization (ICAO) is working to develop global solutions to address GHG emissions from international aviation. In 2010 ICAO adopted a resolution on international aviation and climate change with an agreement on global aspirational goals of improving fuel efficiency by 2 per cent annually and stabilizing CO<sub>2</sub> emissions by 2020.<sup>72</sup> The Assembly also agreed on the development of a global CO<sub>2</sub> certification standard for aircraft. The ICAO will continue to facilitate the development and deployment of sustainable alternative fuels for aviation. States agreed on the voluntary submission by June 2012 of action plans on CO<sub>2</sub> emissions reduction activities, enabling ICAO to assess progress towards the achievement of the global goals and to address country specific needs.

<sup>72</sup> For more information, see <http://www.icao.int/env/>.

## 12.5 Good regulatory practice and enforcement

The success of the regulatory approach, from hard to soft regulations, hinges on the quality and credibility of regulatory institutions and their compliance mechanisms. Regulatory institutions should be transparent and accountable, offer appropriate appeal procedures and be efficient in the sense of keeping transactions costs to the minimum. Effective penalties for non-compliance or associated compliance mechanisms should be designed to discipline economic actors in order to achieve the desired outcomes. The effectiveness of regulatory frameworks also depends on contextual factors (e.g., the rule of law, transparency, social accountability and civil society participation) that underpin environmental institutions and governance. Fostering environmental regulatory approaches to support a greening economy requires institutional strengthening and improved governance, both of which can lead to greater development benefits besides environmental sustainability.

When choosing regulatory approaches to foster green economies, it is necessary to avoid inefficient and ineffective interventions and to ensure that these are reviewed and duly phased out over time. Command-and-control instruments and mandatory standards need to avoid stifling innovation and market activities. Regulations and labelling schemes need to be designed and implemented with a view to minimizing additional costs for businesses and consumers. To avoid unnecessary proliferation of national regulations and standards in the transition to a green economy, references to relevant international standards are essential. Good regulatory practice, in particular in the choice of recognized instruments and the enforcement of the regulatory measures, is vital. This requires, among other things, building the capacity of regulatory, enforcement and court officials in dealing with emerging issues.

It is important that regulations and standards to promote the green economy do not become a source of protectionism (see Chapter 13). The World Trade Organization deals with the rules of trade between nations at the global level. It aims at helping producers of goods and services, exporters and importers conduct their business, while allowing governments to meet social and environmental objectives. For example, the WTO Agreement on Technical Barriers to Trade (TBT), recognizing the important role of standards and regulations, seeks to ensure that they are not discriminatory and do not create unnecessary barriers to trade. The TBT Agreement seeks to achieve a balance between member states' rights to take measures for the achievement of legitimate policy objectives and the need to prevent unnecessary trade barriers. One way to promote this objective is by encouraging members to use relevant international standards, guides and recommendations as a basis for national regulations, recognizing the contribution that international standards can make to improve resource efficiency and the transfer of technology from developed to developing countries.

To help ensure that information on regulations and standards is readily available, WTO members are required to submit notifications and establish national enquiry points. The TBT Committee is the forum for governments to share information and discuss specific trade concerns regarding standards, regulations and their conformity assessment procedures. Environmental labelling, environmental requirements and market access are regular work items in the WTO Committee on Trade and Environment, where members can jointly assess the impact of such instruments and acceptable terms of their usage. This cooperation and information exchange is critical in advancing good practices across economies worldwide.





Confiscated endangered species products at Shenzhen Customs, China.

© Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

## Chapter 13: Sustainable trade and green markets

### 13.1 Introduction

Trade plays an important role in the transition to a green economy by, among others things, facilitating the opening of new markets for green goods and services. Chapter 2 of Agenda 21 acknowledges that trade can have a positive environmental impact and can therefore make an important contribution towards sustainable development. By transmitting growing environmental and social preferences of firms and consumers in world markets, trade plays a central role in the diffusion of green goods, services, technologies and production methods among countries. With supportive national policies and institutions in place, opportunities offered by a green economy globally can stimulate economic growth and diversification to create jobs, raise income levels, improve living standards and assist countries to advance their social, environmental and developmental objectives.

The multilateral trading system and bilateral and regional trade agreements offer trading partners opportunities to expand the development of markets for green goods and services. Cooperative mechanisms under certain trade agreements that promote investment, shared regional infrastructure, technology transfer and skill sharing can also facilitate the transition to green economies.

To deliver green growth effectively, the trading system needs to be open, rules-based and non-discriminatory. The multilateral trading system provides the predictability, security and stability needed to help create an enabling environment for all countries to benefit from trade. Such a stable and predictable system is also beneficial for promoting investment, innovation and technological change.

Certain domestic measures taken to internalize environmental costs may have an adverse impact on trade. Multilateral trade rules and institutions help guard against environmental measures that have unnecessary trade-restrictive effects. The World Trade Organization plays a key role in monitoring and surveying members' trade policies, including trade-related environmental measures. Moreover, the WTO dispute settlement mechanism allows countries to challenge market access restrictions established under the guise of protecting the environment. In addition to resolving environment-related trade disputes, WTO dispute settlement rulings can also inform policymakers about how WTO rules and principles can be applied in the transition to a green economy.

The challenge for a green economy is to create new green markets that can raise incomes and employment and enhance the quality and availability of social and infrastructure services while reorienting economic activities to reduce depletion of natural resources. While trade can help steer an economy towards greener growth, growth should be inclusive by building developing countries' human and productive capacities to enable them to participate effectively in the global economy, by generating employment for the jobless and by increasing access of the poor to basic services such as energy, water, communications and transport. More attention needs to be focused on helping developing countries to connect with global production and supply chains while meeting new environmental requirements. This includes facilitating the participation of low-income producers or exporters in green production and trade.

At the national level, improving pro-poor outcomes of trade depends on the ability of countries to implement complementary national measures to facilitate their participation in the trade of green goods and services, and to promote the broad diffusion of its benefits. At the regional level, the development of free trade agreements offers important opportunities to use shared natural resources more efficiently and to allow participant economies to focus on their areas of strength based on national resource endowments. These agreements need to be accompanied by effective regional infrastructure including transport systems to support subregional trade and development corridors.

### 13.2 Promoting green goods and services

Trade permits countries to meet domestic demand for green goods and services through imports, and provides export opportunities for producing countries in a wide range of green goods and services. The opening of further trade on environmental goods and services can help improve production methods, making environmentally friendly products and technologies cheaper and more accessible. It can bring innovations to a global marketplace while enhancing sustainable economic growth and creating jobs. In the medium and long term, improved access to environmental goods and services will provide further impetus to green investment and technology transfer that can accelerate the adoption of less-polluting technologies and processes globally.

As part of the Doha Round of trade negotiations, WTO members states are negotiating to liberalize trade in environmental goods and services. The negotiations seek to increase trade of green goods and services by lowering trade barriers. Countries can also reduce

trade barriers outside of an eventual WTO agreement, autonomously or through bilateral and regional trade agreements. Reduced barriers can provide opportunities for countries to expand their production and export of environmental technologies (such as solar and wind technologies) and diversify their economies. For some developing countries, reduced trade barriers for environmentally beneficial goods (such as organic foods, natural fibres, sustainably produced forest products) and environmental services (such as ecotourism) could enhance gains for rural communities and facilitate integration of SMEs into green supply chains. Ideally, each developing country should be able to benefit from freer trade by identifying green goods and services of export interest as well as imports needed to advance national environmental protection objectives.

Continued efforts by international organizations and donor agencies are needed to assist developing countries to identify green export opportunities and develop capacities in the production and export of related goods and services. These efforts include initiatives by agencies such as UNCTAD, UNEP, the United Nations Regional Commissions and WTO, as well as frameworks for aid effectiveness such as the United Nations Steering Committee on Tourism for Development led by the World Tourism Organization (UNWTO). To enhance their competitiveness in the green market and to overcome challenges resulting from related environmental requirements, capacity-building efforts (such as training, trade promotion, market information and analysis) remain key to assist developing countries. This implies technical assistance for SMEs to access markets and finance and to meet the standards and certification requirements for green goods and services.

### **13.3 Removing trade distortions to further the green economy**

Removal of trade distortions, particularly harmful subsidies, can constitute a triple win for trade, environment and development. Ensuring fair and equitable trade through the elimination of those subsidies and other inequitable domestic support will discourage environmentally damaging production methods by reducing incentives to over-consume scarce resources. Reform on subsidies – such as for fuels, agriculture, fisheries and forestry – that have adverse socio-economic and environmental outcomes, would contribute to the transition to a green economy. For instance, the WTO Doha Round negotiations on fisheries subsidies seek to remove harmful subsidizations that encourage fishing well past biologically sustainable (and economically profitable) levels.

To promote the green economy, governments generally aim to stimulate the development, deployment and use of cleaner technologies. They typically do so through a variety of fiscal incentives, price support and investment support. The various stimulus plans, and their emphasis on green recovery, are likely to result in a significant increase in the provision of potential subsidies for the development of the green economy. There is therefore a potential for green economy subsidies to distort trade. The WTO Agreement on Subsidies and Countervailing Measures (SCM Agreement) seeks to strike a balance between allowing member states to provide subsidies for legitimate policy purposes and preventing them from providing subsidies that distort international trade. Provided certain basic disciplines are respected, the SCM Agreement leaves governments with substantial policy space for supporting the transition.

Besides subsidies, there are other policy measures adopted by governments to promote the green economy, for example, environmentally related taxation and levies that aim to discourage economic activities that work against the goals of the green economy; green government procurement; and standards and regulatory requirements to prohibit the use of certain hazardous materials, products or processes and production methods that damage the environment. These measures, if not properly designed or implemented, could have the potential to create trade barriers and distortions, disadvantaging foreign producers.

World Trade Organization rules, such as the Agreement on Technical Barriers to Trade, the Agreement on the Application of Sanitary and Phytosanitary Measures and GATT Article XX, provide significant scope for WTO members to put in place measures to protect the environment and advance the green economy, while at the same time imposing disciplines to ensure that such measures are not disguised restrictions on international trade.

### **13.4 Technology development and diffusion**

Increasingly, firms in both developed and developing countries are integrating green purchasing, production and packaging methods into their operations in order to enter and continue their participation in global supply chains. Access to required green technologies and materials is thus critical for competitive, export-oriented supply chain firms. Green technology diffusion to developing countries can be facilitated by transnational corporations. They provide technology transfer packages to foreign affiliate firms to ensure standardization, quality control and efficiency among global production sites.

To attract technology transfer mediated by transnational corporations, developing countries need to establish effective national policies and regulatory frameworks to build the absorptive capacities of domestic enterprises and to promote and support intellectual property rights.

Multilateral environmental agreements also have provisions for green technology transfer. The UNFCCC has promoted the transfer of renewable and clean energy technologies from developed to developing countries through the Clean Development Mechanism. Recently, the UNFCCC has established a Technology Mechanism under the Convention. Its aim inter alia is to enhance endogenous capacities and technologies of developing countries, including cooperative research, development and demonstration programmes, as well as enhancing the deployment and diffusion environmentally sound technologies and know-how to developing countries.

The multilateral trading system has an important role to play in technology development and diffusion. The WTO Agreement on Trade-Related Aspects of Intellectual Property Rights stipulates that the objective of the protection and enforcement of intellectual property rights should be both to promote technological innovation and to facilitate the diffusion of technology to the mutual advantage of producers and users of technological knowledge in a manner conducive to social and economic welfare. Furthermore, it requires developed countries' governments to provide incentives for their companies to transfer technology to least developed countries.

### **13.5 Good governance and policy coherence**

The trading system has become more complex as it has become more important globally. Its impact now goes beyond the traditional realm of trade policy, touching upon core domestic and international interests. Trade policy needs to be couched in the midst of many other accompanying policies in both the social and environmental spheres. Many issues relevant to the green economy are dealt with by international rules outside of the multilateral trading system, and a number of challenges can only be confronted effectively through better global governance. How can this be achieved? Part of the answer lies in the international system, building more bridges between specialized forums and avoiding the compartmentalization or isolation of systems. The most important part of the answer is policy coherence at the national level, including the integration of environmental concerns into trade policy decision-making in the light of country-specific conditions.

To achieve a transition to a green economy would require reorienting production, investment and infrastructure in the economy. It would also imply more sustainable lifestyles and changes in consumption patterns. This transition would be a gradual process, spanning many years, thereby limiting abrupt economic dislocations and shocks. A mix of policy instruments, measures to incentivize research and development and information dissemination to facilitate the choices of consumers and firms will all be essential in driving the transition away from business as usual. Yet the internalization of environmental costs or social externalities is a costly effort that many countries, developing and developed alike, may not be willing to undertake unilaterally or in isolation. There is thus an urgent need for policy coherence as well as financial and technological cooperation at the regional and global levels.

## 13.6 Trade as vehicle to scale up solutions globally

The goals of a green economy are not new. Much of what is implied in a green economy dates back to Agenda 21. Despite progress made, greater efforts are needed. Green economy analysis of global resource use and degradation shows that business as usual is leading down a disastrous path. Trade can play an important role in grasping the opportunities of an alternative growth path. Already at Rio de Janeiro in 1992 it was acknowledged that an open multilateral trading system, supported by the adoption of sound environmental policies, can have a positive impact on the environment and contribute to sustainable development. Twenty years on, the fundamental message remains that mutually supportive trade and environment policies can promote sustainable development. Trade can help governments, business and consumers to take green solutions to global scale.

There are concerns that measures put in place to advance the transition to a green economy could potentially create trade distortions or new forms of green protectionism. World Trade Organization rules provide policy space for countries to promote green economic sectors. Equally, they offer a framework to guard against green protectionism and to ensure that these measures are not disguised restrictions on trade, and are not applied in a manner that would constitute a means of arbitrary or unjustifiable discrimination between countries. Thus, the multilateral trading system must continue to be strengthened to meet future challenges in this area.

A successful conclusion of the current WTO Doha Round of negotiations could contribute significantly to an economic transition. These include negotiations on the removal of trade distortions, in particular harmful subsidies such as

fisheries and agriculture subsidies, and the elimination or reduction of tariff and non-tariff barriers to environmental goods and services. Positive steps are needed to take these negotiations forward. They hold the promise of a win-win-win for trade, environment and development.

Sustainable trade is a trading system that ties to important human values, welfare goals and inclusive growth, assisting those developing countries that are marginalized in the global trading arena. Concerns have been raised that a green economy will introduce constraints on growth, competitive disadvantages and unequal benefits among countries. Advancing a green economy agenda thus requires policy coherence to ensure that trade and development and the protection of the environment can be mutually supportive. Trade policy needs to be accompanied by complementary policies in the social, environmental and economic spheres. At the national level, this requires close collaboration among ministries of trade, industry, agriculture, environment, labour and others.

Capacity-building activities of international and regional organizations and international programmes must be furthered to assist developing countries to design mutually supportive and domestically driven trade and environment policies, enhance regional cooperation, identify green import-export opportunities and develop capacities in the production and trade of green goods and services. These include programmes such as the Aid for Trade and the Enhanced Integrated Framework, as well as the development assistance activities provided by the World Intellectual Property Organization (WIPO) on intellectual property. International programmes in this area are important building blocks for developing countries to take the opportunities that trade offers in a globalizing world economy.



© Shutterstock / Anweber

Solar panels in front of wind energy plants and wheat field.

## Chapter 14: Innovation and technology

### 14.1 Introduction

Regulation and economic incentives for greening need to complement innovation in the marketplace, creating favourable conditions for advancing innovation and technology development. Innovation is a broad concept that is used in many different contexts. Most definitions of innovation emphasize newness and successfulness. At the societal level, innovation has been at the centre of each and every major socio-economic transformation of society since the production of the first tool for hunting up to our age of high-speed and high-impact information and communication technologies. Innovation can be broken down into three categories, each progressively more significant and far-reaching (UNEP and others 2009):

- Incremental innovation entails step-by-step improvements of existing processes and organizational practices in response to changing demands and needs
- Radical innovation drastically changes existing processes and organizational practices, typically offering more opportunity for new market entrants and players
- Fundamental innovation depends on new scientific knowledge put into use, and usually provides the basis for new industries along with a paradigm shift.

The range of innovation possibilities between incremental and fundamental innovation is wide and needs to be supported in the context of the transition towards a resource-efficient society and green economy. This chapter provides a synoptic profile of ongoing or planned initiatives by agencies to support innovation and alternative technology development.

### 14.2 Technological innovation systems

The success of newly developed technologies has often been determined by the institutional and socio-economic structures that affect both the rate and direction of technological change in society. These determine the pace of transition from a technological niche to a new technological regime. When an existing technological regime gets entrenched through the unlimited support of existing institutional and economic structures, it leads to technological lock-ins that result in rigid technological trajectories.

Under such circumstances, there is a strong need to look beyond technical changes and to address changes along a broader social dimension – for example, user practices, regulation and industrial networks – in order to make real technological change viable (Sagar and others 2002). The science, technology and policy communities increasingly recognize the interaction between the technical and social dimensions of innovation as critical. Both technological and social innovation is necessary for enabling a paradigm change, notably the type of change required by a green economy transition.

Technological innovation refers to innovations of all types that are aimed at developing new ways of carrying out economic activities based on expanding scientific knowledge in response to sectoral competition, market needs and social demand. It involves the development of both the hardware and software dimensions of technologies. From a green economy perspective, the following are the three key elements of technological innovation that are largely being influenced by newly emerging sustainability principles:

- Product innovation – the development of products and product service systems that are aimed at reducing the overall environmental impact of products and services from a life-cycle perspective, while maintaining or improving the functional benefit to society
- Process innovation – the whole range of continuous improvement of existing production processes with the purpose of reducing the resource and energy intensity per unit of product produced and the development of new, green technologies that result in the delivery of alternative products and services
- Organizational innovation – organizational management processes that facilitate the promotion of both product and process innovations and result in the delivery of new products and services with reduced environmental impact and increased social benefit.

Social innovation is the process that builds on knowledge sharing and communication processes, resulting in the formation of networks of institutions and people whose activities and interactions initiate, import, adapt and allow the adoption of new technologies. In view of the highly entrenched dominance of the incumbent technologies, the challenge of social innovation is of high strategic importance for a transition to a green economy. Key components are the following:

- Policy and market innovation. These are the sources of all the critical signals that would ultimately determine the success rate of technological innovations. They are largely determined by the policy and institutional measures taken by national governments and public institutions.
- Innovative knowledge systems. The transition to a green economy is being promoted in parallel with another major transition that is happening in the global economy – the transition from an industrial economy to a knowledge economy. Strong complementarities could be developed between these two transitions by developing innovative knowledge systems that would make the maximum use of the opportunities provided by both. This requires adequate use of information and communication technologies available today, and support for the integration and processing of relevant information including key performance indicators.
- International support programmes. International development cooperation has the vital role of facilitating an effective interface between technological innovation, mainly led by the private sector, and social innovation, mainly led by governments and the public sector. This would require developing innovative programmes that support open participation, wider acceptance and effective use of emerging technologies.

## 14.3 Strategic intervention points

Understanding change requires developing an insight into the incumbent technology and the incumbent system in relation to the emerging technology and the emerging innovation system (Hekkert and others 2006). The transition to a green economy is being promoted in a context where there is an incumbent technology regime that has been supported through decades of institutional measures and networks, juxtaposed with an emerging technological niche that promotes resource efficiency and socio-economic care. Supporting such a transition would require working through strategic entry points that would unlock the various bottlenecks for the development and diffusion of alternative technologies. The items below are some of the strategic intervention points that need to be considered.

### 14.3.1 Overcoming social inertia

Since the 1980s markets have witnessed rapid growth in the development of new goods and services, processes and business models that enable higher resource efficiency, cleaner production and sustainable consumption. Nevertheless, countries have not been able to benefit from most of these innovative technologies mainly due to inertia caused by the lag in the field of social innovation. Addressing inertia factors at local, national and global levels and creating favorable market conditions for the widespread application of greener technologies is a key issue that needs to be addressed by national governments, international agencies and development organizations.

### 14.3.2 Ensuring sustainable capital gains

Innovation that contributes to the green economy transition has to lead to sustainable capital gains by reinforcing the net

positive gains across the following principal capital components of a new economy. Natural capital gain should contribute to the conservation and/or regeneration of the natural environment and ensure the healthy functioning of basic ecosystem services. Financial capital gain should contribute to the positive accumulation of financial capital through market capitalization and contribute to green growth. Social capital gain should contribute to the improvement of well-being of the community, while giving due considerations to internationally agreed ethical standards and preserving the positive lessons from indigenous knowledge systems.

### 14.3.3 Creating an optimal environment for private sector investment and innovation

To enable private sector investment, innovation and broad adoption of greener production methods, good governance is essential. Bribery and corruption present real bottlenecks for investments. The same holds for the absence of the rule of law, clear regulations, transparency and predictability. A level playing field as well as fair business practices will be necessary for a green economy to deliver as required. Therefore, governments should involve the private sector in identifying impediments to a green economy transition and establishing clear, stable and coherent regulatory frameworks to facilitate the integration of environmental, social and governance issues into business planning and decision-making.

### 14.3.4 Seizing leapfrogging opportunities

Social and technological innovations could lead to multiple dividends and exponential benefits when they are effectively linked with existing leapfrogging opportunities. Such opportunities are usually high in circumstances where the effect of the incumbent technological lock-in is weaker.

## **Box 2.** Defining environmentally sound technologies

The term “cleantech” has become popular with the investment community in the last decade, referring often to an asset class of climate friendly or renewable energy technologies. Broadly speaking, cleantech or greentech today refers to cleaner technologies or “environmentally sound technologies” (ESTs), the term used since the 1990s. In 1992, Agenda 21 described ESTs as those technologies that, “...protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substitutes. [ESTs] are not just individual technologies, but total systems which include know-how, procedures, goods and services, and equipment as well as organizational and managerial processes.”

This broad definition includes end-of-pipe and monitoring techniques, but explicitly encourages more progressive preventative approaches such as pollution prevention and cleaner production. The aspiration is towards cleaner technologies where the function is to provide a human benefit or service rather than concentrating on products *per se*.

Environmentally sound technologies allow organizations and societies to reduce the use of finite resources and to use existing resources more efficiently. Waste storage, treatment and disposal are costly in financial as well as in environmental and social terms. While environmentally sound technologies generate less waste and fewer residues, the continued use of inefficient technologies leads to higher operating costs. It also results in a retrospective focus on control and remediation rather than prevention. As environmentally sound technologies reduce operating inefficiencies, they also lead to lower emissions of environmental contaminants. This benefits workers who are exposed to much lower levels of hazardous materials on a daily basis and results in a substantially reduced risk of accidents or technological disasters.

These possibilities exist at all levels of the society, from the community and industry level to a country level. Exploring these opportunities and putting more effort in transforming them into potential realities would further expedite and facilitate the transition towards a green economy.

#### **14.3.5 Supporting innovation in small and medium-sized enterprises**

Besides the major contribution they make to national economies, SMEs have proven to be one of the fertile seedbeds for the development and diffusion of innovative technologies and business practices. Unleashing the enormous capacity for innovation that is inherent in SMEs for a transition would require creating necessary support mechanisms. Such mechanisms are needed to support the transfer of knowledge and skills from large multinationals to SMEs along supply chains, as well as the transfer and dissemination of technologies and know-how to developing country partners. Support will include financial incentive programmes as well as targeted education and training, making use of professional bodies and intermediary organizations such as industry associations that represent local small businesses. This also includes the engagement of local entrepreneurs, including young entrepreneurs involved in the establishment of local development partnerships and small business development.

#### **14.3.6 Development of knowledge and skills**

The transition would require a workforce that has a new set of skills and a knowledge framework on top of the wide arrays of knowledge and skills that have been developed over past centuries. This would require various levels of retraining of the existing workforce, with a particular focus on fields that are related to the productive sector and with due consideration to the participation of girls and women. Appropriate training and life-long learning would need to be based on improved definition of the specific skills required by new, green technologies and occupations. The employment transition would also require reorienting formal education programmes by mainstreaming sustainability issues.

### **14.4 Existing initiatives and programmes by international agencies**

The major strategic contribution that the United Nations agencies, BWIs and regional development banks could make is to support developing countries to plan for and manage the technological and social innovation processes needed to successfully employ cleaner technologies (see box 2).

The following is a synoptic profile of existing initiatives and programmes with a focus on the common elements of interventions and modalities of support followed by agencies. (See Annex 1 for details.)

#### 14.4.1 Policy and decision-making support

The policy and decision-making level is perhaps the most strategic level of engagement, one that influences the overall effectiveness of the support to be provided. While all of the programmes and initiatives may have their own policy and decision-making implications, the initiatives under mainstreaming resource efficient and cleaner production in national policies and strategies could be cited as the most notable with significant policy implications. This includes the Life-Cycle Initiative and the Technology Assessment work led by UNEP. The ITU policy recommendations to ICT regulators and administrations, the World Meteorological Organization-led initiative on Global Framework for Climate Services, UNESCO work on Science, Technology and Innovation policies and the FAO Ex Ante Appraisal Carbon-balance Tool also provide important decision-making tools that support change towards more resource-efficient systems.

The World Intellectual Property Organization work to support access to its global technology database (Patentscope) and analysis of such databases (Patent Landscapes) supports innovation and technology transfer by providing information on existing technologies, ownership and trends. The WIPO Green Marketplace provides support for the diffusion of green technologies. The WIPO SME programme supports the use of intellectual property by SMEs and thereby lower barriers for technology diffusion. Support for technology policy and choice at the urban level is also provided by UN-ECLAC, UN-ESCAP and UN-HABITAT. These agencies are collaborating on guidelines to promote the application of eco-efficiency as a key criterion for sustainable urban development. Some regional commissions are also undertaking cross-sectoral assessments of the economic impacts of climate change, in collaboration with ministries of environment and finance, to support the implementation of relevant economic, technology and other policies.

#### 14.4.2 Product design and development support

Some of the existing programmes provide support in promoting the design and development of products that are more resource-efficient and have lower adverse impact on the environment. This includes the ICAO Global Framework for Alternative Aviation Fuels to facilitate the development and deployment of alternative fuels for aviation on a global basis, the IMO Initiative to Reduce GHGs from International Shipping through enhanced energy efficiency design and operational considerations, the World Bank Lighting Africa Project to promote off-grid lighting products and services, the FAO interdisciplinary work on enhancing food security by building capacities in organic production, processing and certification, the ITU work on developing new standards for the use of ICT to reduce the carbon footprint of many industrial sectors including the ICT sector itself and the sustainable product development programme of UNEP, which is aimed at promoting the design and development of sustainable products.

#### 14.4.3 Supporting resource-efficient and cleaner production

Support for resource-efficient and cleaner production refers to operational support that involves direct engagement with industries to promote continuous improvement of production efficiency through technical and managerial interventions. Notable is the Joint UNIDO-UNEP Programme on Resource Efficient and Cleaner Production, which has been supporting developing countries and transition economies since 1994. More recently, the IFC launched its cleaner production programme with a specific focus on resource efficiency and carbon emissions reductions by adopting cleaner production principles. Also relevant is the FAO programmes for Organic Food Systems, Sustainable Crop Production

Intensification, based on Conservation Agriculture, and integrated Crop-Tree-Livestock systems.

#### **14.4.4 Finance and marketing support**

Finance and marketing support is critical, particularly when it comes to seizing leapfrogging opportunities and promoting transition in developing and transition economies. The largest contribution in this area is from the World Bank Group with all of its projects having a financing component. This includes the Cleantech Investment Programme of the IFC, which promotes the growth of clean technology companies; the Clean Technology Fund that promotes scaled-up financing for low-carbon technologies; and the Lighting Africa Project. The United Nations Environment Programme work on African Rural Energy Enterprise Development and the FAO work under Climate Smart Agriculture also support financing and investment strategies.

#### **14.4.5 Skill and capacity development**

All the initiatives involve some level of skill and capacity development through education and training. As key features of investing in human capital, these initiatives contribute to the nucleus of new set of skills and capacity. Some of the initiatives, as in the case of the Joint UNIDO-UNEP Programme on Resource Efficient and Cleaner Production and the Climate Innovation Centre of the World Bank Group, include the establishment of dedicated centres in developing countries and transition economies with a specific task of supporting industries on cleaner production and cleaner technologies. The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD), jointly implemented by FAO, UNDP and UNEP, supports countries to reduce GHG emissions through methodology development and capacity-building

on developing, implementing and monitoring REDD projects. The UNESCO Education for Sustainable Development and Technical and Vocational Education and Training programmes pursue education on sustainability and training for green jobs.

#### **14.4.6 Supporting networks and platforms**

While most capacity-building activities have some element of networking, there are some initiatives that have the development of networks and platforms as specified outputs. Examples are the global network of Climate Innovation Centers under the Infodev Climate Technology Programme that is implemented by the World Bank Group, and the Global Network for Resource Efficient and Cleaner Production that is established under a UNIDO-UNEP programme. Additionally, the activities of the Consultative Group on International Agricultural Research centres on climate change, agriculture and food security and the FAO Communication for Sustainable Development Initiative develop knowledge networks and platforms. The UNESCO World Network of Biosphere Reserves provides support for improved understanding and management of the interaction between nature and societies, and WIPO Green provides a new platform for green technology exchange.

## **14.5 Steps for an improved interagency effort**

The selection of issues that were raised and the initiatives that have been profiled in this Chapter clearly show the strategic contribution that agencies can make in supporting innovation and technology for a green economic transition during the coming decade. Some key points for consideration by international agencies and multilateral funding institutions in supporting innovation and technology are the following:

- Global scale-up. While there are encouraging trends in terms of increased acceptance and market share for emerging green technologies, this acceptance needs to be scaled up many-fold before green technology becomes the dominant regime. Resource-efficient and cleaner production has proven to lead to multiple economic, environmental and social benefits in many industries, but needs to be scaled up through global support, building on the lessons and experience drawn from existing initiatives and programmes, and taking account of lessons learned with respect to incentives and innovative financing to take green technologies beyond the proof-of-concept phase to commercialization and broader market take-up.
- Promoting synergies. From the synoptic review of existing programmes and initiatives that are being promoted by agencies, it is evident that there is considerable scope for complementarities and further collaboration. An example is complementarities between the programmes implemented by UNEP, UNIDO, ITU, FAO, the Regional Commissions and the World Bank Group in the area of resource-efficient production and promotion of alternative resources. The promotion of synergies among such initiatives needs to build on the added value that each of the agencies bring, based on their respective governmental mandates.
- Industry and finance platform. One of the key determinants for the transformation of innovation into a socially beneficial undertaking is the availability of financing. This is particularly critical for SMEs and entrepreneurs in developing and transition economies that are prepared to move towards more resource-efficient and environmentally sound production but lack the necessary financing mechanisms. Improved synergy between the programmes of different policy, technical and financing agencies could make a major contribution in addressing this limitation through the facilitation of sustainable investment platforms as marketplaces where industries and financing institutions can meet.





Directions signpost with distances at Cape Point, South Africa.

## Chapter 15: Indicators of transformation

### 15.1 Introduction

An integrated policy assessment framework, including improved accounting systems and indicators to capture relevant information and measure progress, is an essential part of making the green economic transition. Such a framework should organize thinking concerning different groups of indicators, their relation to the concept of a green economy and their associated statistics. Overall, the framework would confirm sustainable development as ultimate goal and focus on action areas combined with empirical information to speed up implementation and effective use of enablers on the road to sustainable development.

The elaboration of a framework for measuring progress in building a green economy, including growth and prosperity, should draw on a range of existing frameworks and initiatives. This includes the United Nations System of Environmental-Economic Accounting (SEEA)<sup>73</sup>, an internationally recognized statistical framework for representing the relationship between the economy and the environment, and other relevant initiatives such as the Wealth Accounting and Valuation of Ecosystems (WAVES) project, led by the World Bank, and research on resource indicators by the International Resource Panel. In addition, a measurement framework should also draw on the existing frameworks for socio-economic and other indicators of sustainable development.

A conceptual framework for indicators for a green economy transition should provide flexibility for governments to use and develop, as necessary, indicators and supporting statistical frameworks that meet their needs and circumstances. Although the selection of specific indicators may vary, SEEA can provide consistent statistical classifications, concepts and methods underlying flexible indicator sets.

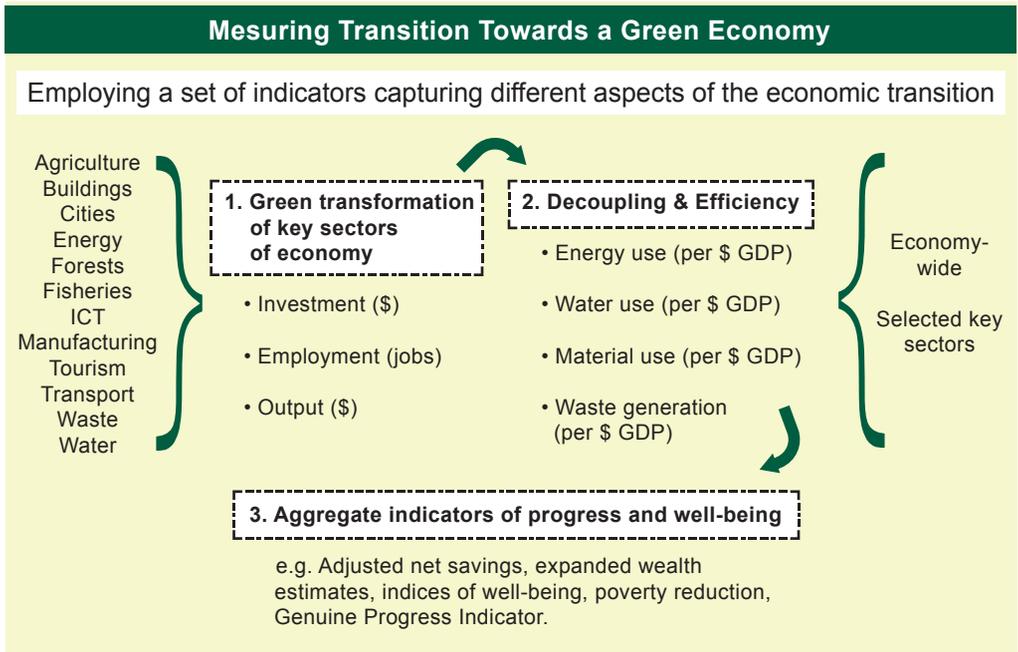
73 Available online at <http://unstats.un.org/unsd/envaccounting>.

## **15.2 A conceptual framework for assessing progress**

The following conceptual framework for assessing progress towards a green economy divides indicators into three groups:

- Green investments, jobs, and sectors. This group has an economic focus and represents efforts to achieve a green transformation of various sectors of the economy. It focuses on investment and the associated share in output and employment.
- Decoupling Impacts and Resource Efficiency. This group assesses the environmental impacts of economic activity, identifying indicators of resource efficiency and the decoupling of economic activity from these impacts. Principle issues include materials and waste, energy, water, land use and ecosystem change, as well as hazardous substances, all related to economic activity.
- Aggregate Indicators of progress and well-being. This group refers to overall measures of economic progress and human well-being, including dimensions such as poverty alleviation, equity, social inclusiveness, overall well-being, capital resources and inclusive wealth (such as in the Beyond GDP initiative). This includes a wide range of proposed indicators, mostly to complement GDP with social, environmental and more detailed economic criteria.

There is a logical link between these groups, as depicted in figure 4 below. The concept of a green economy entails an increasing share of green sectors (or activities to improve sustainability and contribute to the greening of other sectors) in the economy. This could be assessed with economic indicators of these activities: investment, value added, output and employment. The Environmental Goods and Services Sector (EGSS) can provide a starting point for this disaggregation within the System of National Accounts (SNA). The EGSS is incorporated in the internationally agreed SEEA (as discussed below). Regarding employment, it may also be relevant and possible to develop appropriate indicators capturing the extent to which employment can be considered as decent work.

**Figure 4.** Conceptual framework for assessing progress

Source: UNEP – Green Economy Initiative

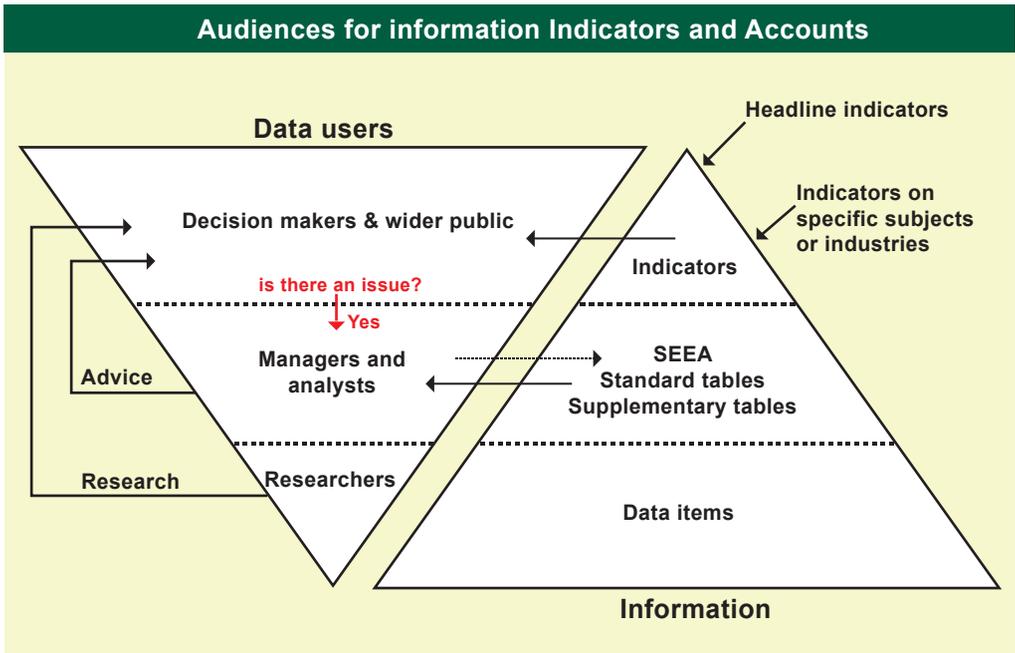
As these green or greener subsectors come to occupy a greater share of the economy, the expectation is that the impact of the economy on the environment in terms of energy and resource use and waste generation will decline. It should be possible to assess these improvements in terms of the second group of indicators on impacts. These will typically be expressed in normalized terms, or relative to economic outputs, such as in the case of resource use per unit (dollar) of GDP.

The work of the International Resource Panel provides a scientifically solid basis on which to build indicators of the environmental impacts of economic activity. The Panel has recently published a report on assessing the environmental impacts of consumption and production (IRP 2010). The report reviews and summarizes scientific work relevant to the environmental impacts and resource consumption of economic activities. Conceptually, the report takes the so-called DPSIR (Driving force – Pressure – State – Impact – Response) framework as a basis, a framework developed by the

European Economic Association, OECD and UNCSO. The framework provides a step-wise description of the causal chain between economic activity and impacts such as loss of biodiversity and diminished human health, welfare or well-being. In addition, the SEEA provides an agreed system for components such as material flow accounts, input-output tables, as well as land and water use accounts, all of which provide the basis for measuring indicators such as energy and resource use at the sectoral and economy-wide scales.

The SEEA provides a framework to integrate information from different sources, and provides the basis on which consistent indicators comparable across countries and over time can be derived and disseminated. Figure 5 presents a matching of different users (left) of indicators and underlying data to the information pyramid (right). One way of disseminating indicators is the DPSIR framework, which has been used by national and international initiatives, but there are several other options for presenting indicators derived from the SEEA.

**Figure 5.** Target audiences and underlying data sources



Source: UN-DESA

The changes in the performance of the economy should also be captured in the third group, comprised of complementary or alternative indicators to GDP, including adjusted GDP measures such as GDP adjusted for natural capital depletion or net savings estimates. Many indicators under this category attempt to portray many other dimensions of well-being and progress beyond the environmental pillar. It should be empirically demonstrable that a green economy transition contributes to reducing poverty and enhancing social equality. Linking the pillars of sustainability suggests the use of measures of inclusive wealth.

There is also an increasing demand to incorporate the link between ecosystems and their functions to productivity, and to assess the impacts of degradation on those functions. Natural capital in the form of ecosystem services, such as nutrients cycling and waste absorption capacity, are now well recognized as fundamental to the green economy and human well-being

in general. Development of the concepts and methods for concrete measures of ecosystem services as natural capital is ongoing. Eventually, it is expected that measures will be available to assess ecosystem health in relation to changes in the economy, and to identify the value of the assets and services of ecosystems in their contribution to the green economy.

### **15.3 An accounting framework for the green economy**

In order to assess a country's or region's green economy transition, data on economic production and consumption should be integrated with information on the environmental impacts of these activities. In terms of the conceptual framework above, the impacts of decoupling and efficiency in the second group of indicators should be related to production and consumption data as maintained in the system of national accounts. In addition, changes in the amount and sectoral disaggregation

of production and consumption, as well as associated employment, can be characterized as part of a green transition, resulting from specific investments or changes in the structure of the economy.

The United Nations System of Environmental-Economic Accounting is becoming an internationally agreed statistical framework for measuring the relationship between the economy and the environment. The SEEA sets the statistical standards for collecting and integrating economic and environmental data for analysis of the green economy and sustainability. It does not propose any single headline indicator. Rather it offers a multi-purpose system – with many different analytical applications – that generates a range of indicators.

For example, the SEEA provides added value to the compilation of GHG emissions by integrating the information on emissions to economic activities and the related economic statistics, thus allowing for a decomposition analysis of the driving forces behind emissions. In order to assess increases in the share of green investment, employment and output, the SEEA provides the framework for compiling economic data classified according to the internationally agreed environmental goods and services sector classification. The SEEA is the reference framework for organizing basic data and deriving indicators that link environment and economy. A recent example is its application in the OECD Green Growth Indicators Report.

The SEEA covers natural capital asset accounts, flow accounts of emissions, energy, water and materials, environmental resource management and protection expenditures and aggregate economic indicators adjusted for environmental depletion and degradation. The asset accounts record stocks and changes in stocks of natural resources and may be compiled both in physical and monetary

terms. The accounts can be used to track the distribution of ownership of these assets and the sustainability of natural capital utilization. The physical flows from the environment to the economy (water, energy and other raw materials) and from the economy to the environment (waste and emissions) are recorded in the SEEA tables according to supply and use by industries and households. The accounts may be combined with monetary information into so-called hybrid accounts. The information from the physical flow accounts is vital for conducting analysis of productivity of natural resource use and cost-recovery from waste and emissions.

The SEEA separately identifies all transactions that are related to the environment such as taxes, subsidies and expenditures on protection, remediation or management of the environment. These accounts can be used to assess the greening of economic policies and the implementation of the polluter-pays principle, and to conduct comparisons of environmental protection expenditures across industries and countries. A valuable contribution of the SEEA for these accounts is the introduction of an internationally agreed classification of environmentally related transactions.

With globalization and growth in the trade in goods and services, the SEEA makes important contributions to understanding green growth by providing internationally comparable compilations of integrated statistics. The SEEA allows for analysis from both the production and consumption perspectives, for example by using input-output modeling to understand the amounts of emissions embodied in exports or imports. Time series of such data can reveal whether mitigation strategies have been effective at the global level, or if the sources of emissions have simply leaked into other production markets.

The SEEA 2003 is currently under revision and a revised version will be provided to the United Nations Statistical Commission in early 2012 for adoption as an internationally agreed conceptual framework for official statistics. The revised SEEA will comprise three volumes. Volume 1 is for compiling asset and flow accounts in physical and monetary terms. It will cover concepts and definitions that are consistent with those of the conventional economic accounts (SNA). Volume 2 will provide the conceptual framework for ecosystem accounting and will address certain accounting items for which an international consensus has not yet been reached.

The ecosystem accounts aim to provide information not only on the stocks and flows of resources and emissions, but also other forms of natural capital. These include notably ecosystem services and measures of the impacts of degradation and depletion on the quality of those services. Volume 3 will contain elaborations and applications of the accounts, for example the use of time series data on natural resource flows to conduct resource productivity input-output analyses. Work on the revision of the SEEA and its implementation in national statistical systems is led by the Committee of Experts on Environmental-Economic Accounting under the auspices of the United Nations Statistical Commission. It is supported by national statistical offices as well as many international and regional institutions.

## 15.4 Relevant indicator sets

Based on the SEEA accounting framework, various sets of indicators can be proposed for assessing progress in meeting green economy goals. Such sets can be organized according to the three groups presented in the conceptual framework. An open question is whether international

agreement should be sought on a specific set of green economy indicators. Similarly, agreement could be sought on a subset of core or headline indicators. Agreement on a common set need not imply agreement on common headline indicators within such a set. Conversely, agreement on common headline indicators does not imply that all countries or regions adopt the same broader set. One advantage of a common set of indicators would be facilitating international comparison. A disadvantage might arise if not all indicators are equally relevant for all countries and their respective circumstances.

Efforts should also be made to build any new indicators on the basis of existing macro indicator sets such as the Human Development Index and established indicators for sustainable development. In considering the feasibility and desirability of a common set of indicators for a green economy, it is worth noting that various sets of (overlapping) indicators for sustainable development and sustainability exist. For example, the Commission on Sustainable Development produced the third set of Indicators for Sustainable Development in 2007. This followed earlier versions in 1996 and 2001 (UNDESA 2007). This latest version contains a core set of 50 indicators, which are part of a larger set of 96 indicators.

Many of these indicators are relevant for assessing progress in a green economy transition, and could be placed in the second group (decoupling and efficiency) in terms of the conceptual framework presented here. The Food and Agriculture Organization has developed a framework for sustainability indicators, comprised of target and core indicators and based on the Bellagio Sustainability Assessment and Measurement Principles.<sup>74</sup> These also overlap with indicators of sustainable development and provide some suggestions for green economy indicators.

74 They are available online at <http://www.fao.org/docrep/012/a1322e/a1322e00.pdf>

As the concept of a green economy is acknowledged as providing an action-oriented opportunity to contribute to sustainable development and poverty eradication, it is logical that green economy indicators will overlap with indicators of sustainable development. The conceptual framework above does, however, suggest the development of indicators of green transformation of the economy and key sectors that are not generally part of agreed sets of broad indicators of sustainable development.

The assessment of a green economic transformation, in terms of possible economic indicators such as output and employment, is also being addressed by the OECD, which is developing a set of indicators for monitoring progress towards green growth. The OECD framework recognizes the SEEA as the international statistical standard on which indicators of green growth are to be based.

## **15.5 Implementing relevant measurement systems**

A framework for indicators to assess progress towards a green economy, including the selection of relevant sets of indicators, poses two implementation issues. One concerns the use of such indicators by different audiences. The other relates to the needs and capacities of different countries, particularly developing countries.

As mentioned above, considerable efforts have been devoted over the last twenty years to developing sets of indicators of sustainable development. Among these,

there have been indicators formulated on environmental-economic inter-relationships, such as the adjusted net savings measures published by the World Bank. It may be possible, for example, by means of assessments, to learn more about the use by policymakers and other stakeholders of such information. This will be important in supporting the goal of better informed decision-making and the setting of targets for a green economy, building on the availability of information in the form of standardized indicators.

Many developing countries are, however, likely to face constraints in generating and making the relevant information available. Technical assistance and capacity-building will be required in order to address the special needs of these countries and support the development of the necessary information systems. Improved access to information and communication technologies experienced by these countries in the past decade provides a unique platform and window of opportunity to initiate concrete actions in this respect.<sup>75</sup>

International agencies need to improve their ability to contribute to the further development of the SEEA, including programmatic support to institutions from developing economies to improve their capacity to collect, organize, interpret and communicate relevant data. Public institutions can also learn from experience gained by responsible businesses in defining and applying core and additional indicators in their reporting systems, and can learn how non-financial information is increasingly linked with financial information in emerging models of integrated reporting.

<sup>75</sup> The report "Keeping promises, measuring results", produced in 2011 by the ITU-WHO Commission on information and accountability for Women's and Children's Health highlighted the potential of ICTs to provide more accurate and timely data for monitoring and reviewing commitments, results and resources invested in improving women's and children's health at the global level (<http://www.everywomaneverychild.org/pages?pageid=14>). Similar approaches can be adopted to monitor green economy indicators.



© Shutterstock / Ronald Summers

Old wooden boats sunken at the edge of a flooded crop field, Vietnam.

## Chapter 16: Conclusions

An unmistakable opportunity is becoming apparent as the vision of a green economy finds its way into the core work programmes of the United Nations agencies and the Bretton Woods Institutions. This trend reflects a growing recognition of the shortcomings of business as usual, and conveys a sense of urgency to find lasting solutions in response to global financial and economic crisis. It is a trend not only driven by renewed awareness of risk, but also by a growing sense that opportunity lies in a fundamental change in the way we govern, operate markets and develop communities.

This report offers a common understanding of the concept of the green economy, and makes the following findings:

- The green economy can be an innovative pathway to sustainable development
- Infrastructure investments today offer a promising entry point for launching transformative and dynamic green growth strategies
- A green economy must be people-centred and invest in both human and social capital
- A green economy requires the reorienting of public policies supported by improved information systems for tracking and communicating progress.

The green economy – like the related concepts of green growth, the circular economy and sustainable consumption and production – is one of the vehicles to carry us towards sustainable development. A major focus of the approach is the transformation of the prevailing energy- and resource-intensive economic structure. This transformation requires the shifting of policy

and investment priorities towards greening infrastructure and emerging green economic sectors, and towards the greening of brown economic sectors. Increased investments in people and societal infrastructure are important in their own right, and can be combined with synergistic investments in the greening of physical infrastructure and target sectors. The following sections provide detailed conclusions.

### **16.1 The green economy is an approach to sustainable development and requires coordinated efforts of all United Nations entities**

The inter-agency dialogue on the green economy shows common concern with linking the concept explicitly with fundamental goals related to human well-being and needs, social inclusiveness and intra-generational and intergenerational equity, all in the context of emerging risks and scarcities. The agencies focus on investment in economic development, resources, human development, social and physical infrastructure, technology and behavioural patterns. They recognize that a rights-based approach is relevant, and that progress needs to be measured in both quantitative and qualitative terms.

The most fundamental challenge that the green economy debate poses to all governmental institutions is to converge, align and integrate work across the three pillars of sustainable development. Part of this challenge relates to institutional collaboration and coherence of policy approaches within and between agencies at the international and national levels. Policy coherence becomes all the more important in view of the growing complexity of the global economic, finance and trading systems.

The challenge to converge, align and integrate investments across the three pillars is also one of substantive integration, and effectively requires the recognition that the green economy approach entails a new level of the mainstreaming of sustainable development. The linkage of green and economy with human well-being and equity as core goals signals a new paradigm in which human and natural assets – including ecosystem services and biodiversity – are more appropriately measured, valued and put at the centre of economic planning and decision-making. This mainstreaming is critical for delivering the balanced and inclusive results that a green economy promises.

As an approach to sustainable development, the green economy is relevant to the mandates of all United Nations entities. The expertise is available at all levels, but each entity needs a better understanding of how its expertise can be mobilized in a coordinated manner to support green economy initiatives at regional and national levels. Such ongoing efforts as the Delivering as One approach of the United Nations can inform this effort.

International agencies of the United Nations and Bretton Woods Institutions have the opportunity to redefine the approach to delivering on their mandates and to advance the mainstreaming of green economic criteria into their portfolio of services. In promoting their mandates related to the three pillars of sustainable development, international agencies – like their national counterparts – need to consider improved and effective ways of mainstreaming the new approach in a coherent manner. Such efforts may include institutional and programmatic reform and the use of environmental and social data alongside improved economic and cost-benefit analysis, and may also expand the boundaries of inter-agency collaboration and coordination at international, national and inter-ministerial levels.

## **16.2 Infrastructure is an entry point in a green economy transformation**

Inadequate infrastructure affects the poor and vulnerable segments of society most directly. Inappropriate infrastructure – fossil-based energy, highways primarily serving the expansion of automobile transport, water supply relying on excessive extraction of underground water – is wasteful and exacerbates environmental problems. Meeting the overall infrastructure needs of the poor and integrating those needs with the greening of existing and new infrastructure are essential aspects of meeting environmental and human development challenges.

The role of ecosystems is similar to that of physical infrastructure. Forests, oceans, coral reefs, wetlands, fertile lands, wild fauna and flora, safe water, clean air and a stable climate are the fundamental bases on which our societies and economies exist and function. Most of the world's poor live in close proximity to rural ecosystems or near coastal areas, and investments in ecosystem conservation, sustainable use and restoration contribute to poverty eradication.

Meeting these infrastructure needs can lead the way to transforming the major components of our economic structure – agriculture, fisheries and forestry; industry; and services. This transformation involves reducing the resource intensity of production and consumption, avoiding and limiting waste, changing lifestyles and expanding the share of the services sector that is low in environmental impact but high in decent work potential. Such dynamic growth strategies are expected to offer first-mover advantages to those who act fast.

The implementation of such strategies will create winners and losers. Transitional

policies are essential to ensure access by the affected not only to social safety nets, but also to the training and education opportunities that will equip them with the skills required to participate in the green economic transformation. These transitional measures must be additional to the overall investments in people and societal infrastructure.

### **16.3 A green economy must be a people-centered economy**

A green economy requires both a healthy, educated and informed workforce with green jobs skills and consumers with awareness of sustainable consumption. In addition, a green economy must invest in people and social capital – through health care, education services and access to social safety nets – independent of the consideration of individuals as human capital, and should ensure that the benefits of economic growth are equitably shared. This emphasis on investing in people helps to safeguard respect for human rights, including the rights of children, women and employees. Investments in people should help empower individuals and groups to become agents of positive societal change.

Employees and managers should explore opportunities to collaborate in building workplaces that are greener, safer and more decent. A green economy will create job opportunities in some sectors while shedding jobs in others, and the formulation of any green economy policies, programmes and projects should identify new goods and services as well as transitional arrangements that can accommodate the shifting of jobs within and across sectors. This effort requires inter-agency and inter-ministerial collaboration and coordination, ensuring that the predicted net positive benefits in job creation become a reality.

Pro-poor economic opportunities may be found in sectors such as agriculture, forestry, water, waste management and sanitation services where green economy interventions can enhance livelihoods. An investment in natural capital is also an investment in human capital – through enhancing food and nutrition security – particularly in low-income and environmentally vulnerable areas. It can also support social entrepreneurship and small business development, but entrepreneurs and informal businesses in poor communities desperately need public institutions that facilitate their access to markets and green business opportunities.

The transition to a green economy will rely heavily on innovation and entrepreneurship, dynamic areas which government regulatory and control mechanisms must take care in enabling rather than limiting. What societies need is technological and social innovation that is of the fundamental rather than incremental kind. In considering ways of making this transition happen, international agencies and governments alike need to consider how their interventions can help citizens and organizations to overcome the problem of social inertia. This highlights the apparent convenience of business as usual and unsustainable patterns of consumption that continue to be engrained by inappropriate incentives.

A people-centred green economy implies the changing of consumer behaviour in resource-intensive consumption areas such as food, housing and mobility. Effecting this change in behaviour will require innovation in knowledge, management systems and incentive mechanisms. International agencies need to scale up their support programmes in education and training, research and development, small business development, continual improvement in resource efficiency and access to innovative financing.

A central component in the transformation is appropriate education for all ages and both genders in areas such as science and economics. It also requires revisiting the role of communications and the media in shaping culture and lifestyles. It implies a fundamental rethinking of basic concepts such as quality of growth, well-being and life styles. Historical data on human development show that improved well-being is linked not only with improvement in material well-being but also with the quality of education and health services. Increasing human well-being and citizen participation also means taking culture into account. Considering cultural specificities in the design of green policies will help ensure the engagement of local populations and secure a desirable outcome of development efforts.

## **16.4 A green economy is about reorienting public policies**

A transition towards a green economy requires shifting public policy priorities from business as usual towards the greening of industries and the empowerment of people. An important instrument at the disposal of all governments is public spending, which needs to target the provision of urgently needed public goods and services including green infrastructure, research and development that spur green technologies and innovation, health care and education services. Public spending is also essential for leveraging private green investments in productive economic sectors. As some countries are experiencing tight fiscal conditions, innovative green economy financing mechanisms at the international level need to be explored and developed quickly. Governments also need to be supported in revising the base of existing sources of revenue and exploring options for alternative taxes and pricing incentives that target environmental externalities.

While providing positive incentives for a green economy transition through public finance, governments can also direct economic activities with laws, regulations, standards, taxes, labelling and reporting requirements, and can further the global objectives of agreed international conventions. In addition, governments need to reform perverse incentives – such as those for the production and consumption of fossil fuels – in order to provide a level playing field for green investors. The absence of appropriate regulation and pricing is causing a failure to create markets in carbon trading, ecosystem services and environmental goods and services. Such markets could be designed to provide new sources of income and jobs for developing countries.

The reform of subsidies and pricing systems must take care to minimize and compensate for any adverse impact on households, especially on the poor. Governments should also consider alternative use of subsidies to support a green economy transition. United Nations entities can help member states find appropriate ways of reforming subsidies and pricing systems. A transparent, rules-based multilateral trading system has an important role in promoting collective action on subsidy reform, preventing trade protectionism disguised as green economy interventions and opening up trade in environmental goods and services. International intellectual property rights regimes can complement the role of trade in a green economy by facilitating developing countries' access to appropriate and affordable green technologies.

A new information system is needed to support the orientation of public policies towards a balanced and inclusive green economy. Such a system should capture, in both physical and monetary terms, the income and employment generation opportunities from the rapidly growing environmental goods and services sector

and the resource efficiency gains from sustainable consumption and production measures. It should show how improvements to ecosystems and the natural resource base result from green economy policy interventions, and how the poor benefit from a green economy transformation.

The United Nations System of Environmental-Economic Accounting, which will become an internationally agreed statistical standard in 2012, has evolved over the last two decades, and provides a statistical framework for regularly measuring the changes to the environment and natural resource base as a result of economic activities. It provides a common international basis for measuring resource efficiency relative to GDP, and includes guidelines for identifying the contribution of environmental goods and services to GDP and jobs. United Nations entities should provide programmatic support to institutions in developing economies to improve their capacity to collect, organize, interpret and communicate the relevant data.

The SEEA, however, is not designed to fully capture human and social dimensions in the nexus between the environment and economy. Dedicated efforts are needed to measure the distribution of benefits among different segments of society and the extent to which poverty has been reduced as a result of green economy policy interventions. There is also a need for measuring overall societal progress and human well-being over time in all societies with or without green economy transformations. Efforts in this area should build on decades of experience in the compilation and use of the Human Development Index.

## **16.5 Rio+20 is an opportunity to adopt the green economy approach as a practical solution to multiple challenges facing a world in economic recovery**

The global challenges that gave rise to the emergence of the green economy approach are still with us. The financial and economic situations in major developed countries are precarious and present serious risks to the sustainable development and poverty eradication prospects of developing countries in a globalized world. High unemployment, especially among youth, is destabilizing even well established democracies, and the threats to food and energy security continue to increase worldwide. Climate change has not shown signs of abating and the frequency of climate-related natural disasters is increasing. The loss of biodiversity, land degradation and the deterioration of our oceans and their vital resources are accelerating.

The green economy approach is no panacea, but it does represent one of the practical solutions to the multiple challenges facing humanity today. The key to this solution is reinvigorating the role of the public sector in mobilizing and directing attention and resources towards issues that truly matter to societies – job creation, wealth generation and equitable distribution of income; a stable climate, clean air, healthy oceans and access to renewable energy and safe water; food security; and healthy, educated and empowered citizens. There are synergies among these societal objectives. Shifting towards sustainable agricultural, for example, has the potential of creating more jobs than conventional agriculture, generating more income for small-holder farmers while saving water and energy, reducing GHG emissions, improving food safety and contributing to food security.

International agencies of the United Nations and Bretton Woods Institutions have the opportunity to redefine approach in delivering their mandates and advance the mainstreaming of green economic criteria in their portfolio of services. Agency mandates address key enablers for delivering results along the three pillars of sustainable development in a more coherent manner. In promoting these, international agencies like their national counterparts need to consider improved and effective ways of mainstreaming the new approach. This includes institutional and programmatic reform, incorporating in their work the use of environmental and social data alongside economic and cost-benefit analysis into mainstream decision-making. Externally, this also expands the boundaries of interagency collaboration and coordination – both at international and national, inter-ministerial level.

The United Nations Conference on Sustainable Development in 2012 provides an opportunity for international organizations, national and local governments, businesses and civil society to appreciate the potential of a green economy transformation for sustainable development and poverty eradication. It is also an occasion where member states can make collective commitments to adopt such an approach and request coherent and coordinated policy advice and technical support from the United Nations System.

This report, with contributions from some 40 United Nations entities including BWIs, includes common messages and proposals for coordinated support to member states. It is expected to inform member states of the shared views on the green economy within the United Nations System. The group that produced this report stands ready to follow up on related outcomes from the conference in June 2012.

## References

- African Development Bank, African Union Commission and United Nations Economic Commission for Africa (2010). *Assessing Progress in Africa toward the Millennium Development Goals - MDG Report 2009*. Tunis: African Development Bank.
- Altenburg, T., H. Schmitz and A. Stamm (2008). Breakthrough? China's and India's Transition from Production to Innovation. *World Development* Vol. 36, No. 2: 325–344.
- Balmford, A. and others (2002). Economic Reasons for Conserving Wild Nature. *Science*, 297: 950–953 (August).
- Balmford, A. and others (2003). Global variation in terrestrial conservation costs, conservation benefits, and unmet conservation needs. *PNAS*, 100(3): 1046–1050 (February).
- Barbier, E. (2005). *Natural Resources and Economic Development*. Cambridge: Cambridge University Press.
- \_\_\_\_\_ (2009). *A Global Green New Deal*. Report prepared for the Economics and Trade Branch, UNEP Division of Technology, Industry and Economics.
- Bovarnick, A., C. Knight and J. Stephenson (2010). *Habitat banking in Latin America and Caribbean: A Feasibility Assessment*. Main Report. New York: United Nations Development Programme.
- Bruner A., R.E. Guilson and A. Balmford (2004). Financial costs and shortfalls of managing and expanding protected area systems in developing countries. *Bioscience*, 54:1119–1126.
- Burtraw, D. and others (2010). *Feasibility Assessment of a Carbon Cap-and-Trade System for Mexico*. Washington DC: Resources For the Future. Available from [www.rff.org/RFF/Documents/RFF-Rpt-MexicoWB.pdf](http://www.rff.org/RFF/Documents/RFF-Rpt-MexicoWB.pdf).
- Calzada Álvarez, G. and others (2009). *Study of the effects on employment of public aid to renewable energy sources*. Madrid: Universidad Rey Juan Carlos. Available from [http://eco-efficiency.management.dal.ca/Files/NSREC/Study\\_of\\_the\\_effects\\_on\\_employment\\_of\\_public\\_aid\\_to\\_renewabl.pdf](http://eco-efficiency.management.dal.ca/Files/NSREC/Study_of_the_effects_on_employment_of_public_aid_to_renewabl.pdf).
- China Development Bank Corporation (2010). *Annual Report 2009*. Beijing: China Development Bank Corporation.
- Coady, D. and others (2010). *Petroleum product subsidies: Costly, inequitable and rising*. IMF Staff Position Note 10/05, February 2010, Washington DC: IMF.
- Davis, S.J., K. Caldeira and H.D. Matthews (2010). Future CO<sub>2</sub> emissions and climate change from existing infrastructure. *Science*, Vol. 329: 1330.
- Department for Environment, Food and Rural Affairs (2006). *Study of Emerging Markets in the Environmental Industries Sector (Executive Summary)*. London: DEFRA, UK Government. Available from <http://www.bis.gov.uk/files/file35101.pdf>.
- Edmonds, J.L. and others (2008). Stabilizing CO<sub>2</sub> concentrations with incomplete international cooperation. *Climate Policy*, 8 (4): 355–76.
- European Employment Observatory (2010). *Workshop on Undeclared Work in the times of economic crisis*. Brussels/Birmingham: CEC, GHK Consulting. Available from [www.eu-employment-observatory.net/resources/meetings/EEOWorkshopReportUDW23April2010.pdf](http://www.eu-employment-observatory.net/resources/meetings/EEOWorkshopReportUDW23April2010.pdf).
- Fay, M. and others (2010). *Infrastructure and Sustainable Development*. In *Postcrisis Growth and Development: A Development Agenda for the G20*. S. Fardoust, Y. Kim and C. Sepulveda, eds. Washington, DC: World Bank.
- Food and Agriculture Organization (2010). *Climate-Smart Agriculture, Policies, Practices and Financing for Food Security, Adaptation and Mitigation*. Report prepared for The Hague conference on agriculture, food security and climate change, 31 October to 5 November 2010. Rome: FAO.
- Foster, V. and C. Briceño-Garmendia, eds. (2010). *Africa's Infrastructure: A Time for Infrastructure*. Washington DC: World Bank.
- Gallagher, K.P. (2010). *China and the Future of Latin American Industrialization*. Paper Number 18, October 2010, The Frederick S. Pardee Center for the Study of the Longer-Range Future, Boston University.
- Gallagher, K.P. and R. Porzecanski (2010). *The Dragon in the Room: China and the Future of Latin American industrialization*. Palo Alto, CA: Stanford University Press.
- Germany, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (2010). *Information on Renewable Energy*. Berlin: BMU. Available from [www.bmu.de/english/renewable\\_energy/general\\_information/doc/4306.php](http://www.bmu.de/english/renewable_energy/general_information/doc/4306.php).
- Ghertner, D.A. and M. Fripp (2007). Trading away damage: quantifying environmental leakage through consumption-based, life-cycle analysis. *Ecological Economics*, 63 (2–3): 563–577.

Global e-Sustainability Initiative (2010). Using ICTs to Tackle Climate Change. Brussels, Geneva: GeSI / ITU. Available from <http://www.itu.int/ITU-T/climate-change/itu-gesi-report.html>.

Guivarch, C. and S. Hallegatte (2011). Existing Infrastructure and the 2°C Target. A response to "Future CO<sub>2</sub> Emissions and Climate Change from Existing Energy Infrastructure. Nogent-sur-Marne Cedex: Centre International de Recherche sur l'Environnement et le Développement.

Haddad, L. (2003). Reducing child malnutrition: how far does income growth take us? *World Bank Economic Review*, 17(1): 107–131.

Hallegatte, S. (2009). Strategies to adapt to an uncertain climate change. *Global Environmental Change*, 19: 240–247.

Harris, J. (2008). Ecological Macroeconomics: Consumption, Investment, and Climate Change. Working paper no. 08-02. Medford: Global Development and Environment Institute, Tufts University.

Hekkert, M.P. and others (2007). Functions of innovation systems: A new approach for analyzing technological change. *Technological Forecasting & Social Change*, 74: 413–432.

International Energy Agency (2009). *World Energy Outlook 2009*. Paris: OECD/IEA.

\_\_\_\_\_ (2011) *World Energy Outlook 2011*. Paris: OECD/IEA. (forthcoming).

International Institute for Labour Studies (2011) *Defining "green" – issues and considerations*. EC-IILS Joint Discussion Paper Series No 10. Geneva: International Institute for Labour Studies. (forthcoming).

International Labour Organization (1999). *Decent Work - Report by the Director-General to the International Labour Conference, 87th session, June 2009*. Geneva: ILO.

\_\_\_\_\_ (2010a). *Promoting Green Jobs for Recovery and Sustainable Development - Global Jobs Pact Policy Briefs*. No. 9. Geneva: ILO. Available from [www.ilo.org/jobspact/resources/lang-en/WCMS\\_146634/index.htm](http://www.ilo.org/jobspact/resources/lang-en/WCMS_146634/index.htm)

\_\_\_\_\_ (2010b). *Youth Entrepreneurship Facility Programme*. Geneva: ILO, Available from <http://www.ilo.org/public/english/employment/yen/whatwedo/projects/y2y/yef/yef.htm>

\_\_\_\_\_ (2010c). *Study on Low Carbon Development and Green Jobs in China*. Report by the Institute for Urban and Environmental Studies (IUE) Chinese Academy of Social Sciences. Beijing:

ILO office for China and Mongolia.

\_\_\_\_\_ (2010d). *The impact of climate change on employment: management of transitions through social dialogue*. Geneva: ILO. Available from [www.ilo.org/wcmsp5/groups/public/@ed\\_emp/@emp\\_ent/documents/publication/wcms\\_158730.pdf](http://www.ilo.org/wcmsp5/groups/public/@ed_emp/@emp_ent/documents/publication/wcms_158730.pdf).

\_\_\_\_\_ (2011). *Growth, Employment and Decent Work in the Least Developed Countries*. Report of the International Labour Office for the Fourth Conference on the Least Developed Countries.

International Resource Panel (2010). *Assessing the Environmental Impacts of Consumption and Production: Priority Products and Materials*. Nairobi: UNEP.

\_\_\_\_\_ (2011). *Decoupling Natural Resource Use and Environmental Impacts from Economic Growth*. Nairobi: UNEP.

International Telecommunication Union, UNESCO and the Broadband Commission (2011). *Broadband: A Platform for Progress*. Geneva: ITU.

Kohlhaas, M. (2004). *Beschäftigungswirkungen der ökologischen Steuerreform in Deutschland – Vergleich der Analysen mit LEAN und PANTA RHEI*. In *Ansätze zur Modellierung von Beschäftigungseffekten in Energiesystemen*. S. Briem and U. Fahl, eds. Berlin: Mensch und Buch Verlag.

Korea, Republic of, Ministry of Government Legislation (2010). *Framework Act and its Presidential Decree on Low Carbon, Green Growth in Korea*. Seoul: Korean Ministry of Government Legislation.

Lin, J.Y. (2011). *New structural economics: A framework for rethinking development*. The World Bank Research Observer, Vol 26 No 2. Washington DC: Oxford University Press, International Bank for Reconstruction and Development/WB.

López, R. (2009). *World Economic Crises in Times of Environmental Scarcity and Wealth Concentration*. College Park: Department of Agricultural and Resource Economics, University of Maryland.

Major Economies Forum (2009). *Declaration of the leaders of major economies forum on energy and climate*. 9 July 2009 – L'Aquila, Italy. Available from [www.majoreconomiesforum.org/past-meetings/the-first-leaders-meeting.html](http://www.majoreconomiesforum.org/past-meetings/the-first-leaders-meeting.html).

Massachusetts Nonprofit Network (2009). *Stimulus and nonprofits*. Vol. 8, MNN ARRA Newsletter. Available from <http://www.massnonprofitnet.org/stimulus-newsletter/advocacy-federal-stimulus-act%E2%80%9393newsletter8/>.

Meadows, D.H. and others (1972). *The Limits to Growth - A Report to the Club of Rome*. New York: Universe Books.

Millennium Ecosystem Assessment (2005). *Ecosystems and Human Well-being: Synthesis*. Washington DC: Island Press.

Nellemann, C. and E. Corcoran, eds. (2010). *Dead Planet, Living Planet – Biodiversity and Ecosystem Restoration for Sustainable Development. A Rapid Response Assessment*. Arendal: UNEP GRID-Arendal.

Nicholls, R.J. and others (2007). *Screening study: Ranking port cities with high exposure and vulnerability to climate extremes (OECD Working Paper)*. Paris: OECD.

Organisation for Economic Co-operation and Development (2005). *Environmental Fiscal Reform for Poverty Reduction*. Paris: OECD.

\_\_\_\_\_ (2008). *Biofuels: An Economic Assessment*. Paris: OECD.

\_\_\_\_\_ (2010). *Strategies for green growth: Framing the issues*. Paper prepared by J. Stephenson and S. Upton for the OECD Roundtable on Sustainable Development, Paris, 13-14 December 2010. Paris: OECD.

\_\_\_\_\_ (2011a). *Towards Green Growth. A Summary for Policy Makers*. Paris: OECD.

\_\_\_\_\_ (2011b). *A Green Growth Strategy for Food and Agriculture – Preliminary Report*. Paris: OECD.

\_\_\_\_\_ (2011c). *Harnessing freedom of investment for green growth. Freedom of Investment Roundtable 14, April 2011*. Paris: OECD.

\_\_\_\_\_ (2011d). *Inventory of estimated budgetary support and tax expenditures relating to fossil fuels in selected OECD countries*. Paris: OECD.

\_\_\_\_\_ (2011e). *Invention and Transfer of Environmental Technologies. OECD Studies on Environmental Innovation*. Paris: OECD.

\_\_\_\_\_ (2012). *Environmental Outlook to 2050*. Paris: OECD (forthcoming).

Organisation for Economic Cooperation and Development (OECD), International Energy Agency, World Bank and Organization of the Petroleum Exporting Countries (2010). *Analysis of the scope of energy subsidies and suggestions for the G-20 initiative*. Paris: OECD. Available from [www.oecd.org/dataoecd/55/5/45575666.pdf](http://www.oecd.org/dataoecd/55/5/45575666.pdf)

Parker, C. and M. Cranford (2010). *The Little Biodiversity Finance Book: A Guide to Proactive Investment in Natural Capital (PINC)*. Oxford: Global Canopy Programme. Available from <http://www.globalcanopy.org/go/biodiversityfinance>.

Principles for Responsible Investment (2011). *Five years of PRI - Report on Progress 2011: An analysis of signatory progress and guidance on implementation*. London: PRI.

Pruss-Ustun, A. (2005). *Preventing Disease Through Healthy Environments*. Geneva: World Health Organization.

Robins, N. and others (2009). *More green money on the table*. London: HSBC Global Research, Climate Change. Available from <http://www.endseurope.com/docs/90401c.pdf>.

\_\_\_\_\_ (2010a). *Delivering the green stimulus*. London: HSBC Global Research, Climate Change. Available from <http://xa.yimg.com/kq/groups/8518353/643699190/name/100310+GREEN+STIMULUS+HSBC.pdf>.

\_\_\_\_\_ (2010b). *Sizing the climate economy*. London: HSBC Global Research, Climate Change. Available from <http://www.research.hsbc.com/midas/Res/RDV?ao=20&key=wU4BbDyRmz&n=276049.PDF>.

\_\_\_\_\_ (October 2010c). *Green austerity hits the UK*. London: HSBC Global Research, Climate Change.

Sagar, A.D. and J.P. Holdren (2002). *Assessing the global energy innovation system: Some key issues*. *Energy Policy*, 30 (6): 465–469.

Sheng, F. (2009). *A green economy: Conceptual issues*. Paper available from <http://www.unep.org/civil-society/Portals/59/Documents/GMGSF12-GE-Conceptual-Issues.pdf>.

Shalizi, Z. and F. Lecocq (2009). *Climate change and the economics of targeted mitigation in sectors with long-lived capital stock*. Policy Research Working Paper No. 5063. Washington, D.C.: The World Bank.

Stiglitz, J.E., A. Sen and J.P. Fitoussi (2009). *Report by the Commission on the Measurement of Economic Performance and Social Progress*. Paris: The Commission. Available from [www.stiglitz-sen-fitoussi.fr/documents/rapport](http://www.stiglitz-sen-fitoussi.fr/documents/rapport).

Tierney, K.J. (1997). *Business impacts of the Northridge earthquake*. *Journal of Contingencies and Crisis Management*, 5:87–97.

Tol, R.S. (2008). *The social cost of carbon: Trends, outliers and catastrophes*. *Economics*, vol. 2 (25): 1–22.

United Nations (2005). UN Millennium Project. Investing in Development. New York: United Nations. Available from <http://www.unmillenniumproject.org/documents/MainReportComplete-lowres.pdf>.

\_\_\_\_\_ (2010). The Millennium Development Goals Report 2010. New York: United Nations.

United Nations Development Programme (2004). Reducing Rural Poverty through Increased Access to Energy Services: A Review of the Multifunctional Platform Project in Mali. New York: UNDP.

\_\_\_\_\_ (2009). Green jobs for the poor: A public employment approach. Discussion paper. New York: UNDP.

\_\_\_\_\_ (2010a). Human Development Report 2010 (20th Anniversary Edition) - The Real Wealth of Nations: Pathways to Human Development. New York: UNDP.

\_\_\_\_\_ (2010b). What Would it Take to the Achieve the MDGs: An International Assessment. New York: UNDP.

\_\_\_\_\_ (2011a) Business innovation to fight climate change and poverty (Policy Note). New York: UNDP. (forthcoming).

\_\_\_\_\_ 2011b. Catalysing Climate Finance: A Guidebook on Policy and Financing Options to Support Green, Low-emission and Climate-resilient Development. New York: UNDP.

\_\_\_\_\_ (2011c). Blending Climate Finance Through National Climate Funds: A Guidebook for the Design and Establishment of National Funds to Achieve Climate Change Priorities. New York: UNDP.

United Nations Department of Economic and Social Affairs (2007). Indicators of Sustainable Development: Guidelines and Methodologies. New York: United Nations.

\_\_\_\_\_ (2011). United Nations, World Population Prospects: The 2010 Revision. Report prepared by the United Nations Department of Economic and Social Affairs, Population Division, United Nations. New York: UNDESA.

United Nations Economic Commission for Latin America and the Caribbean (2010). Time for equality: closing gaps, opening trails. Report prepared for 33d session of ECLAC, Brasilia, 30 May – 1 June 2010. Doc LC/G.2432(SES.33/3. Santiago: UN-ECLAC.

United Nations Economic and Social Commission for Asia and the Pacific, Asian Development Bank and UNEP (2010). Green Growth, Resources and Resilience – Environmental Sustainability in Asia and the Pacific (Preview Version). Bangkok: UN-ESCAP.

United Nations Economic and Social Commission for Western Asia (2011). Environmental Goods and Services in the ESCWA Region: Opportunities for Small and Medium-Sized Enterprises. Beirut: UN-ESCWA.

United Nations Educational, Scientific and Cultural Organization (2010). Engineering: Issues, challenges and opportunities for development. Report published in conjunction with WFEO, CAETS and FIDIC. Paris: UNESCO.

\_\_\_\_\_ (2011). From Green Economies to Green Societies. UNESCO's Commitment to Sustainable Development. Paris: UNESCO.

United Nations Environment Programme (2001). International environmental governance: Multilateral environmental agreements. Report prepared for a meeting of the Open-ended Intergovernmental Group of Ministers or their Representatives on International Environmental Governance, New York, 18 April 2001, UNEP/IGM/1/INF/3 April 2001.

\_\_\_\_\_ (2009a). Global Green New Deal – Policy Brief. Nairobi: UNEP.

\_\_\_\_\_ (2009b). Global Green New Deal: An Update for the G20 Pittsburgh Summit. Nairobi: UNEP. Available from [www.unep.ch/etb/publications/Green%20Economy/G%2020%20policy%20brief%20FINAL.pdf](http://www.unep.ch/etb/publications/Green%20Economy/G%2020%20policy%20brief%20FINAL.pdf).

\_\_\_\_\_ (2010a). Green Economy: Driving the Green Economy through Public Finance and Fiscal Policy Reform. Nairobi: UNEP.

\_\_\_\_\_ (2010b). Green Economy – Developing Country Success Stories. Nairobi: UNEP.

\_\_\_\_\_ (2011). Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication. Nairobi: UNEP. Available from [www.unep.org/greeneconomy/](http://www.unep.org/greeneconomy/).

United Nations Environment Programme and Delft University of Technology (2009). Design for Sustainability: A Step-by-Step Approach. Nairobi/Paris: UNEP and DTIE.

United Nations Environment Programme and Marrakech Task Force on Sustainable Lifestyles (2011). Visions for Change - Recommendations for Effective Policies on Sustainable Lifestyles. Nairobi: UNEP.

United Nations Environment Programme and others (2008). Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World. Nairobi: UNEP

United Nations Framework Convention on Climate Change (2007). Investment and Financial Flows to Address Climate Change. Bonn: UNFCCC. Available from [unfccc.int/files/cooperation\\_and\\_support/financial\\_mechanism/application/pdf](http://unfccc.int/files/cooperation_and_support/financial_mechanism/application/pdf).

United Nations High-Level Panel of Experts (2011). Land tenure and international investments in agriculture: A report by the High-Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. Rome: FAO.

United Nations Human Settlements Programme (2008). State of the World's Cities 2010/2011 – Bridging the Urban Divide. Nairobi: UN-HABITAT.

United Nations Population Fund (2011). Population Dynamics on the Least Developed Countries: Challenges and Opportunities for Development and Poverty Reduction. New York: UNFPA.

United Nations Secretary-General (2010). Progress to date and remaining gaps in the implementation of the outcomes of the major summits in the area of sustainable development, as well as an analysis of the themes of the Conference. Report of the Secretary-General to the First Session of the Preparatory Committee for the UNCSD, New York, 17-19 May 2010, United Nations doc A/CONF.216/PC/2.

United States Government, Federal Communications Commission (2010). National Broadband Plan. Washington, D.C.: FCC. Available from <http://www.broadband.gov/plan>.

World Bank (2005). Pro-poor Growth in the 1990s: Lessons and Insights from 14 Countries. Washington, D.C.: World Bank.

\_\_\_\_\_ (2008). Agriculture and Poverty Reduction. Agriculture for Development Policy Brief. Washington, D.C.: World Bank.

\_\_\_\_\_ (2009a). Program Information Documentation (PID) Appraisal Stage. Report No. AB5003. Washington, D.C.: World Bank.

\_\_\_\_\_ (2009b). World Development Report 2010: Development and Climate Change. Washington, D.C.: World Bank.

\_\_\_\_\_ (2009c). World Economic Prospects: Commodities at the Crossroads. Washington, D.C.: World Bank.

\_\_\_\_\_ (2010a). World Development Report 2010: Development and Climate Change. Washington, D.C.: World Bank.

\_\_\_\_\_ (2010b). Synthesis Report of the Economics of Adaption to Climate Change. Washington, D.C.: World Bank.

\_\_\_\_\_ (2010c). World Development Indicators. Washington, D.C.: World Bank.

World Commission on Environment and Development (1987). Our Common Future. New York: Oxford University Press.

World Economic Forum (2010). Green Investing 2010 – Policy Mechanisms to Bridge the Finance Gap. Geneva: World Economic Forum.

World Health Organization (2009). Global Health Risks. Mortality and Burden of Disease Attributable to Selected Major Risks. Geneva: WHO. Available from [www.who.int/healthinfo/global\\_burden\\_disease/global\\_health\\_risks/en/index.html](http://www.who.int/healthinfo/global_burden_disease/global_health_risks/en/index.html)

\_\_\_\_\_ (2010). Health in the green economy - co-benefits to health of climate change mitigation in health care facilities. Preliminary findings - initial review. Geneva: World Health Organization. Available from [www.who.int/hia/green\\_economy/en/index.html](http://www.who.int/hia/green_economy/en/index.html)

World Resources Institute (2009). Reviewing and Verifying International Climate Action. Washington, D.C.: World Resources Institute. Available from [http://pdf.wri.org/countdown\\_to\\_copenhagen\\_reviewing\\_and\\_verifying.pdf](http://pdf.wri.org/countdown_to_copenhagen_reviewing_and_verifying.pdf).

Young and jobless (2010). The Economist Online, 16 December. Available from [www.economist.com/blogs/dailychart/2010/12/youth\\_unemployment](http://www.economist.com/blogs/dailychart/2010/12/youth_unemployment).

Yumkella, K.K. (2010). Green Industry: Resource and energy productivity for low carbon industry development. Statement by the UNIDO Director General at the Third Nevsky International Ecological Congress, St. Petersburg, Russian Federation, 14 May 2010.

# Annex 1:

## Agency programmes and initiatives supporting green innovation and technology

Implementing Agency/ Agencies	Title of the Programme/ Initiative	Objective	Modality of Support	Expected/Achieved Accomplishments
CGIAR - CIAT	Climate Change, Agriculture and Food Security  <a href="http://www.cgiarfund.org/cgiarfund/sites/cgiarfund.org/files/Documents/PDF/fc3-CRP7_Proposal_Document%20%28Aug_%202010%29.pdf">http://www.cgiarfund.org/cgiarfund/sites/cgiarfund.org/files/Documents/PDF/fc3-CRP7_Proposal_Document%20%28Aug_%202010%29.pdf</a>	Identify and test pro-poor adaptation and mitigation practices, technologies and policies for food systems, adaptive capacity and rural livelihoods.  Provide analysis to ensure cost-effective investments and mutual inclusion of agriculture and climate change issues in relevant policies.	<ul style="list-style-type: none"> <li>Research to identify and test technologies, practices and policies and enhance partnerships, to decrease the vulnerability of rural communities to climate change</li> </ul>	<ul style="list-style-type: none"> <li>Improved understanding of the underlying drivers of social differentiation and gender disparities as influenced by climate change</li> <li>Strategies to provide access to emerging investments, tools and policies</li> </ul>
FAO, UNDP and UNEP	United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD)  <a href="http://www.un-redd.org/">http://www.un-redd.org/</a>  <a href="http://www.fao.org/forestry/nfma/en/">http://www.fao.org/forestry/nfma/en/</a>	Support countries to reduce GHG emissions from deforestation and forest degradation caused by fire, insects, diseases, other pests or poor harvesting practices and to enhance carbon stocks through responsible management of planted and indigenous forests.  Support developing countries in multi-purpose monitoring and assessment of forest resources, land use and land use change, forest uses and users to meet their national forest policy, forest programmes and international reporting	<ul style="list-style-type: none"> <li>Coordination of multi-stakeholder preparatory processes and preparation of implementation and capacity building strategies</li> <li>Capacity building workshops, demonstration projects and training resources</li> <li>National forest monitoring and assessment programmes (NFMA)</li> <li>Measuring reporting and verification (MRV) component of UN-REDD</li> </ul>	<ul style="list-style-type: none"> <li>Methodologies, designs and data to meet forest policy, planning, management and international reporting needs</li> <li>Strengthened policies, strategies, national forest programmes and management practices in fire, forest health, planted forests and harvesting to support achieving sustainable forest management, livelihoods and REDD+</li> </ul>
FAO	Green House Gas (GHG) Assessment for the Agriculture, Fisheries and Forestry Sectors  GHG appraisal of Projects, value chain and policies with EX-ACT tool <a href="http://www.fao.org/tcs/exact/en/">http://www.fao.org/tcs/exact/en/</a>	Support member countries to increase the accuracy of estimates of emissions and potential sinks in agricultural production systems, improving capacity of countries to gather, analyze and use the data for improving the efficiency and sustainability of production systems and increasing opportunities to access CDM type financial mechanisms.  Guide project design and decision making on funding aspects, complementing the usual ex-ante economic analysis of investments projects.	<ul style="list-style-type: none"> <li>Training materials, protocols, guidelines and methodology sheets.</li> <li>National capacity building programmes.</li> <li>C-balance appraisal to appraise over 20 projects, and growth scenarios in 15 countries</li> </ul>	<ul style="list-style-type: none"> <li>Improved national regional and global estimates of GHG emissions.</li> <li>Life Cycle Analysis (LCA) for various agricultural products.</li> <li>Policy briefs and technical guidance on improving sustainability and efficiency of systems.</li> <li>Ex-ACT outputs used in financial and economic analysis of the projects</li> </ul>
FAO	Climate Smart Agriculture <a href="http://afconference.com/images/the-hague-conference-fao-paper.pdf">http://afconference.com/images/the-hague-conference-fao-paper.pdf</a>	Promote agriculture, fisheries and forestry that sustainably increase productivity, resilience (adaptation), reduce/remove GHGs (mitigation) and enhance the achievement of national food security and development goals	<ul style="list-style-type: none"> <li>Through FAO national projects and through a central portal</li> </ul>	<ul style="list-style-type: none"> <li>Technical and policy guidance on methodologies, practices, institutional and policy options, financing and investment strategies</li> </ul>

<b>FAO</b>	<p>Communication for Sustainable Development Initiative</p> <p><a href="http://www.csdinitiative.org">http://www.csdinitiative.org</a></p>	<p>Promote communication methods and services in support of natural resource management, agricultural innovation and climate adaptations.</p>	<ul style="list-style-type: none"> <li>• Knowledge networks and platforms at the regional and global levels</li> <li>• Pilot activities implemented in 4 countries: Bangladesh, Bolivia, Congo, Jamaica</li> </ul>	<ul style="list-style-type: none"> <li>• Up scaling of decentralized communication services</li> <li>• Strengthened capacities of rural knowledge institutions</li> <li>• Improved information and communication networks among stakeholders</li> </ul>
<b>FAO</b>	<p>Organic Agriculture</p> <p><a href="http://www.fao.org/organicag/en/">http://www.fao.org/organicag/en/</a></p>	<p>Assist countries in the development of organic agriculture, including national capacity to effectively produce, store, process, inspect, certify and market organic foods and fibers</p>	<ul style="list-style-type: none"> <li>• FAO Interdepartmental Working Group on organic agriculture</li> </ul>	<ul style="list-style-type: none"> <li>• Comprehensive information dissemination systems and networking arrangements</li> <li>• Effective decision-support tools for organic agriculture systems</li> <li>• Topical studies and policy advice to countries</li> </ul>
<b>IAEA</b>	<p>Regional and inter-regional Technical Cooperation Projects and Environment Programme</p>	<p>Build capacities and transfer technology, knowledge and skills for peaceful use of nuclear and related technologies</p>	<ul style="list-style-type: none"> <li>• Providing wide range of training and internship programmes</li> <li>• Supporting the transfer of nuclear and related technologies</li> <li>• Promoting collaboration through Coordinated Research Programme (CRP)</li> <li>• Promoting networks</li> </ul>	<ul style="list-style-type: none"> <li>• Dissemination of knowledge</li> <li>• Regional Capacity building</li> <li>• Sustainability of know-how transfer</li> </ul>
<b>ICAO</b>	<p>ICAO Assembly Resolution A37-19 "Consolidated statement of continuing ICAO policies and practices related to environmental protection – Climate change"</p> <p><a href="http://www.icao.int/env/">http://www.icao.int/env/</a></p>	<p>Develop and facilitate the implementation of comprehensive mitigation measures to limit or reduce GHG emissions from international aviation</p>	<ul style="list-style-type: none"> <li>• Develop a global CO<sub>2</sub> certification Standard by 2013</li> <li>• Facilitate the global implementation of operational measures</li> <li>• Develop a global scheme for market-based measures</li> <li>• Facilitate the development and deployment of sustainable alternative fuels for aviation</li> <li>• Identify assistance needs of States and develop mechanisms to facilitate the provision of assistance</li> </ul>	<ul style="list-style-type: none"> <li>• Achieve ICAO's global aspirational goals of improving 2 per cent annual fuel efficiency and stabilizing CO<sub>2</sub> emissions at 2020 levels</li> </ul>
<b>ITU</b>	<p>Development of Green ICT Standards</p> <p><a href="http://www.itu.int/climate">www.itu.int/climate</a></p> <p>Bridging the standardization gap</p> <p><a href="http://www.itu.int/en/ITU-T/gap/">http://www.itu.int/en/ITU-T/gap/</a></p>	<p>Reduce GHG emissions through the use of new ICT standards</p> <p>Facilitate increased participation of developing countries in standardization</p>	<ul style="list-style-type: none"> <li>• Develop common methodology to measure reduction of GHG emissions from the ICT industry and from other sectors through the adoption of ICTs</li> <li>• Adopt energy efficiency as one of the key criteria for approving new ICT standards for networks and devices, and raising awareness of its benefits</li> <li>• Develop new standards for ICT applications to be used by other industrial sectors (smart grids, intelligent transport systems, etc)</li> </ul>	<ul style="list-style-type: none"> <li>• Limit and ultimately reduce greenhouse gas (GHG) emissions, foster sustainable development and promote new services and applications in existing industrial sectors</li> </ul>

<b>ITU</b>	Radio communications use for earth observation application  <a href="http://www.itu.int/climate">www.itu.int/climate</a>	Development of international regulations for protection of satellite and ground radio systems which provide Earth observation data	<ul style="list-style-type: none"> <li>• Develop operational, technical and regulatory standards of Earth observation radio communication</li> <li>• Make world-wide spectrum allocation and adopt international protection measures</li> <li>• Improve the recognition of the essential role and global importance of Earth observation applications and understanding of its management</li> </ul>	<ul style="list-style-type: none"> <li>• Collection and exchange of Earth observation data for monitoring and understanding, modeling predicting and verification of all aspects of climate change and for related policy-making</li> </ul>
<b>IMO</b>	IMOs Initiative to Reduce GHGs from international shipping  <a href="http://www.imo.org">www.imo.org</a>	To reduce GHG emissions through improved design and propulsion technologies, and operational measures	<ul style="list-style-type: none"> <li>• Development of an Energy Efficiency Design Index (EEDI) for improved ship design and fuel efficiency</li> <li>• Ship Energy Efficiency Management Plan (SEEMP) for operational efficiency</li> <li>• Market Based Mechanisms (MBM) for emission charges (under review)</li> </ul>	<ul style="list-style-type: none"> <li>• Amendments to MARPOL Annex VI on EEDI and SEEMP formally adopted in 2011, expected to enter into force in 2013. These are the first ever global and mandatory GHG reduction standards for an industrial sector. A MBM work plan will be discussed further at MEPC 63 in 2012</li> </ul>
<b>IMO</b>	The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships (2009)  <a href="http://www.imo.org">www.imo.org</a>	Convention reflects 'cradle to grave' responsibilities of shipowners from the time of a ship's construction to its final demolition. It regulates actions which should be approved by ships' flag states and authorities in ship recycling nations	<ul style="list-style-type: none"> <li>• National capacity building programmes</li> <li>• Training materials</li> </ul>	<ul style="list-style-type: none"> <li>• Convention specifically intended to help improve health, safety and environmental conditions in recycling yards, thereby improving wider social and working conditions of ship recycling activities</li> </ul>
<b>IMO</b>	Marine Biosafety Initiative, incl its International Convention for the Control and Management of Ships' Ballast Water and Sediments (the Ballast Water Management Convention) (2004), and Guidelines for the control and management of ships' bio-fueling to minimize the transfer of invasive aquatic species (MEPC Resolution 207(62), 2011)  <a href="http://www.imo.org">www.imo.org</a>  <a href="http://globallast.imo.org">http://globallast.imo.org</a>	Aims to prevent the potentially devastating effects of the spread of harmful aquatic organisms transferred by ships from one region to another region.	<ul style="list-style-type: none"> <li>• Mandatory requirements to install Ballast Water Management (BWM) systems onboard ships as defined in the Convention through technical assistance and co-operation</li> <li>• IMO/GEF/UNDP Global Ballast Partnership Project assists developing countries to implement the convention. The Global Industry Alliance (GIA) on Marine Biosafety encourages technology innovations. The IMO/GESAMP Ballast Water Working Group reviews and approves ballast water treatment technologies</li> </ul>	<ul style="list-style-type: none"> <li>• Significant reduction in risk from marine invasive species</li> <li>• Technologies in place to address ballast water and bio-fueling issues</li> <li>• Capacity building in developing regions</li> </ul>
<b>UNEP and UNIDO</b>	Joint Programme on Resource Efficient and Cleaner Production (RECP) in Developing and Transition Economies  <a href="http://www.unep.fr/scp/cp/">http://www.unep.fr/scp/cp/</a>	Promote wider application of innovative and resource efficient production methods in industries	<ul style="list-style-type: none"> <li>• Development of tools and guidelines on resource efficient and cleaner production</li> <li>• Building capacities for technical support services to industries at countries level</li> <li>• Mainstreaming of RECP in national development policies and strategies</li> </ul>	<ul style="list-style-type: none"> <li>• Developed more than 10 training kits and numerous sectoral guides</li> <li>• National Cleaner Production Centers and Programmes established in 48 countries</li> </ul>

- Thousands of industrial experts trained and hundreds of industrial demonstrations supported
- Global Network on RECP established

<p><b>UNEP</b></p>	<p>Life Cycle Initiative</p> <p><a href="http://www.unep.fr/scp/lcinitiative/">http://www.unep.fr/scp/lcinitiative/</a></p>	<p>Bring science-based life cycle approaches into practice worldwide through Business, Academic, and Governments working together</p>	<ul style="list-style-type: none"> <li>• Enhance the global consensus and relevance of existing and emerging life cycle methodologies and related data</li> <li>• Encourage life cycle thinking in decision-making in business and industry, as well as government and the general public</li> <li>• Support regional networks to expand capability worldwide in applying and improving life cycle approaches.</li> </ul>	<ul style="list-style-type: none"> <li>• Developed three training kits and numerous supporting tools and guidelines;</li> <li>• Engaged over 2000 individuals collaborating globally</li> <li>• Accepted as one stop shop for life cycle approaches</li> </ul>
<p><b>UNEP</b></p>	<p>Sustainable product development and marketing</p> <p><a href="http://www.unep.fr/scp/design/">http://www.unep.fr/scp/design/</a></p>	<p>Support industries and countries to develop and market more resource efficient and sustainable products</p>	<ul style="list-style-type: none"> <li>• Development of guidelines on sustainable products development</li> <li>• Supporting regional and national Ecolabelling programmes</li> <li>• Promoting sustainable public procurement</li> </ul>	<ul style="list-style-type: none"> <li>• Design for Environment (D4E) guideline produced</li> <li>• Regional Ecolabelling and product specific labeling supported</li> <li>• Tools for SPP produced and more than 10 countries supported</li> </ul>
<p><b>UNEP</b></p>	<p>Technology Assessment and selection</p> <p><a href="http://www.unep.or.jp/ietc/publications/techpublications/techpub-14/2-enta6.asp">http://www.unep.or.jp/ietc/publications/techpublications/techpub-14/2-enta6.asp</a></p>	<p>To enable technology decision-makers carry out a sustainability assessment of different technology options and thus make a more informed decision</p>	<ul style="list-style-type: none"> <li>• Methodology development for assessing the sustainability of technologies</li> <li>• Development of training kit and provision of training on how to use it</li> <li>• Testing the application of the methodologies in pilot projects</li> </ul>	<ul style="list-style-type: none"> <li>• Developed earlier methodology on Environmental Technology Assessment (EnTA) and provided training</li> <li>• Currently finalizing the development of a new tool on Sustainable Technology Assessment</li> </ul>
<p><b>UNEP</b></p>	<p>Sectoral programmes and initiatives on sustainable production and consumption</p> <p><a href="http://www.unep.org/sbci/">http://www.unep.org/sbci/</a>  <a href="http://www.unepfi.org/">http://www.unepfi.org/</a>  <a href="http://www.unep.org/transport/pcfiv/">http://www.unep.org/transport/pcfiv/</a>  <a href="http://www.unep.fr/scp/tourism/activities/partnership/">http://www.unep.fr/scp/tourism/activities/partnership/</a>  <a href="http://archive.basel.int/industry/cooperation/partnership/index.html">http://archive.basel.int/industry/cooperation/partnership/index.html</a></p>	<p>Promote and support organizational innovations and technologies that promote resource efficiency and the transition to low-carbon economies</p>	<ul style="list-style-type: none"> <li>• Support establishment of sectoral initiatives with membership of businesses and relevant public institutions</li> <li>• Develop sectoral guidelines and tools that would be promoted through the sectoral initiative</li> <li>• Provide support to the Secretariat of the sectoral initiatives</li> </ul>	<ul style="list-style-type: none"> <li>• Supporting the Sustainable Building and Climate Initiative (SBCI), UNEP Finance Initiative (UNEP-FI), Partnership for Clean Fuel and Vehicles (PCFV) and Global Partnership on Sustainable Tourism, UNEP Basel Convention Partnership for Action on Computing Equipment (PACE)</li> </ul>
<p><b>UNEP</b></p>	<p>African Rural Energy Enterprise Development (AREED)</p> <p><a href="http://www.areed.org">www.areed.org</a></p>	<p>To expand energy access in rural and peri-urban markets of five African countries (Mali, Senegal, Ghana, Tanzania and Zambia).</p>	<ul style="list-style-type: none"> <li>• Business development services coupled with capital are offered to entrepreneurs, enabling them to create energy enterprises capable of reaching the underserved in rural and peri-urban areas</li> </ul>	<ul style="list-style-type: none"> <li>• Practical tools and materials have been developed, including the REED Toolkit</li> <li>• Capacity developed; US\$ 2 million invested in clean energy enterprises</li> </ul>

				<ul style="list-style-type: none"> <li>• Policies supportive of clean energy enterprises developed and deployed in three countries</li> </ul>
<b>UNESCO</b>	<p>Man and the Biosphere Programme</p> <p><a href="http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/man-and-biosphere-programme/">http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/man-and-biosphere-programme/</a></p>	<p>To set a scientific basis for the improvement of the relationships between people and their environment globally.</p>	<ul style="list-style-type: none"> <li>• Identify and assess the changes in the biosphere</li> <li>• Study and compare the dynamic interrelationships between natural/near-natural ecosystems and socio-economic processes</li> <li>• Ensure basic human welfare and a livable environment</li> </ul>	<ul style="list-style-type: none"> <li>• The World Network of Biosphere Reserves currently consists of 564 sites in 109 countries</li> </ul>
<b>UNESCO</b>	<p>Education for Sustainable Development (ESD)</p> <p><a href="http://www.unesco.org/new/en/education/ed-resources/esd/decade-of-esd/">http://www.unesco.org/new/en/education/ed-resources/esd/decade-of-esd/</a></p>	<p>An umbrella for different forms of education, ESD promotes efforts to rethink educational programmes and systems that currently support unsustainable societies. ESD affects all components of education: legislation, policy, finance, curriculum, instruction, learning, assessment, etc</p>	<ul style="list-style-type: none"> <li>• Promote the exchange and transfer of knowledge on environmental problems and solutions, and to foster environmental education for sustainable development</li> </ul>	<ul style="list-style-type: none"> <li>• New, revised teaching and learning materials on ESD made available</li> <li>• Developed ESD Teaching and Learning for Sustainable Future Resource kits for teachers</li> <li>• A global network of more than 9000 educational institutions in 180 countries</li> </ul>
<b>UNESCO</b>	<p>Technical and Vocational Education and Training (TVET)</p> <p><a href="http://www.unesco.org/new/en/education/themes/education-building-blocks/tvet">http://www.unesco.org/new/en/education/themes/education-building-blocks/tvet</a></p> <p>UNESCO Strategy for Technical and Vocational Education and Training  <a href="http://unesdoc.unesco.org/images/0018/1833/183317e.pdf">http://unesdoc.unesco.org/images/0018/1833/183317e.pdf</a>  <a href="http://www.unevoc.unesco.org/2.0.htmlno_cache=1&amp;tx_drwiki_pi1[keyword]=stainable%20Development">http://www.unevoc.unesco.org/2.0.htmlno_cache=1&amp;tx_drwiki_pi1[keyword]=stainable%20Development</a></p>	<p>Assist Member States in integrating "employability skills" to improve access to green jobs</p> <p>Supporting governments in the integration of Education for Sustainable Development into TVET</p> <p>Clearing house-related actions and informing the global TVET debate</p>	<ul style="list-style-type: none"> <li>• Policy review Expert meeting on 'TVET for the green society' organized in 2010</li> <li>• Draft Framework of Action for Greening TVET under consultation</li> <li>• Development of strategies to facilitate the transition of the workforce into new occupations through TVET</li> <li>• UNESCO-UNEVOC publications on TVET and sustainable development</li> </ul>	<ul style="list-style-type: none"> <li>• TVET policy reviews (15 to 20 countries in the period 2010 to 2015)</li> <li>• International Framework of Action on Greening TVET covering policy under development</li> <li>• A resource centre on TVET for sustainable development. Knowledge sharing between UNESCO member states</li> </ul>
<b>UNESCO</b>	<p>STI Policy Formulation</p> <p><a href="http://www.unesco.org/new/en/natural-sciences/science-technology/sti-policy/">http://www.unesco.org/new/en/natural-sciences/science-technology/sti-policy/</a></p>	<p>To support developing countries in formulating their Science, Technology and Innovation (STI) policies, and the reform of related systems</p>	<ul style="list-style-type: none"> <li>• Country support and advice. The aim is to develop national STI policies for all those eg African countries still without one</li> </ul>	<ul style="list-style-type: none"> <li>• UNESCO is working to respond to the request of 24 Least Developed Countries to assist them with their national STI policies</li> </ul>
<b>APCTT of ESCAP</b>	<p>Asian and Pacific Centre for the Transfer of Technology (APCTT)</p> <p><a href="http://www.apctt.org/">http://www.apctt.org/</a></p>	<p>Assist the members and associate members of ESCAP through strengthening their capabilities to develop and manage national innovation systems; develop, transfer, adapt and apply technology; improve the terms of transfer of technology; and identify and promote the development and transfer of technologies relevant to the region.</p>	<ul style="list-style-type: none"> <li>• Research and analysis of trends, conditions and opportunities</li> <li>• Advisory services</li> <li>• Dissemination of information and good practices</li> <li>• Networking and partnership with international organizations and key stakeholders</li> <li>• Training of national personnel, particularly national scientists and policy analysts</li> </ul>	<ul style="list-style-type: none"> <li>• Technology Transfer Services for SMEs</li> <li>• Technology Transfer and Marketing Mechanisms</li> <li>• Search for Technology Buyers/Sellers</li> </ul>

<b>UNITAR</b>	Capacity Development to Support Local Green Economy and Green Growth Strategies  <a href="http://www.unitar.org/ldp/">http://www.unitar.org/ldp/</a>	To support local authorities in self-assessing and developing capacities to promote the introduction of enabling environments for green economies at the local level, spur green technology transfer, and integrate greener production and consumption strategies within municipal planning.	<ul style="list-style-type: none"> <li>• Use of city-share methodology to foster knowledge-sharing across local authorities through south-south and triangular cooperation</li> </ul>	<ul style="list-style-type: none"> <li>• Thematic knowledge management of good practices, lessons learned, and various toolkits across regional local authorities and roster of committed actions plans per locality</li> </ul>
<b>UNWTO</b>	<a href="http://www.hotelenergysolutions.net">www.hotelenergysolutions.net</a>	Fostering innovation to fight climate change for the accommodation industry	<ul style="list-style-type: none"> <li>• Provide an innovative mitigation software and toolkit</li> <li>• Provide energy efficiency and renewable energy technologies as solutions for investment</li> <li>• Help reduce energy consumption and carbon footprint</li> <li>• Sensitize trade and consumers</li> </ul>	<ul style="list-style-type: none"> <li>• The first phase of the project to elaborate the toolkit</li> <li>• Second phase will include information systems and language adaptation to small island developing countries, other regions and areas including water and waste</li> </ul>
<b>UNWTO</b>	UN Steering Committee on Tourism for Development (SCTD)  <a href="http://www2.unwto.org/en/event/promoting-tourism-sustainable-development-and-poverty-reduction">http://www2.unwto.org/en/event/promoting-tourism-sustainable-development-and-poverty-reduction</a>	Assisting LDCs and other developing countries to promote tourism for development, including investment in clean technologies for energy and water	<ul style="list-style-type: none"> <li>• Innovative framework on Delivering as One for Tourism: Joint effort on tourism by nine UN entities (ILO, ITC, UNEP, UNDP, UNESCO, UNIDO, UNCTAD, UNWTO, WTO)</li> <li>• Mobilize resources for tourism development</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce the poverty gap in LDCs</li> <li>• Increase trade in services (tourism) for LDCs</li> <li>• Increase sustainability and clean energy production</li> </ul>
<b>World Bank Group</b>	IFC Cleantech Investment Program  [ <a href="http://www.ifc.org/ifcext/gict.nsf/Content/Cleantech">http://www.ifc.org/ifcext/gict.nsf/Content/Cleantech</a> ]	Promoting the growth of clean technology companies in developing countries	<ul style="list-style-type: none"> <li>• Venture capital and private equity investments in innovative clean technology companies in developing countries</li> <li>• Introducing to a network of IFC clients</li> <li>• Follow-on debt financing to our portfolio companies</li> </ul>	<ul style="list-style-type: none"> <li>• The program invested US\$ 30 million during its first year of operation in 2009 and is expected to invest US\$ 200 million annually afterwards</li> </ul>
<b>World Bank Group</b>	IFC Cleaner Production  [ <a href="http://www.ifc.org/ifcext/climatechange.nsf/Content/Cleaner-Production">http://www.ifc.org/ifcext/climatechange.nsf/Content/Cleaner-Production</a> ]	Achieve carbon emissions reductions by adopting cleaner production (CP) principles in businesses.	<ul style="list-style-type: none"> <li>• Identify CP opportunities in businesses</li> <li>• Provide advice, and refer businesses to an international network of consultants</li> <li>• Help with financing CP audits</li> <li>• Loans for CP implementation projects to existing clients on a fast-track approval basis</li> </ul>	<ul style="list-style-type: none"> <li>• Number of projects undertaken: 32</li> <li>• Potential Annual savings identified: US\$ 26.8 million</li> <li>• Potential Required capital investment: US\$ 81.36 million</li> <li>• Average Payback period: three years</li> <li>• Potential Annual reduction in GHG: 231,553 tCO<sub>2</sub>e</li> <li>• Actual Investments approved: US\$27.8 million</li> </ul>
<b>World Bank Group</b>	Clean Technology Fund (CTF)  [ <a href="http://www.climateinvestmentfunds.org/cif/node/2">http://www.climateinvestmentfunds.org/cif/node/2</a> ]	Promotes scaled-up financing for demonstration, deployment and transfer of low-carbon technologies with significant potential for	<ul style="list-style-type: none"> <li>• Providing public and private sector investments for demonstration of low carbon development and mitigation of GHG emissions</li> </ul>	<ul style="list-style-type: none"> <li>• It is expected that the CTF will finance programs in 15 to 20 countries or regions</li> </ul>

		long-term greenhouse gas emissions savings.	<ul style="list-style-type: none"> <li>• Scaling-up development through funding low carbon programs and projects that are embedded in national plans and strategies</li> <li>• Sharing experiences and lessons learned while responding to the challenges of climate change</li> </ul>	<ul style="list-style-type: none"> <li>• Three investment plans endorsed with a total funding envelope of over US\$1 billion leveraging over US\$10 billion</li> </ul>
<b>World Bank Group</b>	Infodev Climate Technology Program - Climate Innovation Centers (CICs)  [ <a href="http://www.infodev.org/en/Topic.19.html">http://www.infodev.org/en/Topic.19.html</a> ]	Establishing a global network of CICs that support early-stage innovation in climate technologies.	<ul style="list-style-type: none"> <li>• Provide access to flexible investment mechanisms that support enterprises at varying levels of innovation and scale</li> <li>• Build innovation capacity through the delivery of advice, assistance and educational products</li> <li>• Enable local and regional collaboration that develops and supports a country's innovation ecosystem</li> <li>• Identify and unlocking new opportunities through access to information and market intelligence</li> <li>• Facilitate access to facilities that support rapid technology design, adaptation, proto-typing, testing and manufacture</li> </ul>	<p>Expected:</p> <ul style="list-style-type: none"> <li>• 30 networked CICs,</li> <li>• 2,500 enterprises created,</li> <li>• 240,000 jobs created,</li> <li>• 12m tons of CO<sub>2</sub> mitigated</li> <li>• 450MW in off-grid energy access</li> <li>• Clean water access to 15m homes</li> <li>• 750 technology partnerships</li> <li>• 12,000 training programmes delivered</li> </ul>
<b>World Bank Group</b>	Lighting Africa  [ <a href="http://www.lightingafrica.org">http://www.lightingafrica.org</a> ]	Promote the development of a sustainable private sector market for both existing and innovative off-grid lighting products and services for 2.5 million people who currently rely on kerosene for lighting.	<ul style="list-style-type: none"> <li>• Develop international product Quality Assurance program to stimulate market demand and innovation to meet technical standards</li> <li>• Provide companies with market intelligence and business support services to enter African off-grid lighting markets and scale-up</li> <li>• Facilitate access to finance for manufacturers, distributors and consumers</li> <li>• Address policy barriers such as import tariffs</li> </ul>	<ul style="list-style-type: none"> <li>• Attracted new companies the market: from 8 products in 2008, today more than 70 products are available in Africa – a growing number at prices below US\$ 25</li> <li>• Developed quality testing methodology, 7 products have passed so far</li> <li>• In 2009, reached 500,000 people with quality assured lighting products</li> </ul>
<b>WFP</b>	Cash transfers and Food-for-assets programmes	Enable poor and food insecure rural communities to invest in sustainable land management, water conservation and the construction and rehabilitation of community assets and productive infrastructure, such as irrigation, terracing and reforestation.	<ul style="list-style-type: none"> <li>• Provide food and cash in exchange for work and training on vital community infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• In 2010, WFP supported more than 22.5 million people in almost 10,000 of the most food-insecure communities in the world through food-for-assets programmes</li> </ul>
<b>WFP</b>	R4 – Rural Resilience Initiative <a href="http://www.wfp.org/disaster-risk-reduction">http://www.wfp.org/disaster-risk-reduction</a>	Empower farmers and food-insecure rural households with integrated risk management tools to develop long-term resilience.	<ul style="list-style-type: none"> <li>• A public private partnership of WFP and Oxfam America, supported by USAID and Swiss Re respectively building on the</li> </ul>	<ul style="list-style-type: none"> <li>• In its three of years of delivery this pilot, HARITA, has scaled up from 200 enrolled households in one village</li> </ul>

			<p>Horn of Africa Risk Transfer for Adaptation (HARITA) project in Ethiopia</p> <ul style="list-style-type: none"> <li>• Uses existing government-owned and -led productive safety nets as a delivery mechanism to expand weather-index based insurance and other financial services</li> <li>• Farmers can purchase insurance through work on community assets</li> </ul>	<p>in 2009 to over 13,000 enrolled households in 43 villages in 2011.</p> <ul style="list-style-type: none"> <li>• Over the next five years, Oxfam America and WFP plan to scale up and evaluate the R4 approach in four countries.</li> </ul>
<b>WFP</b>	<p>Purchase for Progress (P4P) initiative</p> <p><a href="http://www.wfp.org/purchase-progress">http://www.wfp.org/purchase-progress</a></p>	<p>Offer smallholder farmers opportunities to access agricultural markets, to become competitive players in those markets and thus to improve their lives. Encourage other buyers of staple commodities including Governments and the private sector to also increasingly buy from smallholders.</p>	<ul style="list-style-type: none"> <li>• As the world's largest humanitarian agency, WFP is a major buyer of staple food. In 2010, WFP bought US\$1.25 billion worth of food – more than 80 percent of this in developing countries</li> <li>• Through P4P, WFP's demand provides smallholder farmers with a greater incentive to invest in sustainable production</li> </ul>	<ul style="list-style-type: none"> <li>• Since 2008, over 200 farmers' organizations contracted to sell food commodities to WFP</li> <li>• Over 65,000 farmers trained in organization management, sustainable farming techniques, quality control &amp; post harvest handling</li> <li>• By 2013, at least half a million smallholder farmers will have increased their agricultural production and earnings</li> </ul>
<b>WFP</b>	<p>Safe Access to Fuel and alternative Energy (SAFE) Initiative</p>	<p>Promote stoves that use less fuel-wood (wood or charcoal) and alternative energy such as briquettes (made of organic waste) in humanitarian settings for households and schools to protect and empower women; enhance access to food and education; conserve the natural resource base marginalized communities depend on; and reduce exposure to climate related extreme weather events; reduce health risks.</p>	<ul style="list-style-type: none"> <li>• Assessment of fuel and cooking needs in emergency and displacement settings</li> <li>• Provision of fuel-efficient stoves and alternative sources of fuel</li> <li>• Investment in sustainable natural resources for fuel, such as tree planting</li> <li>• Introduction of alternative livelihoods for women engaged in firewood gathering or charcoal production</li> <li>• Research on and introduction of adequate technologies</li> </ul>	<ul style="list-style-type: none"> <li>• WFP launched SAFE in Sudan's North Darfur region, Uganda, Haiti and Sri Lanka in 2010. The SAFE programme has reached a million beneficiaries in 2010-2011 and is planning to reach more than 5 million beneficiaries in the next few years</li> </ul>
<b>WIPO</b>	<p>WIPO Green</p>	<p>Sustainable Green Technology Marketplace</p>	<ul style="list-style-type: none"> <li>• A partnership hub to support the accelerated adaptation, adoption and deployment of environmental technologies with appropriate supporting services</li> </ul>	<ul style="list-style-type: none"> <li>• Lowering the barriers to green technology transfer, adaptation and diffusion, supporting developing country transitions</li> </ul>
<b>WIPO</b>	<p>WIPO Patentscope and Patent Landscapes</p>	<p>Programmes to provide access to technological knowledge in existing patent databases</p>	<ul style="list-style-type: none"> <li>• Web based tools to support access to knowledge which supports innovation and technology transfer (also offered through WIPO Technology and Innovation Support Centers)</li> </ul>	<ul style="list-style-type: none"> <li>• Lowering the barriers to green technology diffusion, supporting developing country transitions</li> </ul>

<b>WIPO</b>	SME Program	Program to support the use of Intellectual Property (IP) by SMEs	<ul style="list-style-type: none"> <li>University-industry partnerships around research results and related to the diffusion of technologies and the promotion of innovation through SMEs</li> </ul>	<ul style="list-style-type: none"> <li>Increased adaptation and adoption of green technologies and capacity building of the innovation and SME infrastructure</li> </ul>
<b>WMO</b>	Global Framework for Climate Services <a href="http://www.wmo.int/pages/gfcs/index_en.html">http://www.wmo.int/pages/gfcs/index_en.html</a> <a href="http://www.wmo.int/hlt-gfcs/index_en.htm">http://www.wmo.int/hlt-gfcs/index_en.htm</a>	Strengthen the provision and use of climate predictions, products and information worldwide	<ul style="list-style-type: none"> <li>Strengthened observations, research and information systems, as well as new interaction mechanisms for climate information users and providers</li> </ul>	<ul style="list-style-type: none"> <li>All sectors of society have user-friendly climate products that enable them to plan ahead in the face of changing climate conditions</li> </ul>

## Annex 2: UN programmes and initiatives supporting the social dimensions of a green economy

Implementing Agency/ Agencies	Title of the Programme/ Initiative	Objective	Modality of Support
<b>FAO</b>	Right to Food	Implementation of Voluntary Guidelines to support progressive realization of the right to adequate food in the context of national food security, adopted by FAO Council 2004	<ul style="list-style-type: none"> <li>Development of methods and instruments to assist stakeholders in the implementation of the right to food and preparation of information and training materials to raise awareness and understanding by rights holders, duty bearers, civil society and the general public</li> <li>Support to initial national implementation of the right to food at national level</li> </ul>
<b>FAO</b>	Voluntary Guidelines on Responsible Governance of Tenure of Land, Fisheries and Forests	International Agreement on Responsible Governance of Tenure of Land, Fisheries and Forests intended to assist States, civil society and private sector in improving the governance of tenure	<ul style="list-style-type: none"> <li>Voluntary guidelines to set out principles and internationally accepted standards for responsible practices. Provides a framework that States can use when developing their own strategies, policies, legislation and programmes.</li> <li>Guidelines currently discussed in the framework of the Committee on World Food Security will be finalized in 2012</li> </ul>
<b>FAO, (with several UN agencies)</b>	Globally Important Agricultural Heritage Systems (GIAHS)	International recognition, dynamic conservation and adaptive management of Globally Important Agricultural Heritage Systems and their agricultural biodiversity, knowledge systems, food and livelihood security and cultures throughout the world	<ul style="list-style-type: none"> <li>Pilot sites in several countries where dynamic conservation management approaches are developed and implemented.</li> <li>Support to national and local stakeholders in the conservation and adaptive management of the systems and their components</li> </ul>
<b>FAO</b>	Dimitra Project (Gender, rural women and development)	Improvement of the visibility of rural populations, women in particular so that their respective interests are better taken into consideration and they can fully participate in the rural development of their communities and countries	<ul style="list-style-type: none"> <li>Dissemination of information and exchange of experiences through participatory information and communication</li> <li>Networking of grassroots organizations and strengthening of their capacities and of personnel of relevant ministries in field of information, communication, gender, advocacy and networking</li> </ul>
<b>ILO and FAO</b>	Food, Agriculture & Decent Work	Combating hunger and poverty by promoting rural and agricultural development strategies that are sustainable, gender sensitive and equitable	<ul style="list-style-type: none"> <li>Improvement, in a balanced, participatory and equitable way, the main assets of the poor - their human, social, natural, physical and financial resources.</li> <li>Coordinated strategy to complement and enhance the work currently being carried out by each organization at international and national level on labour and agriculture and on rural development and promotion of rural work</li> </ul>

<b>ILO</b>	Green Jobs Programme	Assist countries in promoting green jobs in accordance with the decent work agenda, in dialogue with workers, employers and labour institutions	<ul style="list-style-type: none"> <li>• Country-level support through technical cooperation</li> <li>• Policy coherence at global subregional, national and local level</li> <li>• Capacity building, research and information on green jobs for workers, employers and labour institutions</li> <li>• Promoting dialogue and participation of the world of work actors in green economy policies</li> </ul>
<b>ITU-UNESCO</b>	Broadband Commission for Digital Development  <a href="http://www.broadband-commission.org/">http://www.broadband-commission.org/</a>	Demonstrate the value of Information and Communication Technologies (ICTs) as a basic green infrastructure to promote sustainable development and the acceleration of the Millennium Development Goals	<ul style="list-style-type: none"> <li>• Compile best practices at the global level in the use of fast-speed Internet networks (broadband) to promote the three pillars of sustainable development</li> <li>• Provide policy advice to expand access to ICT networks to all, in particular to underserved areas</li> <li>• Establish a multi-stakeholder advocacy platform to mobilize resources and political will to further develop ICT applications and infrastructure for poverty eradication and a sustainable future</li> </ul>
<b>ITU</b>	Green ICT Application Challenge  <a href="http://www.itu.int/ITU-T/climatechange/green-ict/index.html">http://www.itu.int/ITU-T/climatechange/green-ict/index.html</a>	Develop innovative ICT applications to promote the transition towards a green economy, build capacity and address social and environmental issues	<ul style="list-style-type: none"> <li>• Establish a multi-stakeholder network of developers in the area of green ICTs</li> <li>• Promote research and application development, with a focus on social and environmental issues</li> <li>• Mobilize resources for the implementation of applications and for sharing best practices with the global community</li> </ul>
<b>UNESCO</b>	Education for Sustainable Development  <a href="http://www.unesco.org/new/en/education/ed-resources/esd/decade-of-esd/">http://www.unesco.org/new/en/education/ed-resources/esd/decade-of-esd/</a>	ESD aims at changing the approach to education so that it integrates the principles, values and practices of sustainable development	<ul style="list-style-type: none"> <li>• Facilitate networking, linkages, exchange and interaction among stakeholders in ESD</li> <li>• Foster an increased quality of teaching and learning in education for sustainable development;</li> <li>• Help countries make progress towards and attain the Millennium Development Goals through ESD efforts</li> <li>• Provide countries with new opportunities to incorporate ESD into education reform efforts</li> </ul>
<b>UNESCO</b>	Technical, Vocational Education and Training (TVET)  <a href="http://www.unesco.org/new/en/education/themes/education-building-blocks/tvet/">http://www.unesco.org/new/en/education/themes/education-building-blocks/tvet/</a>	TVET helps learners acquire skills, knowledge and attitudes needed to develop professional careers and enter the world of work as well as active citizenship and lifelong learning.	<ul style="list-style-type: none"> <li>• Provide upstream policy advice and develop capacity at the country level</li> <li>• Facilitate conceptual clarification and improve the monitoring of TVET</li> <li>• Clearing house and coordinator of the global TVET debate</li> </ul>
<b>UNESCO</b>	Science and Technology Education  <a href="http://www.unesco.org/new/en/education/themes/strengthening-education-systems/science-and-technology/">http://www.unesco.org/new/en/education/themes/strengthening-education-systems/science-and-technology/</a>	Encourage the design of effective science and technology education programmes by promoting gender-sensitive, socio-culturally and environmentally relevant policies and curricula.	<ul style="list-style-type: none"> <li>• Promoting change in science teaching approaches, contents and methods within the framework of the Science of Quality for All aim by re-enforcing national capacities for curricular design and development</li> <li>• Facilitating research in order to improve Science Teacher Education by upgrading the skills of science teacher trainer</li> <li>• Strengthening networks of researchers and teachers in science for their continued professional growth and in order to contribute to improvement in science education</li> </ul>

- Contribute to up-dating in-service teachers in general within the framework of the Science of Quality for All programme to make teaching methods more innovative
- Assisting Member States in developing quality science teacher education materials to improve the teaching of science
- Enhancing science education among stakeholders by encouraging the participation of NGOs, Unions and Science Teachers' Associations in activities for Sciences of Quality for All

<p><b>UNESCO</b></p>	<p>Cultural Industries for poverty reduction and sustainable development</p> <p><a href="http://portal.unesco.org/culture/en/ev.php-URL_ID=35024&amp;URL_DO=DO_TOPIC&amp;URL_SECTION=201.html">http://portal.unesco.org/culture/en/ev.php-URL_ID=35024&amp;URL_DO=DO_TOPIC&amp;URL_SECTION=201.html</a></p> <p><a href="http://portal.unesco.org/culture/en/ev.php-URL_ID=39091&amp;URL_DO=DO_TOPIC&amp;URL_SECTION=201.html">http://portal.unesco.org/culture/en/ev.php-URL_ID=39091&amp;URL_DO=DO_TOPIC&amp;URL_SECTION=201.html</a></p>	<p>Strengthen the performance and competitiveness of the creative industries as a way of reducing poverty and promoting sustainable economic and social development.</p>	
<p><b>UNESCO</b></p>	<p>The power of culture for development</p> <p><a href="http://unesdoc.unesco.org/images/0018/001893/189382e.pdf">http://unesdoc.unesco.org/images/0018/001893/189382e.pdf</a></p> <p>Culture and development</p> <p><a href="http://www.unesco.org/en/culture-and-development-indicators/">http://www.unesco.org/en/culture-and-development-indicators/</a></p>	<p>Integrate cultural approaches that help to make poverty alleviation strategies highly relevant and more effective at the local level in that they respond to local specificities.</p> <p>UNESCO Culture and Development indicators initiative aims to establish a sound and coherent set of indicators that identifies and monitors the complex relationships between culture and development as well as the contribution of culture to development at a national level.</p>	<ul style="list-style-type: none"> <li>• Promoting culture as a means of reducing poverty and hunger, strengthening local systems of food production, promoting universal primary education, promoting gender equality and women's empowerment, improving maternal health and combat HIV and other diseases, promoting environmental sustainability, and promoting global partnerships</li> <li>• Culture and development indicators contribute to evidence based policy making</li> </ul>
<p><b>UNESCO</b></p>	<p>UNESCO Model Curricula for Journalism Education</p> <p><a href="http://portal.unesco.org/ci/en/ev.php-URL_ID=24824&amp;URL_DO=DO_TOPIC&amp;URL_SECTION=201.html">http://portal.unesco.org/ci/en/ev.php-URL_ID=24824&amp;URL_DO=DO_TOPIC&amp;URL_SECTION=201.html</a></p> <p>UNESCO Open Educational Resources Platform</p> <p><a href="http://opentraining.unesco-ci.org/cgi-bin/page.cgi?d1&amp;p=adaptlocalize">http://opentraining.unesco-ci.org/cgi-bin/page.cgi?d1&amp;p=adaptlocalize</a></p>	<p>Assist Member States in the design of journalism education curricula.</p> <p>Empower trainers or/and trainees with free resources, offer them a structured collaborative space to share their training but also to promote and value the "open" training materials, which are freely and openly accessible for trainers and self-learners to use and re-use for non commercial purposes such as teaching, learning and research.</p>	
<p><b>UN-Habitat</b></p>	<p>Cities and Climate Change Initiative</p> <p><a href="http://www.unhabitat.org/categories.asp?catid=550">http://www.unhabitat.org/categories.asp?catid=550</a></p>	<p>Enhance climate change mitigation and the preparedness of cities in developing countries, including localizing and making national adaptation and mitigation strategies more gender responsive and including more youth in related decision-making processes.</p>	<ul style="list-style-type: none"> <li>• Sensitization and training workshops which build the capacity of youth in adaptation and mitigation, with particular emphasis on disaster risk mitigation and entrepreneurship</li> <li>• Support to the formation of youth adaptation and mitigation groups which enables integration to city authorities' climate change response plans</li> </ul>

			<ul style="list-style-type: none"> <li>• Development of a toolkit for mainstreaming gender in climate change assessments</li> <li>• Policy advice on mainstreaming climate change in local government gender policies</li> </ul>
<b>UN-Habitat</b>	<p>Cities and Climate Change Academy</p> <p><a href="http://www.unhabitat.org/content.asp?typ eid=19&amp;catid=657&amp; cid=9317">http://www.unhabitat.org/content.asp?typ eid=19&amp;catid=657&amp; cid=9317</a></p>	Provide universities with resources to better address climate change in urban planning education.	<ul style="list-style-type: none"> <li>• An on-line facility allows specially-designed lecture sessions to be downloaded by universities</li> <li>• The complete package for each session contains a lecture/power point presentation, supplementary lecture notes, a reading list, case studies, suggestions for studio and seminar work</li> <li>• Lecture sessions are combined to constitute a complete semester (or term) course, which forms one course module of a post-graduate (or graduate) degree</li> </ul>
<b>UN-Habitat and WHO</b>	<p>Hidden Cities: Unmasking and Overcoming Health Inequities in Urban Settings</p> <p><a href="http://www.hiddencities.org">http://www.hiddencities.org</a></p>	Strengthen the response of the local, national and global health communities to reduce health inequities in an increasingly urbanized world.	<p>Global research that exposes the extent to which:</p> <ul style="list-style-type: none"> <li>• The urban poor suffer disproportionately from a wide range of diseases and health problems</li> <li>• The inequalities in their social and living conditions cause this vulnerability</li> <li>• Evidence-based information and tools to help municipal and health authorities tackle health inequities in their cities</li> </ul>
<b>UNITAR (with 30 UN Agencies)</b>	<p>UN CC: Learn – One UN Training Service Platform on Climate Change</p> <p><a href="http://www.uncclearn.org">www.uncclearn.org</a></p>	Support countries in developing a strategic approach to strengthen human resources and skills to advance green, low emission and climate resilient development.	<ul style="list-style-type: none"> <li>• Grant support for country-driven strategy development processes through multi-sectoral and multi-stakeholder collaboration</li> <li>• One UN collaboration at the global level and in pilot countries to support national processes</li> </ul>
<b>UNITAR (with UNEP)</b>	<p>E-Learning Course on a Green Economy</p> <p><a href="http://www.unitar.org/egp/">http://www.unitar.org/egp/</a></p>	Enhance the understanding of learners what is a green economy and related international and national policy concepts.	<ul style="list-style-type: none"> <li>• Technology-based-learning with certain number of fellowships provided to learners from developing countries</li> </ul>
<b>UNITAR</b>	<p>Capacity Development to Support Local Green Economy and Green Growth Strategies</p> <p><a href="http://www.unitar.org/ldp/">http://www.unitar.org/ldp/</a></p>	Support local authorities in self-assessing and developing capacities to promote the introduction of enabling environments for green economies at the local level, spur green technology transfer, and integrate greener production and consumption strategies within municipal planning.	<ul style="list-style-type: none"> <li>• Use of city-share methodology to foster knowledge-sharing across local authorities through south-south and triangular cooperation</li> </ul>
<b>UNITAR (with government and civil society partners)</b>	<p>Green Dreams ("Meu sonho verde") Campaign</p>	Participatory youth research and mapping of local "greening" priorities among citizens to rank local public priorities and match these with national/local leadership's investment in municipalities locally.	<ul style="list-style-type: none"> <li>• Coordination and funding support to scale campaign across various regions under the CIFAL Network (local governments partnership platform for regional training centres)</li> </ul>
<b>UNWTO</b>	<p>UNWTO's Capacity Building Programme on Indicators of Sustainability for Tourism Destinations</p> <p><a href="http://sdt.unwto.org/en/content/indicators-sustainability-tourism-destinations">http://sdt.unwto.org/en/content/indicators-sustainability-tourism-destinations</a></p>	<p>Improve capacities on indicators application of government officials at the national and local level, and of the tourism private sector.</p> <p>Mainstream sustainability in tourism policies and strategies.</p> <p>Make optimal use of environmental resources.</p>	<ul style="list-style-type: none"> <li>• A series of regional and national workshops using a demonstration technique and participatory approach at pilot destinations</li> <li>• Promoting the use of sustainable tourism as essential instruments for policy-making planning and management process at destinations</li> <li>• Major sustainability issues addressed range from the management of natural resources (waste, water, energy, etc.) to development control, satisfaction of tourist and host communities, preservation of cultural heritage, seasonality, economic leakages, and climate change</li> </ul>

			<ul style="list-style-type: none"> <li>• Engagement of national and local stakeholders</li> <li>• Facilitate the review and analysis of sustainable tourism policies and tools: principles and practice</li> </ul>
	<p>UNWTO's Sustainable Tourism-Eliminating Poverty (ST-EP) Initiative</p> <p><a href="http://www.unwto.org/step/index.php">http://www.unwto.org/step/index.php</a></p>	<p>Reducing poverty levels through developing and promoting sustainable forms of tourism. Focuses on enhancing the Organization's longstanding work to encourage sustainable tourism with activities that specifically alleviate poverty, delivering development and jobs to people living on less than a dollar a day.</p>	<ul style="list-style-type: none"> <li>• Within the framework of the ST-EP Initiative, a series of capacity-building and training activities have been conducted in matters related to poverty alleviation through sustainable forms of tourism. Since 2004, UNWTO has organized 24 ST-EP training seminars with the participation of over 2000 professionals from the public sector, private sector and civil society</li> <li>• One of the main objectives of the ST-EP initiative is to work with governments, NGOs, bilateral and multi-lateral organizations, businesses and the local communities to identify and support a wide range of projects which would clearly show a reduction in poverty through ST-EP tourism development. With support received from various donors, UNWTO is implementing a portfolio of 100 ST-EP projects, benefitting 33 developing countries in Africa, Asia, Latin America and the Middle East</li> </ul>
	<p>UNWTO /SNV Manual on Tourism and Poverty Alleviation – Practical Steps for Destinations</p> <p><a href="http://sdt.unwto.org/en/content/publications-1">http://sdt.unwto.org/en/content/publications-1</a></p>	<p>Contributes to the understanding of tourism as a tool for poverty alleviation and sustainable development.</p>	<ul style="list-style-type: none"> <li>• Outlines some practical steps that can be taken in tourism destinations to shape and manage tourism in ways that deliver more benefits to disadvantaged individuals and communities</li> <li>• Proposes the establishment of a tourism strategy and action plan which embraces pro-poor concerns and actions and provides guidance on planning monitoring and evaluation</li> <li>• Contains an indicative programme of training sessions, including hand-outs, using the material contained in the manual</li> </ul>
<b>UNWTO</b>	<p>UN Steering Committee on Tourism for development (SCTD): Innovative framework on Delivering as One for Tourism: Joint effort on tourism by nine UN entities (ILO, ITC, UNEP, UNDP, UNESCO, UNIDO, UNCTAD, UNWTO, WTO)</p> <p><a href="http://www2.unwto.org/en/event/promoting-tourism-sustainable-development-and-poverty-reduction">http://www2.unwto.org/en/event/promoting-tourism-sustainable-development-and-poverty-reduction</a></p>	<p>Assisting least developed countries (LDCs) and other developing countries to implement tourism for development, including tourism in the AID for Trade agenda.</p> <p>Mainstream sustainability in tourism policies and strategies Mobilize resources for Tourism.</p>	<ul style="list-style-type: none"> <li>• Reduce the poverty gap in LDCs</li> <li>• Increase trade in services (tourism) for LDCs</li> <li>• Increase sustainability and create jobs</li> </ul>
<b>WFP</b>	<p>Social protection for marginalized and food insecure communities.</p> <p>Social safety nets and public works/ food-for-assets programmes to enhance livelihoods of food insecure communities</p>	<p>Protect the most vulnerable from risks and empower communities to contribute and benefit from sustainable economic growth.</p> <p>Enhance rural community resilience to food insecurity by creating employment and income opportunities and enabling them to invest in land and water conservation, rehabilitation productive infrastructure and disaster risk management.</p>	<ul style="list-style-type: none"> <li>• Well-designed safety nets enable marginalized and food insecure people living in highly risk prone environments to invest in nutrition, health care and education, engage in sustainable income generating activities, and contribute to sustainable and inclusive economic growth. WFP reaches on average over 100 million people every year in the most vulnerable and at risk areas of the world, including 22 million children in more than 60 countries who receive school meals</li> <li>• In 2010, WFP supported more than 22.5 million people in almost 10,000 of the most food-insecure communities in the world, improving access to food and reducing risk through food-for-assets programmes that strengthen livelihoods by catalysing community-based processes</li> </ul>

<b>WFP</b>	<p>Purchase for Progress (P4P) initiative</p> <p><a href="http://www.wfp.org/purchase-progress">http://www.wfp.org/purchase-progress</a></p>	<p>Offer smallholder farmers opportunities to access agricultural markets, to become competitive players in those markets and thus to improve their lives. Encourage other buyers of staple commodities including Governments and the private sector to also increasingly buy from smallholders.</p>	<ul style="list-style-type: none"> <li>As the world's largest humanitarian agency, WFP is a major buyer of staple food. In 2010, WFP bought US\$1.25 billion worth of food – more than 80 percent of this in developing countries.</li> <li>Through P4P, WFP's demand provides smallholder farmers with a greater incentive to invest in sustainable production.</li> </ul>
<b>WHO</b>	<p>Systematic review of health co-benefits of 'green' economic policies in key sectors.</p> <p><a href="http://www.who.int/hia/green_economy/en/index.html">www.who.int/hia/green_economy/en/index.html</a></p>	<p>Comprehensively map evidence on co-benefits to health of green economic development in key economic sectors.</p>	<ul style="list-style-type: none"> <li>This initiative so far has covered: housing, transport, household energy, agriculture and health facilities. It also proposes synergies and strategies for the "best buy" for health and sustainability, by sector</li> </ul>
<b>WHO</b>	<p>Health and Environment Impact Assessment in new economic investments</p>	<p>Building capacity in countries in Africa to do health impact assessment (HIA) of new mining and mineral extraction plans, in order to identify health risks and opportunities linked to proposed new investments.</p>	<p>HIA helps identify:</p> <ul style="list-style-type: none"> <li>potential external health co-benefits</li> <li>different policy options</li> <li>improve the overall returns of investments</li> <li>support "win-win" scenarios.</li> </ul>
<b>WHO</b>	<p>Health Transport Indicators</p>	<p>Develop global, harmonized "indicators" to monitor and evaluate progress on health and sustainability in key sectors.</p>	<ul style="list-style-type: none"> <li>Indicators could be used to monitor, evaluate and improve green investments in sustainable transport systems, particularly bus rapid transit, cycling and walking systems</li> </ul>
<b>WHO</b>	<p>Guidelines for healthy and green sector policies</p>	<p>Develop global "healthy housing" guidelines.</p>	<ul style="list-style-type: none"> <li>Consider the environmental sustainability of the housing stock, in terms of energy efficiency and the climate friendly and resilient structure of dwellings as integral to "health"</li> </ul>
<b>WHO</b>	<p>Occupational health in the context of green jobs</p>	<p>Enable health systems to respond to new and/or changing demands from workers health of a green economy.</p>	<ul style="list-style-type: none"> <li>Equip health systems, in particular through primary health care services, with the tools and means to identify and address Occupational Health risks affected by these new activities. For example, which might result from a growth in the number of workers in the agriculture sector, or because of the emergence of new threats to health emanating from new "green" technologies</li> <li>Enable more effective health systems responses with preventive (workplace settings based), curative and health (health facility based) promoting measures</li> </ul>
<b>WHO</b>	<p>WHO / Global Initiative on clean household energy</p>	<p>Develop adaptive mitigation in the housing and household energy sectors.</p>	<ul style="list-style-type: none"> <li>Technical support for the piloting, testing, and evaluation for scale up of low-carbon household energy solutions in developing countries, including very efficient biomass stoves and potentially carbon neutral biogas, or other renewable fuels</li> <li>Development of indoor air quality guidelines in the household energy context of developing countries</li> <li>Tools for field evaluation and large population/ epidemiological quantification of health impacts of household energy systems</li> <li>Sustainability in water and sanitation systems (UN Water-WHO), district water resource planning, green health waste disposal, healthy use of grey water and dry latrines</li> </ul>

<b>WHO</b>	Greening the Health Sector	Addresses five key areas: energy efficiency and renewable supply, climate friendly and resilient buildings, safe and energy efficient water supply and use, low-carbon procurement/transport and greener, safer use of chemicals. Provides technical support to countries for rapid facility assessment; energy audit tools and guidance; policies for carbon financing health facility improvements; identification of combined health and economic benefits from specific greening measures; advocacy and communications platforms; and pilot projects.	<ul style="list-style-type: none"> <li>• Health care waste disposal: WHO is eg co-partnering with the University in Tanzania in a GEF-funded project to design and test a solar-powered autoclave that would provide a green alternative to incineration for health care solid waste sterilization/disposal. Conventional incineration of health care waste not only generates CO<sub>2</sub> but releases dioxins and other air pollutants harmful to health and climate. Autoclaved waste, on the other hand, can be safely buried without risk of infectious pathogens reaching water supplies, ecosystems or human populations</li> <li>• In the area of renewable energy for the health sector, and energy poverty, WHO is providing technical and communications support for the piloting, testing and evaluation of small, modular, PV solar "suitcases" to provide basic electricity to off-grid health care facilities. The pilot will also examine the specific impacts improved electricity supply has on health service delivery, particularly for maternal delivery (WHO /Liberian Biomedical Research Institute)</li> </ul>
------------	----------------------------	---	---

### Annex 3: Select UN regional programmes and initiatives supporting “the green economy in the context of poverty eradication” as core theme of the UNCSD 2012

Implementing Agency/ Agencies	Title of the Programme/ Initiative	Objective	Modality of Support
UNECA	Committee on Food Security and Sustainable Development	Provides policy guidance for UNECA subprogramme on Food Security and Sustainable Development.	<ul style="list-style-type: none"> <li>• Meets biennially as a forum for the promotion of cooperation, information exchange and experience sharing in various fields of sustainable development</li> <li>• Convenes Africa regional preparatory meetings for Rio+20</li> </ul>
UNECA and UNEP / AMCEN	African Ministerial Conference on the Environment (AMCEN) - Green Economy in Africa	Permanent Forum for African Ministers of the Environment to discuss policy matters, incl support for NEPAD and African Union (AU).	<ul style="list-style-type: none"> <li>• Policy statements and reports, eg regional Environmental Outlook Report, MDG Report</li> <li>• AMCEN Decision on Green Economy in the Context of Africa (2011)</li> </ul>
UNECA and AUC	Joint Annual Meetings of AU Conference of Ministers of Economy and Finance and UNECA Conference of Ministers of Finance, Planning and Economic Development	Annual ministerial dialogue on development issues and related challenges in Africa.	<ul style="list-style-type: none"> <li>• Ministerial Declaration of 4th Joint Annual Meeting of AU Conference of Ministers of Economy and Finance and UNECA Conference of African Ministers of Finance, Planning and Economic Development - expressed commitment to Green Economy transition (2011).</li> <li>• Economic Report on Africa 2011, with a section on the green economy in African context</li> </ul>
UNECE	Environmental Performance Review (EPR) Programme	Monitor the environmental performance and progress in transitioning toward the green economy of ECE member countries in the Caucasus, Central Asia, and Eastern and South-Eastern Europe.	<ul style="list-style-type: none"> <li>• Country reviews, with the third cycle of EPRs due to examine relevant policy and legal aspects of the green economy initiatives in the reviewed countries. It will examine the role of economic and fiscal policies in promoting greener modes of consumption and production. In the case of sectors with considerable potential for greening the economy, analysis will be extended to discuss how policies in the specific sectors are directed towards greening</li> <li>• Joint Task Force on Environmental Indicators reviews indicators covered by the Guidelines for the Application of Environmental Indicators in Eastern Europe, the Caucasus and Central Asia (the Indicator Guidelines)</li> </ul>

<b>UNECE</b>	Energy Efficiency 21 Programme	Facilitate the transition to a more sustainable and secure energy future by improving energy efficiency and conservation.	<ul style="list-style-type: none"> <li>• Its Global Energy Efficiency project aims to create a systematic exchange of information on capacity-building, policy reform and project financing in energy sector across all five UN regional commissions</li> </ul>
<b>UNECLAC (lead, with collaboration with up to 20 agencies)</b>	The Millennium Development Goals (MDGs): A Latin America and Caribbean Perspective	Systematic review of progress and gaps in the fulfillment of the MDGs in Latin America and the Caribbean.	<ul style="list-style-type: none"> <li>• Periodic comprehensive assessment that addresses progress, gaps and previews strategic guidelines and policy options for governments in the region for successful achievement of the MDGs</li> <li>• Accompanied by in-depth reviews of each specific goal, its targets and indicators</li> </ul>
<b>UNECLAC (lead, with more than 20 agencies)</b>	Sustainable Development in Latin America and the Caribbean 20 years after the Earth Summit: progress, gaps and strategic guidelines	Systematic review of progress, gaps, and strategic guidelines in the fulfillment of the commitments emanating from the UNCED (1992) in Latin America and the Caribbean.	<ul style="list-style-type: none"> <li>• Diagnosis of the sustainable development situation, including progress and gaps of the implementation over the last 20 years</li> <li>• Production of strategic guidelines to support the deliberations on the green economy at the UNCSL</li> </ul>
<b>UNESCAP (with UNEP, ILO, UNPOG and non-UN partners such as KOICA, UK Government)</b>	Green Growth Capacity Development Programme	Provide support to policy makers to design, develop and implement green growth policies and tools.	<ul style="list-style-type: none"> <li>• More than 500 policy makers made aware and trained through regional policy dialogues, training of trainers and national seminars to understand, design, develop and apply green growth policies, strategies, roadmaps, and various tools and mechanisms</li> <li>• Training manuals and e-Learning tools developed, and On-line e-Learning Facility launched, green growth portal established since 2006</li> </ul>
<b>UNESCAP (with KOICA and GGGI)</b>	Low Carbon Green Growth Roadmap	Provide support to government officials in developing and implementing policies and tools for low carbon green growth.	<ul style="list-style-type: none"> <li>• Comprehensive set of policy options and guidelines for implementation, and a roadmap how to develop and implement low carbon green growth policies being prepared</li> </ul>
<b>UNESCAP (with UNECE, other UN Agencies and Government of Kazakhstan)</b>	Astana Green Bridge Initiative (AGBI): Europe-Asia-Pacific Partnership for Green Growth	Facilitate establishment of a Europe-Asia-Pacific partnership that will outline the blueprints for a shift from the current conventional development patterns to green growth.	<ul style="list-style-type: none"> <li>• Provide overall substantive and coordination support for the development of various elements of the implementation mechanism of the AGBI</li> </ul>
<b>UNESCWA</b>	Opportunities for Small and Medium-Sized Enterprises (SMEs) in the Environmental Goods and Services (EGSs) Sector	Review of Business Opportunities for SMEs in main EGS Sectors to assess the practical involvement and role of the private sector including target industries in the green economy.	<ul style="list-style-type: none"> <li>• Diagnosis of the EGS market in ESCWA region</li> <li>• Production of the Report on SMEs</li> <li>• Raise awareness of necessity for countries in the region to produce Environmental Accounts and reliable databases</li> </ul>

## Abbreviations and Acronyms

<b>ADB</b>	Asian Development Bank
<b>AfDB</b>	African Development Bank
<b>BWIs</b>	Bretton Woods Institutions
<b>CBD</b>	Convention on Biological Diversity
<b>CDM</b>	Clean Development Mechanism
<b>CEFPF</b>	Clean Energy Financing Partnership Facility
<b>CO<sub>2</sub></b>	Carbon Dioxide
<b>CSIRO</b>	Commonwealth Scientific and Industrial Research Organisation
<b>DFI</b>	Development Finance Institution
<b>DPSIR</b>	Drivers – Pressure – State – Impact – Response
<b>EBRD</b>	European Bank for Reconstruction and Development
<b>EGSs</b>	Environmental Goods and Services
<b>EGSS</b>	Environmental Goods and Services Sector
<b>EIB</b>	European Investment Bank
<b>EIF</b>	European Investment Fund
<b>EMG</b>	Environment Management Group
<b>ENRM</b>	Environmental and Natural Resource Management
<b>ESD</b>	Education for Sustainable Development
<b>ESG</b>	Environmental, Social and Governance
<b>ESTs</b>	Environmentally Sound Technologies
<b>ETS</b>	Emissions Trading Scheme
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>FI</b>	Finance Initiative
<b>GATT</b>	General Agreement on Tariffs and Trade
<b>GDP</b>	Gross Domestic Product
<b>GEF</b>	Global Environment Facility
<b>GGND</b>	Global Green New Deal
<b>GHG</b>	Greenhouse Gas
<b>GRI</b>	Global Reporting Initiative
<b>ICAO</b>	International Civil Aviation Organization
<b>ICT</b>	Information and Communication Technology
<b>IDB</b>	Inter-American Development Bank
<b>IEA</b>	International Energy Agency
<b>IFC</b>	International Finance Corporation
<b>IIASA</b>	International Institute for Applied Systems Analysis
<b>ILO</b>	International Labour Organization
<b>IMF</b>	International Monetary Fund
<b>IMO</b>	International Maritime Organization
<b>IPC</b>	International Patent Classification
<b>ISO</b>	International Organization for Standardization
<b>ITU</b>	International Telecommunication Union
<b>JPOI</b>	Johannesburg Plan of Implementation
<b>JPOI</b>	Johannesburg Plan of Implementation
<b>KfW</b>	Kreditanstalt für Wiederaufbau / German Development Bank

<b>LAC</b>	Latin America and the Caribbean
<b>MDB</b>	Multilateral Development Bank
<b>MDGs</b>	Millennium Development Goals
<b>MEA</b>	Multilateral Environment Agreement
<b>NCAR</b>	National Center for Atmospheric Research
<b>NGO</b>	Non-governmental Organization
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>PA</b>	Protected Area
<b>PECC</b>	Special Program for Climate Change (SPCC – PECC)
<b>PFM</b>	Public Financing Mechanism
<b>PNNL</b>	Pacific Northwest National Laboratory
<b>POP</b>	Persistent Organic Pollutant
<b>PRI</b>	Principles for Responsible Investment
<b>RDI</b>	Research, Development and Innovation
<b>REDD</b>	Reducing Emissions from Deforestation and forest Degradation
<b>SCC</b>	Social Cost of Carbon
<b>SCM</b>	WTO Agreement on Subsidies and Countervailing Measures Agreement
<b>SCP</b>	Sustainable Consumption and Production
<b>SEEA</b>	United Nations System of Environmental-Economic Accounting
<b>SEI</b>	Sustainable Energy Initiative
<b>SMEs</b>	Small and Medium-sized Enterprises
<b>SNA</b>	System of National Accounts
<b>TBT</b>	Technical Barriers to Trade
<b>UNCCD</b>	United Nations Convention to Combat Desertification
<b>UNCSD</b>	United Nations Conference on Sustainable Development
<b>UNCT</b>	United Nations Country Team
<b>UNCTAD</b>	United Nations Conference on Trade and Development
<b>UNDG</b>	United Nations Development Group
<b>UNDP</b>	United Nations Development Programme
<b>UNECE</b>	United Nations Economic Commission for Europe
<b>UN-ECLAC</b>	United Nations Economic Commission for Latin America and the Caribbean
<b>UNEP</b>	United Nations Environment Programme
<b>UN-ESCAP</b>	United Nations Economic Commission for Asia and Pacific
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>UN-HABITAT</b>	United Nations Human Settlements Programme
<b>UNIDO</b>	United Nations Industrial Development Organization
<b>UNWTO</b>	World Tourism Organization
<b>WAVES</b>	Wealth Accounting and Valuation of Ecosystems
<b>WHO</b>	World Health Organization
<b>WIPO</b>	World Intellectual Property Organization
<b>WMO</b>	World Meteorological Organization
<b>WSSD</b>	World Summit on Sustainable Development
<b>WTO</b>	World Trade Organization

# Acknowledgements

## UN Entities

## Authors

## Contributors

Food and Agriculture Organization (FAO)		Stéphane Jost, Alexander Müller, Noemi Nemes, Nadia Scialabba
International Atomic Energy Agency (IAEA)		Maria Betti, Christopher Kavanagh
International Civil Aviation Organization (ICAO)		Lorenzo Gavilli
International Labour Organization (ILO)	Ana Bélen Sanchez	Marek Harsdorff, Kees van der Ree
International Maritime Organization (IMO)		Karin Sjölin Frudd
International Monetary Fund (IMF)	Ruud De Mooij	Benedict J. Clements, Elliott C. Harris
International Telecommunication Union (ITU)		Cristina Bueti, Jose Maria Diaz Batanero, Gary Fowlie, Vadim Nozdrin, Beatrice Pluchon, Anna Tzanaki
International Trade Centre (ITC)		Alexander Kasterine
Secretariat of the Basel Convention		Matthias Kern
Secretariat of the Convention on Biological Diversity (CBD)		Markus Lehmann
Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)		Juan Carlos Vasquez, Marceil Yeater
Secretariat of the United Nations Chief Executives Board (CEB)		Yasin Samatar
Secretary of the Intergovernmental Panel on Climate Change (IPCC)		Renate Christ
The United Nations Relief and Works Agency for Palestine Refugees in the Near East		Robert Stryk
United Nations Children's Fund (UNICEF)		Rhea Saab
United Nations Conference on Trade and Development (UNCTAD)	Robert Hamwey	Lucas Assuncao, Sophia Twarog
United Nations Convention to Combat Desertification (UNCCD)		Sergio Zelaya
United Nations Department of Economic and Social Affairs, Division for Sustainable Development (UNDESA/DSD)	David O'Connor, Marianne Schaper	Alessandra Alfieri, Tariq Banuri
United Nations Development Programme (UNDP)	Usman Iftikhar, Anne Marie Sloth Carlsen, Maude Veyret-Picot	Dima Al-Khatib, George Bouma, Seon-Mi Choi, Cristina Colon, Ngone Diop, Yannick Glemarec, Leo Horn-Phathanothai, Nicole Igloi, Selim Jahan, Pradeep Kurukulasuriya, Shantanu Mukherjee, Maria Nyholm, Eric Patrick, Paul Steele, Veerle Vandeweerd, Yanchun Zhang
United Nations Economic and Social Commission for Asia and Pacific (ESCAP)		Masakazu Ichimura, Aneta Slaveykova Nikolova
United Nations Economic and Social Commission for West Asia (ESCWA)		Fidele Byiringiro, Roula Majdalani, Riccardo Mesiano
United Nations Economic Commission for Africa (UNECA)		Josue Dione
United Nations Economic Commission for Europe (UNECE)	Laura Altinger	Marco Keiner, Monika Linn

United Nations Economic Commission for Latin America and the Caribbean (ECLAC)

Hugo Altamonte, Omar Bello, Sebastian Herrerros, Ricardo Jordan, Marcelo Lefleur, Carlos de Miguel, Heather Page, Joseluis Samaniego, Marcia Tavares

United Nations Educational, Scientific and Cultural Organization (UNESCO)

Clare Stark

Nada Al Hassan, Anatheia Brooks, Borhene Chakroun, Peter Dogse, Matthias Eck, Keith Holmes, Natarajan Ishwaran, Francois Langlois, Dominique Larochele, Iulia Nechifor, Krista Pikkat, Mark Richmond, Caroline Siebold

United Nations Environment Programme (UNEP)

Paul Clements-Hunt, Derek Eaton, Marenglen Gjonaj, Moustapha Kamal Gueye, Cornis van der Lugt, Desta Mebratu, Sheng Fulai

Ivar Baste, J. Christophe Bouvier, Hossein Fadaei, Aniket Ghai, Arab Holballah, Leigh-Ann Hurt, Sylvie Lemmet, Julie Marks, Asad Naqvi, Julie Nevski, Benjamin Simmons, Guido Sonnemann, Steven Stone, Derrick Waithanje, Wu Yitong

United Nations Framework Convention on Climate Change (UNFCCC)

Yolando Velasco

United Nations Global Compact

Carrie A. Hall, Georg Kell

United Nations Human Settlements Programme (UN-HABITAT)

Andrew Rudd

United Nations Industrial Development Organization (UNIDO)

Sarena Arshad, George Assaf, Rene van Berkel, Ralf Bredel, Giuseppe De Simone, Hedda Femundsenden, Sam Hobohm, Heinz Leuenberger, Eun Mee Lee, Marina Ploutakhina

United Nations Institute for Training and Research (UNITAR)

Achim Halpaap

United Nations Population Fund (UNFPA)

Michael Herrmann

United Nations Regional Commissions

Marianne Fay, Ari Huhtala

Srinivas Tata

World Bank

Yuvan Beejadhur, Glenn-Marie Lange, Robin Mearns, Helena Naber, Jean-Louis Racine, Mike Toman, David Treguer

World Food Programme (WFP)

Carlo Scaramella, Catherine Zanev

World Health Organization (WHO)

Elaine Ruth Fletcher, Marina Maiero

Diarmid Campbell-Lendrum, Carlos Dora

World Intellectual Property Rights Organization (WIPO)

Joe Bradley

World Meteorological Organization (WMO)

Christian Blondin

World Tourism Organization (UNWTO)

Luigi Cabrini, Sofia Gutiérrez, Marcel Leijzer, Samiti Siv

World Trade Organization (WTO)

Vivien Liu-Chan Wai Chun, Patrick Rata

## Non-UN Entities

Inter-American development Bank (IDB)

Carlos Ludena

Organization for Economic Co-operation and Development (OECD)

Nils-Axel Braathen, Nathalie Girouard, Elianna Konialis, Helen Mountford

Zoï Environment Network

Carolyne Daniel, Geoff Hughes, Otto Simonett





**Green Economy** – This report is the result of a collective effort by more than forty UN entities, the Bretton Woods Institutions and other inter-governmental bodies. It offers a shared understanding of green economy as an approach to sustainable development and poverty eradication. It highlights the importance of investment in not only the green transformation of our economic structures but also the construction of an inclusive and equitable society. The policy advice in the report covering financing, full cost pricing, regulatory instruments, sustainable trade and green markets, innovation and technology, and indicators of transformation should be of interest to anyone seeking practical solutions to the multiple challenges facing humanity today.

**UN system contributors:** (FAO), (IAEA), (ICAO), (ILO), (IMO), (IMF), (ITU), (ITC), Secretariat of the Basel Convention, (CBD), (CITES), (CEB), (IPCC), The United Nations Relief and Works Agency for Palestine Refugees in the Near East, (UNICEF), (UNCTAD), (UNCCD), (UNDESA/DSD), (UNDP), (ESCAP), (ESCWA), (UNECA), (UNECE), (ECLAC), (UNESCO), (UNEP), (UNFCCC), United Nations Global Compact, (UN-HABITAT), (UNIDO), (UNITAR), (UNFPA), United Nations Regional Commissions, World Bank Group, (WFP), (WHO), (WIPO), (WMO), (UNWTO), (WTO).



INDUSTRIALISATION  
PROCESS



**The Environment Management Group (EMG)** is a United Nations (UN) System-wide coordination body. It furthers inter-agency **Cooperation** in support of the implementation of the international environmental and human settlement agenda. Its **Membership** consists of the specialized agencies, programmes and organs of the United Nations including the secretariats of the Multilateral Environmental Agreements. It is chaired by the Executive Director of United Nations Environment Programme (UNEP) and supported by a secretariat provided by UNEP. More information on the EMG can be found at [www.unemg.org](http://www.unemg.org).



UNITED NATIONS

