OECD Green Growth Studies

Putting Green Growth at the Heart of Development

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BETTER POLICIES FOR BETTER LIVES

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Foreword

Seven billion people inhabit the world today. By 2050, this number will rise to 9 billion, bringing with it growing demands for food, water and energy. In our increasingly resource-constrained world, the resilience of social and environmental systems is being tested, despite growing economic wealth. Only by putting in place policies that provide for sustainable and inclusive growth can we address these challenges.

Putting Green Growth at the Heart of Development addresses the question: what type of growth can generate both wealth and well-being for all citizens of current and future generations, while at the same respecting the environment? The report proposes a twin-track approach to guide national and international action to support green growth in developing countries. It builds on a growing number of successful practices from across the world and highlights lessons learned.

The examples and cases described in the publication present a clear and hopeful message: the pursuit of green growth by developing countries is vital for their future and can lead to large economic and social benefits over time, including for the poorest citizens. For example, the study concludes that as many as 25 to 50 million low-income households in developing countries could benefit from sustainable management of natural forests. Green taxes – largely untapped in developing countries – could also sustain the use of natural resources as well as economic growth, while creating revenues for government budgets that can be used to fund other development priorities. Reforms of fossil fuel subsidies could encourage efficient energy use and level the playing field for clean energy, while freeing up large amounts of public funding for other public policy priorities, such as education and health care. In another example, the report points out that rapidly growing demand for organic agriculture offers developing countries both domestic and export market opportunities.

The challenge is to waste no time in embarking on this transformative journey. An urgent goal will be to manage the difficult trade-offs between short-term demands and longer-term impact, and the need to make choices that will deliver a more stable and sustainable future while also securing immediate gains. At the national level, the report identifies as key elements of a good green growth strategy the existence of strong leadership, the establishment of platforms for strong public and private stakeholder engagement, and the integration of green growth into specific policy packages. At the international level, co-operation can provide essential support to developing countries in managing their transition to green growth, through targeted development finance, strengthened international trade in green goods and services, and technological support to boost the pace of green innovation and tailor it to local needs.

Integrating economic and environmental policies is easy to speak of, but harder to put in place. Instilling change takes real leadership, a shared vision for the future, and a solid commitment over time to cooperate across ministries and levels of government on this

agenda. The international community must work hand-in-hand with developing countries to foster green growth. This report demonstrates the benefits of making this a priority to ensure better policies for better lives.

Angel Gurría
OECD Secretary-General

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This book has...

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Acronyms and abbreviations

CDM	Clean Development Mechanism
CO_2	carbon dioxide
CO_2eq	carbon dioxide equivalent
CRS	Creditor Reporting System (OECD)
DAC	Development Assistance Committee (OECD)
EITI	Extractive Industry Transparency Initiative
EU	European Union
FDI	foreign direct investment
GEF	Global Environment Facility
GGGI	Global Green Growth Institute
IIED	International Institute for Environment and Development
IPR	intellectual property rights
MFP	multifactor productivity
NCSD	National Council for Sustainable Development
NSDS	National Strategies for the Development of Statistics
ODA	official development assistance
ODF	official development finance
PCD	policy coherence for development
PEER	public environmental expenditure review
PES	payments for ecosystem services
PPP	public-private partnership
PPP	purchasing power parity
R&D	research and development
REDD	Reducing Emissions from Deforestation and Forest Degradation
RMB	Renminbi (Chinese currency)
RMC	raw material consumption
SEA	strategic environmental assessment
SEEA	System of Environmental-Economic Accounting

SMEs	small and medium enterprises
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollar
WTO	World Trade Organization

Executive summary

Green growth: A way forward for developing countries

The environmental risks faced by developing countries today call for a radical shift in how we view growth and development. These risks are driven by unsustainable natural resource exploitation; lack of sufficient food, freshwater and energy; deadly air and water pollution; rural poverty; and high vulnerability to climate change impacts. Environmental risks in developing countries are exacerbated by other development challenges, including inequality and poverty, rapid population growth and urbanisation, lack of basic infrastructure and poor access to services such as health care. In the face of these severe challenges and their high costs for national economies, developing countries have begun to explore new models of growth that can boost development, help reduce poverty and improve quality of life in the short term while preserving natural assets and raising the potential for economic growth over the long term. Green growth is such an approach; it integrates environmental considerations and the value of natural capital into economic decision making and development planning. Embracing green growth can secure a strong, stable and sustainable future for developing countries.

This book outlines a twin-track agenda for national and international action to help achieve green growth in developing countries. Its aim is to assist governments interested in pursuing green growth in their own countries, or supporting it in others. It draws on extensive consultations with developing countries and international stakeholders, which provided a forum for discussing questions and concerns around the concept of green growth. The book surveys developing countries' experience to focus on the development policy dimensions of green growth. It is a companion piece to the 2011 *OECD Green Growth Strategy* and targets policy makers in both developing and developed countries.

Why is green growth vital for the future of developing countries?

Governments that put green growth at the heart of development can achieve sustainable economic growth and social stability, safeguard the environment and conserve resources for future generations. This is particularly true for developing countries because of their acute exposure and vulnerability to environmental risks such as air, water and soil pollution and climate change, as well as their reliance on natural resources for economic growth. It is also in the interest of the development co-operation community because green growth is a cost-effective way to bring more profound and lasting sustainable development. The links between environmental performance, equity and poverty are more direct and significant in developing countries than in developed countries. Development that is not based on green growth may lead to prosperity, but only in the short term, and will soon be undermined by insecurity and vulnerability.

The benefits of green growth to developing countries include:

- Sustainably managed natural assets on which to build growth and human well-being.
- Reduced poverty, depending on the design of policies for green growth and complementary measures, which will affect how the benefits and costs of development are distributed. When green growth policies are designed to take into account the interests of the poor and of vulnerable groups, they can have profound impacts on poverty reduction and social equity.
- New economic growth opportunities and potentially new job opportunities, particularly through ecosystem service provision, technological innovation and new markets for green goods and services.
- Resilient infrastructure that does not lock countries into fossil-fuel based energy and emission-intensive pathways and vulnerability.
- Greater access to clean water and sanitation services, diverse energy supplies and greater energy security, accompanied by lower pollution and greenhouse gas emissions.
- More secure livelihoods for those dependent on sustainable management of natural resources such as agricultural land and fertile soil, fisheries and forests.

How can developing countries shift to green growth?

While an increasing number of developing countries are implementing innovative policies to pursue green growth, these efforts are recent and limited in scope. Such efforts will need to be scaled up and broadened significantly to improve economic and environmental outcomes across the developing world. For this, developing countries will need to take full ownership of this transformative agenda. There is an opportunity to exploit untapped potential to use green growth policy reforms to boost domestic fiscal revenues and attract quality investment for years to come. Governments will need to mobilise ministries of finance, development planning, labour affairs and line ministries to mainstream green growth objectives and policies into every government department and most importantly, national budgets. A practical three-step agenda for action, which should be treated as a guide rather than a blueprint, can help to guide developing country policy makers as they explore and pursue green growth policies:

1. establish leadership, set a vision and plan for green growth, including integrating green growth considerations into existing planning processes, such as national development plans and budgetary systems;
2. design, reform and implement policies to broadly value natural assets and align incentives with green growth policy goals; and
3. strengthen governance and develop the capacity and resources needed for learning and sound decision making to implement, measure progress, monitor and enforce green growth policies effectively.

How can international co-operation support green growth in developing countries?

Successfully shifting to a model of growth that sustains natural assets over time will require the engagement of all countries. The international community can play a crucial role in helping developing countries make the shift, especially by providing assistance to manage the short-term trade-offs of going "green". Recognising developing country concerns that implementing green growth could be expensive, international co-operation can also ensure access to external sources of green financing. An agenda for action for international co-operation will be built on at least three pillars:

1. strengthening green finance and investment, including through better targeting of official development assistance (ODA) and other types of official development finance, and promoting private investment;
2. promoting green technology innovation through co-operation and building capacity for endogenous green innovation and adoption, as well as through protection of intellectual property rights and enabling conditions for successful technology transfer; and
3. facilitating trade in green goods and services through fostering international markets, removing tariff and non-tariff trade barriers, and building capacity in developing countries to allow more producers and consumers to participate and benefit from growing international markets.

These pillars will have greatest success when built within the context of capacity development; coherent policy choices both in developed and developing countries; the implementation of and financing from multilateral environmental agreements; and supportive and informative international partnerships.

How to measure progress towards green growth?

Measuring progress is an integral component of any national or international green growth policy. Without a measurement agenda or robust statistics, countries will not know whether they are making progress towards their green growth objectives. Measuring progress on green growth will be underpinned by use of the System of Environmental-Economic Accounting (SEEA), which was adopted by the United Nations Statistical Commission in 2012 to integrate statistics on the environment and its relationship to the economy into the core of statistics on national accounts. The OECD has developed a green growth measurement framework proposing indicators in four areas, reflecting the main features of green growth: (1) the environmental and resource productivity of the economy; (2) the natural asset base; (3) the environmental dimension of quality of life; and (4) the economic opportunities and policy responses. Socio-economic indicators to assess the context and characteristics of growth are a fifth area of measurement that is particularly important in developing countries. The international community is now also moving ahead – notably through a partnership between the Global Green Growth Institute (GGGI), the OECD, United Nations Environment Programme (UNEP) and the World Bank – to adopt a common framework for measuring progress on green growth. These international organisations are working with developing countries to strengthen their capacity to measure progress towards green growth, and some developing countries are already implementing a green growth measurement framework.

Seizing green growth opportunities

This book presents the many benefits of green growth. Now is the time to seize the opportunity and start to deliver these benefits on a large scale. The international community is working towards a new development framework, and this will incorporate sustainable development goals (SDGs) as agreed at the United Nations Conference on Sustainable Development in 2012 (Rio+20). Green growth is emerging as a guiding framework for delivering these goals and for scaling up efforts to achieve sustainable development. Green growth is not a luxury – it is a way of delivering sustainable development and global security for all.

Chapter 1

Understanding the development dimension of green growth

Developing countries face numerous challenges that together call for an alternative model of growth that can improve quality of life in the near term, without undermining it over the long term. Green growth can address these challenges and avoid locking countries into resource-inefficient, costly and environmentally damaging infrastructure or production and consumption patterns. This chapter explains the concept of green growth and its role as a means to achieve sustainable development. It explores developing countries' views and concerns about what green growth can deliver for their national development objectives and discusses the potential political challenges, trade-offs and short-term transitional costs of going "green".

The resilience of a wide range of socio-economic and environmental systems is in question today in the struggle to support the needs of a rapidly growing global population and increased levels of economic activity. This includes meeting the energy, food and water needs of 9 billion people by 2050 and ensuring that they have clean and healthy living environments (OECD, 2012a). In the 20th century, the world population multiplied by four, economic output by 22 and fossil fuel consumption by 14 (UNEP, 2011). Though global GDP climbed at a steady rate between 1971 and 2010, a wide gap still remains between the developed and the developing world, and the gap between the richest and the poorest is growing in both (UNCTAD, 2012; OECD, 2012a). The current growth model is not sufficient to provide the quality of life desired by all human beings (World Bank, 2012).

Developing countries are being affected by increased stress on natural resources and the environment. Failing to adjust economic growth to limit environmental risks, brings large costs and potentially irreversible consequences (OECD, 2012b). Inaction could lead to an additional 1 billion people living in severely water-stressed areas by 2030, and a decline in global terrestrial biodiversity of an additional 10%, accompanied by a loss of essential ecosystem services. It would also imply about a 50% increase in greenhouse gas emissions by 2050 and global mean temperature increases of 3-6 degrees Celsius by the end of the century. Failing to limit climate change will also lead to more severe and frequent natural disasters, and will hit developing countries particularly hard. This will further threaten water security, the livelihoods of poor people and agricultural productivity. The Intergovernmental Panel on Climate Change (IPCC) warns that projected reductions in crop yield in some African countries could be as much as 50% by 2020 and crop net revenues could fall by as much as 90% by 2100 due to changes in climate patterns and associated extreme weather events (IPCC, 2007). Yet the UN Food and Agriculture Organization (FAO) estimates the need to increase by 50 to 70% global food production by 2050 to take into account population growth in developing countries and the change of consumption patterns in emerging economies (FAO, 2009).

Beyond this, growing levels of dangerous air emissions from transport and industry will threaten human health in rapidly growing cities across the developing world. Particulate matter is already surpassing malaria as a global killer. Without new pollution control measures, premature deaths due to particulate matter are estimated to more than double from today's levels to 3.6 million a year by 2050, and most of this increase is expected to occur in emerging economies such as China, India and Indonesia (OECD, 2012b).

Sustaining and enhancing natural assets – the wealth of poorer countries – achieves development objectives and addresses inequality. Green growth represents a fundamental shift away from the traditional economic growth model: it considers the environment to be fundamental to economic growth and development. Green growth can improve the resilience of developing economies by reducing the risk of negative shocks to growth from resource bottlenecks or imbalances in natural systems. It can open up new sources of income and tax revenues, employment and opportunity from innovation, and the emergence of green goods, services and markets. It should contribute to more resilient livelihoods, disaster-proof infrastructure, and wider access to energy supply and public transport. In this view, the sustainability of natural assets and green innovation determines the potential, longevity and quality of a country's future development.

Yet developing countries are facing specific obstacles in realising green growth, including limited institutional capacity and capital, and market failures. In this context, green growth demands holistic strategies, encapsulating: (1) equitable and efficient tax systems; (2) the phase-out of environmentally harmful subsidies; (3) free and open trade including for environmental

products and services; (4) policies that incentivise investment in green technology and practices; (5) industrial and other sector policies that promote innovation; (6) risk assessment and management; (7) labour market and skill policies that maximise the benefits for workers and help to ensure that adjustment costs are equitably shared; and (8) a host of flanking and complementary policies to explicitly address poverty reduction and social equity issues.

Despite significant challenges, a growing number of developing countries are already successfully implementing national green growth strategies or elements of such strategies. These include low-income countries, such as Cambodia and Ethiopia (see Box 3.2 in Chapter 3). There is also growing experience with green growth in middle-income countries. For example, South Africa has launched a Green Fund in partnership with the Development Bank of Southern Africa to facilitate investment in green initiatives. Funds are made available to support green cities and towns, the transition to a low-carbon economy, and environmental and natural resource management, through project and capital development grants, research and policy development grants, and concessional project development loans.[1] China has also prioritised green development in its 12th Five-Year Plan, and it is experimenting with a range of green growth policies, in particular aiming to reduce poverty through the creation of green jobs in the forestry sector (OECD, 2012b). All these countries are investing in natural assets, building resilience to climate change, and integrating green growth objectives into development policies designed to create jobs and promote innovation, technology and land use choices that respect the environment. Other developing countries may still have reservations about what green growth means to them, what trade-offs it will involve, and how to finance the transition. This book hopes to allay some of those concerns and to answer some of the questions that developing countries are asking about green growth.

In our globally connected world, green growth is not something that developing countries can achieve in isolation. This book outlines a twin-track agenda to guide national and international decisions to advance green growth in developing countries. The book is a companion piece to the 2011 *OECD Green Growth Strategy* (OECD, 2011a and b). Unlike some studies on this topic, this book does not offer new quantitative projections of green growth benefits for developing countries, nor does it contain new estimates of the costs of actions required to transform their growth pathways in the years ahead. Instead it aims to provide practical advice for a wide range of policy makers and stakeholders from developing and developed countries alike. It is based on extensive consultations with developing country and international stakeholders at both regional and country level, and a comprehensive literature review, to survey their experiences, share ideas and respond to their questions (Box 1.1). It starts in part from the concerns and technical challenges identified by developing countries based on their early efforts to "go green". A list of developing country examples referenced in the book can be found in Annex A.

Box 1.1. **OECD engagement with developing countries on green growth**

The concerns and technical challenges voiced by developing countries in this book call for a process of consultation, learning and consensus building. This book was developed through a series of consultations with developing country stakeholders (public, private and civil society groups) to build consensus on what green growth means to them and how to make it a reality. These consultations included a joint meeting organised with the Global Green Growth Institute in May 2012 in Seoul; both technical and ministerial level meeting organised at the Rio+20 Conference in June 2012; and a joint workshop organised with the African Development Bank in Lusaka, Zambia in January 2013. Two in-depth country case studies looking at the

Box 1.1. **OECD engagement with developing countries on green growth** *(continued)*

specificities of green growth were also developed in collaboration with the governments of Cambodia and Ethiopia (see Box 3.2 in Chapter 3).

Some of the key take-away messages from these consultations and country studies on how to pursue green growth include:

- **Advance a long-term vision for national development:** green growth needs to meet priority short-term needs, including unemployment – particularly among the young – and poverty and inequality across class and gender. In the long-term, green growth should help to meet developing countries' infrastructure deficit, connect it to markets worldwide and regionally, and support the greening of growing cities.
- **Secure high-level political will and stakeholder engagement:** High-level political buy-in is essential for promoting green growth and enabling sustainable development, but this should be anchored in increased citizen engagement – building ownership, trust and confidence across stakeholder groups – and with the involvement of the private sector.
- **Ensure social equity and poverty reduction as a critical dimension in this policy transformation:** inclusion is increasingly essential for the credibility of the green growth concept. For it to succeed, the green growth agenda needs to ensure every citizen has a right to participate in green growth policy making through making information publicly available and providing opportunities for public participation and monitoring. Special attention also needs to be paid to the distribution of the benefits and costs of green growth policies.
- **Review development options in the light of environmental and socio-economic changes:** green growth policies need to build on environmental indicators and information that reflects the environmental costs of economic growth and the value of natural resources. Trends and policy options should be carefully assessed to inform policy choices.
- **Broaden international financing avenues while supporting local financing mechanisms:** External and domestic finance are both needed to support green growth. While official development assistance (ODA) flows for environmental protection have increased, there is a need to better target green ODA to the needs of countries, as well as to use it more effectively to leverage other sources of capital.
- **Focus on programmatic rather than project-based solutions:** this implies an emphasis on enhanced cross-sector collaboration, with a systemic approach to integrating environmental concerns into sector and structural policies (e.g. skills development and training programmes).

1.1. Green growth can contribute to sustainable development

The OECD has been at the forefront of developing the concept of green growth, ways of applying it and ways of measuring it (Box 1.2). This section introduces green growth and its relationship with sustainable development, and outlines what it means to developing countries.

Sustainable development provides an important context for green growth. Green growth has not been conceived as a replacement for sustainable development, but rather as a means to achieve it (OECD, 2011b). The OECD sees green growth as a way to foster economic

growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies (Box 1.2) (OECD, 2011a). The concept of green growth is narrower in scope than the concept of sustainable development, but entails a clear and workable policy agenda for concrete, measurable progress at the interface of the economy and the environment. In this concept, natural assets – including renewable and non-renewable resources and a stable climate – play a significant role in delivering production and welfare gains. The concept also provides a strong focus on the necessary conditions for innovation, investment and competition that can give rise to new sources of economic growth and resilient development.

The goal for many developing economies is to achieve diversified and sustainable growth to reduce poverty, increase well-being and bring major improvements to the quality of life of their citizens. This can be achieved by taking into account the full value of sustainably managed natural capital and recognising its essential role in economic growth. Green growth promotes a cost-effective and resource efficient way of guiding sustainable production and consumption choices. Put simply, greening growth will help developing countries to achieve sustainable development.

Box 1.2. **The development of the *OECD Green Growth Strategy***

National and international efforts have been intensifying to promote green growth as a new approach to increasing sustainable wealth. The *OECD Green Growth Strategy* was initiated in June 2009, when all of the 34 OECD member countries signed a Ministerial Declaration on Green Growth. In this declaration, ministers acknowledged that "green" and "growth" can go hand-in-hand. The countries asked the OECD to develop a green growth strategy bringing together economic, environmental, technological, financial and development aspects into a comprehensive framework. The strategy, *Towards Green Growth* (OECD, 2011a), was endorsed by OECD ministers in May 2011. Several developing countries since then also have adhered to the Declaration on Green Growth, including Colombia, Costa Rica, Morocco and Tunisia.

Source: OECD (2011a), *Towards Green Growth*, OECD, Paris.

1.2. The OECD approach to green growth

The *OECD Green Growth Strategy* responds to the dual global challenges of (1) expanding economic opportunities for a growing population; and (2) mitigating the environmental pressures that otherwise could undermine our ability to take advantage of these opportunities. The strategy recognises that just as different countries follow different growth paths, advanced, emerging and developing countries will also need to pursue green growth differently. Each country's starting point and strategy for green growth will depend on its policies, institutions, levels of development, natural capital and environmental vulnerabilities. That said, there are common principles that all countries pursuing green growth will need to take into account. These include (OECD, 2011a):

- *Capturing the importance of changes in the comprehensive wealth of an economy.* This requires tracking the impacts of changes in all forms of capital, including not only human and physical capital, but also natural capital and intangible assets such as innovation. Each of these types of capital may have critical thresholds that, once reached, can undermine well-being.

- *Incorporating the dual role played by natural capital in growth*. Natural assets not only provide inputs for production, but also contribute to human well-being, such as through the provision of clean air and water.
- *Acknowledging that public policy intervention is most needed in investment in natural capital, as this is where market incentives for private sector investment are weakest*. Because the contribution of natural assets to production or human well-being is typically not fully valued (Box 1.3), market incentives are insufficient to direct investment to sustaining natural assets. This suggests a role for public sector investment.
- *Recognising that innovation is needed to reduce trade-offs that arise between depleting natural assets and maximising their productivity*. Once the productivity of natural assets is raised to its full potential and inefficiencies have been eliminated, the trade-off between sustaining and depleting natural assets will become more pronounced. Innovation can further raise the potential for natural asset productivity and efficiency, thereby reducing the likelihood this trade-off will be reached.

At its most basic, green growth is about integrating these considerations into national economic growth and development policies (OECD, 2011a).

Box 1.3. **Capturing the full value of natural assets for sustainable management**

A mixture of market and regulatory failures contribute to imperfect management of many natural assets. For instance, biodiversity and ecosystem services are often overlooked because they come at a limited cost or zero cost to producers even though the value of these services is in fact large, albeit difficult to measure. In order to make choices about the optimal extent and rate of exploitation of resources, it is necessary to attach a value to changes in the level of natural assets and environmental conditions.

"Willingness-to-pay" and "willingness-to-accept" are the economic terms used to capture the value of direct use of goods and services exchanged on markets. However, the value of natural assets is not only in direct use, but also indirect (or non-consumptive) use and in "non-use". *Direct use* includes the acquisition of materials, energy or space for human activities, e.g. the value of timber from a forest or energy in an oil field. *Indirect use*, where the physical characteristics of an asset do not change, includes recreational use of a body of water and ecosystem services from waste assimilation, carbon sequestration, fish habitat, and flood control. *Use* values include the actual or planned use of the good or service in question (that is, as a source of water for irrigation purposes) or possible use (that is, a spawning ground for development of fisheries in the future). *Non-use* values incorporate those values which people attach to a good or service even though he or she does not have (or foresee) any actual, planned or possible, use for the good or service for him or herself. These include "*existence*" values, which arise from a sense that the good or service should not cease to be. For any given change in environmental conditions, direct use, indirect use and non-use values can be aggregated into "total economic value" for society. However this does raise some practical difficulties and ambiguity, especially in terms of quantifying non-use and option values.

Accounting for the value of natural assets can help to avoid patterns of development that lock-in high costs or resource bottlenecks. For example, urban development in metropolitan Mexico City has locked-in demand for fresh water from distant lowland sources, which has to be pumped at high cost.

Source: OECD (2011a), *Towards Green Growth*, OECD, Paris.

1.3. The case for a green development model

Developing countries face numerous challenges that together call for a growth model that can improve quality of life quickly but without undermining it over the long term. Vulnerability to environmental threats is greater in developing countries than in wealthier countries. The multiple environmental risks to human well-being faced by developing countries stem from: (1) unsustainable natural resource exploitation; (2) lack of access to food, water and energy and a lack of basic infrastructure; (3) deadly air and water pollution in a context of rapid urbanisation and population growth; (4) rural poverty with a large share of people's livelihoods dependent on natural resources; and (5) high vulnerability to climate change impacts including a rise in natural disasters and high risk of lock-in to emission-intensive development patterns, land use and infrastructure. The linkages between environmental performance, equity and poverty are much starker in developing countries than developed countries.

A range of persistent development challenges exacerbate environmental challenges in developing countries:

- *Growth, poverty and inequality:*Although the world's overall GDP may have climbed at a steady rate for the past four decades, a wide gap remains between the developed and developing world, with growing inequalities in both. Poverty reduction still remains a pressing concern in many parts of the world (UNCTAD, 2012) and more than a billion people still go hungry today. In 2008, 1.29 billion people – or 22% of the population in the developing world – lived in extreme poverty, with incomes below USD 1.25 a day. While poverty has declined in all regions, progress has been uneven. In particular in Africa, growth has not been inclusive and has been driven by certain sectors of the economy – frequently mineral extraction – that are not directly linked to the livelihoods of poor people. For these people, today's type of development provides few benefits. Inequalities are still persistent, with the poor, especially women, being the most vulnerable to climate change and other external "shocks".
- *Demographics of development:* Population dynamics are key drivers of local and global environmental change. The world's population has increased from less than 4 billion in 1970 to 7 billion today. By 2050, the United Nations has projected that global population will grow to almost 9.2 billion – an additional 2.2 billion people. Most of this population growth will be in today's developing world. Population growth raises the stakes for policy efforts to reduce poverty, create employment, and most importantly to provide food, water and energy security while safeguarding the natural environment (WEF and UNFPA, 2012).
- *Dependence on natural capital:* Natural capital comprises 25% of total per capita wealth in low income countries, as compared to 2% in OECD countries (World Bank, 2006; OECD, 2008). The importance of natural capital in national economies is particularly significant in some regions, such as Africa. In general, within poor developing countries the poorer the household, the more important is the contribution of natural resources for food, fuel, building materials, medicinal plants and income. Yet natural resource scarcity, degradation and conflict threaten the livelihoods of many of the poorest people in developing countries. Green growth is the right way forward to correct the current market failures of not capturing the full value of natural assets in economic decision making (Box 1.3). Dependence on natural capital also raises the risk of inter-temporal inequities. This can result where today's generation reaps the benefits of resource-consumptive production and lifestyles, while threatening the well-being of future generations by depleting or degrading the natural resource base necessary for development.

- *Limited access to energy, water and sanitation services:* Today 1.3 billion people worldwide have no electricity; 74% of them live in Africa. Of these people, 80% live in households that rely on wood-based biomass as their main energy source. The resulting indoor air pollution has a high health impact, causing a higher mortality rate than caused by malaria. In developing countries, a significant percentage of the population still does not have access to water and sanitation services, whilst many others suffer from unsatisfactory services (Chapter 2). To close the existing gaps in access to energy, water supply and sanitation, huge investments in basic infrastructure are required and will need to ensure resilience to future environmental and climate changes.

To tackle these challenges in developing countries cost effectively, a new growth and development model is required: to improve the existing patterns of income distribution, to create incentives for sustainable natural resource management, to fill the clean energy and water access gap, and to provide low carbon climate resilient infrastructure, for example to meet accelerated demand from rapid urbanisation. Green growth offers the potential for economic, environment and social benefits for all if policies and strategies are appropriately designed and implemented (Box 1.4).

Green growth means viewing growth more broadly than simply growth in gross domestic product (GDP) alone. From a traditional economic perspective, growth implies

Box 1.4. **Some elements of a green growth path to development**

The overarching goal of green growth is to establish incentives or institutions that increase well-being by:

- improving resource management so as to boost productivity;
- encouraging economic activity to take place where it is of best advantage to society over the long-term;
- finding new ways of meeting the above two objectives, i.e. innovation; and
- recognising the full value of natural capital as a factor of production along with other commodities and services.

Greening the growth path of an economy depends on its policy and institutional settings, level of development, resource endowments and particular environmental pressure points. Policy action requires looking across a very wide range of policies, not just traditionally "green" policies.

Matching green growth policies and poverty reduction objectives will be important for adapting this framework to emerging and developing countries. There are important complementarities between green growth and poverty reduction that can help to drive progress towards achieving the Millennium Development Goals (MDGs). These include:

- increasing access to energy, water and transport services and more efficient infrastructure;
- alleviating poor health associated with environmental degradation; and
- introducing efficient technologies that can reduce costs and increase productivity, while easing environmental pressure.

Source: Adapted from OECD (2011b), *Towards Green Growth – A summary for policy makers*, OECD, Paris.

wealth creation, and this is measured by GDP or a similar metric to compare changes in the level of economic vitality in a region over time. However, GDP measures do not reflect all the value in an economy, and also do not account for some of the risks and costs embedded in economic activity. Further, GDP only measures resource flows but not the underlying resource stocks (OECD, 2011c). For instance, GDP can continue to grow for a time even as the resources upon which it depends are being depleted. In conventional approaches to economic growth, the value of environmental services, natural capital and pollution are not measured alongside other activities that are readily valued by markets (OECD, 2013). Indeed, the economist who established the definition of GDP clearly stated that it was never meant to be a measure of well-being (Kuznets, 1934). To capture the many other elements of growth and development, the OECD has joined other institutions in a cross-cutting international effort to develop indicators that are more inclusive of the environmental and social aspects of progress (Box 1.5).

Box 1.5. **GDP and beyond: better ways to measure better lives**

For nearly ten years the OECD has been leading international reflection on measuring the progress of societies. While GDP remains, for the most part, the dominant financial measure of growth and is treated as a reasonable indicator of material well-being and even as a proxy for quality of life, there are now debates about whether GDP is a useful approximation of societal well-being.*

As a result, the OECD, along with the European Commission, the European Parliament, the Club of Rome and the World Wildlife Fund, has been one of the global leaders in designing a measurement framework that better takes into account the environmental and social aspects of progress. The OECD has proposed a more comprehensive measure of well-being in its *Better Life Index*. The index covers 11 topics (including housing, income, jobs, community, education, environment, health), each of which includes several indicators.

* See, for instance, Stiglitz, Sen and Fitoussi (2009), or Jackson (2009).

Sources: www.beyond-gdp.eu; www.oecdbetterlifeindex.org.

1.4. Understanding developing country concerns about green growth

The concept of green growth is generating a great diversity of political positions, ranging from enthusiastic to cautious.[2] Such views reflect variously a lack of clarity and limited experience, the different opportunities available to specific countries, and fears that international green growth policy regimes might put some countries at a disadvantage. There is generally a high degree of ambition and political support for green growth across the developing world, where it can be shown to lead to poverty reduction, higher social welfare and job creation. In addition, it must support the structural transformation of the economy to achieve higher productivity and more value-added products.

Yet some developing countries are cautious about the concept and are only just beginning to assess the opportunities, threats and indeed meaning of greening their development pathways. Some of the policy ideas and technologies associated with green growth are neither easily accessible nor entirely relevant to their national development needs. Some typical concerns that countries have voiced include:

- *Will green growth help address poverty, equity and other development priorities?* The green growth policies being discussed – with an emphasis on low-carbon and

high-technology – do not obviously tackle equity at either the national or global level. There is often no discussion of how to include many poor countries and people within the informal economy. Not enough attention has been paid to the potential for more efficient use of natural capital, which in turn can yield benefits to the poorest. Furthermore, a number of governments are concerned that the focus on green growth could undermine the Rio Principles, particularly the principle of "common but differentiated responsibilities".

- *Will implementing green growth be expensive?* Many developing countries fear that initial costs for the transition to green growth would be beyond their reach, e.g. to provide solar power for rural communities. Even the most basic technologies and infrastructure are still lacking in most developing countries, particularly wastewater treatment, household and hazardous waste management, energy and integrated water resource management. In addition there is a concern that developing countries' own technologies, including indigenous approaches, will not be able to compete, and that they will need to import technologies.
- *Will developing countries have sufficient access to new international markets for green goods and services?* Trade rules for green goods and services may lead to products from developing countries being excluded from trade if they are not considered "green", and this could further encumber the Doha round of trade negotiations under the World Trade Organisation (WTO). A related concern is the potential for eco-certification and eco-labelling to also act as non-tariff trade barriers. Beyond this, pursuit of green growth in many developing countries will require learning how to generate value in international markets from natural assets. For example, eco-tourism in Costa Rica, organic farm products from Kenya and sustainable forest management in Guyana and Congo may provide marketable green goods and services from these countries. However the mechanisms and markets available to do this are still poorly developed.
- *Will development co-operation providers place new "green" conditions on development assistance and other forms of development co-operation?* Many countries are also concerned about the possibilities that green growth could directly or indirectly lead to an imposition of extra conditions on bilateral and multilateral development assistance for developing countries. There is a fear that such conditions would be directed by external policy prescriptions that are not central to developing countries' priorities for development. The key for developing countries would be to ensure that they fully "own" and endorse green growth strategies and policies at the national level and tailor to these to their specific needs efforts. In this way they set out their own conditions on how to effectively use such development assistance to support their own national development agendas.

1.5. Political challenges, trade-offs and short-term transitional costs of going "green"

Developing countries also face policy choices and trade-offs with respect to green growth that are different from those of developed countries. This is one of the main reasons that integrating environmental considerations and performance into economic decision making has been difficult to achieve in the developing world. In addition to their high dependency on natural assets for income and livelihoods, many developing countries, particularly lower-income countries, have large informal economies. Even when excluding agriculture, the informal economy still accounts for 75% of jobs in sub-Saharan Africa and over two-thirds in South and Southeast Asia (Parlevliet et al., 2008). Implementation of economic, fiscal

and regulatory policy instruments in these contexts is a particular challenge. High levels of poverty and inequality require more targeted policies to avoid negative distributional outcomes, while capacities for designing and financing such policies are limited. Capacities for innovation and investment, both public and private, are also lacking, constraining countries' abilities to take advantage of the opportunities that green growth offers.

Furthermore, developing countries have the greatest need and demand for development, economic growth and welfare improvement in the short term. The balance between the welfare gains from a better environment and those from economic growth are not the same as for the OECD or emerging economies. In lower-income countries, where natural assets are frequently abundant, the welfare returns from transitioning to green growth are not as evident as those from economic development, particularly in the short term. Sometimes there is a perception that maintaining natural assets benefits developed countries while the opportunity costs in foregone economic development will be borne by the poor in developing countries. Without simple mechanisms to transfer the value of natural assets to the individuals who provide them, and the delivery of near-term local benefits, those individuals will have no incentive to manage natural assets in a way that contributes to environmental goals. Consideration of the potential costs and risks associated with green growth need to be adequately reflected in the design and timing of policies (OECD et al., 2012). The political viability of green growth policies rests on managing any trade-offs among green growth, economic development and poverty reduction through good policy design.

Reconciling short-term economic growth and development goals with long-term sustainable development and green growth objectives will require a balanced policy approach. Economic instruments to pay poor countries for ecosystem services with global environmental benefits, and to pay poor people in developing countries for managing land and other natural resources to produce ecosystem services with local benefits, can increase economic and welfare benefits accruing to them and will be critical to building political support for green growth. Investments in human capital and skills will also ensure workers who are employed in former "brown" economic sectors can also quickly pick up the skills required in green sectors. Like all transformative processes, shifting to green growth is likely to change the short-term and long-term comparative advantages of countries, industries and population groups. Support from the international community to manage the transition and share experiences in progress made to achieve green growth in different national contexts, as well as through international development finance, technology co-operation and trade, will help to build political momentum for boosting green growth in developing countries.

To respond to these various concerns, as well as the foreseeable trade-offs and transitional costs of going green by developing country stakeholders, this book starts by highlighting the potential benefits developing countries could reap from transforming their development and growth model (Chapter 2). Yet despite potentially large benefits of achieving green growth there are also numerous obstacles. Obstacles to realising green growth include the difficulty of changing individual and firm-level behaviour, of addressing government and market failures, and of surmounting limited access to capital. Overcoming these obstacles requires a consistent agenda for action to guide policy decisions and support the engagement of key stakeholders. Chapter 3 provides such an agenda for national policy makers and civil society stakeholders in developing countries.

Many developing countries are not yet fully equipped to introduce new, greener policies or to tap into the benefits of a green future. Institutional and capacity development efforts may be needed to help them get ready. The international community plays an important role in providing a supportive enabling environment for a transition to green growth, not

only in strengthening capacities but in providing financing, technology co-operation and in facilitating trade in green goods and services, as well as partnerships for learning through international collaboration (Chapter 4). Chapter 5 discusses how progress can be measured in a way that is meaningful and achievable for developing countries. Chapter 6 brings the two strands together by summarising the next steps in our joint journey towards global green growth.

Notes

1. See *www.sagreenfund.org.za/Pages/default.aspx*.
2. See the UNCSD country submissions, available at: *www.uncsd2012.org/index.php?menu=119*.

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Chapter 2

Why is green growth vital for developing countries?

Rapid growth in many developing countries and increased inequality are contributing to looming environmental challenges that threaten well-being and risk to further increase social inequality and undermine growth for future generations. Chief among these environmental challenges are rising rates of air and water pollution, unsustainable consumption of water and other natural resources, and growing vulnerability – and contribution – to global climate change. This chapter outlines the features of economic growth and development today, including related environmental risks, and describes the many benefits of achieving green growth, illustrated by numerous examples from developing countries.

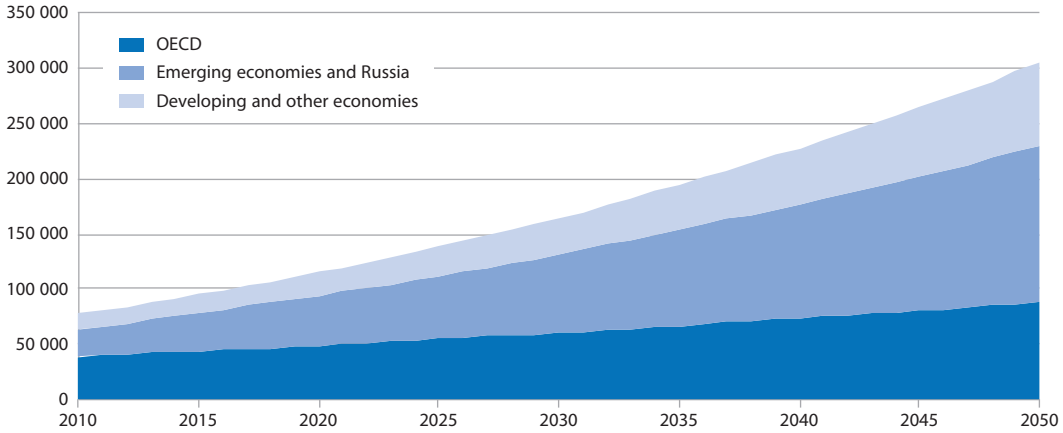
While policy makers in developing countries are understandably concerned that the sustainable management of natural resources and services will hold back growth in the short term, this chapter highlights why and how green growth can positively contribute to their development. Development that is not based on green growth may lead to prosperity, but only in the short term, and will soon be undermined by insecurity and vulnerability. We begin by considering the different features of growth in developing countries and the consequences of a business-as-usual path. We then discuss how green growth can address pressing development challenges.

2.1. What does growth look like in developing countries today?

Countries' current patterns of growth will help determine how they might transition to economic growth and development patterns that allow for the sustainable management of both natural and economic assets. The decade of 2000-10 saw, for the first time since the 1970s, large numbers of developing economies catching up with developed countries in per capita income growth rates. The number of countries "catching up" more than quintupled over 2000-10, from 12 to 65, and the number of poor countries fell by over half, from 55 to 25 (OECD, 2010a).[1] The most spectacular growth in per capita income was in China and India, whose economies grew at three to four times the OECD average. The GDP of developing countries as a whole is projected to continue to grow at a higher rate than that of OECD countries between 2010 and 2050 (Figure 2.1).

Figure 2.1. **Real gross domestic product (GDP) growth, 2010-50**

Purchasing power parity (PPP), constant 2010 prices, billion USD



Note: OECD includes Mexico and Chile, even though these countries also receive Official Development Assistance (ODA). Emerging economies include Brazil, China, India, Indonesia and South Africa. Developing and other economies include all other countries, regardless of whether they receive ODA.

Source: OECD Environmental Outlook Baseline; output from ENV-Linkages.

StatLink http://dx.doi.org/10.1787/888932829856

With respect to the distribution of wealth, developing countries have seen a growing middle class[2] but they have also experienced increasing income inequality and persistent pockets of poverty. Poverty has fallen substantially in developing countries as a whole in recent decades, largely due to rapid economic growth in China.[3] Hundreds of millions of people have moved out of extreme poverty and the world is on track to achieve the Millennium Development Goal of halving the number of people living on less than

USD 1.25 a day by 2015. East Asia has exhibited the most dramatic reduction, slashing its USD 1.25 a day poverty rate from 77% of its population in 1981 to 14% in 2008. In South Asia, the proportion of the population living in extreme poverty is now the lowest it has been since 1981, falling from 61 to 36% between 1981 and 2008. Progress has been much slower in sub-Saharan Africa, with the share of people living below the poverty line only dropping from 51% in 1981 to 47% in 2008.[4]

While poverty has declined in all regions, progress has been uneven and the number of absolute poor has risen in certain developing regions. Strong economic performance of countries such as China and India has also resulted in more poor people living in middle-income countries than in low-income countries. Global poverty has become increasingly concentrated in parts of sub-Saharan Africa and South Asia and, particularly in low-income countries in these regions, many people remain locked in poverty.

Increased inequality in per capita income or expenditure within countries is also seen.[5] For example, China, India, Indonesia and South Africa all experienced a rise in Gini coefficients[6] (i.e. their income inequality increased) between the 1990s and the 2000s. By contrast, the Gini coefficients fell in Brazil and Russia. At the same time, the global middle class is growing rapidly, and reached 1.8 billion people in 2009 (Kharas, 2010). It is set to grow to 3 billion by 2020 and 5 billion by 2030, of which respectively one-half and two-thirds will be living in the Asia-Pacific area. Without environmental policy action, the rise of the middle class will lead to more resource-intensive and polluting consumption patterns, which in turn challenges sustainable development.

Natural assets are also fundamental to growth today. It is important to recognise the dual role that natural assets play: they both provide the inputs for marketable goods (timber, fisheries, crops etc.) as well as valuable ecosystem services, including clean air, drinkable water and carbon dioxide absorption. Thus they contribute both to growth and to the quality of that growth (OECD, 2011a; Box 2.1). Sustaining natural assets is fundamental to developing countries' growth because, as discussed above, unsustainable management of natural assets can hamper economic growth and can undermine the quality of life for residents of poor countries.

Natural assets tend to be a larger factor in economic growth in developing countries than in OECD countries. In low-income countries, natural capital contributes 25% of total per capita wealth, as compared to 12% in middle-income countries and 2% in OECD countries (World Bank, 2006; OECD, 2008). The United Nations Environment Programme (UNEP) estimates that ecosystem services provide for 47% to 90% of income in poorer countries (UNEP, 2011). Fisheries provide for between 10-30% of government budgets in several West African countries and forestry resources provide for 25% of tax revenue in Cameroon (OECD, 2008). Export revenues of forest resources amounted to over USD 100 million in some developing countries, such as Liberia (Republic of Liberia, 2006), and more than 10% of export earnings in countries such as Cameroon and the Central Republic of Congo (OECD, 2008 citing Lebedys, 2004; World Bank, 2004). Seafood exports from Africa into the European Union are worth over USD 1.75 billion a year and are Africa's largest food export product (OECD, forthcoming a; PEP, 2006; OECD, 2008). Fisheries also provide employment for 47 million people in developing countries. Forestry provides formal employment for 10 million people and informal employment for 30-50 million, and can account for more than 10% of GDP in developing countries (OECD, 2012a citing OECD, 2008). The role of natural assets as a source of growth in developing countries may be even larger than these figures suggest, as informal contributions of natural resources to economic development are not typically reported (OECD, 2008) (Table 2.1).

Box 2.1. **Understanding natural assets**

The *OECD Green Growth Strategy* considers several different categories of "natural assets" on which we build here (OECD, 2011b; table below). We can further separate these categories into natural assets that are managed at the national or sub-national level, and those managed by two or more countries. National policy makers, whether in developed or developing countries, may find it easier to sustainably manage natural assets over which they have control, or when the benefits of better management return directly back to the national government. For global or other shared assets, such as water resources from a transboundary watershed or a stable climate, taking action that delivers benefits fairly to multiple countries is more challenging.

Main categories of natural assets

Natural asset	Measure of key changes	Ecosystem and related services	Level of control
Stable climate	• Production-based CO_2 productivity (GDP per unit of energy-related CO_2 emitted) • Demand-based CO_2 productivity (real income per unit of energy-related CO_2 emitted)	• Stable temperatures, predictable precipitation patterns, and limited sea level rise (e.g. from land subsidence) • Healthy environment for people and agricultural food production	Global
Other air resources	• Air emissions • Air pollution concentrations	• Clean air for healthy people, urban environments and agricultural production	National and sub-national
Freshwater resources, watersheds	• Available renewable resources (groundwater, surface water, national, territorial) and related abstraction rates • Water pollution concentrations • Watershed area	• Drinkable water available in urban and rural areas • Water filtration and purification services • Storm buffering, flood prevention	Sub-national, national, or multi-national
Forest resources	• Area and volume of forests; stock changes over time	• Soil conservation • Storm buffering, flood prevention • Biodiversity and carbon absorption	National or sub-national, may also be multi-national
Fish resources, ocean resources	• Proportion of fish stocks within safe biological limits (global)	• Source of food and income coastal communities • Biodiversity	Multi-national or global
Mineral resources	• Available (global) stocks or reserves of selected minerals, for example: metallic minerals, industrial minerals, fossil fuels, critical raw materials; and related extraction rates	• Source of income for nations as a whole	National or sub-national
Land resources	• Land cover types, conversions and cover changes • State and changes from natural state to artificial or man-made state	• Soil conservation • Storm buffering, flood prevention; water filtration and purification • Biodiversity and carbon absorption	National or sub-national
Soil resources	• Degree of top soil losses from agricultural land and other land • Nitrogen pollution concentrations	• Foundation of agricultural productivity • Carbon absorption	National or sub-national
Wildlife resources	• Trends in farmland or forest bird populations or in breeding bird populations • Species threat status: mammals, birds, fish, vascular plants in % species assessed or known • Trends in species abundance	• Biodiversity (providing ecosystem services such as pollination for food production) • Source of income through tourism	Sub-national, national, or multi-national

Source: Adapted from OECD (2011b), *Towards Green Growth: Monitoring Progress: OECD Indicators*, OECD Publishing, Paris.

Table 2.1. **Goods and services derived from natural resources**

Goods	**Formal market** Timber and fish harvested by formal-sector operators • Fisheries provide for between 10-30% of government budgets in several West African countries (OECD, 2008). • Export revenues of forest resources amounted to over 10% of export earnings in countries such as Cameroon and the Central Republic of Congo (OECD, 2008 citing Lebedys, 2004; World Bank, 2004).	Accounted for in economic statistics
	Informal market Fruit, fish, mushrooms or herbs, bush meat, palm, timber and non-timber forest products, artisanal mining products	Not accounted for in economic statistics
Services	**Local** Water filtration and purification services, water cycles regulation, flood prevention • Approximately 30 million people rely on coral reef-related resources for food and livelihood (TEEB, 2010, citing Gomez et al. 1994; Wilkinson 2004).	
	Global Carbon sequestration, biodiversity maintenance • Reducing deforestation rates by 50% by 2030 would avoid damage from climate change estimated at more than USD 3.7 trillion in net present value terms, not accounting for the many co-benefits provided by forest ecosystems (TEEB, 2010, citing Eliasch, 2008).	

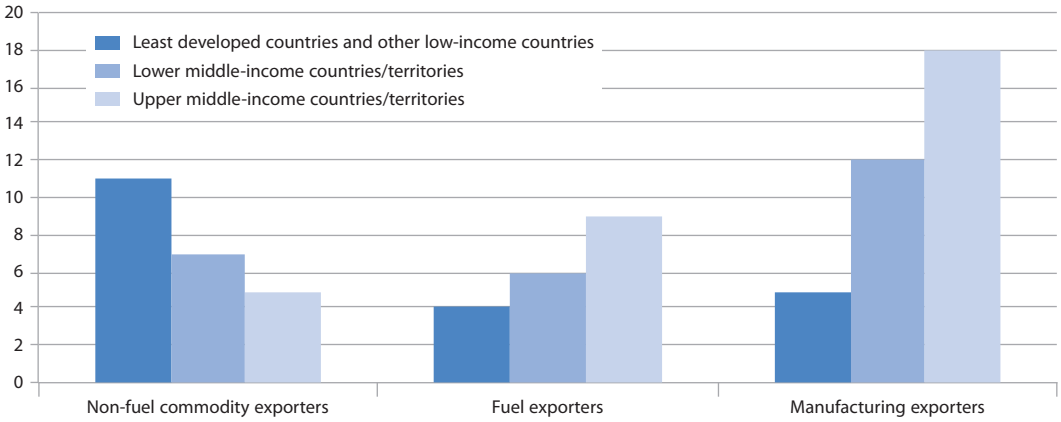
Source: OECD (2008), *Natural Resources and Pro-Poor Growth*, DAC Guidelines and Reference Series, OECD, Paris; TEEB (2010) *The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB*, TEEB, printed by Progress Press, Malta, available at *www.teebweb.org/wp-content/uploads/Study%20and%20Reports/Reports/Synthesis%20report/TEEB%20Synthesis%20Report%202010.pdf.*

If the revenues from exploring and using natural assets are not transformed into other forms of capital in an equitable manner, they can actually undermine growth and create social unrest. Some low-income countries with considerable endowments of natural resources (particularly mineral resources or even fossil fuels) have economies with growth rates amongst the lowest in the world – a phenomenon known as "the resource curse" (Gylfason, 2004; Collier, 2007). This paradox stems from several factors: the impact of currency appreciation (resulting from the large monetary transactions related to these assets) on the competitiveness of other sectors of the economy; the high volatility of these commodity prices; and social conflict and corruption associated with their exploitation (Collier, 2007). One way of overcoming the resource curse is to use the revenues to invest in productive assets that will have multiplier effects, such as infrastructure in Botswana, and/or to help diversify economic activity (Haglund, 2011). More fundamentally, a priority for governments with economies that are highly mineral-dependent is to strengthen domestic institutional mechanisms to tackle corruption, ensure transparency and boost accountability such that real benefits from natural assets can be more widely distributed. For example, public sector institutions in Ghana have worked closely with sister institutions in Norway to develop and improve relevant legislation, establish or reform institutions, and develop capacity in order to sustainably manage Ghana's petroleum resources (OECD, 2012b).

From a trade perspective, the drivers of economic growth and development can be grouped into three main categories: (1) non-fuel commodity exports, including trade natural resource commodities, such as forest and fish; (2) fuel exports; and (3) manufacturing exports. Generally, least developed and other low-income countries tend to export non-fuel commodities, such as minerals, forest products and agricultural goods. Upper middle-income developing countries, on the other hand, tend to be more reliant on manufacturing exports (Figure 2.2). This underscores the dependency of poorer developing countries

Figure 2.2. **Developing countries by income and main types of exports**

Number of countries in each category



Note: This figure presents three clusters of developing countries, based on the largest share of merchandise exports by major product group averaged over 2001-10 or the latest available year. Based on a sample of 77 of 146 countries on the OECD Development Assistance Committee (DAC) list of official development assistance (ODA) recipients (see Annex 2.A1). Least developed countries are defined by the United Nations (see *www.unctad.org/en/Pages/ALDC/Least%20Developed%20Countries/UN-list-of-Least-Developed-Countries.aspx*). Other low-income countries are those in which per capita GNI was less than or equal to USD 1 005 in 2010. Lower middle-income countries/territories are those in which per capita GNI was between USD 1 006-3 975 in 2010. Upper middle-income countries/territories are those in which per capita GNI was between USD 3 976-12 275 in 2010.

Source: OECD calculations based on OECD (2013) "DAC List of ODA Recipients", OECD, Paris, available at *www.oecd.org/dac/stats/daclist*; World Bank (2011), World Development Indicators 2011; World Trade Organization; and national sources.

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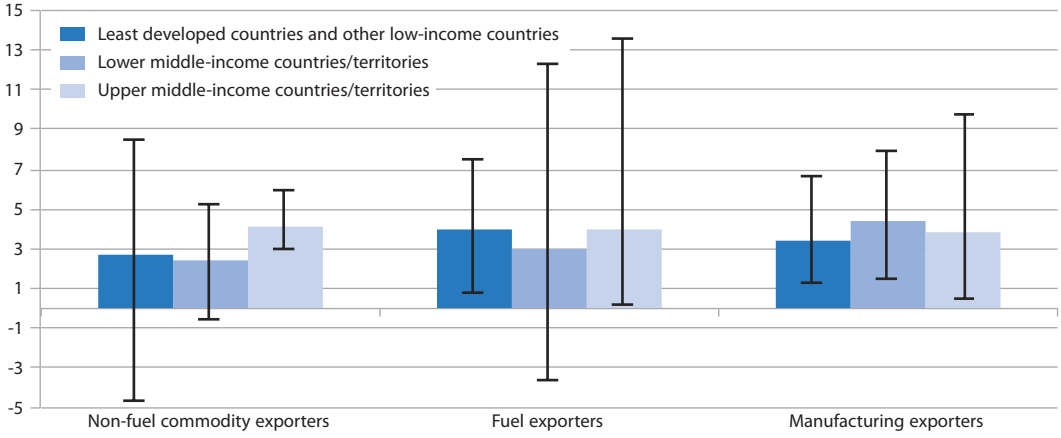
Figure 2.3. **Developing country growth rates, 2000-10**

Real per capita GDP growth rates (annual average), with maximum and minimum range of sampled countries



Note: This figure presents three clusters of developing countries, based on the largest share of merchandise exports by major product group averaged over 2001-10 or the latest available year. Based on a sample of 77 of 146 countries on the OECD Development Assistance Committee (DAC) list of official development assistance (ODA) recipients (see Annex 2.A1). Least developed countries are defined by the United Nations (see *www.unctad.org/en/Pages/ALDC/Least%20Developed%20Countries/UN-list-of-Least-Developed-Countries.aspx*). Other low-income countries are those in which per capita GNI was less than or equal to USD 1 005 in 2010. Lower middle-income countries/territories are those in which per capita GNI was between USD 1 006-3 975 in 2010. Upper middle-income countries/territories are those in which per capita GNI was between USD 3 976-12 275 in 2010.

Source: OECD calculations based on OECD (2013) "DAC List of ODA Recipients", OECD, Paris, available at *www.oecd.org/dac/stats/daclist*; World Bank (2011), World Development Indicators 2011; World Trade Organization; and national sources.

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on natural resources. Manufacturing exporters are strongly represented among the lower middle-income and upper middle-income countries, including Brazil, China, India, Indonesia and South Africa. While growth rates do not vary greatly among developing countries as a whole, there is a wider variation of growth rates within non-fuel and fuel commodity exporters than among manufacturing exporters (Figure 2.3). This wide variation may be explained in part by differences in developing countries' policy approaches and governance for managing natural resources and related commodities.

2.2. Current growth patterns in developing countries threaten long-term growth and well-being

Rapid growth in many developing countries and increased inequality are contributing to looming environmental challenges that threaten well-being, further increase social inequality and undermine growth for future generations. Chief among these are rising rates of air and water pollution, unsustainable consumption of water and other natural resources, insufficient infrastructure and growing vulnerability – and contribution – to global climate change.

Deadly air pollution and lack of access to clean water and sanitation

The large, negative impacts of uncontrolled air and water pollution affect the developing world most strongly. Pollution is responsible for millions of deaths every year (WHO, 2009). When poor air and water quality harm human health, they also undermine economic growth through the costs of treating sick people and through lost opportunities for education and work (Box 2.2).

Box 2.2. **The cost of environmental inaction – two country examples**

Indonesia: Inadequate water and sanitation constitute the largest short-term cost to the Indonesian economy, estimated at more than USD 6 billion in 2005: more than 2% of national GDP. The health impacts of outdoor and indoor air pollution have also been estimated to be high, at USD 4.6 billion per year or about 1.6% of gross national income. In addition, by the end of the century the long-term economic consequences of climate change could diminish the Indonesian economy by between 2.5 and 7% of national GDP every year (World Bank, 2009).

Central African Republic: Environmental health risks are the main environmental degradation cost in the Central African Republic, with unsafe water supply, lack of access to sanitation and poor hygiene estimated to cost USD 64 million a year. Indoor air pollution is estimated to cost the country another USD 29 million every year. The total estimated cost of environmental degradation, for both human and natural capital, is estimated at USD 130 million per year, equivalent to approximately 8% of national GDP (World Bank, 2010a).

Source: World Bank (2009), *Summary: Investing in a more sustainable Indonesia*, World Bank, Washington, DC; World Bank (2010a), *Central African Republic Country Environmental Analysis: Environmental Management for Sustainable Growth*, World Bank, Washington, DC.

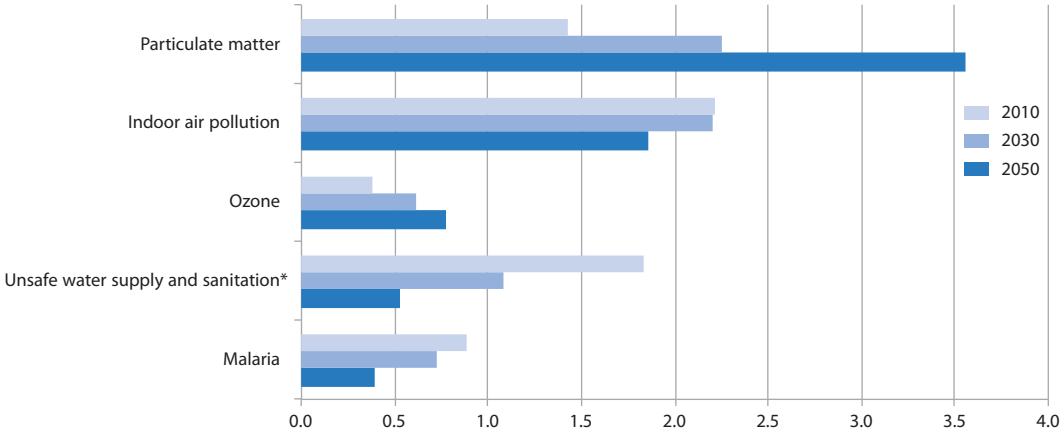
With rapid urbanisation and growth in industry, developing countries are seeing growing levels of dangerous air pollution from the use of fossil fuels in transport and industry. Under current policies, the global number of premature deaths linked to outdoor air pollution is expected to rise radically from about 1.8 million today to 4.4 million in 2050 due to exposure to both ozone and particulate matter (Figure 2.4). Premature deaths from airborne particulate matter is the largest threat, as it is projected to more than double

from today's levels to 3.6 million people a year by 2050 if no policy action is taken. These effects will be the most severe in developing countries, particularly emerging economies such as China, India and Indonesia (Figure 2.5) (OECD, 2012a). Indoor air pollution is also a significant threat to human life and this is largely due to lack of access to modern energy sources and polluting cookstove technologies. While the threat of indoor air pollution to human life is expected to decline to 2050 under current policies that target this problem, the threat of outdoor air pollution is expected to rise rapidly, with deadly consequences largely for urban dwellers in developing countries (OECD, 2012a).

In terms of water quality and related services, access to improved water sources and to sanitation facilities remains a key development challenge. Between 1990 and 2008, access to

Figure 2.4. **Global premature deaths from selected environmental risks in 2010, 2030 and 2050**

Millions of people



Note: *Child mortality only.

Source: OECD Environmental Outlook Baseline; output from IMAGE.

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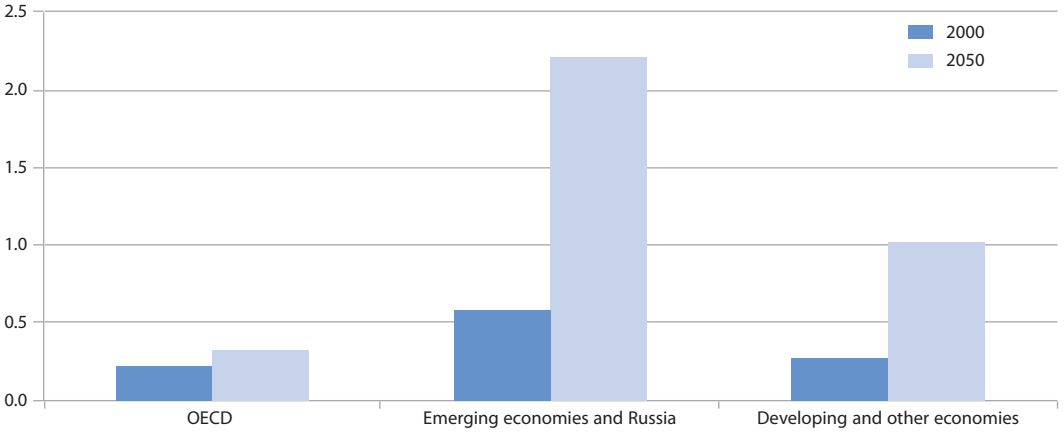
Figure 2.5. **Premature deaths worldwide from exposure to particulate matter in 2000 and 2050**

Millions of people



Note: OECD includes Mexico and Chile, even though these countries also receive official development assistance (ODA). Emerging economies include Brazil, China, India, Indonesia and South Africa. Developing and other economies include all other countries, regardless of whether they receive ODA.

Source: OECD Environmental Outlook Baseline; output from IMAGE.

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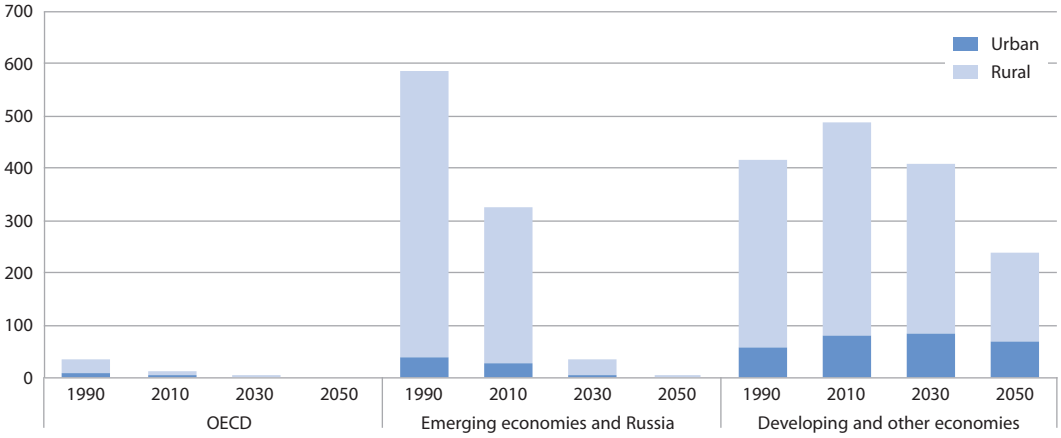
improved water sources increased by 1.8 billion people, however 240 million people are still expected not to have access to an improved water source by 2050, primarily in developing countries (Figure 2.6). This problem is particularly acute in urban areas as the share of city dwellers without access to treated water actually increased between 1990 and 2008. The share of people without access to treated water is also expected to increase in sub-Saharan Africa, where the Millennium Development Goal for improved water supply is unlikely to be met (Figure 2.6). Worse still, nearly 1.4 billion people are expected to have no access to basic sanitation services in 2050 (Figure 2.7) (OECD, 2012a). Despite strong calls for action

Figure 2.6. **Population lacking access to improved water supply in 1990, 2010, 2030 and 2050**

Millions of people



Note: OECD includes Mexico and Chile, even though these countries also receive official development assistance (ODA). Emerging economies include Brazil, China, India, Indonesia and South Africa. Developing and other economies include all other countries, regardless of whether they receive ODA.

Source: OECD Environmental Outlook Baseline; output from IMAGE.

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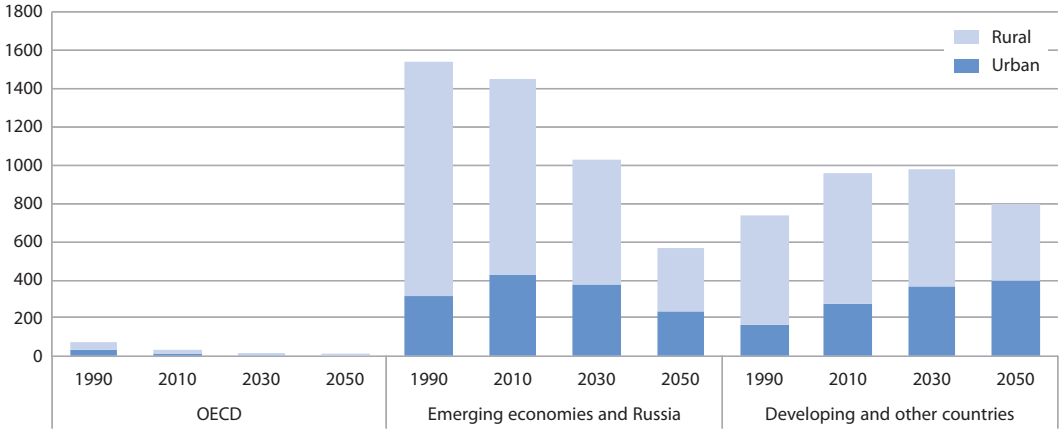
Figure 2.7. **Population lacking access to improved sanitation facilities in 1990, 2010, 2030 and 2050**

Millions of people



Note: OECD includes Mexico and Chile, even though these countries also receive official development assistance (ODA). Emerging economies include Brazil, China, India, Indonesia and South Africa. Developing and other economies include all other countries, regardless of whether they receive ODA.

Source: OECD Environmental Outlook Baseline; output from IMAGE.

StatLink http://dx.doi.org/10.1787/888932829970

at the international level, the Joint Monitoring Program, led by the World Health Organisation (WHO) and UNICEF, found that 2.6 billion people still do not use improved sanitation, whilst 884 million people do not use improved sources of drinking water (JMP, 2010). Of critical importance is the fact that access to an "improved" water source does not necessarily mean access to "safe" water fit for human consumption. As a result, half of Africa's hospital beds are filled with people suffering from a water-related disease (OECD, 2012b).

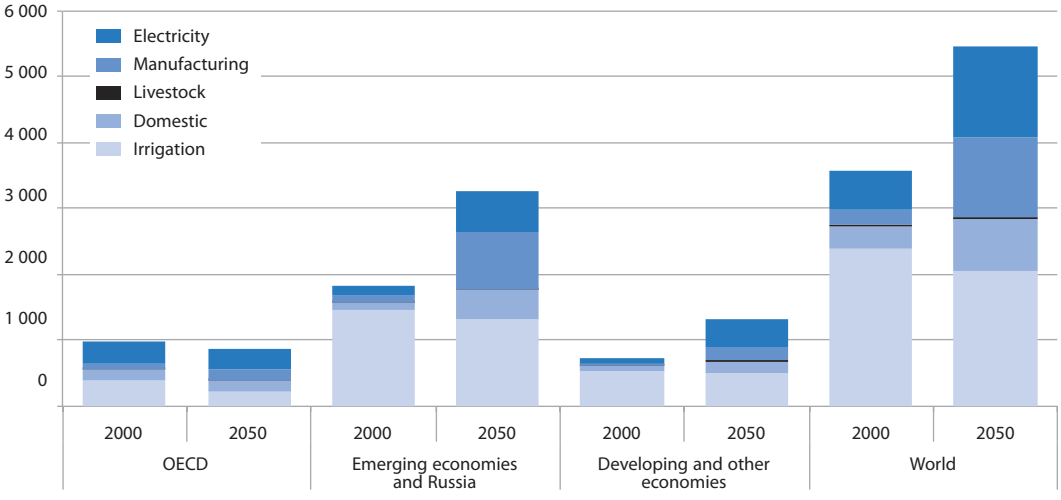
Natural resource scarcity

As noted above, poor developing countries are far more dependent on natural resources than are industrialised ones. The importance of natural capital in national economies is particularly significant in Africa. Africa has abundant natural assets, both renewable and exhaustible; with the right management these could be the basis for sustained and sustainable growth and welfare. The African Development Bank notes that nations in Africa with natural resource-based economies are projected to grow more rapidly than others (AFDB, 2012). Yet managing those resources in a sustainable way will be essential to support growth in the future. In the case of forest resources, Africa's deforestation rate is twice the world rate and it is estimated to be losing more than 4 million hectares of forest cover every year (AFDB, 2012). Ineffective and inequitable management of natural assets, including the world's climate, has already led to severe resource shortages, degradation and conflicts and raised unacceptable risks for the livelihoods of many on the African continent and elsewhere.

Good soil, healthy forests and strong fisheries support the livelihoods of millions of people in developing countries. In general, within poor developing countries, the poorer the household, the more important is the contribution of natural resources for food, fuel,

Figure 2.8. **Projected global water demand in 2000 and 2050**

Cubic kilometres (km^3)



Note: This graph measures only blue water demand and does not consider rain-fed agriculture. Blue water is defined as freshwater in aquifers, rivers, lakes, that can be withdrawn to serve people.

OECD includes Mexico and Chile, even though these countries also receive official development assistance (ODA). Emerging economies include Brazil, China, India, Indonesia and South Africa. Developing and other economies include all other countries, regardless of whether they receive ODA.

Source: The Environmental Outlook Baseline; output from IMAGE.

StatLink http://dx.doi.org/10.1787/888932829989

building materials, medicinal plants and income. Despite the value of natural assets and their significant contribution to current growth, resource use in many developing countries is currently unsustainable, which will lead to a loss of ecosystem services. Globally, about 28% of marine fisheries were overexploited, depleted or recovering from depletion in 2007 (FAO, 2008; OECD, 2008). Freshwater availability continues to decline in many regions, with 2.3 billion more people projected to be living in river basins experiencing severe water stress in 2050 than today. This means that under "business as usual" policies, by 2050 over 40% of the world's population will be living in water stressed areas, especially in northern and southern Africa, and southern and central Asia. Overall water demand is projected to increase by some 55% due to growing demand from manufacturing (4 times more), thermal electricity generation (1.4 times more) and domestic use (1.3 times more) (Figure 2.8). Such water stress will increase competition for scarce supplies amongst users. It will also hinder the growth of many economic activities, put ecosystems at risk and lead to significant groundwater depletion, placing even more pressure on freshwater supplies for the world's growing population (OECD, 2012a).

Growing vulnerability and contribution to global climate change

Both high exposure to risks and lower capacities to cope with and respond to climate change and disasters make developing countries particularly vulnerable to climate change. Climate change will impact some countries more than others, and certain regions, such as Africa, risk being harmed the most. Climate change will directly affect developing countries mainly through temperature increases, changes in precipitation patterns, sea-level rise and shifts in extreme weather patterns. While climate change will affect countries unevenly, the IPCC has identified some broad regional trends for developing countries under growth scenarios with limited greenhouse gas abatement and adaptation (IPCC 2007; OECD 2012a):

- **Africa:** By 2020, between 75 and 250 million people are projected to be exposed to increased water stress; yields from rain-fed agriculture could be reduced by up to 50% in some regions by 2020; agricultural production, including access to food, may be severely compromised.
- **Asia:** Freshwater availability projected to decrease in Central, South, East and Southeast Asia by the 2050s; coastal areas will be at risk from increased flooding; the death rate from diseases associated with floods and droughts is expected to rise in some regions. An additional 49 million people in Asia are projected to be at risk of hunger by 2020.
- **Latin America**: Gradual replacement of tropical forest by savannah in eastern Amazonia; risk of significant biodiversity loss through species extinction in many tropical areas; significant changes in water availability for human consumption, agriculture and energy generation.

Changes in climate and resulting shifts in patterns of natural disasters and extreme events will have significant impacts across developing countries in the absence of timely adaptation policies (IPCC, 2007; OECD, 2009). Risks in developing countries include an increase in the intensity of extreme weather events in Africa, increases in extreme rainfall and winds in East, South-East and South Asia, and more frequent, stronger and longer-lasting heat waves in East Asia (IPCC, 2007). As a whole, changing precipitation patterns, higher temperatures and freshwater scarcity are projected to reduce the area of land suitable for agriculture across many developing countries, and decrease the length of growing seasons and agricultural productivity, especially for rain-fed crops (IPCC,

2007). As a consequence, food insecurity and hunger are likely to rise significantly. While drought will pose challenges to many countries, some areas might benefit from more rain, or be exposed to more frequent flooding after intense rainfall. Unless timely adaptation occurs, sea level rise will exacerbate coastal hazards and threaten coastal infrastructure and settlements, especially rapidly growing coastal cities. Pressures on natural resources and biodiversity are projected to increase due to climate change, including significant risks of biodiversity loss in Asia and Latin America and increasing damage to coral reefs for Asia and small island states (IPCC, 2007; OECD, 2012a). Climate change is also likely to have a range of impacts on human health, including making previously malaria-free areas in eastern Africa susceptible to malaria incursions; increasing health and death risks due to flooding in East, South and South-East Asia; and increasing malaria, heat stress and water-borne disease risks in Latin America (IPCC, 2007; OECD, 2012a).

Many developing country economies rely heavily on climate sensitive sectors such as agriculture or fisheries. The impacts of climate change in these areas are also likely to be worse because exposure to high temperatures is already high today in many developing countries; additional increases, as projected in many developing countries, will push them further away from optimal temperatures for these activities (IPCC, 2007). In addition, many developing countries have limited capacity to cope with environmental impacts and extreme events, due to low GDP, high levels of poverty, low levels of education, and under-developed institutions, technical skills, human capital and financial and economic systems (OECD, 2009).

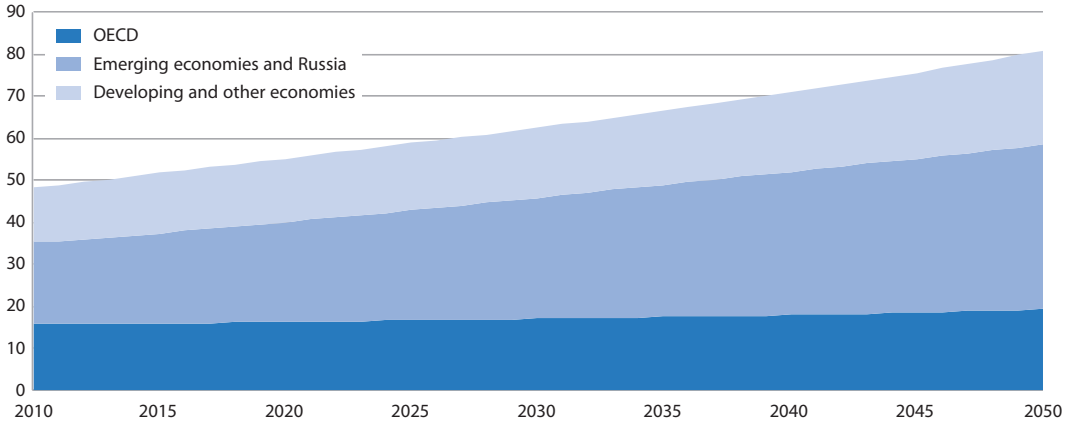
Without adaptation, climate change will have significant consequences for growth and for efforts to reduce poverty in developing countries. It will reduce the potential for economic growth in developing economies through both incremental changes in climate and the rise in impacts from extreme events. A wide range of studies has identified links between decreases in growth or welfare and climate change impacts.[7] These have considered the specific connections with increasing average temperatures (Dell et al., 2011); with decreased agricultural yields and production (Arndt et al., 2012; Calzadilla et al., 2009); with impacts on infrastructure (Arndt et al., 2011b); and with impacts on natural resources (Reid et al., 2007). Natural disasters and extreme events can give rise to significant economic damage, in addition to the environmental and humanitarian impacts.

While developed countries experience the highest economic costs from natural disasters in absolute terms, economic losses as a proportion of GDP are higher in developing countries (IPCC, 2012). In addition to the one-off economic impacts, disasters can also reduce long-term economic growth prospects by diverting expenditure towards emergency relief and reconstruction at the expense of investments in growth and poverty reduction (Benson and Clay, 2004), or by reducing the quantity of productive capital in the economy (Vivid Economics, 2010). For example, the long-term economic growth effects of Hurricane Mitch in Honduras were such that six years after the hurricane struck in 1998, GDP was estimated to be 6% to 9% below what it would have been without the hurricane (CDKN, 2012a). Without measures to manage these risks, the losses from natural disasters and extreme events in low and middle-income countries may even rise faster than their economic growth rates (CDKN, 2012a).

In addition to being vulnerable to climate change, developing countries are increasingly contributing to it (Figure 2.9). Many developing countries are already locked into energy sources that emit high levels of pollution and greenhouse gases. Without deploying new, low-emission sources of energy on a scale equivalent to the industrial revolution, the energy-related emissions of CO_2 from developing countries are projected to double by 2050 (OECD 2012a; IEA, 2011).

Figure 2.9. **Trends in greenhouse gas emissions, 2010-50**

Gigatonnes of carbon dioxide equivalent ($GtCO_2e$)



Note: Carbon dioxide equivalent is the amount of CO_2 emissions that would cause the same time-integrated radiative forcing, over a given time horizon, as an emitted amount of a long-lived greenhouse gas or a mixture of greenhouse gases. The equivalent CO_2 emission is obtained by multiplying the emission of a greenhouse gas by its global warming potential for the given time horizon. For mixed greenhouse gases it is obtained by summing the equivalent CO_2 emissions of each gas. Equivalent CO2 emission is a standard and useful metric for comparing emissions of different greenhouse gases but does not imply the same climate change response.

OECD includes Mexico and Chile, even though these countries also receive official development assistance (ODA). Emerging economies include Brazil, China, India, Indonesia and South Africa. Developing and other economies include all other countries, regardless of whether they receive ODA.

Source: OECD Environmental Outlook Baseline; output from ENV-Linkages.

StatLink http://dx.doi.org/10.1787/888932830008

2.3. What potential benefits might green growth provide to developing countries?

As well as offering a way to avoid the risks posed to health, the environment and economic growth by a business-as-usual growth path, green growth can also provide a number of benefits to developing countries.

Sustainable management of natural assets to build stable growth and human well-being

Sustainable management of natural assets in developing countries will need to balance short and long-term benefits. If the productivity or added value of the resource is not carefully managed, efforts to sustainably manage natural resources over the long term could potentially undermine short-term growth in developing countries. Setting limits on resource consumption may reduce short-term growth in related sectors but help to maintain productivity over the long term. For example, the sustainable management of renewable resources such as forests and fisheries may lead to an immediate decrease in the primary materials available for people in developing countries to earn their livelihood, and may also impose restrictions on related activities, such as agriculture or fishing (e.g. prohibitions on developing forest land for agriculture, or restrictions on agricultural chemicals that may harm water supply or fish stocks). Creating growth in the face of such restrictions will mean improving productivity and product quality, moving up the value chain, and capturing the value generated by the protection and enhancement of ecosystem services to return it to those most affected in the near term (World Bank, 2012). It also requires taking a longer-term perspective and considering the productive life of the natural assets that are being managed.

There is a growing number of successful examples of sustainable resource management in developing countries that are delivering direct, local benefits for development (Boxes 2.3 and 2.4). For example, the net loss of global forest area between 2000 and 2010 was 5.2 million hectares a year, down from 8.3 million between 1990 and 2000 (FAO, 2010). This can be attributed in particular to the strong policies in Indonesia and Brazil to reduce deforestation. Furthermore, protected areas now cover nearly 13% of the total land area in developing countries, compared to 11.6% in developed countries, and increasingly include indigenous and local community-managed areas (UNEP, 2012; World Database on Protected Areas website).

Box 2.3. **Green growth through forest, fish and water resource management: What developing countries are already doing**

- *Job creation through tackling invasive non-native plants*: these species pose a threat to South Africa's biodiversity, as well as to water security, the ecological functioning of natural systems and the productive use of land. The government's Working for Water programme has cleared alien species from more than one million hectares of land, providing jobs and training for approximately 30 000 people every year, over half of them women.
- *Income and jobs from sustainable forestry*: forests account for almost 40% of the land in Nepal. The Forest Act and Forest Rules recognise Community Forest User Groups as "self-governing autonomous corporate bodies for managing and using community forests". Community-owned forests now make up around a fifth of all forested land in the country, with 17 685 groups of local community members managing more than 1.6 million hectares. More than two million households are benefiting from employment and income from forest protection, tree felling, log extraction, and non-timber forest products (Elson, 2012).

Source: Department of Water Affairs website, Republic of South Africa *www.dwaf.gov.za/wfw/,* accessed 22 February 2013; Elson, D. (2012), *Guide to Investing in Locally Controlled Forestry*, Growing Forest Partnerships in association with FAO, IIED, IUCN, The Forests Dialogue and the World Bank, IIED, London.

Beyond economic growth, natural assets also provide ecosystem services that are vital to sustain growth and quality of life. Growth that does not sustainably manage these ecosystem services risks reducing the quality of air, water, soil and other assets on which human health and well-being depend (OECD, 2011a). Low environmental quality resulting from unsustainable resource use can significantly harm human health and create sizeable costs for the economy over time. Poorer populations are particularly vulnerable to poor environmental quality, as they are less able to pay for access to higher quality resources (e.g. bottled water, less-polluting cook stoves, or dwellings located far from pollution "hot spots" or outside of flood zones).

Reduced poverty, depending on policy design

Green growth presents an opportunity to generate higher value from natural assets (Box 2.4), but the benefits to the poor depend on how the revenue is distributed and how immediate costs are financed. Poor individuals and communities risk being marginalised from revenue gains as they are less likely to have the financial resources, knowledge and skills to adjust their production methods and practices to profit from supplying environmental goods and services. For example, the costs of getting certified to participate in an "eco-labelling " scheme or other sustainable product standards may exclude small farmers, loggers, fishermen and other producers who may not have sufficient savings or institutional support, unless policies are designed to explicitly include these communities (OECD, forthcoming a).

Box 2.4. How green growth can increase the income for local communities dependent on natural resources

- *Controlled fishing increases shrimp prices in Madagascar:* the shrimp industry brings Madagascar over USD 155 million a year in export revenues. Efforts by the private sector and the government to improve the industry have led to significantly rising prices. These efforts included controls on overfishing, leading to larger shrimp sizes, and improved access to market and other information through an economic observatory. Export prices increased by 10% in 2000/01 and 3% in 2001/02, raising incomes for local fishing communities (OECD, 2008).
- *Increased incomes from organic agriculture in Uganda:* Uganda's organically certified agriculture export value jumped from almost USD 3 million in 2003 to almost USD 23 million in 2008. Price premiums for Ugandan farmers of certified pineapple, ginger and vanilla were 300, 185 and 150% higher respectively than for conventional producers (UNEP, 2011).
- *Benefits from natural forest regeneration in Ethiopia***:** under the Humbo Assisted Natural Regeneration Project, farmer-managed regeneration of natural forest encourages new growth from felled tree stumps. The regeneration of nearly 3 000 hectares has resulted in increased production of wood and tree products, such as honey and fruit, which has increased household revenues. Improved land management has also stimulated grass growth, providing fodder for livestock that can be sold as an additional source of income. Regeneration of the native forest is expected to provide an important habitat for many local species, as well as reduce soil erosion and flooding (World Bank, 2012 citing Brown et al., 2011).

Sources: OECD (2008), *Natural Resources and Pro-Poor Growth: The Economics and Politics*, DAC Guidelines and Reference Series, OECD Publishing, Paris; UNEP (2011), *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication – A Synthesis for Policy Makers*, UNEP, Nairobi; World Bank (2012), *Inclusive Green Growth: the Pathway to Sustainable Development*, The World Bank, Washington, DC; Brown, DR., et al. (2011), "Poverty Alleviation and Environmental Restoration Using the Clean Development Mechanism: A Case Study from Humbo Ethiopia", *Environmental Management*, August 2011, Volume 48, Issue 2.

Fiscal green growth policies and subsidy reform can give incentives for sustainable resource use and may raise revenue for infrastructure; however, they may also raise resource prices. Concerns have been expressed that such green growth policies – such as higher water tariffs, carbon taxes, and the removal of water or fossil fuel subsidies – could affect poor households disproportionately, because they spend a higher proportion of their income on these basic essentials. The impact also depends on the type of fossil fuel affected and what form of the subsidy or the tax takes. For example, in the case of India, taxing or removing subsidies on kerosene could impose a significant burden on the poor, as poor households rely on it for cooking fuel (IEA, 2011). Higher prices for other natural assets such as water, agriculture and forest products could also present a larger burden for the poor (Schroeder, 2008; IEA, 2011). However, experience in Indonesia and India, for example, suggests that the poor in developing countries are less negatively affected if complementary policies such as cash transfers and other social protection mechanisms are in place to ensure that disadvantaged groups are being compensated for the change due to fiscal policies or reform of environmentally-harmful subsidies. Some of these policy instruments are discussed in Chapter 3.

To ensure that green growth policies contribute to poverty reduction in developing countries, it is important to consider two aspects: (1) how the economic and environmental benefits of green growth are distributed, including to what extent they reach the poor in

both the short and long term; and (2) how the financial effects and immediate costs are distributed, including higher taxes and higher prices for the basic goods on which the poor rely. It is essential to design and implement green growth policies carefully to account for these distributional impacts in terms of the benefits or costs experienced by the poorest populations (OECD, forthcoming a).

New economic growth opportunities and potentially new job opportunities

Green growth in developed countries could present opportunities for developing countries that sustainably manage their natural assets. For example, the rapidly growing organic agriculture sub-sector provides opportunities for both domestic and export markets for many developing countries. In this sub-sector, 97% of the revenues in developing countries are generated in developed countries, while of the total number of producers, 80% of them are from developing countries (Willer and Kilcher, 2009). Developing countries gain from selling carbon credits to developed countries and are also attracting foreign investment to green infrastructure projects, which can drive further business opportunities. Ethiopia recently identified its domestic potential greenhouse gas abatement to be 250 million tonnes of equivalent CO_2 (CO_2eq) by 2030 through implementing its Climate Resilient Green Economy Strategy (EPA, 2011; OECD, forthcoming b). For more than 80% of the mitigation potential, abatement costs are less than USD 15 per tonne of CO_2eq. One main element of this strategy is aimed at attracting international climate finance and support from development partners to help finance these projects, whose total cost is estimated at USD 150 billion over the next 20 years (EPA, 2011; see also Box 3.2 in Chapter 3).

Biodiversity and ecosystem services could be larger sources of growth for developing countries than currently, but valuing and establishing appropriate and effective incentives for natural assets is an essential first step. Given that developing countries often have rights over significant biodiversity and large natural areas of biodiversity-rich ecosystems, there is the potential to better capture the value from these assets (see Box 1.3 in Chapter 1), especially as many local ecosystem services will accompany global services. For example, highly biodiverse tropical forests are often soil-conserving and water-retaining, and therefore also high-carbon retaining. The challenge is to place economic value on natural assets in a way that makes the most of growth opportunities and sustains the resource while also delivering the most valued benefits. Most often these assets are economically "invisible", or their value is only captured through marketed products, such as timber, where incentives for sustainable management are weak. Brazil and Costa Rica have both created mechanisms for rewarding activities that conserve and sustainably use natural assets (Box 1.3 in Chapter 1; Box 2.5). A number of other instruments are also available, such as community-based forest management and ecosystem-based adaptation, to help foster biodiversity and natural asset conservation and sustainable use while also delivering development benefits to local communities (OECD, 2012a). Eco-tourism is another emerging economic activity, which has already profited many developing countries with natural resource comparative advantages.

There is also growing evidence that green policies can have a net positive impact on employment, with many studies indicating net gains in employment of 0.5–2% (ILO, 2013). Moreover, recent studies suggest that employment gains may be higher in emerging economies and developing countries than in industrialised ones. This can be the case notably when environmental policies are combined with complementary government policies and incentives such as tax credits, transitional green subsidies, worker training and education. The eight sectors where greening economies could particularly contribute to net employment are agriculture, forestry, fisheries, energy, resource-intensive manufacturing,

recycling, building and transport. These are also sectors that tend to employ the largest share of the population in developing countries – notably in the poorer countries where productive and income generating sectors typically rely on natural resources. By complementing green policies with labour market and social policies, including social protection and the upgrading of skills, any potential negative effects of greening reforms can be reduced (ILO, 2013).

Box 2.5. **Green growth through biodiversity and ecosystem services: What developing countries are already doing**

- Brazil's Family Production Socio-environmental Development Program (*Proambiente*) awards farmers and ranchers with up to one-third of the minimum wage when they use more environmentally sound agricultural production practices, such as not using pesticides, or introducing sustainable agroforestry systems.
- Costa Rica's Payments for Environmental Services programme, created by law in 1996 and financed through taxes on fuel and water, discourages deforestation by paying forest owners for the environmental services that the forest produces, such as watershed and biodiversity protection and greenhouse gas mitigation. The programme has paid out over USD 230 million since its inception.

Source: The Proambiente and Fonafifo websites, *www.proambiente.cnpm.embrapa.br*; *www.fonafifo.go.cr*; Porras (2010), *Fair and Green? The social impacts of payments for environmental services in Costa Rica*, International Institute for Environment and Development, London; OECD (2010b), *Paying for Biodiversity: Enhancing the Cost-Effectiveness of Payments for Ecosystem Services*, OECD Publishing, Paris.

Infrastructure that does not lock countries into emission-intensive pathways

Infrastructure built today will determine the ecological impact of development for decades to come. Its long working life means that much infrastructure can be vulnerable to future climate and natural disaster risks, and can lock in high levels of local pollution and greenhouse gas emissions. The general lack of infrastructure to deliver basic services in developing countries is an opportunity for them to get their infrastructure right (World Bank, 2012). This can be done through integrating climate change and other environmental concerns into infrastructure planning to build more climate-resilient and energy-efficient infrastructure for future sustainable development (Corfee-Morlot et al., 2012; OECD et al., 2012; OECD, 2012c). Investing in green infrastructure is critical for developing countries to minimise environmental and financial risks, build resilience and avoid costly renovations at a later date. For example, investing in clean transport infrastructure presents an opportunity for developing countries to avoid locking in energy inefficient transportation modes and brings co-benefits in terms of reduced congestion and air pollution, and improved health. Some positive examples of green infrastructure investment in developing countries are presented in Box 3.9 in Chapter 3.

The barriers to shifting to green infrastructure in developing countries vary. In rapidly urbanising countries there is a lack of sufficient public funding and limited access to capital markets; and shifting to green infrastructure is part of a larger investment gap for infrastructure more generally. Other barriers include a tendency to plan for the short term, ignoring the realities of urban population growth and economic and environmental change. Developing country governments may lack the capacity to assess and address environmental challenges in an integrated fashion in implementing infrastructure projects as part of development planning. These barriers could be tackled through a more holistic approach; by bringing together actors from land-use planning, transport planning, city

planning, and finance and trade sectors to agree on a long-term vision; and by using existing planning tools so that green infrastructure can become an engine for future growth and development.

Resilience to climate change and natural disasters

As noted, climate change threatens to reduce economic growth, to damage natural resources and to harm the livelihoods of the poor in particular. As discussed earlier, extreme weather events are expected to intensify due to climate change, with significant economic costs and a reduction in economic growth over subsequent years. Even gradual climate change can slow down economic growth. Climate change will also make it more difficult to ensure the sustainability and productivity of natural resources and biodiversity. This will have significant consequences for the welfare and livelihoods of the poor, particularly if they depend on agriculture and natural resources, and will make it harder to achieve socially equitable growth. For this reason, policies for green growth and resilience to climate change and natural disasters can be of mutual benefit.

Green growth can contribute to climate resilience. By maintaining a healthy natural resources base, green growth helps to maximise the adaptive capacity of ecosystems and of the people who depend on them (Bowen et al., 2012; CDKN, 2012b). For instance, protecting coastal mangroves or inland watershed areas ensures natural flood buffering against storm surges and water security benefits (IUCN, 2010). Another example is energy or water efficiency measures that provide short-term financial benefits for firms and households but also build systemic resilience to energy shortages (e.g. in the event of a disaster and ensuing power outages) (Pasquier, 2011; OECD et al., 2012). Additionally, inclusive economic growth itself will help to make countries more resilient, as increasing wealth and household income should improve people's ability to cope with climate change impacts. Green growth policies need to take the reality of climate change into account in order to decrease the vulnerability of the economy, design growth policies that are sustainable in the long term, and offer alternative options to those who are most vulnerable to the impacts of climate change.

Climate resilience is also a crucial component of green growth. As climate change makes it harder to achieve the economic, social and environmental benefits of green growth, adaptation to climate change and policies to manage the risks from natural disasters and extreme weather have a key role to play in safeguarding economic growth and development, and in achieving the economic, environmental and social benefits of green growth. Recent national studies in Ethiopia, Vietnam and Samoa suggest that adaptation investments can significantly reduce the economic losses from climate change (World Bank 2010b, c and d). Some adaptation measures can also provide additional economic growth – for example, agricultural climate-proofing measures in the Mopti region of Mali have the potential to generate additional revenue by delivering two harvests per year instead of one, by increasing the land area for horticulture, and by increasing the cultivation of cash crops (ECA, 2009).

Given the potential negative impact that climate change can have on natural resources and biodiversity, efforts to increase wealth through natural assets need to incorporate adaptation measures. Measures that use ecosystem conservation in land-use planning to adapt to climate change can help to respond to gradual changes and natural disasters, for example by providing "space for water" in the event of flooding or preserving mangroves as a means to buffer storms. Efficient use of natural resources is also a means of anticipating and limiting the risk of instability in the natural resource base due to external shocks from extreme weather. Finally, climate change might alter conservation priorities and practices. For example, a higher flood risk can increase the need for forest

conservation on hillsides, while projections of a drier climate can change the preferred tree species for a reforestation project. Some developing countries have already recognised the important links between green growth, poverty reduction and climate resilience. For example, Rwanda launched its national *Green Growth and Climate Resilience* strategy in 2011, and Ethiopia is currently developing the climate resilience component of its *Climate Resilient Green Growth Strategy* (Republic of Rwanda, 2011; EPA, 2011). Bangladesh's *Climate Change Strategy and Action Plan 2009* makes adaptation a political priority, and adaptation is mainstreamed in the country's *Poverty Reduction Strategy Papers* to ensure coherence with development policies (MoEF, 2008).

Greater energy security and lower emissions

Green growth policies in developing countries will also need to help increase energy access (OECD and IEA, 2011). Today, 585 million people in sub-Saharan Africa lack access to electricity, and some 85% of those without access live in rural areas (IEA, 2010). One important element of green growth strategies is to promote clean and efficient technologies and energy use practices that can help to both scale up energy access to many rural locations and to deliver local and global environmental benefits, for example by leap-frogging traditional, fossil fuel-based technologies. For example, the deployment of off-grid power generation in rural areas can avoid the significant costs of establishing and maintaining power grid infrastructure, while also ensuring low conventional air pollution and greenhouse gas emissions (Box 2.6). Access to modern energy can also avoid over-use of traditional biomass, which contributes to high deforestation rates and soil degradation, as well as indoor air pollution with high health risks, in African and Asian countries.

Box 2.6. **Energy systems and green growth: What developing countries are already doing**

- Ghana is the largest per capita consumer of charcoal in West Africa. Toyola, a private company based in Ghana, manufactures and sells cooking stoves which are 40% more efficient than the traditional models. To date 35 000 households have purchased these cookstoves, offsetting 15 000 tonnes of carbon dioxide emissions and employing over 200 people. The business model is easily replicable in many countries (Green Economy Coalition, *www.greeneconomycoalition.org/glimpses/efficient-cooking-stoves-ghana-china*).
- Jamaica aims to diversify energy supplies by creating a stable regulatory framework to promote renewable energy technologies. These include use of wind, solar, and biomass among others, thereby simultaneously reducing the country's need to spend foreign exchange on importing fossil fuels rather than on other development objectives such as health care and education (UNCSD submission Jamaica, 2012).
- Tunisia's solar energy plan (2010-16) aims to cut national energy consumption by 22% and to increase renewable energy production to 1 000 MW by 2016. A framework of regulations and incentives is gradually being put in place to encourage the production of renewable energy. The most recent example is the self-generation of electricity using renewable energy sources, which allows private users to sell surplus energy to the national power utility (UNCSD submission, Tunisia, 2012).

Source: Green Economy Coalition, *www.greeneconomycoalition.org/glimpses/efficient-cooking-stoves-ghana-china*; UNCSD submission, Jamaica (2012), w*ww.uncsd2012.org/rio20/index.php?page=view&type=510&nr=566&menu=20*; UNCSD submission, Tunisia (2012), *www.uncsd2012.org/rio20/index.php?page=view&type=510&nr=220&menu=20.*

Through pursuit of higher energy efficiency and increased use of renewable resources, green growth should reduce dependency on fossil fuels and help to build long-term energy security. Fossil fuel dependence exposes countries' growth pathways to both financial and political risks arising from the price volatility of fossil fuels. Reducing fossil fuel dependence also reduces the fiscal burden from fossil fuel subsidies where they are in place (however, subsidy reform is also essential, as noted above). Without such policies, dependence on fossil fuels can also lock-in higher local air pollution and higher carbon emissions for many years through long-lived infrastructure choices and development patterns (e.g. for transport). While many developing countries are not currently significant contributors to climate change, projections over 2010-50 estimate that their impact on climate change will grow at a faster rate than OECD countries (Figure 2.9). Choosing low-carbon modes of development now will reduce the costs of greenhouse gas mitigation in the future. In addition, a number of developing countries note that their natural resource endowments put them at a relative advantage for developing renewable energy sources, which in turn can provide opportunities for new business activities and economic growth while helping their economies become more resilient to external "shocks" from the global energy market (Box 2.6).

This chapter has highlighted the potential that developing countries have for growing in a sustainable way, and the consequences of failing to adopt a greener growth path. Many of the concerns expressed by developing countries about transitioning to green growth can be allayed through careful policy design. The next chapter outlines an agenda for action to set the vision, design and implement green growth policies in developing countries, while taking into account their institutional and economic challenges.

Notes

1. *Perspectives of Global Development*: *Shifting Wealth* (OECD, 2010a) defines converging or catching-up economies as those which have seen per capita income growing at more than twice the rate of high income OECD countries; and poor countries as those growing at less than that rate and with a per capita annual income level of less than USD 935 in 2007.
2. Defined as those who spend between USD 10 and USD 100 per day (Kharas, 2010).
3. Poverty in China, measured at USD 1.25 a day in PPP terms, fell from 60% of the population in 1990 to 13% in 2008. The number of poor worldwide declined by nearly 300 million in the first half of the 2000s, compared with 120 million in the 1990s. A recent study on poverty incidence in Asia shows that this trend (measured by the USD 1.25 per day poverty line) has been continuing, albeit at a slower pace, in more recent years (Wan and Sebastian, 2011).
4. World Bank website on poverty, see *http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTPA/0,,contentMDK:22397595~pagePK:210058~piPK:210062~theSitePK:430367,00.html.*
5. See ADB (2012) for a detailed discussion of income and non-income inequality in a broad range of Asian developing countries.
6. The Gini coefficient is a number between 0 and 1, where 0 corresponds with perfect equality (where everyone has the same income) and 1 corresponds with perfect inequality (where one person has all the income and everyone else has zero income).
7. See Vivid Economics, 2010; AIACC 2006; Arndt et al., 2011a; Robinson et al., 2012; SEI, 2009, 2010; Thurlow et al., 2009.

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Annex 2.A1

OECD list of recipients of official development assistance

Table 2.A1.1. **The OECD Development Assistance Committee list of recipients of Official Development Assistance**
Effective for reporting on 2011, 2012 and 2013 flows, as of January 2012

LEAST DEVELOPED COUNTRIES	OTHER LOW-INCOME COUNTRIES (per capita GNI < = USD 1 005 in 2010)	LOWER MIDDLE-INCOME COUNTRIES AND TERRITORIES (per capita GNI USD 1 006-3 975 in 2010)	UPPER MIDDLE-INCOME COUNTRIES AND TERRITORIES (per capita GNI USD 3 976-12 275 in 2010)
Afghanistan	Kenya	Armenia	Albania
Angola	Korea, Dem. Rep.	Belize	Algeria
Bangladesh	Kyrgyz Rep.	Bolivia	*Anguilla
Benin	South Sudan	Cameroon	Antigua and Barbuda
Bhutan	Tajikistan	Cape Verde	Argentina
Burkina Faso	Zimbabwe	Congo, Rep.	Azerbaijan
Burundi		Côte d'Ivoire	Belarus
Cambodia		Egypt	Bosnia and Herzegovina
Central African Rep.		El Salvador	Botswana
Chad		Fiji	Brazil
Comoros		Georgia	Chile
Congo, Dem. Rep.		Ghana	China
Djibouti		Guatemala	Colombia
Equatorial Guinea		Guyana	Cook Islands
Eritrea		Honduras	Costa Rica
Ethiopia		India	Cuba
Gambia		Indonesia	Dominica
Guinea		Iraq	Dominican Republic
Guinea-Bissau		Kosovo[1]	Ecuador
Haiti		Marshall Islands	Former Yugoslav Republic of
Kiribati		Micronesia, Federated States	Macedonia
Laos		Moldova	Gabon
Lesotho		Mongolia	Grenada
Liberia		Morocco	Iran
Madagascar		Nicaragua	Jamaica
Malawi		Nigeria	Jordan
Mali		Pakistan	Kazakhstan
Mauritania		Papua New Guinea	Lebanon
Mozambique		Paraguay	Libya
Myanmar		Philippines	Malaysia
Nepal		Sri Lanka	Maldives
Niger		Swaziland	Mauritius
Rwanda		Syria	Mexico
Samoa		*Tokelau	Montenegro
São Tomé and Príncipe		Tonga	*Montserrat
Senegal		Turkmenistan	Namibia
Sierra Leone		Ukraine	Nauru
Solomon Islands		Uzbekistan	Niue
Somalia		Vietnam	Palau
Sudan		West Bank and Gaza Strip	Panama
Tanzania			Peru
Timor-Leste			Serbia
Togo			Seychelles
Tuvalu			South Africa
Uganda			*St. Helena
Vanuatu			St. Kitts-Nevis
Yemen			St. Lucia
Zambia			St. Vincent and Grenadines
			Suriname
			Thailand
			Tunisia
			Turkey
			Uruguay
			Venezuela
			*Wallis and Futuna

* Territory

(1) This is without prejudice to the status of Kosovo under international law.

Chapter 3

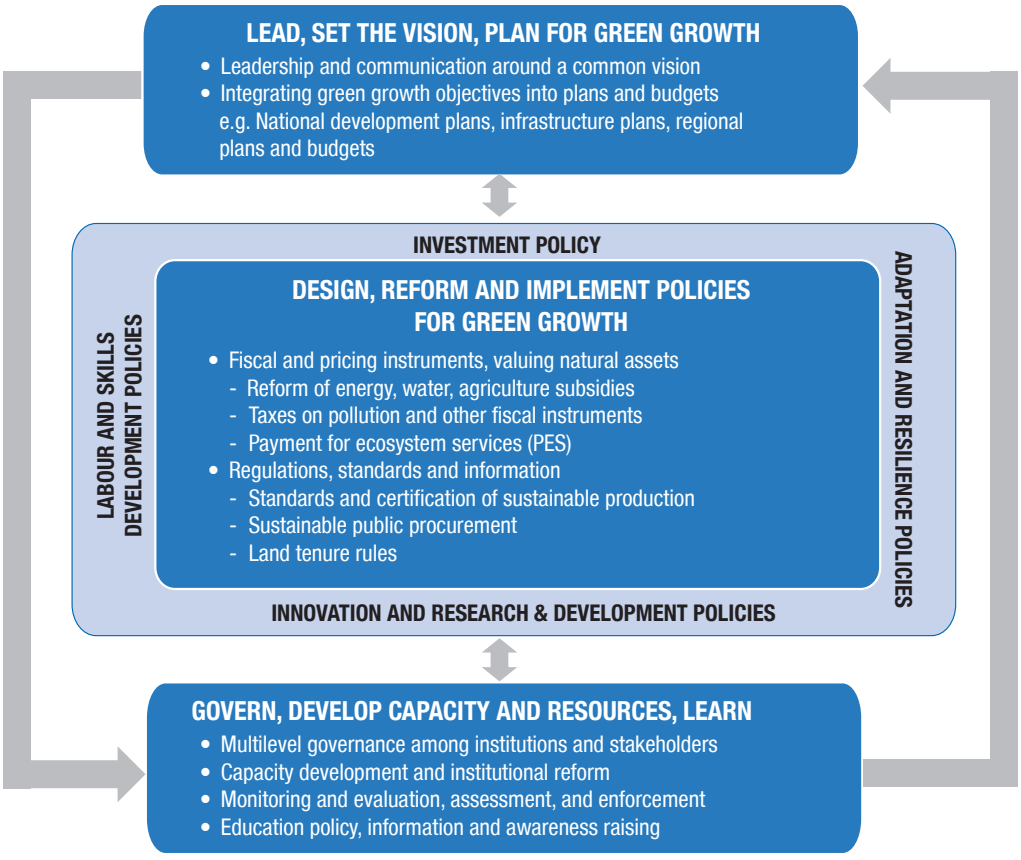
An agenda for action on national green growth policy

This chapter outlines an agenda for action to plan, design and implement green growth policies in developing countries. It provides many practical examples of different policy instruments and mechanisms that are being successfully used in developing countries today. Each of these tools is assessed for its economic, environmental and social implications; its uptake in developing countries; and lessons learned to inform any future scaling-up or wider use. Tools range from energy subsidy reform, payment for ecosystem services and fiscal instruments to production and procurement standards, certifications, and land tenure regulations. The chapter also reviews the type of cross-cutting policies that will be essential for mainstreaming green growth, especially policies related to investment, innovation and research & development, labour and skills development, and climate change adaptation and resilience. The chapter concludes by reviewing the institutional mechanisms and resources required to govern, develop capacity, implement, measure progress, enforce and learn from the implementation of green growth strategies.

This chapter outlines a practical three-part agenda to guide developing country policy makers as they explore and pursue green growth (Figure 3.1). The chapter is structured around each part of this agenda and draws on the growing number of successful examples and evidence from green growth policies in developing countries. This agenda builds on the *OECD Green Growth Strategy* (OECD, 2011a).

Individual countries will have very different starting points for exploring green growth. While each part is important for developing robust national green growth policies, this agenda should be treated as a guide rather than a blueprint. Decision makers can pick and choose the most suitable entry points and policy mixes for their countries. The chosen policies and measures will provide the incentives, allocate fiscal budgets, assess opportunities and progress, and engage all stakeholders in learning and decision making to sustainably manage natural assets and improve human well-being. It is also important to note that this agenda for action on national green growth and development belongs to all stakeholders, including the private sector, civil society groups, academia and ordinary citizens. International co-operation is also needed to help support national action on green growth in developing countries. An agenda for international action is discussed in Chapter 4.

Figure 3.1. **An agenda for national action on green growth in developing countries**



3.1. Establishing leadership, setting the vision and planning for green growth

Pursuing green growth at the national level is often most effective when guided by a clear strategy or vision that is built upon engagement and input from key stakeholders. It is most useful when championed at the highest level of national leadership (e.g. by the president or prime minister), as well as the ministers charged with overseeing its key activities (e.g. ministers of planning or finance). It should present a vision of what green growth will look like in the short and medium term, and objectives around which plans can be built. A clear vision for green growth can:

- help to communicate national policy priorities and maintain strong engagement with stakeholders;
- help motivate officials from multiple ministries to work towards a common goal;
- achieve policy coherence among environmental and economic policies; and
- guide investment decisions in the private sector.

As green growth is a fundamental shift away from existing growth models, interested countries will need to reconsider and revise their current plans for growth and development. To be effective, strategies for green growth should be aligned with and integrated into existing national development plans and policies. Integrating green growth into development planning will be most successful if combined with dialogue around what type of development pathways are desired and the role of different stakeholders, including different parts of government but also affected communities, consumers and business. Plans are tools to develop and reflect a common "vision" of the future by those served by development policies. Using pre-existing national development plans to steer green growth is a good way of systematically incorporating key goals into sectoral, territorial and land use policies, infrastructure planning and budgetary allocations (OECD, 2012a).

Integrating green growth objectives into plans and budgets

Development patterns are established through a myriad of investment, land use and infrastructure decisions. Infrastructure investments are long-lived and particularly important because they can lock-in environmental risk, vulnerability and resource-intensive growth, or alternatively open the way towards green growth. These investments are often financed or co-financed with national-level public funds but designed and implemented locally. For this reason, institutions for multi-level governance will be needed to align planning priorities across national, sub-national and local governments and stakeholders (Section 3.4).

Overall national development, land-use and infrastructure planning, when combined with rigorous social and environmental assessment, provides an opportunity to proactively integrate green growth considerations into sector policies as well as physical planning and capital investment decisions (Section 3.3). Integrating green growth into development planning, including through use of physical and financial planning instruments, can help policy makers to make the most of limited resources and work towards common goals. Good planning and policy decisions will require assessment tools and capacity to evaluate the costs, benefits and possible trade-offs of alternative green policies or measures, based on the best available information, and mechanisms to review and update decisions based on lessons learnt from future evaluations (this is further discussed in Section 3.4).

Pursuing green growth means incorporating the value of natural assets into the economic growth model and development planning so as to ensure that these assets continue to provide the resources and environmental services on which well-being and economic activity rely. A national strategy can usefully identify the specific natural resources and ecosystem services that are key to green growth and highlight the benefits these natural assets provide. A variety of policy instruments are available to take into account the value of natural assets in light of the full benefits they provide to growth and development (e.g. see Section 3.2). Some developing countries have already employed certain tools to ensure that green growth objectives align with development plans. These include the use of strategic environmental assessment, public environmental expenditure reviews, and efforts to integrate climate change adaptation and resilience into national-level policy processes. These are described in more detail in the sections that follow, but first we outline some of the principles for mainstreaming green growth across government.

Principles for mainstreaming green growth strategies and policies

A recent study of 13 developing countries' efforts to integrate environment and development policies through sustainable development strategies highlights three principles for a successful alignment of policies, as well as a list of best practices (Box 3.1) (Dalal-Clayton and Bass, 2009):

1. *Integrate green growth objectives into mainstream national plans* and related strategies before embarking on major individual green growth projects, especially given the range of trade-offs that might be associated with individual projects.
2. *Acknowledge and engage the different interests* embedded in existing strategies. The process of stakeholder engagement to build and refine a national green growth vision and strategy will matter to its political acceptance and implementation by stakeholders.
3. *Manage uncertainty and allow for continuous learning and updating of the national green growth strategy.* Developed and developing countries alike are only beginning to pursue green growth, and scientific, technological and market uncertainty is high. National green growth strategies need to be regularly reviewed and refined, in particular to foster market confidence. In the agenda for action on national green growth policy (Figure 3.1), capacity development and monitoring, evaluation and dissemination of findings are all useful tools for managing uncertainty.

Many mainstream policy arenas can and should support green growth. These include fiscal, development, technology, investment, labour, innovation, adaptation, trade and foreign policies. It is politically and administratively difficult to orchestrate the simultaneous improvement of all these policy areas; however, a mainstreaming process can provide an opportunity to map common objectives and gaps, identify approaches that work, and mobilise the various actors. It is likely to require a clear, overarching strategy, as discussed above, to promote the green growth concept where particular plans do not yet have tractable entry points or are moribund. By identifying promising policy options from amongst existing plans, this can ensure that they are quickly mobilised and scaled up, avoiding the legislative and other delays associated with planning from scratch.

Cambodia and Ethiopia are among the low-income developing countries to embark on national green growth strategies. Both national green growth strategies rely on attracting quality foreign investment for financing. They differ, however, in their aim and focus:

Cambodia's strategy focuses on well-being, whereas Ethiopia's strategy focuses on climate change (and by extension, food security) and aims to raise the country to middle-income status. The OECD, in a series of case studies on inclusive green growth undertaken in partnership with the International Institute for Environment and Development (IIED), has analysed these differences and recommended changes to increase each strategy's effectiveness (Box 3.2; OECD, forthcoming a and b).

Box 3.1. **Best practices for aligning environment and development policies**

1. *Identify the plans that direct national policy, institutions and public expenditure*: Generally a multi-year national development plan predominates, but others may also be pivotal, including:
    - national vision statements *(*e.g. Vision 2050, 2030, 2020);
    - national economic/growth policies (e.g. recovery strategies, stimulus programmes);
    - poverty reduction strategies;
    - national budgetary processes;
    - infrastructure investment plans;
    - spatial plans (e.g. urbanisation and land use plans).
2. *Assess the degree to which each of the above plans align with green growth priorities* – whether detailed intentions (specific, budgeted activities and targets) or mere mention.
3. *Analyse trends and coherence* – noting the most common green growth outcomes aimed at by the diverse plans; and identifying potential synergies and gaps to be addressed.
4. *Assess green growth opportunities* – some of these will have been identified by existing plans; their efficiencies, potential linkages (e.g. input-output synergies) and added value need to be assessed.
5. *Consult* – bring together economic, social and environmental stakeholders in government, civil society and business to discuss the above analysis and begin to outline options to explore, and how they will be governed.
6. *Identify the economy-wide enabling factors* required to deliver green growth benefits, such as regulation enforcement, without which specific policies and investments may not be taken up or produce adequate leverage.
7. *Develop and adjust resource/sector policies and particular policy options for delivery, translate policies into action plans and budget lines*, together with an assessment of the likely impacts of those policies on green growth outcomes (or economic, environmental and social impacts).
8. *Establish long-term institutional mechanisms for continuous improvement* in mainstreaming green growth over time. Where an initial green growth strategy can mobilise stakeholders through its predictability (clear visions) and credibility (having built on what works and addressing stakeholder needs), mechanisms are also needed to bring in the right degree of flexibility (in the light of learning and changing conditions).

Source: Dalal-Clayton, D.B. and S. Bass (2009), *The Challenges of Environmental Mainstreaming: Experience of integrating environment into development decisions and institutions*, International Institute for Environment and Development, London.

Box 3.2. Green growth strategies in Cambodia and Ethiopia: Two approaches

The table below highlights the main features of emerging green growth strategies in Cambodia and Ethiopia, comparing the different approaches. The OECD, in partnership with IIED, is working in collaboration with the governments in these countries to review progress on green growth and recommend possible next steps. In summary:

Cambodia. An Inter-Ministerial Green Growth Working Group adopted a National Green Growth Roadmap in 2010. This emphasises access to essential resources for all, including to water, agriculture, sustainable land use, renewable energy and energy efficiency, information and knowledge, means of better mobility and finance and investments (UNESCAP, 2009). Based on these seven access objectives, a National Green Growth Master Plan is currently being developed to outline the implementation plan to deliver better outcomes.

Ethiopia. The main framework for green growth is the Climate Resilient Green Economy Strategy (CRGE), launched in 2011. Developed under the leadership of the Prime Minister's office, the CRGE provides a vision, high-level commitment, plans and an extensive portfolio of investments. The strategy's goal is to increase GDP per capita by 475% between 2011 and 2030 so as to move from least-developed to middle-income country status, while reducing greenhouse gas emissions by 35% (EPA, 2011).

Comparing Cambodia and Ethiopia's green growth strategies

Cambodia	Ethiopia
Motivation for pursuing green growth	
• Better well-being, social harmony and cultural importance	• Middle income country status, climate change, food security
Natural assets prioritised	
• Access to seven natural assets or public services (1) renewable energy and energy efficiency; (2) water and sanitation; (3) agriculture; (4) sustainable land use; (5) information and knowledge; (6) better mobility; (7) and finance and investment	• Climate change
Implementation plan	
• Master plan to be produced focusing on how to achieve the seven access goals • Depends on attracting quality foreign investment for financing	• Line ministries produce specific project to mitigate climate change • Depends on attracting international carbon finance
Institutional arrangements	
• National Council on Green Growth: presided over by the Prime Minister, chaired by the Minister of the Environment, and co-ordinated by a general secretariat	• Climate Resilient Green Economy Facility created and led by Ministry of Finance to select projects to finance

OECD/IIED report recommendations

Cambodia: Cambodia's National Green Growth Roadmap is broad in scope: supporting citizens to achieve greater societal well-being through environmental conservation and sustainable use. The OECD/IIED country study team held consultations with multi-stakeholders in Cambodia. These led to recommendations in the following areas to deliver more concrete outcomes and meet the seven access objectives (OECD, forthcoming a):

- *Establish strong financial institutions:* the goal of these reforms would be to guide use of official development finance and domestic resources to address national green growth priorities. Key actions could include "greening" national budgetary systems; setting up national funds for inclusive green growth to secure financial sustainability; building capacity in the local banking sector to promote investment in green infrastructure or business activities.
- *Build multi-level governance capacity for green growth:* this would include strengthening inter-sectoral co-ordination to avoid conflicting government policies (to be fulfilled by the National Council on Green Growth); mainstreaming environmental education in the national curriculum and the use of mass media to raise public awareness and build better engagement with civil society.

Box 3.2. **Green growth strategies in Cambodia and Ethiopia: Two approaches** *(continued)*

- *Planning and mobilising investment for green infrastructure*: in particular there is a need to plan and invest in sustainable transportation systems to ensure all citizens have access to means for better mobility.
- *Strengthening capacity to monitor and evaluate progress* for mid-course corrections: this includes developing indicators to measure the achievement of inclusive green growth, building data collection and monitoring into green policies; and designing institutional mechanisms to use such information to inform decision making over time.

Ethiopia: Ethiopia's CRGE has a rather narrower initial focus than Cambodia's strategy. In order to fully exploit its potential for green growth, it is critical for Ethiopia to broaden the focus to include green growth policies and to ensure environmental safeguards are put in place to avoid any unwanted environmental consequences (though the focus on climate change mitigation is now being broadened to include climate adaptation and resilience). The OECD/IIED country case study team has recommended that the CRGE Facility considers the following areas of improvement (OECD, forthcoming b), developed through consultation with many stakeholders in Ethiopia:

- *From projects to policies:* broaden the current wide range of individual CRGE investment projects to also focus on improving systems, structures and incentives. Further projects should also be developed based on cataloguing good practices in Ethiopia.
- *From governmental actors to other actors:* shift from government driving CRGE implementation to mobilising businesses and civil society resources as well.
- *Mobilise a range of financial resources:* Ethiopia should go beyond only attracting special international climate finance for green projects to also look at domestic resource mobilisation. This could be done through greening national budgetary systems and expenditures, and attracting quality foreign investments.
- *From GDP to well-being:* open up the CRGE priority success criteria from GDP growth and greenhouse gas reduction to inclusive green growth principles and criteria (based on inclusion, human well-being, and environmental limits).
- *Look for home-grown talent:* CRGE relies heavily on foreign technologies and expertise. Although this is crucial, strengthening traditional knowledge in building resilience and sustainable natural resource management can also contribute significantly to Ethiopia's overall "green brand".

Source: EPA (Environmental Protection Authority of Ethiopia) (2011), *Climate Resilient Green Economic Strategy*, EPA, Addis Ababa; OECD (forthcoming a and b), *Making Growth Green and Inclusive: the Case of Cambodia and Ethiopia*, OECD, Paris; UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific) (2009), *The National Green Growth Roadmap*, UNESCAP, Phnom Penh.

Strategic assessment of environmental and social outcomes of development plans and policies

Strategic environmental assessment (SEA) is a tool to assess the environmental, and often social, implications of development policies, plans and programmes (OECD, 2012b). SEAs are increasingly used in developing countries and can help integrate green growth objectives into existing plans (Box 3.3). For example, SEA can be used to assess how national growth plans will affect natural assets. The focus of SEAs on the policy and institutional level is potentially useful in making the governance changes required for greening the economy as a whole, as opposed to specific economic activities.

The focus of SEA on identifying trade-offs among environment, social and economic objectives also makes it a potentially valuable tool for assessing whether policies or

programmes described as "green"– such as subsidy reform, or the introduction of specific green technologies – do in fact meet a broad range of economic, environmental and social objectives. SEA's process for technical evaluation of environmental, social and economic implications can reveal a range of trade-offs in growth and development programmes, whether or not they feature environmental considerations. They can also open up new mechanisms for dialogue and consensus-building around those trade-offs. For example, a multi-stakeholder dialogue conducted as part of a policy SEA of scaling up the mining sector in West Africa led to demands for a more permanent multi-stakeholder platform that could follow up on the integration of environmental and social concerns in the implementation of the West Africa Mineral Governance Programme[1] (Loayza et al., 2011). That said, there are challenges associated with applying SEA, particularly the lack of awareness of the value of conducting SEA, and lack of knowledge on how to implement SEA. These challenges can be addressed through capacity development efforts, including technical training, awareness-raising workshops, supporting the institutionalisation of the SEA process and its evaluation systems, and sharing best practices across countries.

Box 3.3. **Growing use of strategic environmental assessments in developing countries**

Countries around the world are increasingly using strategic environmental assessments (SEAs) (Dalal-Clayton and Sadler, 2005). Over 60 countries at all levels of development now have legislation, policies, directives or regulations prescribing the application of SEAs, and many more are introducing it as part of their policy toolkits (OECD, 2012b). Some examples include:

- In Benin, the Second Poverty Reduction Strategy 2011-15 has been accompanied by a participatory strategic environmental assessment which has helped to ensure that environmental issues are covered both in a sectoral and cross-cutting manner.
- In Mauritius, the European Union supported the government to undertake an SEA in 2007 of its Multi-Annual Adaptation Strategy to respond to the removal of EU subsidies on sugar imports (part of the reform of EU Sugar Protocol), from which Mauritius' sugar sector had benefited from for many years. The SEA exercise helped policymakers understand the environmental implications of the reform of the sugar sector and identified areas, such as land-use policy, which would require further policy attention to avoid negative environmental consequences.
- In Vietnam, the sixth National Power Development Plan was designed to meet the country's growing energy demand. A SEA of the plan was commissioned under a revised law in 2005, rather than conducting environmental impact assessments (EIAs) of individual plans. The SEA has helped to clarify strategic economic choices and raise government awareness of biodiversity and tourism issues.
- In Bhutan, a SEA is being applied to mainstream environmental concerns into national five-year plans and sector policies. The process is supporting the realisation of the Kingdom of Bhutan's unique approach towards sustainability by addressing all seven pillars of gross national happiness.

Source: Dalal-Clayton, D.B. and B. Sadler (2005), *Strategic Environmental Assessment: A Sourcebook and Reference Guide to International Experience*, Earthscan, London; OECD (2012b), *Strategic Environmental Assessment in Development Practice: A Review of Recent Experience*, OECD Publishing, Paris.

Aligning green growth priorities within national budgets

Part of the green growth mainstreaming process involves reflecting green growth objectives in national budgeting decisions. A forward-looking national budgetary process, such as the medium-term expenditure framework (MTEF), can be beneficial in strengthening fiscal discipline and bringing greater predictability to the allocation of public resources across competing sectors. This budgetary stability and predictability is critical, given the long-term nature of environmental policies and infrastructure investment. Countries such as South Africa and Armenia have already benefited from deploying MTEFs as they have received greater fiscal resources in the environment sector (Petkova, 2009).

Another budget planning tool is public environmental expenditure review (PEER), which can be used to assess the degree to which green growth objectives have been mainstreamed into national plans and policies. A PEER can be designed to include questions on spending for the sustainable management of natural assets and to assess whether government resource allocations match environmental policy priorities. It can provide valuable data for designing policy reforms, government budgets, and investment projects. Typically organised by the government, it can be used to answer a series of questions on inputs, outputs, outcomes and sensitivities of environmental expenditure. Though it is data-intensive, much of the data already exist.

PEERs have not been routinely conducted, but their use is growing (Box 3.4). When they have been used, they have commonly helped finance ministries and other key economic decision makers to understand the impacts of their decisions on the environment. Often they have highlighted the mismatch between environmental policy and plans and levels of spending. And in some cases, they have resulted in the reallocation of resources

Box 3.4. **PEER uptake in developing countries**

- In Madagascar a PEER revealed a financing gap for the protected area system, as well as the system's 50% dependence on aid. It also revealed how the protected area system could become a net source of government revenue through ecotourism fees (Markandya et al., 2006).
- In Mozambique a PEER demonstrated that environmental expenditure was only 0.9% of GDP; it identified very weak links between environmental policy and actual budgets, which then highlighted the lack of prioritisation of environmental policy (Cabral and Dulcídio, 2008).
- A Malawi PEER showed how the contribution of natural resources to GDP is far more than is currently measured: the tourism contribution of wildlife plus woodfuel together contributed nearly 13% of GDP. It also showed that environmental degradation was halving Malawi's net national wealth accumulation (Bass et al., 2011).
- In Tanzania a 2004 PEER established the government's levels, trends and distribution of environmental expenditure as well as the ideal level of expenditure required to meet the country's linked environmental priorities and poverty reduction objectives. By demonstrating the value of environmental investment for livelihoods, it contributed to increasing the environment authority's budget by five times in 2006 (Markandya et al.).

Source: Markandya A., Hamilton K., and E. Sanchez-Triana (2006). "Getting the Most for the Money – How Public Environmental Expenditure Reviews Can Help", *World Bank Environment Strategy Notes,* No 16, World Bank, Washington, DC; Cabral, L. and F. Dulcídio (2008), *Environmental Institutions, Public Expenditure and the Role For Development Partners: Mozambique Case Study*, Overseas Development Institute, London; Bass S., et al. (2011), *Mainstreaming the Environment in Malawi's Development: Experience and next steps*, International Institute for Environment and Development, London.

to environmental budgets and institutions responsible for environmental priorities (OECD, 2012a). The World Bank's recommendation for environmental expenditure in developing countries, at between 1.4% and 2.5% of GDP, provides a useful benchmark (Markandya et al., 2006).

3.2. Designing, reforming and implementing policies that stimulate green growth

This section presents policy tools that are relevant for pursuing green growth in developing countries. Each of these tools is presented in a standard way to show their economic, environmental and social implications; their uptake in developing countries; and lessons learned for future scaling-up. All of these tools are already in use in some countries, and have proven benefits, even if problems in implementation remain. Some examples have proven their significance in contributing to the green growth objectives, while others may still require further refinement.

This selection of policy tools should be understood as a snapshot of possible interventions or "best bets" that might be used in different combinations and degrees according to the national context. It is not meant to be exhaustive or to prioritise policies, but rather aims to inform developing country policy makers who are interested in taking practical steps towards green growth.

Taxes, pricing instruments and mechanisms that value natural assets

Energy subsidy reform

Many developing country governments subsidise natural resource use, including energy, water and cultivation of agricultural land. While all three are priorities for subsidy reform, this section focuses on the role that energy subsidy reform can play in contributing to green growth in developing countries. Energy subsidies can include direct financial transfers, preferential tax treatment, and provision of services at less than the actual cost. The declared aim of these subsidies is variously to assist poor households, to reduce prices for end users, to buffer shocks arising from global price spikes, or to promote the development of certain productive sectors. In some cases, subsidies can form a larger share of government budgets than those for other policy priorities such as education or healthcare.

The International Energy Agency estimates that price-driven, fossil fuel consumption subsidies in 37 developing and emerging economies amounted to around USD 523 billion in 2011, almost five times the current aid support given by OECD countries to developing countries. However, only 8% of this amount went to the poorest 20% of the population (IEA, 2012). Many developing countries are now reforming or planning to reform their energy subsidies because they may not be meeting their intended social goals, they cost too much and can have a negative environmental impact. However, such reform is not always easy given the vested interests of those who benefit from the status quo. A high degree of transparency will be required for building support for reform and challenging those against it. It also requires strong political leadership and broad support across government departments (OECD, 2011a).

Contribution to green growth

Reforming environmentally harmful subsidies, and specifically fossil fuel subsidies, is an important step in "getting the price right" to reduce fossil fuel use and related air pollution and greenhouse gas emissions. Subsidies on fossil fuels both encourage inefficient over-consumption of these fuels and pollution, and constrain governments' ability to promote long-run green growth (IMF, 2013; OECD, 2011a). As subsidies artificially reduce the price paid by end consumers, removing them would influence behaviour and reduce final energy demand. Savings from subsidy reform could offer a budgetary opportunity to boost support to green growth, as well as social programmes.

Uptake in developing countries

The experiences of Indonesia and Ghana with energy subsidy reform provide some useful lessons (Box 3.5).

Box 3.5. **Energy subsidy reform in Indonesia and Ghana**

Since the early 2000s, the Indonesian authorities have attempted to reduce energy subsidies. Most early attempts failed, due to poor communication and stiff opposition to reforms. In 2005, the Indonesian government managed to double the price of diesel fuel and to almost triple that of kerosene. This was introduced in parallel with an effective compensation policy – an unconditional cash transfer programme through the postal system and distributed monthly cash payments of USD 10 to 19 million to low-income individuals. However, relying on compensation programmes in the form of cash transfers to shield low-income households from the attendant rise in energy prices, if necessary, does not appear to be a sufficient condition for success. Subsequent attempts to phase out energy subsidies in Indonesia faced strong public opposition and failed to get parliament's approval, despite the use of compensation programmes. In this regard, the recent decision to give the government the leeway to lower energy subsidies without parliament's approval is a step in the right direction. Importantly, communicating broadly the benefits of reform, along with its distributional impact, will be crucial to overcome public resistance (Mourougane, 2010; OECD, 2012c).

In 2005, Ghana initiated a public and parliamentary debate on petroleum subsidy reform following the findings of a poverty and social impact analysis which demonstrated that the subsidies went predominantly to higher income groups. The government decided to remove the subsidies, accompanied by several flanking measures such as the elimination of fees for attending primary and junior-secondary school, and increasing funding for primary health care, urban transportation and rural electrification programs (UNEP, n.d.). However, the sharp rise in global oil prices in 2007 and 2008 halted the reform and energy prices became an issue in the 2008 election. The subsidy reform has been stalled since the opposition party won the election (Lann et al., 2010). Despite this, a key lesson from this example is the need for clearer and more visible accompanying measures to assist the poorest; these are essential in ensuring a smooth transition for those households that may otherwise lose out from the subsidy reform process.

Source: Mourougane, A. (2010), "Phasing Out Energy Subsidies in Indonesia", *OECD Economics Department Working Papers*, No. 808, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5km5xvc9c46k-en*. OECD (2012c), *OECD Economic Surveys: Indonesia 2012*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/eco_surveys-idn-2012-en*; UNEP (United Nations Environment Programme (n.d.), *Ghana's Pathway to a Green Economy*, UNEP website, *www.unep.org/greeneconomy/AdvisoryServices/Ghana/tabid/56355/Default.aspx*, accessed 15 February 2013; Lann, T., Beaton, C. and B. Presta (2010), *Strategies for Reforming Fossil-Fuel Subsidies: Practical lessons from Ghana, France and Senegal*, Global Subsidies Initiative, International Institute for Sustainable Development, Winnipeg.

Impact

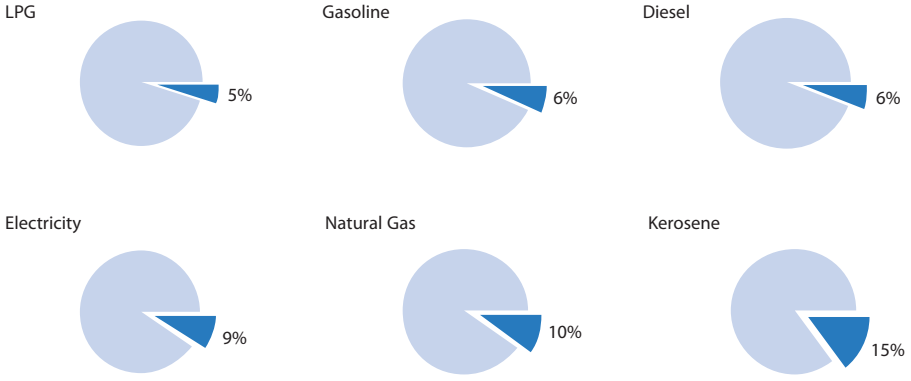
Economic: According to OECD analysis, in most cases countries removing their consumer subsidies on fossil fuels would realise a net economic benefit, measured both in terms of GDP impacts and real income effects (OECD, 2012d; also see IEA, 2011). Removing fossil fuel subsidies could also increase global real income by 0.3% by 2050 (OECD, 2012d). However, some oil-exporting countries may have potentially significant income losses as these economic benefits could be offset by trade impacts if other countries also removed their subsidies and thus reduced their demand for fossil fuel imports. Furthermore, a reduction of subsidies may encourage greater energy efficiency in production, and force a more rapid rate of technological change (Ellis, 2010). It is also likely to free up funds for governments to spend on actions that can promote growth, such as infrastructure and human capital development.

Environment: Removing fossil fuel subsidies is widely seen as a cost-effective way of reducing greenhouse gas and other harmful emissions. OECD modelling shows that removing fossil fuel subsidies in a number of emerging and developing countries could reduce world greenhouse gas emissions by 6% by 2050 (OECD, 2012c). Removal of energy subsidies can also give incentives for investing in energy efficiency measures and renewable energy. However, without accompanying measures in developing countries, such as direct cash transfer, removing fuel subsidies could also lead to greater use of biomass with potential adverse effects for forests and emissions from forest degradation as well as indoor air pollution (Ellis, 2010, citing von Moltke et al., 2004).

Social: Although subsidies are often introduced and subsequently defended on social grounds, in practice they are often shown to be ineffective and inefficient in reaching the poor (Figure 3.2 and Box 3.5). A review of country studies on fuel subsidies in 20 countries in Africa, Asia, the Middle East and Latin America conducted between 2005 and 2009 found that, averaging across countries and energy products, the top income quintile received six times more in energy subsidies than the bottom income quintile (Arze del Granado et al., 2010). This suggests that phasing out energy subsidies could potentially free up funds for more targeted assistance to poor households, as was originally intended in Ghana (Box 3.5).

Figure 3.2. **Share of fossil-fuel subsidies received by the lowest 20% income group, 2010**

Eleven surveyed developing economies



Note: Countries surveyed were Angola, Bangladesh, China, India, Indonesia, Pakistan, Philippines, South Africa, Sri Lanka, Thailand and Vietnam. LPG: liquid petroleum gas.

Source: IEA (International Energy Agency) (2011), *World Energy Outlook 2011*, IEA, Paris.

Lessons learned

An important challenge in energy subsidy reform is how to mitigate the short-term negative effects of subsidy removal on the poorest populations. Energy subsidy reform is therefore best accompanied by adequate social protection measures targeted at the poor, such as means-tested social safety net programmes, cash transfers and other measures to shield low-income consumers from increases in energy prices (Laan and Oliveira, 2010). Also needed are measures to facilitate the transition to renewable energies and energy-efficient technologies, for example through credit programmes or support for research and development. There are several key principles that can guide developing countries aiming to rationalise their existing fossil fuel and energy subsidy programmes (IEA, et al., 2010):

- *Conduct research and stakeholder consultation* early on to quantify subsidies, assess how their costs and benefits are distributed, and understand the likely effects of their removal on the population. In particular, research should identify the target groups and their respective interests and concerns.
- *Create a coherent reform strategy* that establishes clear objectives and priorities, sets out a timetable for implementation, includes complementary policies such as targeted cash transfers, and develops a communication strategy and mechanisms to ensure transparency throughout the reform process, as well as introduce appropriately phased price increase, which can be sequenced differently across energy products (IMF, 2013).
- *Use public expenditure freed up from subsidy reform* to finance measures such as cash transfers to promote the well-being of the poor and insulate them from the increasing energy price; however, depending on a country's priorities, funds can also be invested in promoting longer-term growth through innovation and reduced energy intensity.
- *Ensure that capacity exists* to implement the reform effectively throughout the process (i.e. at the design, implementation, monitoring and evaluation stages).

Environmental taxes, fees and trading schemes

There is a range of fiscal instruments that can be good for the environment and raise revenue for governments for fiscal consolidation and for financing access by the poor to water, sanitation and electricity services (OECD, 2005). They can also reduce environmental problems that threaten the livelihoods and health of the poor. These instruments include taxes or royalties on natural resource extraction (including environmental and carbon taxes); user charges for services such as water supply and waste management; and schemes to trade pollution licences. Pollution taxes can provide incentives to reduce pollution while also raising revenue for governments. Subsidy reform discussed earlier may also be closely linked.

Contribution to green growth

Environmental fiscal measures refer to a range of taxation and pricing measures. These measures can directly address environmental problems that threaten the livelihoods and health of the poor and stable development. They can also free up public financial resources and generate revenues. Environmental taxes and charges can increase efficiency in environmental management and the use of natural resources. For example, taxing air and water polluting emissions and charging a fair price for water use from industry provide an

incentive for innovation in production processes that reduce emissions and use resources efficiently. The resulting improvements in environmental quality and resource efficiency can enhance productive activities which rely on environmental inputs – such as clean water provision – and can have positive impacts on human health. The revenue raised can be used for fiscal consolidation with a share going to environmental and poverty reduction programmes, or to reduce the taxes imposed on labour and capital which have more negative distorting effects (OECD, 2005).

Uptake in developing countries

Taxes and royalties on the extraction of publicly-owned natural resources – such as minerals, timber and fish – are very common for revenue-raising in developing countries. However, limited experience and capacities in some developing countries may mean that the taxes and royalty rates may not be at the right level to raise revenue or encourage careful resource management. Taxes and royalties that are directly linked to environmental goals are even less common. One recent good example is Cameroon, which has introduced a forest taxation regime to promote sustainable forest management, increasing local processing, sharing forest rents more equitably and improving governance and transparency in the sector (Topa et al., 2009; and see below).

User charges are common in the water sector. However, their levels are often too low in developing countries to reflect the sustainable economic value of the resources or compensate for opportunity costs (OECD, 2007a). A study of Moldova, a country in the former Soviet Union, suggested that existing water charges would only cover 50% of the operation, maintenance and capital expenditure costs of water infrastructure. By gradually increasing the user charges from 3% to 5% of household disposable income (that is to the affordability limit), then only in 2028 would the charges cover 95% of water infrastructure costs. In the interim, public budgets and ODA will have to make up the shortfall (OECD/EAP Task Force, 2008). Other types of user charges – such as grazing charges to prevent land degradation from too many livestock and road congestion charges to reduce air pollution from transportation emissions – are rather less common in developing countries, but have the potential to account for and recover the costs associated with resource use.

Pollution taxes, charges or trading schemes are based on the quantity or content of pollutants released into the environment. For example, for many years China has applied a set of pollution taxes to waste, sewage, noise and various pollutants from industrial production (OECD, forthcoming c). Its more recent pollutant trading schemes for sulphur dioxide (SO_2) and chemical oxygen demand are an effort to set clear environmental price signals which allow those companies that can economically reduce SO_2 or other pollutants to sell emission rights to other companies. By early 2012, ten provinces had been selected as national pilot emission trading provinces with strong government support both in terms of "match making" for buyers and suppliers, and "guided price setting" for permit prices (see discussion below on "Impact"). Some countries also operate *product taxes* primarily for revenue-raising purposes. For example Costa Rica has a fuel tax, a portion of which funds the national PES scheme (Porras et al., 2008).

Impact

The impact of these instruments varies according to the particular context. Here we offer some case studies that illustrate some of the potential positive and negative impacts on economic, environmental and social outcomes.

Natural resource taxes and royalties: The World Bank (2005) found that Cameroon's forest sector reform had achieved modest results through increasing tax on commercial logging and facilitating community based forest management. The contribution of the forest sector to Cameroon's economy grew from 1994 to 2002 along with fiscal revenues to both state and local governments, reflecting a 90% recovery rate for forest fees and taxes. But as Karsenty (2010) notes, there are intense debates about the impact of forest taxation on forest management. Another evaluation of the reform finds that since 1992, although the commercial harvests declined by more than 32%, the sector as a whole continues to provide substantial revenues for the government because of the increasing tax burden for all types of wood products (Topa et al., 2009). Employment also increased slightly, with a greater share going to processing. There are major difficulties in ensuring a fair and efficient allocation system, in particular in ensuring the benefits reach the poorest communities (Topa et al., 2009). This is despite the fact that in 1998 a new provision required 50% of the area tax to be shared with local councils and communities. It seems likely that the recognition given to traditional forest rights in the 1994 Forest Law has had more beneficial impact than the revenue-sharing provisions because of the elite being able to siphon off the benefits ("elite capture"). To take this into account, a political economy perspective is critical (OECD, 2005). For example, building on public pressure can drive regulatory change. Public awareness and participation invariably play a key role in forging the necessary political will to enact and enforce regulatory changes, and overcome resistance from industry. Information provision and transparency are the key to build on public pressure.

Pollution taxes and trading schemes: Colombia's water pollution tax provides an example of both the potentials and pitfalls of pollution taxes. By 2002, 24 *Corporación Autónoma Regional* (regional environmental regulatory authorities) were invoicing companies and municipalities discharging wastewater into their watershed and 21 were collecting payments. Some companies responded to the tax by reducing their pollution level. One chemical company estimated the annual pollution tax bill would be over USD 450 000 and decided to invest in a treatment plant costing USD 452 000. In a number of water basins levels of biological oxygen demand and total suspended solids dropped significantly between 1997 and 2003 (Blackman, 2006). An evaluation carried out by the UN's Economic Commission for Latin America and the Caribbean revealed other significant accomplishments: the generation of approximately USD 15 million since the initiative's inception, low administrative costs (approximately 15% of collected tax revenues), and a beneficial shift in the activities of water authorities from negotiating effluent discharge conditions to monitoring and enforcement. A major problem, though, was that the municipalities were unable or unwilling to meet the discharge standards and failed to pay more than 40% of the amounts invoiced (Blackman, 2006). One of the main reasons for this is that there was lack of legal clarity about whether, and how, municipalities could pass on the pollution charge or the costs of improved treatment to water consumers in the form of higher tariffs. As a result of these problems, substantial modifications were made to the scheme in legal decrees in 2003 and 2004, in particular excluding municipal emissions from the calculation of total pollution load (Acquatella Corrales, 2009).

Lessons learned

Environmental fiscal reforms can be important tools for fostering growth that sustains natural assets, but their design needs to take into account existing revenue structures and distribution of costs and benefits. One major risk involved in environmental fiscal reform is that the revenue-raising goal may take precedence over the environmental goal. The relatively

large size of the informal economy in developing countries can also undermine the collection of environmental taxes and fees. To ensure effective implementation, environmental fiscal instruments need to be tailored to the capacities of local and regional contexts. Those affected need to be involved in identifying pollution or resource use baselines and targets, the means of pollution control or efficiency gains, and programme design, implementation, monitoring and evaluation. The following key principles can contribute to the effective application of fiscal instruments to green growth objectives (OECD, 2005):

- *Identify and involve the winners and losers* – as for any policy instruments, there will be winners and losers. Identifying and engaging with the likely winners and losers and understanding their perspectives and interests is an essential first step for policy makers.
- *Effective use of revenue from environmental tax and fees* – many environmental and natural resource agencies see environmental taxes and fees as a way to generate funding given low national budgetary allocations within these sectors. There are, however, risks to this kind of earmarking. Public finance should provide for separation between revenue and expenditure initiatives (OECD, 2011a citing Lawson and Bird, 2008). Nevertheless, allocating a part of the proceeds from pollution taxes to help firms invest in pollution control and improve production efficiency can boost political acceptance for environmental taxes and fees and provide both incentives and financial resources to accelerate changes in production practices. Furthermore, scheduling and announcing future charge or tax increases in advance can allow industry, businesses and households to adjust and reduce resistance (OECD, 2005).
- *Match instruments to implementation capacity* – it is crucial that agencies implementing and enforcing environmental charges have the capacity to do so. Instruments need to be designed with the existing functions and capacity of the implementing agency in mind.
- *Build the capacity and credibility of environmental agencies* – monitoring agencies must collect accurate and timely information on industrial pollution flows, their origins and their impacts. Continued capacity building is necessary to ensure reliable monitoring over time and to protect the integrity of the environmental fees and charges programme from political changes.

Payments for ecosystem services

Payments for ecosystem services (PES) involve a user or beneficiary of an ecosystem service (such as clean groundwater or a forested watershed) making direct payments to individuals or communities whose management decisions influence the provision of that service (Wunder, 2005). Payments for ecosystem services are flexible, incentive-based instruments whereby a user or beneficiary of an ecosystem service provides direct payments to individuals or communities whose management decisions influence the provision of ecosystem services (OECD, 2010a). Payments may be made by ecosystem service beneficiaries directly – for example a soft drinks bottling company may pay landowners to maintain the forest cover on which the quality and quantity of its water supply depends – or by government, donor agencies and NGOs on behalf of the beneficiaries or society in general. PES can focus on single or multiple services and can range in size from local schemes involving a few individuals and a few hundred hectares, to national and international programmes involving thousands of individuals and millions of hectares.

Contribution to green growth

Payments for ecosystem services can contribute to green growth by capturing the value of ecosystem goods and services. Without such instruments, these ecosystem goods and services and the natural assets that produce them will not be used in an efficient and sustainable manner, and are therefore more likely to be degraded. Thus, PES encourages sustainable use of natural assets and can also contribute to local livelihoods and increase incomes of those who manage the resource. Whether or not PES is cost-effective depends largely on how it is designed and implemented. Factors include the use of metrics and indicators to identify areas where benefits are highest, or scoring or weighting methods to prioritise payments where multiple ecosystem services are being targeted (OECD, 2010a).

Uptake in developing countries

Table 3.1 presents a selection of large-scale PES schemes. The majority of schemes focus on services derived from forest ecosystems (biodiversity, carbon and water) and are receiving growing attention in the preparations for Reducing Emissions from Deforestation and Forest Degradation (REDD) and REDD+.[2] However schemes incorporating agriculture are increasingly common. Many have a multi-country regional dimension, international support and a pro-poor focus. Payments for ecosystem services programmes can differ depending on the type and scale of ecosystem service targeted, the payment source, the performance measure used, and the payment mode and amount (Engel et al., 2008).

Table 3.1. **Large-scale PES schemes**

Country/scheme	First year of payments	Size (hectares)	Number of participating landowners	Total amount transferred to participants (scheme costs)	Source
Costa Rica *Pago por Servicios Ambientale*s Bundled services – carbon, water, biodiversity, landscape	1997	860 000 ha 3.77 million trees (agroforestry component)	13 000 contracts	USD 277 million	Porras et al., 2012
China Sloping Lands Conversion Programme Watershed regulation	1999	9.27 million ha cropland 13.67 million ha waste land	15 million by 2005	(USD 7 billion by end of 2003)	Bennett, 2009 Xu et al., 2010
Mexico Watershed services	2003	2.9 million ha	3 336	USD 303 million over 5 years	TEEB, 2011
Ecuador *Programa Socio Bosque* Biodiversity, soils and water, carbon	2008	320 000 ha 3% of natural forest cover	23 000	N.A.	TEEB, 2011
Amazonas State, Brazil *Bolsa Floresta* Carbon, biodiversity	2009	10 million ha	8 000 households approximately	USD 9 million in 2011	*Fundação Amazonas Sustentável* – pers. comm.
Lam Dong, Vietnam Payment for Forest Environmental Services Water regulation, soil conservation, landscape	2009	209 705 ha	9 870 households and 22 Forest Management Boards and forestry businesses by December 2010	USD 4.46 million	Winrock International, 2011

Impact

Economic: UNEP has simulated the potential impact of forest-based payments for ecosystem services at the global level. Compared to business as usual, these estimate an increase in global GDP of USD 0.5 trillion and an increase of 5 million forest sector employees between 2011 and 2050 (UNEP, 2011). The impact of PES schemes on poverty reduction may take longer to appear. However, if the schemes include capacity development measures and a more transparent property rights system (see next point), then providers of the ecosystem services can become better off over time, and their increased incomes and job opportunities can have multiplier impacts on the national economy.

Environment: There is mixed evidence on the environmental effectiveness of PES programmes, which is mainly due to how different programmes have been designed and implemented. Evidence from Costa Rica and Mexico suggests reductions in deforestation, but causality is difficult to prove (Pagiola et al., 2005; Alix-Garcia et al., 2010). Some issues to consider in PES design include how to ensure additionality, and how to minimise the risk that environmental gains will only be temporary. Some schemes for example have not targeted payments to degraded lands or to areas at risk from deforestation, which in turn will decrease environmental gains. For example, the Sloping Lands Conversion Programme in China did not specifically target up to 21% of degraded land in the programme design (Xu et al., 2010).

Social: The impact of PES schemes on social well-being depends on the extent to which the poorest groups are able to participate and how the benefits are distributed (Engel et al., 2008; Porras et al., 2008). Some small, local schemes have achieved a good level of participation from smallholder farmers and poor communities partly because they have been able to adapt to local circumstances, build up trust amongst landowners and manage obstacles such as unclear land title or the high costs of carbon monitoring (Lager and Nyberg, 2012; Robertson and Wunder, 2005). The impact of national payments for ecosystem services programmes on the poor varies by country. For example, small farmers are not well-represented in Costa Rica's PES programme, despite efforts to prioritise the poorest regions of the country (Porras, 2010). In contrast in Mexico, where much forest land is common property, marginalised groups received as much as 72% of the payments for ecosystem services in 2003, and 83% of the payments in 2004 (Muñoz-Pina, 2008). This may be because the Mexican programme explicitly targeted marginalised groups. Reviews of the evidence for livelihood benefits of PES schemes for those participating have generally been positive (*e.g*, Bond et al*.,* 2009; Porras et al*.,* 2008; Engel et al*.,* 2008). Non-financial benefits such as capacity building in both productive activities and social co-ordination, and strengthening of land and resource tenure, are also considered important.

Lessons learned

The landscape of PES programmes is continually changing as new programmes learn from the experience of previous ones. Key lessons that have emerged include:

- *Successful PES programmes require careful design and planning to have economic, environmental and social benefits*. Important aspects are well-identified target groups, differentiating payments to reflect different levels of ecosystem service provisions, and minimising transaction costs. This calls for clear programme objectives and clearly defined and enforced property and land tenure rights, with specific safeguards for potentially vulnerable groups (OECD, 2010a).

- *To ensure that the poorest landowners can voluntarily participate and benefit*, the design of PES programmes should be informed by lessons from existing schemes on how to overcome obstacles such as high transaction costs for the poor.
- *Capacity development measures are also needed* to raise participants' awareness and ability to invest and undertake the necessary changes in natural resource management and use practices. Enabling policies, such as land use planning and capacity enhancement in agricultural production, are also key to the success of PES schemes in developing countries (Porras et al., 2010; Xu et al., 2010).

Regulations, standards and information policies

Land tenure reform

For the poorest people in middle and low-income developing countries – especially those living in rural areas – soil, water, fisheries, forests and minerals are the principal sources of income (OECD, 2008). However, systematic inequalities in access to such natural resources, and in particular lack of land ownership, can fundamentally undermine the ability of poor people to generate consistent and adequate incomes from these natural assets. Further, the fact that many low-income households depend on land for subsistence income can result in mismanagement and overexploitation of the land and its resources. A well-defined and transparent tenure rights system can significantly improve management of natural assets and open the possibility for use of innovative market instruments, such as payment for ecosystem services.

Contribution to green growth

Land tenure can exist in different forms, including state, communal, customary and individual (UNECA, 2004). A fair and equitable land tenure system gives the poor security in their access to land and its natural resources, and improves their opportunities to generate a stable income. Land tenure rights can serve as collateral for credit or be exchanged for capital to start other income-generating activities, which can improve producers' incomes (Meinzen-Dick et al., 2007). A more transparent land tenure rights system can also enable efficient collection of property revenue via district taxes and transfer fees, which in turn enable government authorities to support sound land management practices and undertake detailed planning (Warnest et al., 2012).

Uptake in developing countries

The extent of land reform has varied widely by geographical region. In Latin America, land reform has generally increased the number of land holders through redistribution of land resources among the rural population. In Rwanda, land tenure regularisation led to approximately 10.04 million parcels being demarcated and adjudicated between June 2009 and March 2012: 97% of the total targeted parcels in the whole country (Warnest et al., 2012). Malawi presents another successful example of land tenure reform (Box 3.6).

Box 3.6. **Land tenure reform in Malawi**

Prior to 2005, Malawi had a highly unequal land distribution ratio. Most smallholder farmers held land under customary tenure and owned less than one hectare, too small to produce adequate amounts of food. In order to improve access to land, the national government started a series of land reforms through market-assisted, community-based approaches to land acquisition. Smallholder farmers who participated in the community-based land development programme have increased their access to land and financial resources, are more likely to invest in improved maize seeds, tend to be more productive, and have overall better welfare than non-participants. However, studies show that these positive effects are driven more by access to the financial resources provided under the package of assistance in the first season than changes in land tenure *per se*. New beneficiaries with only one season of farming under the programme tend to invest more in hybrid maize and are more productive than those who have been under the programme for two seasons. The results underscore the importance of complementary investments and assistance in order for land reform programmes to benefit poor household farmers.

Source: Chirwa, E.W. (2008), "Land Tenure, Farm Investments and Food Production in Malawi", *IPPG (Improving Institutions for Pro-Poor Growth) and UK DFID Discussion Paper Series* Number Eighteen, available at *www.dfid.gov.uk/r4d/PDF/Outputs/ProPoor_RPC/IPPGDP18.pdf* (accessed 05 December 2012).

Impact

Economic: A World Bank study of land policies in 73 countries between 1990 and 2000 shows that countries with more equitable initial land distribution achieved growth rates two to three times higher than those where land distribution was less equitable (Deininger, 2003). Land rights that provide long-term tenure security are an important incentive for households to invest in sustaining and increasing the productive capacity of their land. Studies show that a shift from insecure to more secure forms of tenure can raise returns on land investments by more than 50% and boost land values by between 30% and 80% (World Bank, 2005).

Environmental: Improved land tenure rights mean that producers can reap the long-term benefits of their more sustainable practices. This can be an incentive to adopt the potentially higher productivity and higher-value goods (e.g. organic produce, certified forest products) that contribute to green growth. Secure land tenure can also encourage producers to invest in adapting land and natural resource management to changing climate conditions. In the case of forest land, Agrawal (2008) found that the larger the forest area under community tenure, the higher the probability of better biodiversity maintenance, community livelihoods and carbon sequestration.

Social: Land tenure rights allow smallholder farmers to benefit from commercialisation directly, which provides significant benefits, including productivity gains, more stable income and better social standing and bargaining power. In Malawi, when farmers who used to grow tobacco on estates as contract labourers were given tenure to their own farmland, the returns to their labour from tobacco farming were much higher and their other crops were also better managed (UNECA, 2004).

Lessons learned

Clear, equitable land tenure rights can play an important role in many developing countries in achieving growth that sustains natural assets. Some critical lessons have already emerged from countries which have undertaken land reforms in recent decades:

- *Secure the correct land rights for the right people* (IFAD, 2008): It is necessary to specify what kinds of rights (full private ownership or user rights) and whose rights (individual, family, village, ethnic group, region) need to be secured. In this process, it is essential to avoid granting land entitlement to elite groups who can influence the land distribution process.
- *Invest in technical and institutional infrastructure for land tenure administration:* Both technical and administrative capacities are required to implement land tenure reform effectively. Countries that have invested in the technical and institutional infrastructure required for efficient and equitable land tenure administration, and that have been in the forefront of ensuring property rights for both men and women, have developed much faster with a much higher level of food security, health and welfare (FAO, 2002). The Malawi case study (Box 3.6) also underscores the importance of accompanying reform with investments and assistance in order to have significant impact on poor household farmers.
- *Understand the local context and involve non-government actors:* Land reform is not only a technical exercise, it is also a political exercise given the strong social and cultural value attached to land in many developing countries. Policy makers from national to local governments need to understand the political economy of the area concerned. Engaging with individual households and civil society groups is also crucial for assuring the transparency and accountability of the land tenure reform process.

Standards and certification of sustainable production

Since the 1990s there has been a marked increase in the number and scope of sustainability standards and certification in both developed and developing countries, notably in the forest, agriculture, fisheries and tourism sectors. Global demand for certified products has been growing rapidly, driven largely by producers' interests in differentiating their products from the competition and by consumers' interests in reducing the damage to the environment caused by their consumption. Typically, third-party certification consists of the following elements:

- a s*et of standards* outlining best or acceptable practice, usually agreed through a multi-stakeholder development process and accreditation of the certifiers;
- an *auditing process* to assess compliance with the standards;
- a *tracing process* to show that the final product on the market has come from a sustainable source; and
- *labelling* of the product so that buyers can identify it.

Contribution to green growth

Goods and services that are certified as having been produced in a way that sustains natural assets can increase in market value and market share. This can benefit participating producers, improve environmental practices and help maintain the long-term sustainability of the resource. Developing countries have also struggled with the proliferation of standards,

which implies significant transaction costs for local producers and can potentially increase consumer confusion over the meaning behind the labels. Successful use of sustainable certification in developing countries will require concerted effort and international co-operation to build capacity and access by developing countries to growing markets for green goods and services (Section 4.4, Chapter 4).

Uptake in developing countries

Certification of agricultural lands has only been conducted to a limited extent in developing countries. For instance, by 2010 only 1.2 million hectares of agricultural land had been certified by Fairtrade, which includes environment sustainability criteria (FLO, 2011), and 13.4 million hectares were certified organic under the Organic Agriculture programme in developing countries (Willer et al., 2011). These areas represent only a tiny fraction of the total cultivated land in these countries (Willer et al., 2011). Of the total area of forest land, only 5% is certified as sustainably managed under the two main forest certification programmes (Forest Stewardship Council and the Programme for the Endorsement of Forest Certification) according to the FAO (2011). The Marine Stewardship Council is one of the most well-known certification schemes for sustainable fisheries. Its certification reflects sustainability of the fisheries resources, ecosystem impacts and robustness of the management system. In April 2009, 7% of the world's edible wild-capture fisheries by volume were engaged in this programme, with 110 certified business-to-business suppliers based in Asia/Pacific, 10 in Africa and 4 in South America. However, developing country participation is much less significant than by OECD countries in North America and Europe (UNEP, 2009).

As noted, developing countries often struggle to use sustainable product standards and certification policies successfully to help them access markets for these goods and services, in part due to the proliferation and fragmentation of relevant policies. For instance, in 2005 Kenya, Tanzania and Uganda each had their own different organic standards, and at least five public and several private and international standards were being used in the region. Multi-country certification standards can reduce confusion and create a more easily recognisable product. In 2007, the East African Organic Products Standard was adopted as the single, official standard for organic agricultural products in the region.

Impact

Economic: Certification and standard schemes have the potential to help farmers and producers from developing countries access international niche markets by providing high premium goods and services. In their review of the empirical literature, Nelson and Pound (2009) reported that Fairtrade provides a favourable economic opportunity for smallholder farming families; brings higher and more stable incomes, which eventually allow producers to take a longer-term perspective on investment in their land; and improves household conditions and children's education. Case studies of forest certification in Malaysia (Shahwahid, 2006), Indonesia (Muhtaman and Prasetyo, 2006) and the Solomon Islands (Wairu, 2006) reported premiums on certified timber products, suggesting market benefits of certification as long as increased revenue offsets the transaction costs of obtaining and maintaining the certification. However, the long conversion period for organic certification can mean a decline in yields in the short term, although even smallholder farmers tend to recover over time. Limited farming capacity and financial management skills can also prove to be barriers to smallholder farmers entering the international market (Thapa and Gaiha, 2011).

Environmental: Evidence of the environmental impact of forest certification is limited and tends to be indirect rather than field-based. Studies have shown an increase in good practices such as the creation of riparian buffer zones and green tree retention in clear-cuts, protected areas and biodiversity corridors (van Kuijk et al., 2009; Cubbage et al., 2010). There is also evidence that annual audits and evaluations encourage companies to resolve bad practices (Peña-Claros et al., 2009). Jawtusch et al. (2011) reviewed impact studies of organic certification primarily in developed countries (213 of which examined environmental impacts). They found that organic agriculture provided greater environmental benefits than conventional agriculture.

Social: Many studies have investigated the social impact of agricultural certification schemes, such as Fairtrade, organic, Rainforest Alliance and Utz Certification (e.g. Dankers and Liu, 2003; Jawtusch et al., 2011; Nelson and Pound, 2009; Blackman and Rivera, 2010). Most of them offer evidence that producers benefit from higher returns and more stable incomes. The non-income impacts of agricultural certification schemes – such as building self-esteem, providing access to training programmes, and increasing bargaining power – have also been found to be important for smallholder farmers, especially under Fairtrade. The social impacts of forest certification have been less well studied; however, initial research suggests positive social effects such as improved pay and conditions for workers (Cashore et al., 2006).

Lessons learned

The main risk posed by certification is the requirements these schemes impose on producers. These can exclude poorer and less well-resourced groups, especially those in countries with weak legislation and market conditions that do not support requirements such as traceability. To address these risks, the Forest Stewardship Council, Roundtable on Sustainable Palm Oil and Fairtrade are developing group certification, incremental approaches and other strategies to include smaller or less organised producers in their certification programmes. In order for certification to become a more widely used instrument for growth that sustains natural asset in developing countries, it is important to address the following issues:

- *Ensure that certification programmes address local differences in conditions,* both on the supply side and the demand side, while avoiding confusion for consumers and unnecessary administrative burdens for producers.
- *Increase demand for certified products* while retaining the appropriate degree of rigour in the standards and assessment.
- *Ensure that smallholder farmers can access and benefit from certification* and that certification can be used by informal economy producers without having to be formalised.

Sustainable public procurement

By exploiting the power and scale of government purchasing, governments can stimulate markets for goods and services that sustainably manage natural assets and contribute to environmental goals. Procurement was increasingly used as a policy lever to promote sustainable development, but many countries faced challenges in achieving environmental objectives through public procurement and called for additional guidance. This led the OECD to develop a compendium of good practices on green procurement (OECD, 2012e). Analysis of the links between the implementation of environmentally-discretionary public procurement and other policy fields indicates that there are significant win-win

opportunities. For instance, the realisation of improved public budget and expenditure systems can go hand in hand with reduced environmental impacts associated with green public procurement (OECD, 2003).

Contribution to green growth

In developing countries public procurement presents an opportunity to shape domestic markets to favour goods and services that contribute to the sustainable management of natural assets. Public procurement represents around 25-30% of GDP in developing countries, with some indications of even higher levels in some emerging economies: 35% in South Africa, 43% India and 47% in Brazil (Perera et al., 2007). Sustainable public procurement can shape consumption and production trends, generate new domestic markets for green technology and business, and provide examples of good practice for business and consumers. While sustainable public procurement practices are more often associated with developed countries (Box 3.7), they are equally relevant to developing country policy makers interested in using purchasing to advance policy goals, including improving natural resource efficiency or supporting small and medium enterprises (SMEs) or enterprises in disadvantaged communities.

Box 3.7. **Benefits from sustainable procurement in OECD and emerging countries**

The protection of the environment has given rise to an important market for green goods and services that is contributing significantly to economic growth and environmental-related jobs creation. By 2020, it is estimated that sales by global eco-industries will reach EUR 2.2 trillion (OECD, 2012e). Governments can "kick start" markets for more environmentally-friendly goods and services and thus encourage businesses to follow their lead. For instance, incentivised by public policies, the United States invested USD 18 600 million in clean energy in 2011, while China invested USD 34 600 million in clean energy the same year; much of the energy produced is purchased by the government (OECD, 2013a). Governments' purchases of green goods and services can also help to improve overall environmental conditions. For instance, the government of Estonia purchased 110 new environmentally efficient buses in 2011, which will be used for public transport.

Source: OECD (2012e), *Progress Made in Implementing the OECD Recommendation on Enhancing Integrity in Public Procurement: Report to Council*, OECD, Paris; OECD (2013a), *Public Procurement Review of the United States Federal Government*, OECD Publishing, Paris.

Uptake in developing countries

To date, interest in sustainable public procurement often exceeds uptake in developing countries. This is partly due to inadequate supplies of environmental goods and services, concerns over higher purchasing prices, and limited government capacity to operate sustainable public procurement programmes effectively, equitably and transparently. For example, in 2004 the Philippines government announced a green public procurement policy, but the initiative was not launched until 2012 due to lack of technical knowledge and supply, particularly from SMEs who were unable to keep up with the demand for environmentally preferable products and services (Manila Bulletin, 2012). There is evidence that climate change and energy efficiency policies are helping to drive sustainable public procurement in some countries, such as Colombia and Costa Rica (Box 3.8).

Box 3.8. **Sustainable public procurement: the case of Colombia and Costa Rica**

In Colombia, green procurement is an emerging priority with the government. The National Development Plan (*Plan Nacional de Desarollo para Todos*) 2010-14 prioritises sustainable production and processes and optimal use of natural resources. To promote these objectives, in 2012 the Colombian Ministry of Environment collected information on environmentally sustainable public procurement and selected five products (coffee; printed materials including books, maps and publications; light bulbs; paper; and mining materials) on which it is conducting market research in order to arrive at environmental procurement targets (e.g. product specifications, selection criteria). Alongside such market research, the Ministry of Environment has issued 15 guidelines on how to include green criteria in procurement, five of which include life-cycle analysis of products. The likelihood of success of such green procurement projects would to an extent depend on the adoption of adequate monitoring mechanisms to assess their progress and results (OECD, 2013b).

In Costa Rica, the Institute of Electricity pursued sustainable public procurement by outsourcing the supply chain management of car tires. Under the project, suppliers were contracted for the distribution, management, and collection of new and used tires under the "delivery on demand" principle, in order to increase economic and operational efficiency. Suppliers were also requested to have a waste management process in place that complies with standards and regulations of the Ministry of Health, to prevent the impact from waste on biodiversity and ecosystems through water, soil and air contamination. As a result, the project led to overall annual cost savings of 20% as well as environmental benefits of CO_2 emission savings from reduced transport of tires, and sustainable waste management by recycling used tires as a propellant for cement fabrication (UNEP, 2012).

Source: OECD (2013b), OECD Public Governance Review of Colombia, OECD, Paris; UNEP (2012) *The Impacts of Sustainable Public Procurement: Eight Illustrative Case Studies*, UNEP, Nairobi.

Impact

Most developing country sustainable public procurement programmes are still in their infancy, and so evidence of their impact is limited. A recent study by UNEP (2012) reviewed eight sustainable procurement programmes, including two in Costa Rica and Brazil. The authors identified the main economic impacts as financial savings by the government and economic support provided to small business activities. Environmental impacts were more visible: a reduction in waste, greater use of recycled products, improvement in material use through life-cycle assessment and a reduction of greenhouse gas emissions. Although the social component is not necessarily the main focus of sustainable procurement programmes, many programmes do try to target specific suppliers, such as disabled or low-income groups. For example, Rwanda's national strategic foodstock reserves procurement programme requires 40% of the stock to come from smallholder farmers' co-operatives (WFP, 2012). However, sustainable public procurement programmes have also been criticised for their lack of transparency and monitoring (Perera et al., 2007).

Lessons learned

Sustainable public procurement is still controversial in many developing countries due in part to perceived higher costs and the lack of a supplier base. It also risks: (1) developing supplier monopolies on key products and services, which in turn can deter innovation and entrepreneurship elsewhere in the market; (2) capture by vested interests as a result of non-transparent selection processes; and (3) being constrained by lack of capacity in the public sector.

Experience from developing countries suggests that initiatives can be usefully guided by the following actions (Perera et al., 2007):

- *Demonstrate the long-term savings of green procurement* by assessing life-cycle costs and benefits as a powerful incentive for government officials to implement it. For example, life-cycle analysis could show that while a more energy-efficient building may cost more to construct, it will save money in the long run through reduced electricity and heating costs. This is important to identify green goods and services whose life-cycle costs are equal or lower than goods and services that do not meet environmental criteria.
- *Identify and prioritise high-impact goods and services* rather than taking a "blanket approach" to public procurement.
- *Build multidisciplinary teams* which include procurers, lawyers and environmentalists in order to mainstream environmental policies into green procurement policies.
- *Consider pilot initiatives* to build the capacity of local and central authorities and ensure multi-stakeholder collaboration between the public and private sector from the outset.
- *Provide suppliers with advanced information* on future needs, and engage early with potential suppliers so they can adjust their business models in good time.
- *Include incentive-based instruments, such as tax reductions,* as part of the sustainable public procurement programme to maintain competition among suppliers.

3.3. Cross-cutting policies to grow green

In addition to specific policies to stimulate green growth, developing countries interested in pursuing green growth need also to incorporate environmental considerations into existing growth policies. Investment policies, innovation and research and development policies, labour and skills development policies, and adaptation and resilience policies are priority areas for mainstreaming green growth objectives, as they provide the conditions for stimulating and sustaining growth.

Investment policies – the case of infrastructure

Investment is a crucial driver of growth in developed and developing countries alike and also a catalyst for green growth. The case of infrastructure is particularly illustrative for developing countries. For example, transportation infrastructure (including roads, ports and public transport) can improve the flow of goods and people; communications infrastructure connects producers, sellers and customers; and energy and water infrastructure is fundamental to household well-being and economic performance. However, global infrastructure investment greatly lags behind need, and the gap is particularly apparent in developing countries (Kennedy and Corfee-Morlot, 2012; OECD, 2012f). In Africa, for example, of the USD 40.8 billion estimated to be needed annually to develop energy infrastructure by 2015, only USD 11.6 billion are being provided, representing a gap of 71% (UNECA, 2011). Given the combined need for investment to support development and infrastructure provision in developing countries, there is an opportunity – and an urgency – to build infrastructure that enables growth while sustaining natural assets.

Contribution to green growth

Green infrastructure is an important contributor to green growth. Green infrastructure, for example, can deliver basic services more efficiently, thereby minimising waste of natural assets such as energy and water; it can support the sustainable production of natural resources; it can reduce greenhouse gas emissions; and it can increase resilience to climate change and natural disasters. To increase investment in green infrastructure, it is essential to integrate green growth considerations into land use, infrastructure and investment policies: not just by building more infrastructure, but by also building it "right" (World Bank, 2012).

Sustainability concerns will rarely be the main catalysts for infrastructure policies and planning in most domestic contexts. Rather, other policy goals will motivate public support for sustainable infrastructure, such as economic or health concerns, and the environmental benefit will be a co-benefit of the investment. For instance in several developing cities, public decision makers have supported sustainable transport infrastructure projects mainly to relieve traffic congestion and increase mobility and accessibility for low-income populations (World Bank, 2012). However, promoting public transportation primarily to reduce congestion and improve accessibility provides human health benefits and also greenhouse gas mitigation co-benefits. Similarly, in least developed countries, upgrading and maintaining roads to support development goals also contributes to climate change adaptation, as it increases the ability to efficiently move goods and people during extreme weather, and in this way can boost resilience in an area vulnerable to climate change impacts (Ang and Marchal, forthcoming).

Uptake in developing countries

Though attention to greening infrastructure investments in developing countries is small, it is growing. Several national and local governments in developing countries have invested in sustainable infrastructure projects (Box 3.9). The OECD has undertaken investment policy reviews of several developing countries, such as Colombia and Tunisia, which outline government efforts to establish a green growth strategy and improve the domestic investment policy framework for green growth (OECD, 2012g; OECD, 2012h; OECD, forthcoming d; OECD, forthcoming e).

Lessons learned

Relevant policy action includes establishment of sound planning and assessment processes, including working with local stakeholders and experts to: (1) understand evolving socio-economic and environmental pressures and how these are likely to change over time; (2) project the need for economic opportunities, basic infrastructure services and resilient land use in a spatial context within national development planning; and (3) assess the full costs and benefits of projects and programmes to green infrastructure investment, including non-monetary indicators of social and environmental performance (Corfee-Morlot et al., 2012). As development patterns, land-use and infrastructure programmes are often financed or co-financed nationally but designed and implemented locally, multilevel governance will help to align policies and priorities across levels of development, from sub-national regions to local governments and stakeholders (Section 3.4). Overall national land-use and infrastructure planning, when combined with rigorous social and environmental assessment, provides an opportunity to integrate green growth considerations into physical patterns of development and investment decisions.

Box 3.9. **Examples of sustainable infrastructure projects in developing countries**

- **Mexico City's** Bus Rapid Transport system (known as Metrobus) illustrates how transport infrastructure investment can contribute to green growth by providing a range of economic and environmental benefits, as well as improving the quality of life for poorer populations. Beginning in 2005 and still expanding, Metrobus grew out of a greater effort to improve air quality in Mexico City, but also managed to integrate climate change concerns into its strategic planning. It is a surface metro system consisting of four lines covering 93 km, using 365 buses (including new, diesel-powered articulated buses, hybrid diesel-electric buses and buses with "Euro V-EEV" emission standards) and moving a daily capacity of over 700 000 passengers. It features dedicated, confined bus lanes, enclosed stations, electronic fee payment prior to boarding, high capacity buses and advanced control systems. It replaced an ineffective microbus network which was unsafe and polluting. The Metrobus project had to face multiple barriers to investment, including complicated concessionaire participation and lack of funding, and initially received little political support. It was designed specifically to provide a range of benefits in order to gain the support of individual government authorities. These impacts have now been verified:
  - *greenhouse gas emission reductions*: 110 000 tonnes fewer greenhouse gas emissions each year;
  - *air quality improvements*: 2-3 times reduced exposure to particulate matter (pm2.5), as well as reductions of carbon monoxide and mono-nitrogen oxides emissions, leading to health benefits;
  - *faster travel speed*: increased from 12km/hr to 19km/hr for metrobus lanes and 17km/hr for other lanes;
  - *travel time savings*: 40% trip time reduction for users, amounting to 180 million man-hours per year;
  - *reduction in the number of daily car trips* by 122 000; 17% of metrobus users formerly travelled by car;
  - *road safety improvements*: on one of the four lines alone, accidents were reduced by 84% from 2005 to 2010, with a 54% reduction in the first year alone; and
  - *technological upgrading*: replacement of 1 108 older, more polluting buses with 380 clean units (all with higher capacity, 95% lower emissions).
- Grid electricity in **Cambodia** is one of the most expensive in Southeast Asia, with consumer prices in excess of USD 0.20 per kilowatt hour. It is a patchwork of inefficient regional systems that extend from the major cities out into the countryside. In the last two years, biomass gasifiers have been introduced to provide reliable, affordable and green electricity to Cambodia's small rural industries. The gasifiers convert agricultural waste, such as rice husks, into electricity for powering local industries. Electricity generated by a biomass gasification system can cost as little as half that of grid electricity and is significantly less polluting than fossil fuel alternatives. Operations also improve as industries increase control over their energy supply and are not forced to shut down during frequent blackouts. One company, SME Renewable Energy Ltd., has installed 32 gasifiers, eliminating the need for over 3 million litres of diesel fuel and reducing carbon emissions by over 9 000 tonnes a year (Sutter and Sutter, 2010).
- **Thailand's** Small Power Producers programme (SPP) was launched in 1992. This opened up the sale of electricity from independent producers to the grid system. By 2001, 47 SPPs with a capacity of 1 958 megawatts (MW) were supplying power to the grid, but only

Box 3.9. **Examples of sustainable infrastructure projects in developing countries** *(continued)*

14% of this was renewable energy. Since it was recognised that capital cost was the most important barrier for renewable energy power generation, a pricing subsidy for renewable energy was introduced, to be awarded through competitive bidding. This encouraged 20 new SPPs based on biomass to be set up, with capacity of about 240 MW (Ruangrong, 2008). In 2006, the government set a target of purchasing 530 MW of renewable energy from SPPs and introduced fixed premiums for 230 MW generated from wind, solar, and municipal solid waste. The Very Small Power Producers (VSSP) regulations approved in 2002 allow small community or small entrepreneur-owned renewable energy generation of up to 1 MW to connect to the grid and sell excess electricity to utilities. This programme was introduced because the cost of grid connection under the SPP was not economic for such small producers (Ruangrong, 2008). The tariff was set at avoided cost. Since 2006 each generator can now export up to 10 MW to the grid, with a premium at fixed rates varying according to energy type for a period of 7 years (10 for wind and solar). The change in the VSSP programme and the introduction of the feed-in-tariff premium was followed by a marked increase in connection of small renewable energy plants to the grid – from just 16 MW in 2005 to over 850 MW by the end of 2011.

Source: Ang and Marchal (forthcoming), "Mobilising Private Investment in Sustainable Transport Infrastructure: The Case of Land-based Passenger Transport ", OECD consultation draft, Paris, based on Francke, E., J., Macías and G., Schmid (forthcoming), "The Mobilisation of Private Investment for Low-carbon, Climate-Resilient Infrastructure: The Case of Metrobus Bus Rapid, OECD Discussion Paper, Paris; GEF (2002), *Mexico: Introduction of Climate Friendly Measures in Transport,* Project Appraisal Document, Washington, DC; World Bank (2002), *Cities on the Move. A World Bank Urban Transport Strategy Review*, World Bank, Washington, DC; NYC Global Partners (2012), "Best Practice: Metrobus Bus Rapid Transit System", New York City; Sutter, K. and A. Sutter (2010), Turning Rice Husks into Cheap, Green Energy in Cambodia, GreenBiz.com website, *www.greenbiz.com/blog/2010/04/08/turning-rice-husks-cheap-green-energy-cambodia*, accessed 3 April 2013; and Ruangrong, P. (2008), "Thailand's Approach to promoting Clean Energy in the Electricity Sector", *Forum on Clean Energy, Good Governance and Regulation,* 16-18 March 2008, World Resources Institute, Washington, DC.

Governments play a central role in commissioning infrastructure and in mobilising capital to fund it. At the local level, green infrastructure and land-use planning will need to be closely integrated with urban planning, for example to ensure that water, sanitation and transport services are available in areas where population growth is likely to occur, that the poor have access to such services or that critical infrastructure systems or growth in human settlements are not located in areas that are flood-prone. In most countries, environmental, land-use and investment policies function quite separately and sometimes work against each other. This can undermine or slow investment in green infrastructure and development.

An integrated approach to "green investment policy" can help governments create and improve the enabling conditions to shift and scale-up private sector investments to support green growth. Such a framework can steer use of limited public funds while catalysing private investment to support a transition to green growth across relevant sectors and regions (Corfee-Morlot et al., 2012). The main elements of such a framework include:

- *Goal setting and policy alignment for green investment*; in particular, considering infrastructure and land-use planning from a "co-benefits" perspective, taking into account environmental, economic and social goals, can help to ensure policy coherence with green investment across sector, territorial, infrastructure planning and across different levels of government action.

- *Establishing and reforming markets to enable and incentivise green investment:* this includes strengthening of competition and tax policies to support green investment; ensuring protection of intellectual property rights and the rule of law; implementing policies to "get the price right", e.g. to price pollution, reform environmentally harmful subsidies, etc.
- *Strengthening financial policies and instruments to provide transitional support for new green technologies:* this includes financial reforms and direct public financial support for green, long-term infrastructure investment; innovative financial mechanisms to de-risk or increase market liquidity for green investments (e.g. through green bonds); and capacity development in the local financial sector.
- *Mobilising public and private resources to support green investments and business activity:* for example through research and development policies, worker training and skills development programmes; these programmes can be supported through both public and private sector funding (see also innovation and skills development policies below).
- *Raising awareness, promoting engagement and green business and consumer behaviour:* for example through information, consumer awareness programmes and public outreach. This will help to create both the demand for green investment in infrastructure (e.g. for public transportation or for water-saving technologies) and the supply through viable forward-looking business activities and engagement to support private investment. Good examples of voluntary measures also exist here, with investor groups are calling for greater corporate disclosure and transparency in environmental performance. Leading multinational firms are responding with better environmental reporting and management (Kauffman et al., 2012).

Innovation and research and development policies

Along with infrastructure, innovation is the other key catalyst of green growth (OECD, 2011a). Innovation results in new ideas, new entrepreneurs and new business models, and can lead to new markets and jobs (OECD, 2011a). Innovation involves not only the development and diffusion of new and existing technologies, but also collaboration between countries and different actors, and new approaches to planning, systems and work practices that can also contribute to greener growth (OECD, 2011b).

Contribution to green growth

Innovation can help countries shift to a green growth model more quickly and cheaply – this makes it of particular interest to developing countries. The need to make developing country economies more resilient to climate change and natural disasters can also spur innovation. Innovation that lowers costs can make green products accessible for a larger share of the population (OECD, 2011a).

Uptake in developing countries

There are three main policy areas related to green innovation on which some developing countries have begun to focus:

1. The first area involves focusing national innovation efforts on fostering green innovation where possible, notably by addressing local needs, such as water scarcity, biodiversity loss, or support for ecosystem service provision, all of which

are also important for sustaining future economic growth. This includes focusing any existing public R&D more on areas which are promising for both inducing economic growth and for addressing environmental concerns.

2. The second area of policy action is to foster green innovation more broadly, such as by encouraging firms and households to adopt green technologies and products. Improving price signals is important to strengthen incentives, but is often not enough, due to a range of other market failures and barriers. Other policies should therefore be considered, although their application depends on the national context, including existing institutions and governance and market conditions.

3. The third area involves strengthening the absorptive capacity for innovation, which is still limited in many developing countries. In these countries, it will be important to harness local capabilities to absorb technology from abroad and adapt it to local needs. As the formal business sector in these countries often has only a limited ability to meet local innovation and technology needs, the engagement of other local players and resources can make a real difference, for instance by involving local entrepreneurs and by applying indigenous knowledge and expertise. Creating entrepreneurship and facilitating private-sector development should be high on the agenda to promote the autonomy needed to translate opportunity into prosperity.

While developed countries still lead green innovation at the frontier, developing countries and emerging economies have their own green innovation and business models, reflecting their own needs and building on their own strengths (Box 3.10).

Box 3.10. **Green innovation in practice in developing countries**

- **Broad Group,** based in Changsha (China), is a company with a revenue of RMB 3.6 billion in 2010. It produces energy-efficient air conditioners and air filtration systems as well as prefabricated energy-efficient buildings, notably the broad sustainable building. It claims to triple the energy efficiency of facilities while drastically reducing emissions. Its products are exported globally, including to developed countries such as the United States (Beard and Hornik, 2011).
- **Solar Sister** (*www.solarsister.org*) focuses on the application of solar energy in Africa. Using an Avon-style distribution system, Solar Sister creates access to clean energy technology by using women's rural networks. Solar Sister provides the women with a "business in a bag": a start-up kit of inventory, training and marketing support. The kit includes solar lamps that can replace toxic kerosene lanterns and solar cell phone chargers to provide connectivity in even the most energy poor communities. The women become their own entrepreneurs, using their networks of family, friends and neighbours to provide an effective distribution channel to rural and hard-to-reach customers.
- **Husk Power Systems** (*www.huskpowersystems.com*) is a company in Bihar province, India that focuses on the decentralised generation and distribution of electric power based on biomass from discarded rice husks. Thus far it has installed 60 mini-power plants that power about 25 000 households in more than 250 villages. On average, each power plant replaces about 42 000 litres of kerosene and 18 000 litres of diesel a year. By 2014, HPS plans to serve over 6 500 villages, save 750 000 tons of CO_2, create 7 000 local jobs and save USD 50 million in cash for over 5 million people by replacing kerosene and diesel with its proprietary renewable energy technology.

Source: Beard, A. and R. Hornik (2011), "It's Hard to be Good", *Harvard Business Review*, November 2011.

In reality, however, the rate of green innovation – as measured by patents – remains low in many developing countries, but market opportunities for green innovation exist nonetheless. Brazil, China and India have all become important drivers of green innovation in recent years and the technologies from these countries may be more suited to the needs and conditions of developing countries than those from developed countries. Moreover, many of the relevant technologies appropriate for developing and emerging countries will not be readily subject to protection through patents, whether because of the nature of innovation or because of the characteristics of intellectual property regimes.

The argument that intellectual property regimes can be an important barrier to the diffusion of environmental technologies in developing countries does not bear scrutiny. For example, over the last three decades, just over 650 patents related to climate change mitigation technology were registered in African countries (in particular related to energy storage and renewable energy), representing only 0.4% on average of global green growth patents during that period. The patents were heavily concentrated in a few countries, particularly South Africa (84% of the 650 patents), Egypt, Algeria, Morocco and Kenya (OECD, 2012i).

Bottom-up, frugal improvisation approaches in India are attracting interest. Known as *Jugaad*,[3] readily available technologies are merged in ways which produce new and low-cost solutions (Radjou et al., 2012). These and other "base of pyramid" innovations are in sharp contrast to the highly structured and costly corporate innovation processes in developed countries. Green technology transfer from developed to developing countries, or between developing countries, has not yet happened on a large scale. The low rates of technology transfer from developed to developing countries are not limited to environmental technologies, so are not fully explained by inadequately stringent environmental regulations in developing countries. They may be due instead to relatively high trade barriers and limited foreign direct investment, weak intellectual property laws and lack of local absorptive capacities (e.g. human capital). Global green innovation would benefit from the closer involvement of developing countries in science and technology co-operation, and from the building up of research and technology capacity in these countries.

Lessons learned

Green innovation offers great potential for developing countries. A systematic approach is desirable – a focus on isolated technologies can be much less effective than innovating multiple aspects of systems, such as energy, transport, or value chains systems. The challenges to stimulating green innovation in developing countries include a lack of local skills and capacities; finding technologies that contribute to green growth and employment; and fluctuating policy signals. Policies to foster green innovation in developing countries can address these challenges in part by:

- *Ensuring that prices* reflect the true value of natural resources and the costs of pollution, thus providing incentives for green innovation; this will result in a more efficient allocation of resources, strengthen markets for green innovation, and lower the costs of addressing environmental challenges.
- *Incorporating green growth objectives into national public R&D efforts and innovation policies*, notably for local needs such as water scarcity, local air pollution, soil loss and off-grid energy generation.
- *Supporting private investment in green innovation through more targeted support:* this can be achieved through ensuring competitive selection process, focusing on performance rather than specific technologies, avoiding favouring incumbents, and ensuring a rigorous evaluation of policy impacts.

- *Using the opportunities offered by public procurement, standards and regulatory policies* to strengthen and improve the markets for green products, fostering innovation in the process.
- *Engaging with stakeholders on green innovation*, particularly at the national level, bringing together both informal and formal innovators, in particular small and medium-sized enterprises (SMEs), which account for the bulk of firms in developing countries. Policy can help to improve access to finance, enable SMEs to participate in knowledge networks, support the formation of the skills that can lead to innovation, and reduce the regulatory burden on firms.

Based on a set of studies to review national innovation policies,[4] including some from non-OECD countries, it is clear that adopting such principles will often require deep-seated institutional reform and improvements in governance. This includes improvements in the university curriculum, focusing more on establishing and strengthening centre of excellence and public research institutions, investment in the physical and soft infrastructure necessary for innovation, strengthening of the intellectual property right system to incentivise innovation in the business sector, and more general legal and regulatory reform to improve the business environment for innovation.

Labour and skills development policies

Economies moving towards production based on the sustainable use of natural assets can maximise job creation if they can anticipate structural changes and provide the support needed to shift workers to new occupations (ILO, 2011). However, lack of adequate skills and human capacity remains a key challenge for many developing countries embarking on a greener path of growth. Labour and skills development policies, such as the OECD Skills Strategy (2012j), can support green growth objectives by equipping workers for a more smooth transition from activities that undermine natural assets to those that manage them sustainably, hence boosting productivity, employment growth and development.

Contribution to green growth

Many developing countries are currently experiencing skill shortages in emerging economic sectors, such as industry and financial services. Transitioning to green growth also demands new skills and a strategy to avoid marginalising workers in the shift to greener industries. Labour market policies and skills development programmes can play a significant role in delivering green growth benefits by identifying skills needs through surveys and other instruments; disseminating information on available training and education opportunities for adults and youth; helping workers adjust though income support measures, such as unemployment benefits; and providing greater engagement with enterprises to encourage upskilling of their workers as an integral part of their business development.

Uptake in developing countries

Green growth has become an opportunity for many countries to integrate their labour and skill strategies and connect into global development networks for new technologies and the development of green sectors. The Government of Mali, which has established a strategy for greening the economy, has set up Units for Training and Support for Enterprises to meet the training and retraining needs of Malian workers, in particular in retraining farmers for the energy and transport sectors. In Thailand, the Automotive Institute is working closely with universities and training institutes to upgrade skills for green jobs, and the Employers'

Confederation of Thailand and National Congress of Thai Labour have been building members' awareness of green jobs through training courses and conferences (ILO, 2011). The Indian perspective on developing skills for low carbon growth is also worth noting here (Box 3.11).

Box 3.11. **Skills for low carbon growth: an Indian perspective**

Sustainable development is a focus area of India's 12th Five-Year Plan (2012-17). The Government of India has formulated a low-carbon strategy with a focus on the agriculture, waste management, energy, transport and service sectors. However, in order to implement the low-carbon strategy effectively, the government needs to bring about a change in the occupational structure and associated skill sets. Recognising the skill response varies from sector to sector, the Indian government is taking a thematic approach to address a shortage of green economy skills. In some sectors, such as energy efficiency in buildings, agencies like the Indian Green Building Council and the Bureau of Energy Efficiency are conducting training programmes and a national certification examination for energy managers and energy auditors respectively. The Ministry of Road and Surface Transport is organising skill development programmes for drivers and conductors of the compressed natural gas (CNG) buses and attendants at the CNG filling stations. Agricultural training institutes are providing skill development courses on plant protection, pest management and locust controls. Needs-based training programmes in new and emerging areas such as organic farming are being organised by the Indian Council of Agricultural Research.

Source: Sanghi S. and J. Sharma (2012), "Skills for Low Carbon Growth: An Indian Perspective", in OECD LEED (eds), *Skills Development Pathways in Asia: Employment and Skill Strategies in Southeast Asia Initiative*, OECD, Paris.

Lessons learned

Although developing countries are increasingly recognising the need to match workers' skills with those required by green sectors, most programmes are still new and quite small, and will require major scaling up in the medium term. National governments may also need to make extra efforts to:

- *Assure a just transition* to ensure that workers who are displaced from declining firms and sectors receive the help they need to maintain their living standards while reintegrating into the labour market. This will require complementary social protection measures and re-employment services (ILO and OECD, 2012).
- *Enable SMEs to seize green growth opportunities* by enhancing their capacities to access information about green markets, training programmes, efficient technologies and financing schemes. Co-operatives and business associations can be good entry points to help SMEs grow and become more sustainable.
- *Seek opportunities to formalise green sectors of the informal economy*, which may include natural resource management, waste picking and small-scale renewable energy generation. Formalising these sectors through establishing regulations and creating policy incentives can ensure longer-term employment potentials and social stability.
- *Build green skills* partnerships between government, business, trade unions and civil society organisations to strengthen the capacity of local and national skills systems to respond rapidly to emerging skills needs in green sectors.

Adaptation and resilience policies

Adaptation policies aim to increase societal resilience and safeguard economic growth against the impacts of climate change. Building resilience to climate change impacts and natural disasters can contribute to growth by protecting human well-being and the natural and economic assets necessary for sustained growth. As a crucial component of green growth, it is important that adaptation and climate resilience are themselves mainstreamed into government policies and operations. Adaptation mainstreaming includes focusing development planning on overcoming adaptation deficits (inability to cope with current climate and environmental risks, which can be due to social, technical, institutional and financial weaknesses) while at the same time avoiding "maladaptive" development or growth that increases exposure to climate change risks over time. A mainstreamed approach to adaptation also means that climate vulnerability and resilience is integrated into all relevant government regulations, policies and programmes (OECD, 2009). In addition to mainstreaming, it is also important to establish adaptation measures and initiatives to implement adaptation policies, and to target any specific issues that adaptation mainstreaming does not address

Contribution to green growth

All of the adaptation policies and related tools are relevant to green growth; however, they vary in terms of how they contribute to it. Some will directly avert negative impacts on income, welfare or economic growth paths (for example, measures which ensure that businesses are not disrupted by extreme events, or which enable them to continue operations under increasingly severe climatic conditions). Other adaptation measures will support more general economic and development aims, such as the protection of infrastructure networks and the protection of people and their homes in the event of severe flooding. Many adaptation policies also have clear social and environmental benefits. However, in some cases adaptation policies can also conflict with other green growth goals. The choice and mix of adaptation policies will therefore affect their net social, environmental and economic impacts and will need to be adjusted to address trade-offs and seek synergies across different green growth policy goals.

Uptake in developing countries

Many developing countries have started to plan and implement adaptation policies and programmes. A variety of different types of policies and tools, each with different entry points for development planning and policies, are outlined below.

Risk/vulnerability assessments: Assessments of climate change risks, and actors' vulnerabilities to those risks are crucial inputs to adaptation planning and implementation (Section 3.4) and can be the basis for awareness raising efforts, e.g. in working with local governments and communities as well as businesses.

Insurance and risk sharing: A wide range of insurance tools can help affected populations cope with unavoidable climate change impacts. For developing countries, discussion has often focused on the potential of parametric insurance (where payouts are linked to observed events, such as weather conditions) and on micro-insurance schemes (with low premiums and low coverage limits for low-income actors not served by traditional insurance markets). Developing countries have also used international pooled cash reserves to help cope with climate impacts. For example, the Caribbean Catastrophe Risk Insurance Facility pools funds from 16 Caribbean countries to provide members with financial assistance in the aftermath of earthquakes and hurricanes (CCRIF, 2012).

Sector-specific policies: Each economic sector is affected by a different set of vulnerabilities and climate risks and will require different mixes of adaptation policies. The most effective policies for sectors with a fixed infrastructure base, such as the energy sector or buildings, will include regulatory standards, economic instruments and revision of infrastructure investment plans. In contrast, service industries may require minimal technical adaptation measures, but need to cope with climate change impacts through operations planning measures. The agriculture sector will require significant research and investment in adapting practices, crop and livestock choices to new climatic conditions. Water is also a key sector directly affected by climate change through water scarcity, changing precipitation patterns and flood risk and will require a comprehensive, integrated approach to managing impacts (Box 3.12).

Social protection tools: A number of social protection tools have been deployed to help poor and vulnerable populations cope with the shocks and stresses that will arise due to climate change. These include cash transfer schemes, pension schemes, micro-insurance/ weather-indexed insurance schemes, livelihood diversification and asset transfer schemes. Given that climate change can affect livelihoods in many ways, social protection tools need to be targeted towards impacts on production (e.g. crop insurance, flood protection measures), impacts on income (e.g. employment guarantee schemes, cash for work schemes), and impacts on welfare (e.g. health interventions, conditional cash grants).

Ecosystem-based adaptation: This involves incorporating biodiversity protection and ecosystems management into adaptation strategies so that natural resources help people avoid or cope with climate change impacts. Examples include managing natural wetlands so that they act as floodwater reservoirs and stores of water for use in drought periods, or maintaining coastal vegetation such as mangroves to protect against flooding (Munroe et al., 2011).

Adaptation planning has become widespread across a large number of the poorest of developing countries. As of September 2012, 47 least developed countries (LDCs) have produced National Adaptation Programmes of Action (NAPAs) as part of the effort under the United Nations Framework Convention on Climate Change (UNFCCC) to identify critical immediate adaptation needs for these countries; the goal is to provide financial assistance to plan and implement priority measures (UNFCCC, 2012). These NAPAs identify almost 500 priority projects in LDCs; while planning is advanced, implementation has been slower.

Recent overviews of progress on adaptation nevertheless indicate increasing levels of uptake in developing countries. Among the most frequently pursued approaches are adjustments to natural resource management and agricultural practices; building institutions to support adaptation; awareness-raising measures; and establishing monitoring and early warning systems (WRI, 2007). These measures appear also in the NAPAs along with other measures such as diversifying economic activities and implementing technical and infrastructure measures to protect against climate impacts (UNFCCC, 2012). Index-based insurance tools have proved particularly popular: the OECD identified 26 different risk transfer products in use or in development in lower income countries (Agrawala and Fankhauser, 2008) and recent studies document many more applications or trials (Cole et al., 2012; Forum for Agricultural Risk Management in Development, n.d.). Also a 2011 survey of ecosystem-based adaptation approaches identified over 130 applications, almost half of which were in developing countries, primarily to address drought, flooding and reduced agricultural productivity (Munroe et al., 2011).

Box 3.12. **Integrated water resource management**

The core principles of integrated water resource management (IWRM) are that:

- freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment;
- water development and management should be based on a participatory approach involving users, planners and policy makers at all levels;
- women play a central part in the provision, management and safeguarding of water; and
- water has an economic value in all its competing uses and should be recognised as an economic good. (ICWE, 2004)

In recognising the environmental, economic and social value of water, these principles align closely with green growth principles for managing natural resources.

IWRM can help to ensure more climate resilient water planning by linking both land and water governance and through its flexibility and robustness in the face of uncertainty. Effective water resource management approaches provide a wide range of benefits, including benefits to water users (including a reduction in risks) and to the natural environment (such as biodiversity conservation and ecosystem protection) (OECD, 2012k). IWRM can help to deliver sustainable water extraction and use, greater resilience of surface-water and ground-water systems, more efficient use of irrigation for agriculture, and sustainable infrastructure planning (UNWWAP, 2009). It can also contribute to broader green growth aims, through maintaining healthier water quality and a healthy aquatic environment (UNWWAP, 2009) and by providing disaster risk management benefits (e.g. flood buffering).

Source: ICWE (International Conference on Water and Environment) (2004), *The Dublin Statement on Water and Sustainable Development*, 22 June 2004, ICWE, available at *www.un-documents.net/h2o-dub.htm*, accessed 11 December 2012; OECD (2012k), *Meeting the Water Reform Challenge*, OECD Studies on Water, OECD Publishing, Paris; UNWWAP (United Nations World Water Assessment Programme) (2009), *Integrated Water Resource Management in Action*, UNWWAP Dialogue Paper, UNESCO (United Nations Educational, Scientific and Cultural Organization), Paris.

Impact

It can be challenging to assess the effectiveness of policies aimed at increasing climate resilience, as adaptation measures are typically forward-looking and in many cases the impacts that they intend to protect against have not yet occurred. Additionally, some instruments are still at early stages of development and deployment. However, the emerging evidence does indicate the extent to which these policies support green growth aims:

Economic: Due to the context and location-specific nature of adaptation, it is not possible to identify the scale of net economic costs and benefits for generic adaptation policies. Some country specific estimates are available, however, indicating potentially large returns from investments in adaptation (Box 3.13). Despite methodological shortcomings, a number of studies have estimated the total annual costs of implementing adaptation in developing countries to lie in the region of USD 10-100 billion a year to 2020, with water infrastructure expected to represent the largest cost (Parry et al., 2009; Agrawala and Fankhauser, 2008). With respect to benefits, adaptation measures are estimated to avert potentially large GDP and welfare losses by improving water availability and access; implementing flood control measures; increasing agricultural irrigation; agricultural research and development; investing in climate-resilient infrastructure; preparing for new health concerns due to climate change;

developing early warning systems for natural disasters; and urban planning for better ventilation and shading (World Bank, 2010a, 2010b; Arndt et al., 2011; SEI, 2009).

Environmental: A number of adaptation measures aim to increase resilience through more sustainable management of natural resources. Ecosystem-based adaptation approaches can deliver multiple benefits including food security, sustainable water management, disaster risk reduction, and conserving biodiversity (UNFCCC, 2011). There will also be environmental trade-offs to be managed. For example, increased air conditioning in buildings to cope with increasing temperatures may increase greenhouse gas emissions and air pollution; similarly constructing dykes to cope with rising flood risks may threaten ecosystem conservation goals. Policy mixes will need to balance these.

Social: Adaptation tools and policies can have social benefits, including better livelihood opportunities, increased income and quality of life, and enhanced social, human and knowledge capital. Ecosystem-based adaptation approaches may be particularly accessible and cost-effective for poorer or rural communities (e.g. compared to hard infrastructure or technical adaptation approaches), especially as the poor are often reliant on natural resources for their livelihoods (UNFCCC, 2011). Integrating social protection tools into adaptation and disaster risk reduction approaches can also help to reduce underlying poverty and vulnerability (OECD, forthcoming e). However, it is difficult to separate climate change impacts from other social stresses (OECD, forthcoming e). Social benefits can be assured if adaptation policies are integrated into broader social protection strategies, i.e. accounting for multiple stresses faced by the most vulnerable communities.

Box 3.13. **The economics of adaptation to climate change**

The World Bank's Economics of Adaptation to Climate Change case studies in Ethiopia, Vietnam and Samoa all project significant avoidance of economic losses as a result of adaptation investments. In Ethiopia, the benefits from adaptation policies are projected to be 5 to 13 times greater than their costs, and they are projected to reduce economic losses due to climate change by more than half (World Bank, 2010c). In Vietnam, adaptation is projected to reduce GDP losses by between 1.3% and 1.6%, and also to reduce losses to aggregate consumption and to agricultural value added (World Bank, 2010d). In Samoa, the projected net benefits of adaptation are in the order of 0.4% to 1.2% of baseline GDP, though these would be less if investments were made using longer-term design standards (World Bank, 2010e). In addition to protecting against negative growth impacts, some adaptation activities have the potential to provide additional boosts to economic growth. For example, "climate-smart agriculture" approaches can drive growth in input, manufacturing and services markets (FAO, 2012). These include "conservation agriculture" techniques, which contribute to adaptation through increasing yields, reducing mechanical disturbance to soils, increasing the water in soils, and reducing flood risks from heavy rain (Milder et al., 2011). While conservation agriculture is profitable for farmers, it typically requires new investments in specific tools and inputs, and increased farm profits can also lead to additional investments and employment opportunities both on and off-farm (FAO, 2012).

Source: World Bank (2010c), *Ethiopia: Economics of Adaptation to Climate Change,* World Bank, Washington, DC; World Bank (2010d), *Vietnam: Economics of Adaptation to Climate Change*, World Bank, Washington, DC; World Bank (2010e), *Samoa: Economics of Adaptation to Climate Change*, World Bank, Washington, DC; Milder, J., T. Majanen and S. Scherr (2011), "Performance and potential of conservation agriculture for climate change adaptation and mitigation in Sub-Saharan Africa", *Ecoagriculture Discussion Papers* No.6, Ecoagriculture Partners, Washington, DC; FAO (UN Food and Agriculture Organization) (2012), "Greening the Economy with Climate-Smart Agriculture", background paper for the *Second Global Conference on Agriculture, Food Security and Climate Change*, September 2012, Food and Agriculture Organization, Rome.

Lessons learned

Many developing countries have begun to carefully assess their needs and develop tailored adaptation plans and policies to suit their own circumstances and priorities. A number of general lessons arise:

- *National institutional reform can mainstream adaptation into national development* planning and policy processes and uses a wide variety of entry points to pursue adaptation. Climate resilience is an important component of other policies discussed here, such as green investment policies that target long-lived fixed infrastructure investments or sustainable public procurement policies that can establish "resilience" performance criteria for product suppliers and contractors.
- *Early engagement* with relevant parts of government (e.g. sector line ministries) and with local governments, communities and businesses can raise awareness and action particularly where there is timely and relevant information from regional risk assessment (see Section 3.4; OECD, 2010b).
- *Ensure coherence by exploiting synergies and manage trade-offs* between adaptation and other green growth goals. For example, putting value on sustainable natural resource management and valuing ecosystem services, such as water purification services from watershed protection, can increase incomes and employment while also building resilience to natural disasters and climate change. Increasing wealth also increases society's ability to cope with climate change impacts. Similarly trade-offs will also need to be managed – for example, ensuring that agricultural irrigation policies to cope with decreasing rainfall do not increase water scarcity for other actors in an increasingly water-scarce world.
- *Build capacity for iterative decision making* to monitor progress, identify lessons learnt and make adjustments to improve performance. Building networks of communities for knowledge sharing will improve decision making over time.

3.4. Governing, developing capacity and resources, and learning

The third main part of a national green growth agenda for action (Figure 3.1) is putting in place the institutional mechanisms and resources to govern, develop capacity, implement, monitor and learn from the implementation of green growth strategies. These institutional mechanisms include multi-level governance co-ordination, comprehensive capacity development efforts, monitoring and evaluation of progress, and education and awareness raising.

Multi-level governance among institutions and stakeholders

Green growth by nature affects multiple government agencies and levels of government, as well as non-governmental stakeholders. This calls for co-ordinating green growth objectives through multi-level governance. Multi-level governance characterises the mutually dependent relationships – be they vertical, horizontal, or networked – among public actors situated at different levels of government (Charbit and Michalun, 2009; OECD, 2010b).[5] For example, green industrial policies need to be used in combination with clean energy policies; and carbon sequestration potentials in the forestry sector can only be successfully realised if proper land and forestry rights regimes are deployed. At the urban level, sustainable land-use and land development policies are needed along with energy-efficient building codes and climate resilient strategies (OECD, 2010b). Therefore government needs to work

both horizontally (across ministries) and vertically (across national, regional and local governments) so that policies relevant to green growth complement and support each other. Collaboration is also needed with civil society and the private sector to ensure that green growth policy design takes into account a wide range of stakeholder interests.

A good way to manage this co-ordination is to establish a high-level, multi-stakeholder body to "own" the national green growth strategy, set objectives, co-ordinate policy implementation and manage its continuous improvement. This is a good idea given the newness of the green growth concept and differences in how it is understood, as well as the increasing number of (international) institutions proposing particular approaches. National Councils for Sustainable Development (NCSDs) could be adapted to play this role (Box 3.14). In countries that have not yet established an NCSD, a similar inter-ministerial working arrangement, such as Cambodia's National Council for Green Growth, could fulfil this role. Where such arrangements do not exist, a new mechanism for oversight could be put in place.

Box 3.14. **National Councils for Sustainable Development and the Philippines' experience**

National Councils for Sustainable Development (NCSDs) were first introduced by the 1972 Brundtland Commission on Sustainable Development, which explicitly recognised the need for "a new era of economic growth – growth that is forceful and at the same time socially and environmentally sustainable" (UN World Commission on Environment and Development, 1987). Many NCSDs were established in response to the specific call by the 1992 Earth Summit in Rio de Janeiro for countries to set up multi-stakeholder structures and mechanisms to implement their Agenda 21 commitments. NCSDs could be useful institutions for facilitating the creation of green growth strategies, mainstreaming green growth objectives in existing national development plans, and enabling horizontal co-ordination across multiple government agencies and with civil society representatives. A majority of developing countries have established councils and commissions for sustainable development, either by presidential or ministerial decree, cabinet decision, or sometimes by law (Antonio, 2009).

The Philippines' move towards sustainable development can be traced back to its national strategy in 1987 – the Philippine Strategy on Sustainable Development. This evolved into a national plan of action, entitled the Philippine Agenda 21, adopted in 1996. Throughout this process, a semi-governmental multi-stakeholder body, the Philippine Council for Sustainable Development (PCSD) was established. PCSD was the first of its kind in Asia and played an influential role in advising the President, the legislature and the Cabinet on ways to integrate environmental considerations into economic and social policy making and planning. Besides the advisory function at the national level, PCSD has also been supporting local initiatives to create local councils for sustainable development through technical assistance and training. By early 2000, 16 local PCSD units had been established, 11 of which were at the regional level, 4 at the provincial level and one at the municipal level (IISD and GIZ, 2004).

Source: Antonio, E. (2009), "Profiles of Tools and Tactics for Environmental Mainstreaming", *Council for Sustainable Development*, No. 11, International Institute for Environment and Development, London, *www.environmental-mainstreaming.org;* IISD (International Institute for Sustainable Development) and GIZ (2004), *Philippines Case Study: Analysis of National Strategies for Sustainable Development*, unpublished Working Paper, available at *www.iisd.org/pdf/2004/measure_sdsip_philippines.pdf.*

Drawing on experience from NCSDs, two factors are especially critical to the design of such a coordinating mechanism (Antonio, 2009). The first is high-level leadership. As noted, leadership at the highest level of government (e.g. the president or prime minister), as well as the ministers charged with overseeing its activities (e.g. planning or finance)

can determine the success or failure of green growth and sustainable development efforts (Section 3.1). "Champions" beyond the chairperson (from amongst all stakeholders) often play a key role in pushing the policy agenda and strengthening its relevance and impact. Second is the need for a clear role and function; without a clear role and mandate, there can be conflict or duplication of functions with other bodies, which can lead to confusion and "forum shopping" by other interest groups. Eventually, this can render the mechanism inactive. It is imperative to clearly identify the niche or appropriate roles and functions of the co-ordinating mechanism in relation to other existing bodies to make it relevant and stable.

Where NCSDs exist, they may already provide a valuable mechanism for co-ordinated and principled working relationships among government, business and civil society. They can help to integrate the multiple dimensions of sustainable development into planning and strategy formulation, policy making, programme implementation, and monitoring and evaluation. They can provide a critical means for reconciling priorities at local to national (and global) levels, and for translating global commitments into national and local initiatives and sustainable development priorities into concrete policies and actions (OECD, 2001; Antonio, 2009). Many NCSDs have served as fora for resolving conflicts among different interest groups, facilitating alliances for private-public action and investments (Antonio, 2009). The main risks in using existing NCSDs for guiding green growth are that their work has often focused too narrowly on the environment, or they have become moribund, or their mandate was created by an environment ministry alone. Nevertheless experience from NCSDs is relevant given their focus on growth combined with sustainable development and these lessons can provide guidance for adapting them or similar institutions to pursuing green growth.

Institutional reform and capacity development

A key challenge for many developing countries aiming at green growth is a lack of institutional capacity for environmental policy design and implementation. Specifically, government officials may lack the capacity to identify environmental challenges and priorities systematically, assess their implications for development and well-being, design appropriate policy responses, and implement green growth strategies. Capacity may also be lacking to monitor, collect information and assess in a systematic way environmental degradation and risk, to make the economic case for greening development, to co-ordinate relevant policies across ministries and sectors, and to reform budgets and other fiscal policies that have environmental implications (OECD, 2012a). Key entry points for mainstreaming green growth policy goals are also the entry points for institutional reform and capacity development. These include national development planning and related national budgetary processes (typically working through development or finance ministries and infrastructure planning processes); and sector policy processes (e.g. water and natural resources, energy, transport and industry ministries).

Many countries have already undertaken green growth capacity development initiatives and have valuable lessons to share (Box 3.15). Chief among these is that capacity development works best if it is country-owned, priority-driven (as opposed to donor-driven) and uses developing countries' own multi-year development planning processes as a vehicle to systematically integrate green growth into national processes. Capacity development efforts do well when they build both the functional and technical skills of a range of stakeholders, not just government environmental staff, in order to achieve long-term sustainability in promoting green growth. To ensure efficiency, it is best to avoid competing and overlapping capacity development initiatives. Mechanisms should be created to ensure

harmonisation of efforts. Capacity development initiatives are more successful when they target institutional arrangements at the organisational level, rather than solely focusing on individual skills and expertise.

Section 4.5 in the next chapter outlines ways that development co-operation can enhance capacity for green growth, while Section 5.4 in Chapter 5 describes capacity-building efforts for enhancing statistical capacity for monitoring green growth. The remainder of this chapter highlights specific institutional functions that will strengthen governance and decision making for green growth.

Box 3.15. **Capacity development for green growth: Developing country examples**

In 2002, the **Ghana** National Development Planning Commission and the Environment Protection Agency undertook a strategic environmental assessment of the recently completed Ghana Poverty Reduction Strategy (GPRS). The aim was to ensure environmental issues were better integrated into the next version of the GPRS. All the key ministries were taught about strategic environmental assessment processes and guided on how to incorporate environmental issues into policy formulation. As a result of this capacity development support, the 2006-09 GPRS was drafted with direct inputs from the Ghanaian Strategic Environmental Assessment team and resulted in refinements to the development policy, alterations of district level plans, and revision of planning guidelines on how to include environmental considerations into planning at sector and district levels (OECD, 2006).

Established in 2006, the **Uganda** Carbon Bureau has been conducting training and capacity development in climate change and carbon finance for the public, banking and private sectors in Uganda. The capacity development work aims at building awareness about climate change, highlighting the potential for earning carbon finance and scaling-up the participation of the financial and private sectors in the carbon market. Formal training is currently being provided to staff of the National Water and Sewerage Corporation, the East African Development Bank, the Uganda Investment Authority and the Uganda Bankers' Association (OECD, 2012a).

Source: OECD (2006), *Good Practice Guidance on Applying Strategic Environmental Assessment in Development Co-operation,* OECD, Paris; OECD (2012a), *Greening Development: Enhancing Capacity for Environmental Management and Governance*, OECD, Paris.

Education policy, information and awareness raising

Pursuing green growth calls for going beyond public policy making and private investment decisions to also affect individuals' decisions and actions. Policy makers in developing countries can complement government institutional and capacity development efforts with educational campaigns that target ordinary households to build awareness of the concept of green growth and of its relevance to their daily lives. Information campaigns can also be organised to help change consumer behaviours towards more sustainable practices. A survey of household behaviours in OECD countries revealed that consumer information and education policies can play a significant role in making consumption patterns more sustainable (OECD, 2011c). Similar patterns can be expected in developing countries.

In order to take responsible actions, people need to be empowered with the relevant skills and knowledge to take into account the impacts of their daily activities on the environment. Education policy, information provision and awareness-raising campaigns can enable citizens to acquire the skills and knowledge that allow equitable economic progress

without depleting natural assets (UNESCO, n.d.). The UN High-Level Panel on Global Sustainability has recognised the important role of education in achieving sustainability goals and strongly recommends that secondary and vocational education be structured to help prepare students to address sustainability challenges (UN SG's High-Level Panel on Global Sustainability, 2012). This could be done for example through designing curricula to develop key competences in ecosystem management, science, technology and engineering; to encourage innovation and accelerate technology transfer; and to provide training in skills vital for new green jobs (UN SG's High-Level Panel on Global Sustainability, 2012).

Monitoring and evaluation, assessment, and enforcement

For green growth approaches to be successful in the long term, it is crucial that developing countries:

- develop metrics of development and growth that take into account and value natural assets and relate these to well-being;
- take account of the wide range of environmental risks they face and manage these risks;
- assess options for and progress in implementing green growth policies, including the provision of information to improve enforcement and compliance with environmental policies and regulations.

Accounting for the value of natural assets

As discussed in Chapter 1, the idea of integrated environmental and economic accounting recognises that measuring growth based on GDP alone can be misleading if the natural asset base upon which GDP growth depends is being undermined. A range of resource and wealth accounting approaches has been developed; these are introduced in Chapter 5 in a more detailed discussion on measuring green growth progress. In this section we use the term "green accounting" more generally to refer to the integration of environmental and social information into measures of national economic accounts, with the aim of giving a more accurate picture of the state and progress of the economy and how they are influenced by green growth policies.

Setting up green accounting can be daunting for developing countries. While many developing countries have begun to incorporate green accounting into their national accounting framework, most have struggled to maintain national resource accounting initiatives. Potential starting points for green accounting, depending on countries' level of ambition, include:

1. Compiling physical accounts of important assets, such as forest and fisheries stocks. These physical accounts can be integrated with national systems of economic accounting to monitor trends in the resource efficiency and emissions intensity of GDP, and make comparisons across sectors.
2. Integrating physical account data into macroeconomic models for economic planning and policy analysis.
3. Conducting an economic valuation of ecosystem services, losses or enhancement in different locations to build up an evidence base.
4. Conducting an economic valuation of the changes identified in physical accounts to come up with a single monetary figure for comparison with GDP, or for adjusting GDP to green GDP.

5. Conducting an economic valuation of the changes identified in physical accounts, combined with macroeconomic modelling, to examine knock-on effects (important where changes are large).
6. Changing the basis of accounting to include alternative indices that aim far more squarely at human and ecosystem well-being.
7. Mainstreaming sustainability issues into investors' decision-making processes (Box 3.16), e.g. guided by the United Nations Principles for Responsible Investment or the Natural Capital Declaration, both of which are voluntary business-led initiatives (see Chapter 4).

Box 3.16. **Green stock exchange indices in developing countries**

The Johannesburg Stock Exchange (JSE) was the first exchange to develop a sustainability index. It employs listing criteria that reflect both global sustainability standards as well as issues specific to South Africa, such as black economic empowerment. In 2010, the JSE upgraded its reporting requirements to a "comply or explain" basis, making South Africa the first country to mandate the disclosure of financial and non-financial performance in one integrated report for all listed companies.

Brazil's BM&F BOVESPA was the first stock exchange worldwide to sign the Global Compact's 10 principles in the areas of human rights, labour, environment and anti-corruption in 2004. It then signed the UN Principles for Responsible Investment in 2010. Currently, 66% of the stock market's domestic market capitalisation comes from companies in the higher corporate governance tiers. The index also launched a Corporate Sustainability Index in 2005, which remains the only sustainability index in Latin America (Favaretto, 2012).

Other stock exchanges in developing countries which lead the way include the Indonesian stock exchange with its sustainability index; Shanghai's sustainability index; the Egyptian Exchange which developed the Environment, Social and Governance Index as the first in the Africa and the Middle East region; and most recently the Mexican *Bolsa de Valores*, which launched a sustainability index in 2011 (EIRIS, 2010; EIRIS, 2011).

Source: Johannesburg Stock Exchange (n.d.), "The JSE Socially Responsible Investment Index", webpage, *www.jse.co.za/About-Us/SRI/Introduction_to_SRI_Index.aspx*; Favaretto, S. (2012), *The Policy Dimension: Current National Practices in Climate Change Reporting*, UNCTAD, OECD, CDSB and GRI Workshop on Climate Change Reporting, 16 March 2012, Geneva; EIRIS (Experts In Responsible Investment Solutions) (2011), "Mexico Launches Sustainability Index with EIRIS Research", EIRIS press release, 8 December, EIRIS, London, *www.eiris.org/files/press%20releases/Mexsustindex.pdf*; EIRIS (2010), *Sustainable Stock Exchanges: Improving ESG Standards among Listed Companies, Experts In Responsible Investment Solutions*, London, *www.eiris.org/files/research%20publications/SustainableStockExchanges2010.pdf.*

To lay the groundwork for green accounting, considerable work is needed in many developing countries to:

- improve physical accounts, starting with priority sectors or environmental issues;
- integrate physical information with economic modelling to understand and predict economic impact of changes on the environmental resource base and the impact of economic policies on the environment (see below); and
- improve the evidence for the value of ecosystem services for different stakeholder groups and particularly the poor.

Assessing environmental risk and policy options

Risk and vulnerability assessments play important roles in green growth policy design and implementation. There is a wide range of risk and vulnerability assessment tools available, across a wide range of environmental issues. These vary from relatively simple techniques to more complex and data-intensive approaches. At the simple end of the spectrum is a range of qualitative risk assessment tools to support decision making, such as participatory or community-based risk assessments and climate risk screening approaches (Hammill and Tanner, 2011). These include the use of maps as a visual tool, for example, to overlay location of critical infrastructure, particularly in vulnerable communities (e.g. those in informal settlements) and areas prone to flooding. A more complex exercise is to look at how exposure and risk may change under different future scenarios. In this case, a thorough assessment to consider how risk will change over time requires quantitative integrated assessment modelling that combines different types of data (physical and economic) with policy options and their influence on change.

Effective risk assessment regimes rely on the capacity of actors to undertake and interpret risk assessments, and on the availability of robust data and scientific inputs. Capacity-development efforts, as discussed earlier, include components on building and maintaining actors' abilities to undertake risk assessments, and to use the outcomes of these processes in policy making. Countries will also need to develop their data collection and validation systems in order to provide the data inputs needed for risk assessments. Though this can be costly and technically challenging for governments, it is often possible and cost-effective to partner with academic or other research institutions to create centres of expertise to support data collection and policy decision making (OECD, 2010b).

Science-policy processes characterise environmental risk assessment and are typically complex and costly to organise. One approach to overcoming problems is to establish "boundary organisations" that are responsible for working with producers of policy-relevant science (e.g. scientists) and consumers of such information (e.g. policy makers, consumers and business). While boundary organisations have been more common in developed countries, some prominent examples exist to guide decision making in developing countries. The Consultative Group on International Agricultural Research (CGIAR) is a research partnership that focuses on food security in developing countries and conducts boundary work as part of its operations (Clark et al., 2011). Capacity development may nevertheless be required to enable boundary organisations to function properly, including helping users of new scientific information to articulate their needs to the producers, enabling users to better access relevant information, and better integrating experiential knowledge into scientific knowledge frameworks (Clark et al., 2011).

In conjunction with developing country capacity development, it is important to ensure that the type of data collection and risk assessment undertaken, and the timing of these activities, match decision makers' needs. A gap may exist between the information that is generated by existing monitoring and assessment efforts and what is needed to assess the impact of policies on green growth. Additionally, in some cases scientific data can be challenging to understand and difficult to apply in practice. Training may be required to boost the human and technical capacity within government to use the results of scientific assessment in policy processes.

Beyond environmental risk assessment is a range of less conventional policy evaluation approaches that support policy decisions by assessing economic and social outcomes of alternative policies or of those already put in place. Forward-looking assessment tools – such as marginal abatement cost analysis (*e.g.* for pollution control measures) or

macro-economic analysis combined with physical metric analysis – can support decisions about proposed policies or reforms by providing information about the costs and/or the benefits of alternatives. Financial risk management approaches may also be relevant, including real option analysis, which considers the value of robust outcomes across policy options in case of major uncertainty (Blyth et al., 2007; Scandizzo, 2011).

Monitoring policy performance to ensure compliance and evaluate progress

Successfully implementing green growth also requires ensuring compliance with regulations and programmes designed to foster green growth. This in turn raises the need to anticipate and build in resources to collect relevant data to monitor performance and assess compliance. Where policies are regulatory in nature, they can only be effective when implementation is enforced (e.g. see discussion of regulations and standards in Section 3.2). Institutional reforms will be required to build in technical and human capacity for data collection and enforcement efforts. To date, many developing countries have already put in place innovative national laws and regulations, as discussed in Section 3.1 and 3.2, although the degree of compliance varies significantly across countries, and requires attention to boost effectiveness of policies. OECD countries face similar challenges in ensuring compliance with environmental regulations and the strategies that they have employed to overcome these may provide useful insights for developing country policy makers (OECD, 2009).

Monitoring and evaluation approaches also have important roles to play in informing national green growth strategies and green growth policy development by assessing the performance of policies once they have been put in place. Drawing on its breadth of experience in conducting policy analysis, collecting statistical data and monitoring economic progress, the OECD has advanced a framework specifically for measuring progress in green growth that is also being used in developing countries, and which is discussed further in Chapter 5.

This chapter has presented an agenda for developing countries to take national policy action to go green. Developing countries will need support to successfully adapt and implement this agenda for national action. The next chapter outlines how international co-operation can support the pursuit of green growth in developing countries.

Notes

1. This initiative was created to help West African countries catalyse development opportunities from mining sector growth by (1) enhancing donor coordination; and (2) strengthening regional capacity to negotiate contracts with mining companies.

2. Reducing Emissions from Deforestation and Forest Degradation (REDD) is an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. “REDD+” goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks (see Box 4.3 in Chapter 4).

3. *Jugaad* is a Punjabi term applied to a creative or innovative idea providing a quick, alternative way of solving or fixing a problem. *Jugaad* literally means an improvised arrangement or work-around, which has to be used because of lack of resources.

4. For more information on OECD Reviews of Innovation Policy in both OECD and non-OECD countries, please refer to *www.oecd.org/sti/inno/oecdreviewsofinnovationpolicy.htm*.

5. In practice, multi-level governance refers to "the explicit or implicit sharing of policy-making authority, responsibility, development and implementation at different administrative and territorial levels, i.e. (1) across different ministries and/or public agencies at central government level (upper horizontally), (2) between different levels of government at local, regional, provincial/state, national and supranational levels (vertically); and (3) across different actors at sub national level (lower horizontally)" (Charbit, 2011).

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Chapter 4

International co-operation on green growth

International co-operation can help to enable and provide incentives for developing countries to implement green growth national policies. This chapter outlines an international agenda for action to support green growth in developing countries. It identifies and discusses three pillars of international action: (1) green finance and investment, supported by international development co-operation and private sector engagement; (2) international technology co-operation; and (3) free trade in green goods and services. Success in these areas depends on the enforcement of international agreements, support for capacity development, policy coherence, and effective partnerships to share knowledge and know-how. International support may be particularly important to help in tackling short-term trade-offs and ensuring a smooth transition to green growth.

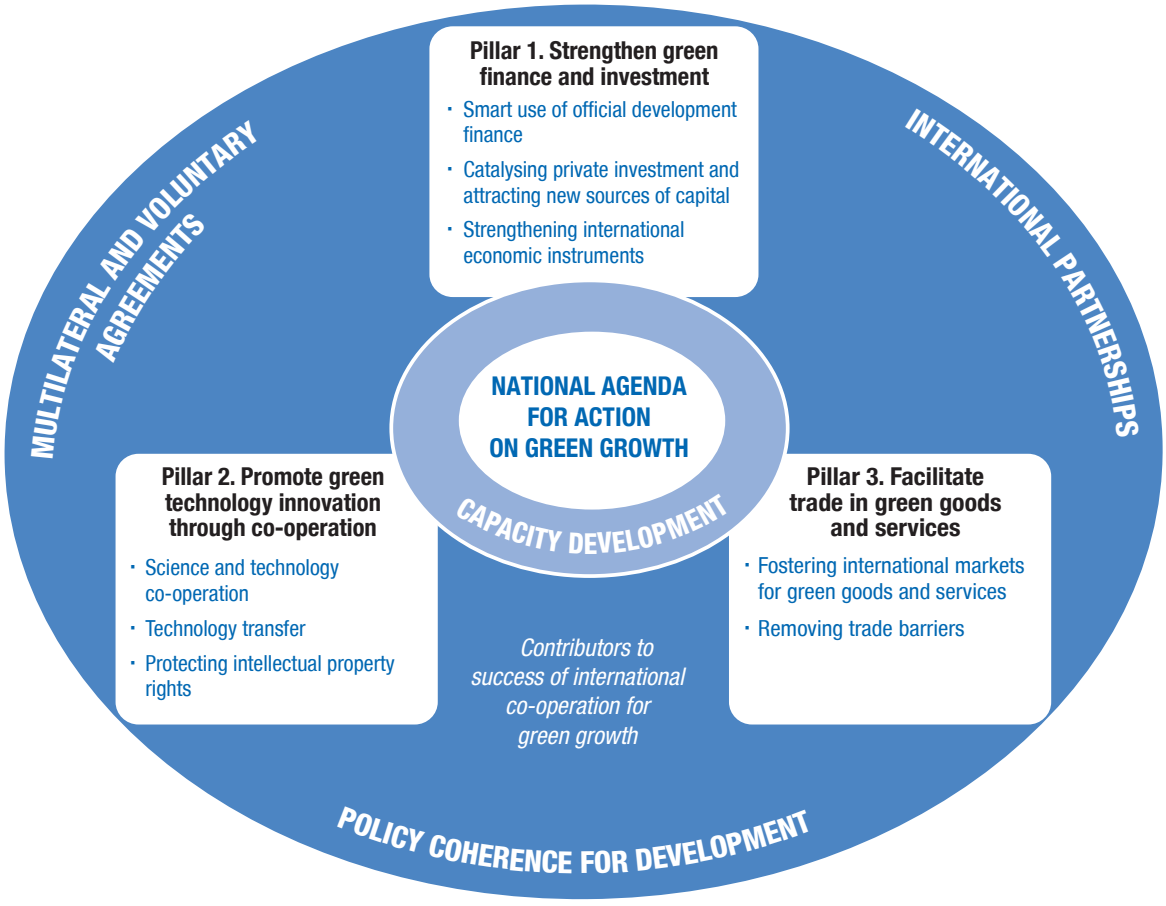
The previous chapter outlined the national policy agenda for shifting towards green growth. Although there is an increasing number of examples and emerging lessons in developing countries from their pursuit of green growth, these efforts are still recent and limited in scope. Such efforts will need to be scaled up and broadened significantly to improve economic and environmental outcomes across the developing world. This chapter presents key elements of an international co-operation agenda to support developing countries greening their growth. The chapter is particularly relevant for policy makers and government officials in developed countries who shape development co-operation policies and the delivery of other international co-operation programmes.

4.1. International co-operation on green growth: An agenda for action

International co-operation on green growth rests on three pillars, all of which support the national agenda for action on green growth (Figure 4.1):

1. green finance and investment supported by international development co-operation and private sector activities;
2. international technology co-operation; and
3. free trade in green goods and services.

Figure 4.1. **An agenda for international co-operation on green growth in developing countries**



As shown in Figure 4.1, these pillars will have greatest success when built within the context of:

- efforts to develop human and institutional capacities for pursuing green growth;
- coherent policy choices both in developed and developing countries, which together contribute to a strong international enabling environment for green growth;
- the implementation of multilateral environmental agreements and voluntary initiatives; and
- supportive and informative international partnerships that share experiences and knowledge.

This chapter discusses each of these elements in turn, drawing on examples from developing countries and international co-operation efforts. Some international support mechanisms are already in place, some can be found within broader efforts to support developing country's growth, and some will require new efforts. International co-ordination will also be essential to facilitate learning among developing countries on successful strategies for pursuing green growth.

4.2. Pillar 1: Strengthening green finance and investment

Pursuing green growth in developing countries will require substantial investment – in infrastructure, natural resource management, capacity and skill development. Some developing countries will be able to mobilise domestic resources to pay for these costs, and ideally over the long term most countries will be able to fund any costs associated with transitioning to green growth from public and private domestic resources. In the short and medium term, however, many developing countries will require external financial resources. Relevant international sources include official development assistance (ODA), other forms of official development finance (ODF) *(*e.g. non-concessional or non-ODA development finance), foreign direct investment (FDI) and other international private or public-private finance options. Developed countries have committed to increase their financial support to environmental action in developing countries drawing on public and private sources over the next decade under the UN agreements described in Section 4.5 (see also Box 4.1). Here we outline steps that the providers of these financial resources can take to ensure they maximise their contribution to green growth by working with government and civil society stakeholders in developing countries.

Box 4.1. **Scaling up international climate finance**

Climate change finance is set to increase substantially throughout the next decade as developed countries scale up resources to meet their pledges under the UN Framework Convention on Climate Change (UNFCCC). Over the next eight years, funding for climate change adaptation and mitigation will have to increase significantly. USD 30 billion was pledged in fast start financing for the three years up to 2012. This will need to increase to meet the target of USD 100 billion annually by 2020, and will come from both public and private sources. The potential scale of this funding makes the effectiveness of its delivery and use critical, not only for the impact of mitigation and adaptation measures, but also for development and poverty reduction.

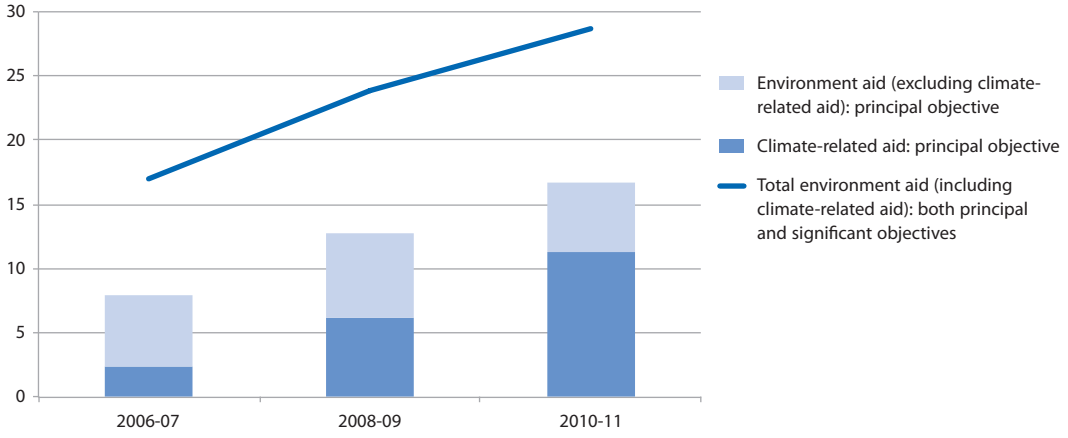
Bilateral official development finance

Smart use of bilateral ODF can be a key instrument to support green growth in developing countries. A starting point is to consider how ODA is currently supporting green growth and development. Available data indicate that today, bilateral ODA is a relatively large channel for green development finance. For example, in an assessment of multilateral and bilateral flows of ODA for climate change, it is typically estimated that bilateral flows of commitments are equivalent to or even greater than those flowing through multilateral channels (Buchner et al., 2011). The OECD Creditor Reporting System (CRS), which tracks the ODA from donor countries who are members of the OECD Development Assistance Committee,[1] identifies aid that is provided for environmental purposes (Box 4.2). The amount of bilateral ODA to support environmental sustainability has been increasing. Annual average bilateral aid commitments from DAC members targeting environment as a "principal objective" have more than doubled since 2006/07 reaching USD 17 billion in 2010/11. Annual average bilateral aid commitments targeting climate change as a "principal objective" have quadrupled since 2006/07, reaching almost USD 12 billion in 2010/11 (Figure 4.2). Despite these increases, the scope for further increases in the near term may be somewhat limited. Indicative forward spending surveys suggest that ODA as a whole will grow slowly at best over the coming years in the face of the current financial crisis and large fiscal constraints in donor countries (OECD, 2012a); environmental aid is also likely to level off in the near future.

Bilateral non-concessional development finance is another source of funding to support green growth in developing countries. While comprehensive data for DAC members on non-concessional flows targeting climate change are not yet available, a report led by the United Nations Environment Programme (UNEP) for selected agencies suggests that in 2009 it was about one-third of the magnitude of ODA targeting climate change (UNEP, 2010; and see Atteridge et al., 2009). DAC members have committed to begin to track

Figure 4.2. **Trends in environment aid (including climate-related aid), 2006-11**

Bilateral commitments by OECD Development Assistance Committee members, USD billion, constant 2010 prices



Notes: 1. A number of activities fall under "climate-related" aid, and are thus included here; however, a sub-set of these activities are not recorded as "environment" aid amounting to USD 2.7 billion in 2010/11; this might for example include a large hydro-electric facility.

2. Since 2010, "climate-related" aid includes both adaptation and mitigation (see Box 4.2).

Source: OECD/DAC Creditor Reporting System (CRS).

StatLink http://dx.doi.org/10.1787/888932830027

Box 4.2. Tracking bilateral aid allocated to the environment and sustainable development

The Creditor Reporting System is the OECD DAC's aid activity database, containing statistics on individual aid activities, including those for environmental purposes. The aid activity data come from donors, including the 23 member countries of the DAC, EU Institutions and other international organisations and private donors. The data are part of DAC members' official statistical reporting to the OECD and benefit the broader international community working in this area. A network of statistical correspondents collects data continually from aid agencies and government departments (central, state and local). They also ensure that reporting conforms to the definitions and classifications agreed by the DAC. The reporting system distinguishes between activities that target environmental sustainability as:

- a "principal objective": environmental sustainability is an explicit objective of the activity and fundamental in its design (i.e. the activity would not have been undertaken without this objective, such as a sustainable forest management programme);
- a "significant objective": environmental sustainability is an important, but secondary, objective of the activity (i.e. not one of the principal reasons for undertaking the activity).

This marker system enables analyses of environment-oriented aid in all economic sectors. However, figures can only be considered as estimates (data for activities with the score "significant" are less precise than those with the score "principal").* In general, analyses should take into consideration both categories, but should present each separately.**

Developed countries that signed the three Rio Conventions (the conventions on biological diversity, desertification and climate change)*** in 1992 committed themselves to helping developing countries to implement these conventions. Since 1998 the DAC has monitored aid targeting the objectives of the Rio Conventions using the so called "Rio markers". Every aid activity reported to the CRS is screened and marked as either (1) targeting the conventions as a "principal objective" or a "significant objective"; or (2) not targeting the objective. Rio markers distinguish between four categories of aid which contribute to sustainable development:

Biodiversity-related aid: activities that promote at least one of the three objectives of the Convention on Biological Diversity: the conservation of biodiversity, sustainable use of its components (ecosystems, species or genetic resources), or fair and equitable sharing of the benefits of the utilisation of genetic resources.

Desertification-related aid: activities that combat desertification or mitigate the effects of drought in arid, semi-arid and dry sub-humid areas through prevention and/or reduction of land degradation, rehabilitation of partly degraded land, or reclamation of desertified land.

Climate change mitigation-related aid: activities that contribute to the objective of stabilising greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, by promoting efforts to reduce or limit greenhouse gas emissions or to enhance greenhouse gas sequestration (Figures 4.3 and 4.4).

Climate change adaptation-related aid: this new marker was approved by DAC members in December 2009. It tracks aid that supports climate change adaptation. This new marker will complement the existing climate change mitigation marker, and thus allow presentation of a more complete picture of aid to developing countries' efforts to address climate change (Figure 4.4).

* In some cases, only a proportion of an activity scored "significant" targets environmental sustainability, whereas the amount recorded in the database relates to the entire activity.

** When examining the share of a donor's aid that targets environmental sustainability, it is necessary to also take into account the score "not targeted" which means that the activity has been screened against, but was found not to be targeted to, environmental sustainability (activities not screened against the objective should be excluded from the total amount).

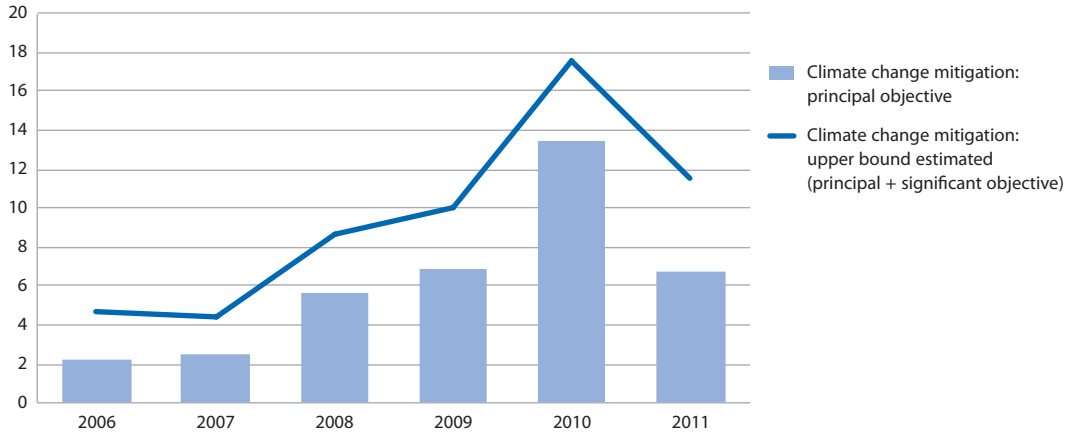
*** The United Nations Convention on Biological Diversity (UNCBD), United Nations Convention to Combat Desertification (UNCCD) and the United Nations Framework Convention on Climate Change (UNFCCC).

Source: OECD User's Guide to the Creditor Reporting System (CRS) Aid Activities database, available at *www.oecd.org/dac/stats/crsguide*.

non-concessional ODF that targets climate change action and data should be available in the near future. Non-concessional funding is potentially powerful because it is often used to attract and mobilise private investment. In turn, where private investment yields good returns, it can be a motor for change, operating at a scale that is neither attainable nor sustainable through public funding alone.

Figure 4.3. **Trends in aid for climate change mitigation, 2006-11**

Bilateral commitments by OECD Development Assistance Committee members, USD billion, constant 2010 prices

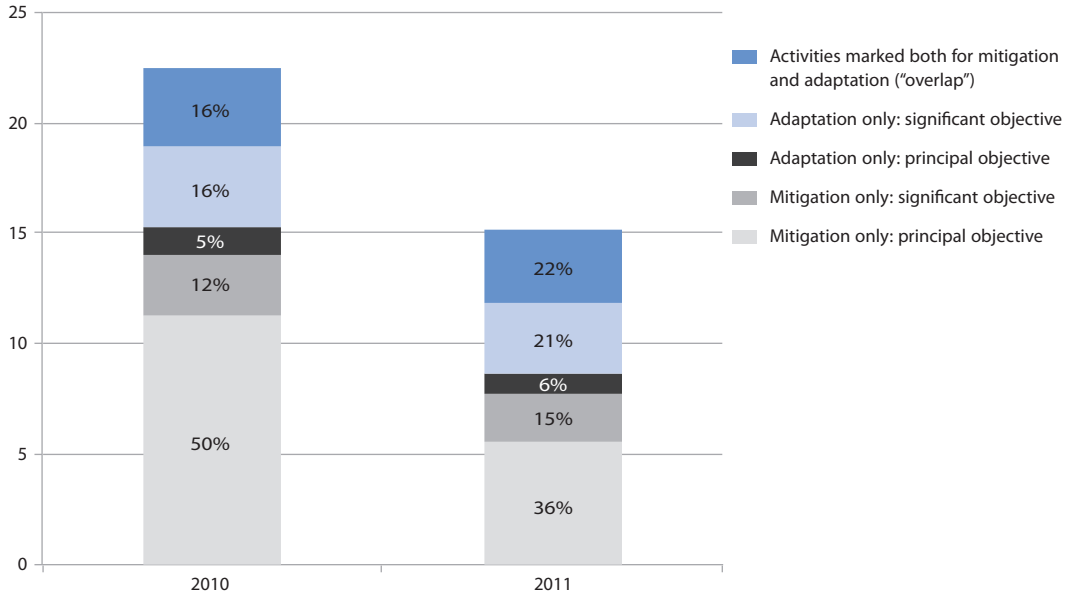


Source: OECD/DAC Creditor Reporting System (CRS).

StatLink http://dx.doi.org/10.1787/888932830046

Figure 4.4. **Total climate-related aid, 2010 and 2011**

Bilateral commitments by OECD Development Assistance Committee members, USD billion, constant 2010 prices



Note: Some ODA targets activities achieving both adaptation and mitigation objectives. 2010 is the first year of available data for the new "adaptation" Rio Marker (Box 4.2).

Source: OECD/DAC Creditor Reporting System (CRS).

StatLink http://dx.doi.org/10.1787/888932830065

Multilateral official development finance

Multilateral development banks, agencies and programmes are another key means of disbursing ODA and other forms of ODF targeting green growth in developing countries. Global programmes such as the Global Environment Facility and the UN Programme on Reducing Emissions from Deforestation and Forest Degradation (REDD) (Box 4.3) are already providing significant funding to green growth. International financial institutions, such as the World Bank and the International Finance Corporation, as well as regional development banks (African Development Bank, Asian Development Bank, Inter-American Development Bank, the European Bank for Reconstruction and Development and the European Investment Bank) also channel ODF that can be used to support green growth. Beyond provision of ODA, multilateral channels have been shown to be particularly powerful in their ability to direct and use non-concessional ODF to partner with and catalyse private investment.

Box 4.3. **Multilateral channels for green growth development co-operation**

- **The Global Environment Facility (GEF)** is an independent financial organisation that serves as the main financial mechanism for several multilateral environmental agreements, including the UNFCCC and the CBD. It involves 182 countries working in partnership with international institutions, civil society organisations and the private sector. Its aim is to address global environmental issues while supporting national sustainable development initiatives, and it provides grants for projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants. Since 1991, the GEF has provided USD 10.5 billion in grants and leveraged USD 51 billion in co-financing for over 2 700 projects in over 165 countries. Through its Small Grants Programme, the GEF has also made more than 14 000 small grants directly to civil society and community-based organisations, totalling USD 634 million. The most recent replenishment period (2007-10) saw a total of USD 2.87 billion provided in grants to address the most urgent environmental challenges worldwide (GEF, 2011). The flow of ODA financing for green growth channeled through the GEF is approximately USD 800-900 million per year (2009-11; GEF, 2011).
- **Reducing Emissions from Deforestation and Forest Degradation (REDD) and REDD+** may represent one potential form of an international system of payments for ecosystem services (see Section 3.2 in Chapter 3). REDD is an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. REDD+ goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks. While international climate negotiations continue, considerable resources have already been mobilised outside the formal negotiations to support action in developing countries. In June 2010, 69 governments, including all major forest-rich developing countries, joined efforts to create the REDD+ Partnership (www.reddpluspartnership.org/en/). This partnership serves as an interim platform to co-ordinate REDD+ activities, and is currently facilitating the flow of USD 4 billion fast-start climate finance pledged for REDD+ efforts by both bilateral and multilateral donors, particularly for readiness and capacity building (UNEP, 2011). This partnership demonstrates the high level of interest from developing countries to work together with the international community to advance REDD and REDD+ programmes.

Box 4.3. **Multilateral channels for green growth development co-operation** *(continued)*

- **The Climate Investment Funds (CIFs)** comprise four financial facilities operating under two trust funds (the Clean Technology Fund and Strategic Climate Fund) to support developing countries in catalysing investment and transformation towards low-carbon climate resilient development. The Clean Technology Fund promotes investments in clean energy technologies. The Strategic Climate Fund is channelled through three financing windows to support targeted programmes for reducing emissions from deforestation and forest degradation, integrating consideration of climate risk and resilience into core development planning and implementation, and increasing energy access by scaling up renewable energy deployment in low-income countries. Having received their mandate from the UNFCCC, 14 developed countries pledged over USD 6.5 billion in 2008 in the form of grants, concessional or non-concessional loans and/or risk mitigating instruments. CIFs are disbursed through the multilateral development banks to support effective and flexible implementation of country-led programmes and investments. Civil society groups, indigenous people and the private sector sit as observers at the CIF governance table at the country level.

Source: GEF (Global Environment Facility) (2011), *GEF Annual Report 2010*, GEF, Washington, DC, available at *www.thegef.org/gef/sites/thegef.org/files/publication/WBAnnualReportText.revised.pdf*; UNEP (United Nations Environment Programme) (2011), *REDDy, Set, Grow – Opportunities and Roles for Financial Institutions in Forest Carbon Markets*, UNEP, Geneva; CIF website *www.climateinvestmentfunds.org/cif.*

The lack of a harmonised reporting system working across bilateral and multilateral development finance means that it is difficult to know how much aid and other ODF is flowing to developing countries for green growth or even for climate change issues, or to understand its effectiveness. Early indications from a first round of reporting on climate finance from multilateral development banks, and from the DAC Creditor Reporting System on bilateral finance, suggest that the amounts of finance flowing annually to developing countries through multilateral agencies is roughly the same as that flowing from bilateral institutions (Joint-MDB, 2012a and b). It will be essential for the development co-operation community to work closely together to develop and use a harmonised reporting system (Buchner et al., 2011; Corfee-Morlot et al., 2009).[2] Building such a system will be a multi-year effort and require the engagement and strong commitment of bilateral donor agencies, multilateral donor agencies and partner countries. A harmonised reporting system may be worth the effort however, as it would provide a reliable means for the international community to track progress on developed country commitments to support developing countries to green their growth pathways and achieve sustainable development.

Integrating green growth into development co-operation

While ODF already plays a significant role in promoting green growth, both financially and technically, much work remains to fully integrate green growth objectives into development co-operation practice. Members of the OECD DAC endorsed a Policy Statement for the Rio+20 Conference in April 2012, which reiterates their commitment to supporting developing countries' efforts towards green growth.[3]

Development co-operation partners have decades of experience in working together with partner countries, and are now doing more to harmonise their activities in order to promote the mainstreaming of green growth. High-level dialogue can be useful to raise the profile of green growth with senior officials in key ministries in partner countries, and provides

a means for better harmonisation among key donors on these topics. Another approach is to contribute to a horizontal fund for climate change or for green growth, managed by a central government body from which sectoral ministries can draw to stimulate and promote sustainable development (OECD, 2009a; Irawan et al., 2012). For example, the Six Banks Group[4] operating in Vietnam is a USD 200 million multilateral initiative that harmonises donor support towards the National Target Programme to Respond to Climate Change; the programme works in close consultation with the Vietnamese national government. Funded activities include the Support Program to Respond to Climate Change (SPRCC), which is currently helping the Vietnamese government to streamline strategies on green growth, as well as policies on energy efficiency and disaster management; to align these strategies and policies with Vietnam's own Socioeconomic Development Plan; and to monitor and reflect impacts of these changes in the SPRCC (Korea Eximbank, 2012).

One challenge for mainstreaming green growth into development co-operation is that countries that receive aid face a wide range of development challenges and specific obstacles; support efforts need to be tailored to these specific needs. These range from frequent food insecurity or water stress in rural regions of the Sahel, to negative consequences of massive urbanisation and extreme weather events in peri-urban, coastal areas of Indonesia. Countries need to review the range of opportunities and challenges for green growth and prioritise areas for co-operation. Ideally this planning effort will be based on a country-driven assessment or routine diagnostic process that considers the costs and benefits of different types of greening policies. This in turn can support dialogue with national stakeholders and with development co-operation partners on how to incorporate green growth thinking into aid programme design and delivery, both in terms of targets of support, but also choice of aid instruments and modalities for aid delivery.

There is an essential role for ODA and other ODF to enable green growth in many developing countries (OECD, 2011a). The following are key areas where ODF can add particular value, discussed in more detail below (see more examples in Box 4.4):

1. Funding or co-funding of green infrastructure, as this tends to receive only limited private funds (OECD, 2011a). For example, ODF may be used to finance major projects in sustainable agriculture, renewable energy and low-carbon transportation networks (OECD, 2011a). ODF can be used to encourage private investment in green growth activities and business practice in developing countries by helping to create the right conditions and mitigate certain investment risks (e.g. financial risks associated with uncertainty about the performance of new green technologies).
2. Building resilience to climate and natural disasters. Since 2008, development co-operation providers and developing country partner governments have widely agreed that climate-proofing and disaster risk reduction approaches should be mainstreamed into development co-operation programmes and particularly into aid-funded public investment projects (OECD, 2012b).

Supporting green infrastructure by blending sources of financing

As discussed above (and in Chapter 3), an essential way ODF can help support green growth is to finance or co-finance green infrastructure in a number of relevant sectors such as transportation, water, energy and agriculture. Many developing countries are constrained by weak infrastructure in these sectors, in part because of their limited access to public finance and capital markets. Deficient infrastructure can hamper economic activity and weaken human development efforts. A massive shortfall in funding for African infrastructure projects is costing the continent up to 3% of GDP a year. For example, poor

Box 4.4. **ODA and development co-operation for green growth: some examples**

- *Low carbon transportation networks.* The Climate Investment Funds (Box 4.3) are supporting developing countries to build public transportation systems that reduce emissions while also providing a variety of other public goods. Other donors are supporting a range of low-carbon transport options, particularly urban public transport, and mostly in middle-income countries. For example, France has provided USD 63 million to Morocco to partly finance a tramway in Rabat; and in 2009, Japan supported mass rapid transport in New Delhi (USD 816 million), Jakarta (USD 496 billion), and Bangkok (USD 648 million).
- *Renewable energy and energy access.* Bilateral ODA for power generation has been increasing, and in 2009 stood at almost USD 3 billion. Over 40% of this funded power generation from renewable sources. One area of interest is the role of biofuels (where they do not compete with food production). For example, Brazil is working in partnership with the UK to transfer its bio-ethanol technology to Mozambique. Such technologies can help developing countries reduce their oil imports. A number of feasibility studies and research ventures in solar and wind technologies are also currently being funded by ODA. In 2010, Spain lent USD 139 million to Morocco to construct a solar-thermal plant at Ain Beni. Spain provided almost USD 300 million to Tunisia for wind energy parks in the region of Bizerte. Energy access agenda is another key focus of bilateral support. Through the ACP-EU Energy Facility the EU has been involved in more than 130 projects in African, Caribbean and Pacific countries. Using its resources of about EUR 340 million, the facility has leveraged about the same amount from other public and private sources. Overall, the countries involved have been able to bring modern energy services to between 12 and 13 million people (OECD, 2012b).
- *Sustainable agriculture.* The World Bank has provided loans of USD 30 million in Uzbekistan to increase the productivity, financial and environmental sustainability of agriculture and the profitability of agribusiness. These loans aim to strengthen water user associations, provide investments in demonstration plots in the districts for applied modern irrigation techniques and provide rural training and advisory services. In 2009, Norway provided USD 6.3 million in ODA to Malawi for sustainable agricultural development. The programme aims to improve the capacity of rural communities to use their natural resource base effectively and sustainably to produce sufficient food, generate income and employment and to influence the socio-economic policies that affect their livelihoods. In another example, the same year Korea provided USD 21 million to assist the government of Mali contribute to sustainable growth of agro-pastoral and fish production by maximising the use of irrigated areas through increased control of water and flood areas.
- *Forestry.* The Netherlands fund a programme on Fostering Environmental Stewardship, Social Responsibility and Good Governance in Africa's Heartland. Many donors also contribute to the Forest Carbon Partnership Facility (FCPF) housed by the World Bank. The FCPF has two objectives: to build capacity for REDD in developing countries (see Box 4.3) and to test programmes for performance-based incentive payments for ecosystem services in some pilot countries. More generally, the FCPF is helping developing countries to establish credible estimates of national forest carbon stocks, identify sources of forest emissions and develop incentives for conserving forests and investing in sustainable forest management. As just one example, Finland provided USD 10 million to the FCPF in 2009.
- *Ecotourism.* In 2009, USD 146 million was channeled through bilateral donors to the tourism sector in developing countries, some of which targets ecotourism. More than 20% of aid projects in the tourism sector have a principal environmental objective, which amounts to approximately USD 36 million. Donors who themselves have large tourism industries, such as Spain and Italy, provided a substantial share of this support. The largest project by the US's Millennium Challenge Corporation in Namibia is a tourism project: "Ecotourism Development for Communal Conservancies Activity". It represents a transfer of USD 17 million.

Source: All project details are from the OECD/DAC Creditor Reporting System, available at *http://stats.oecd.org/Index.aspx?datasetcode=CRS1*; OECD (2012b), *Development Co-operation Report (2012), Lessons in Linking Sustainability and Development,* OECD, Paris.

infrastructure quality is undermining the productivity of manufacturing firms, especially in low-income countries in central Africa (OECD, 2012c). This infrastructure gap is a key opportunity to invest in new or renovated infrastructure that is low-carbon, resource-efficient and more resilient to climate change risks (OECD, 2009a; Corfee-Morlot et al., 2012; Kennedy and Corfee-Morlot, 2012; OECD, World Bank and the UN, 2012). Any other approach would be shortsighted and risk locking developing countries into a high-carbon, resource-intensive, vulnerable, or "brown" development pathway with huge dangers and costs for future development.

A variety of different types of ODF are available to support infrastructure investments in developing countries. ODA instruments include grants, concessional and technical support; these are currently used in efforts to help sub-Saharan Africa to boost the current 12% electrification rate to allow more economic growth (OECD, 2012b). However it is typically through non-concessional or innovative development finance that development co-operation programmes successfully catalyse private investment.

Table 4.1 lists innovative financial mechanisms that can successfully boost investment in the water sector (OECD, 2010a). These instruments, along with export credit agency instruments, are increasingly found in development co-operation programmes in other sectors, such as energy and transport (OECD, 2010a; Corfee-Morlot et al., 2012; CPI, 2012). For example, in Thailand a blending of ODA and non-concessional ODF has successfully been used to leverage private sector investment in renewable energy and energy efficiency to avoid locking the country into a high carbon intensive and polluting development pathway (OECD, 2012b). Blending of innovative development finance with ODA and domestic funding is increasingly observed in development co-operation efforts targeting clean energy, with the aim of accelerating the delivery of climate change and local development benefits by combining public and private investment (Trabachi et al., 2012; Falconer and Frisari, 2012). A test of success for some of these green investments, particularly in higher income developing countries, will be whether over time they become fully commercial and less dependent on the infusion of public funding.

Table 4.1. **Innovative financial mechanisms for increasing investment in the water sector**

	Required for increased access to private financing and investment			
Public financial mechanism or supporting action	Commercial banks	Bond markets	Project finance	Equity finance
1. Blending commercial grants and repayable financing	X			
2. Extending the range of potential borrowers via micro-finance	X			X
3. Alleviating affordability constraints with output-based aid	X		X	
4. Mitigating risks with loan guarantees and insurance	X		X	
5. Creating grouped financing vehicles to increase access to finance	X	X		
6. Increasing lending to sub-sovereigns via innovation	X		X	
7. Strengthening the balance sheet via equity injections	X			
8. Increasing transparency in the sector via credit ratings	X	X		X
9. Developing "bankable" projects through project preparation facilities	X		X	
10. Developing local equity markets				X

Source: Kennedy, C. and J. Corfee-Morlot (2012), "Mobilising Private Investment in Low-Carbon Climate-Resilient Infrastructure", *OECD Environment Working Paper,* OECD, Paris; based on OECD (2010a), *Innovative Financing Mechanisms for the Water Sector,* OECD, Paris.

Despite a large potential for private investment to fill the financing gap for infrastructure in developing countries, the ability to access capital markets differs greatly between low and high-income countries. Accessing capital markets in higher-income developing countries will be aided by the maturity of bank and non-banking financial services, as well as broader legal, regulatory and institutional capacity (Kennedy and Corfee-Morlot, 2012). High and upper middle-income developing countries have universal banks and non-banking financial services, including government and corporate bonds and market equity, as well as alternative services such as private equity and venture capital. In these contexts, interest rates are fully market-based and risk management is robust. There is full availability of long-term funding, as is typically necessary for infrastructure investments. Low-income countries, by contrast, typically have only basic banking services, and lack non-banking financial services. The capacity to undertake risk management is weak. The availability of long-term funding is typically limited to up to a year. Better access to long-term funding may be available in middle-income countries, through full range banks, government bonds and equity, meaning that long-term financing may be partially achieved (Kennedy and Corfee-Morlot, 2012).

Building resilience to climate change and other "external" shocks

As discussed earlier, green growth can only occur if livelihoods are resilient to external "shocks", including climate change and natural resource scarcity. Provision of adequate infrastructure and basic services to the poorest populations in developing countries will be an essential step to protect these communities and to build resilience to external stressors. A look at the water sector illustrates the challenges. The global demands for water infrastructure are estimated to be huge, around 1% of world GDP today or more than USD 1 trillion per year in new investment required by 2020, with particularly high needs in developing countries (Kennedy and Corfee-Morlot, 2012; OECD, 2006).

The financing challenges for infrastructure in developing countries are also large, as noted above. Several recent studies suggest high potential to use repayable market-based finance for water infrastructure investment, i.e. finance and investment provided by private actors through markets, including private loans, bonds and equity. However, these sources of private capital and finance will need to be catalysed by public finance (OECD, 2010a; Table 4.1). Filling the financing gap for water infrastructure in lower income developing countries will rely to a great extent upon the availability of ODF or other public funding sources (e.g. domestic funding) but the private sector may also have a role to play.

Beyond infrastructure, there is growing recognition of the potential role of social protection as a key instrument to respond to the multiple risks and short and long-term shocks and stresses associated with climate change (Davies et al., 2009; IPCC, 2012). The integration of social and environmental concerns into development co-operation practice has already delivered tremendous benefits. Examples include disaster risk management measures, such as cash transfers to ensure that vulnerable children are not withdrawn from school or that they can access healthcare following an extreme weather event. Other examples include safety net programmes to provide seasonal employment in public works in exchange for cash or food transfer to protect household assets and smooth a shift away from emergency food aid towards more predictable and targeted safety net measures. Finally, in the agriculture sector weather-indexed crop insurance is one innovative financial mechanism that can be supported by development co-operation. This provides protection against crop failure caused by drought or excess rain and enables farmers to access credit in order to purchase quality seeds and fertilisers (UN, 2007).

Encouraging private sector engagement in green growth activities

As noted above, ODA and other ODF can play an important role in mobilising private investment in developing countries through the use of innovative instruments to make green investment more attractive. Development co-operation programmes that help to build local financial capacity and that partner both with developing country governments and engage with the private sector can offer innovative models for the use of limited public funds to mitigate financial risks and mobilise private investment (Box 4.5). Innovative development finance and modalities could be particularly useful in sectors where investment has been limited by concerns over the performance of new, green technology, or of regulatory and other market risks, which raise the cost of private financing.

Partnerships with the private sector may also take the form of "public-private partnerships" (PPP). PPPs offer a more formal type of contractual arrangement in which investment risks are shared between public and private sector actors. However, PPPs' uneven track record, even in developed and upper-income developing countries, suggests that they may only be successful when the government has strong administrative and financial capacity to negotiate, design and manage the contracts (Kennedy and Corfee-Morlot, 2012; OECD, 2012b).

Box 4.5. **Examples of public-private collaboration to finance green growth**

- **Public-private stakeholder platform for water management in Jordan.** A pilot public-private stakeholder platform, the Jordan Business Alliance on Water, has been formed with initial USD 100 000 funding from the US Agency for International Development (USAID). One project involves establishing a plant at a cost of USD 910 000. Approximately 60% will be financed by the public sector and 40% secured from private sector funds. A similar model was agreed for another slightly smaller scale project, costing USD 380 000. The initial USD 100 000 investment in this partnership thus brought in total project finance of approximately USD 1.3 million, a leverage ratio of 1:13 (World Economic Forum, 2011).
- **Climate public private partnership for developing countries**. The UK Government, in collaboration with the International Finance Cooperation and Asian Development Bank, launched the Climate Public Private Partnership in 2012. For every pound provided by the UK taxpayer, this initiative will leverage up to 30 times the amount in private capital using two new commercial funds. This initiative will help support projects to deliver clean, renewable and efficient energy, new technology and protect natural resources in emerging and developing countries. It is estimated that the initiative could generate more than 7GW of clean, reliable energy – equivalent to 66% of current UK renewable energy capacity – and create 40 000 jobs (DFID, 2012).

Source: World Economic Forum (2011), *Financing Green Growth in a Resource-Constrained World: Partnerships for Triggering Private Finance at Scale,* WEF, Geneva; DFID (Department for International Development) (2012), "Mitchell: Private Sector to Tackle Climate Change", Press Release, DFID, London.

Foreign direct investment and other private engagement to support development

FDI has greatly exceeded ODA in the last decade in economic sectors that strongly contribute to greenhouse gas emissions and other forms of environmental pollution (agriculture, forestry, mining, manufacturing, energy, transport, and construction). It is therefore important to understand how FDI flows and why, and the extent to which FDI supports investments that lower emissions or pollution levels (Corfee-Morlot et al., 2009; Golub et al., 2011). One goal of green growth policy reform is to catalyse a shift from "brown"

to "green" investment across all private sources (domestic and foreign). Private investment and FDI in particular have the potential to not only stimulate development, but also technological innovation, in developing countries. This is because they often operate through the channels of multinational enterprises, which are normally equipped with better skill development opportunities and large capital for R&D as compared to domestic companies in developing countries (Popp, 2009).

"Green FDI" can involve transferring green technologies and management processes to enterprises operating in developing countries, which in turn can directly translate into environmental and economic benefits (UNCTAD, 2010). Furthermore, FDI in developing countries is typically at least as environmentally-friendly as domestic private investment (Golub et al., 2011; Haščič et al., 2010). This is especially true in the agricultural, manufacturing and mining sectors (Golub et al., 2011). Green FDI can also have positive spillover effects for domestic firms. For example, domestic competitors or other suppliers may adopt the clean technologies that are originally introduced through FDI, thus extending the direct effects of such investment to other companies (Gallagher and Zarsky, 2007).

FDI is driven through the private sector and where it flows depends upon the availability of human capital and institutional infrastructure to support (and protect) private investment, as well as a country's locational advantages, such as market access, resource availability or production costs (UNCTAD, 2010). As such, FDI will likely flow to relatively wealthier developing countries with good governance, including a strong rule of law. This means it may inadvertently have limited influence or relevance in the poorest countries. OECD research suggests that foreign investors favour countries with transparent and well-enforced environmental regulations, such as on greenhouse gas emissions or other types of pollution (Kauffmann and Tébar Less, 2010). Similarly, Dean et al. (2004) found that Chinese foreign joint ventures were attracted to areas with more stringent environmental regulations. In Chile, foreign investors convinced the government to impose clear regulations in the mining sector (OECD, 2002). As a result, developing country governments interested in attracting FDI as part of a broad green development strategy may choose to strengthen and above all clarify environmental regulations and policies.

ODA can work in partnership with developing country governments to strengthen policy and governance conditions to attract FDI. Lasting national policy reforms will be needed in many developing countries to attract foreign private investment and institutional investors – development co-operation programmes can help to set in motion, enable and strengthen these reform processes. For instance, the United States and United Kingdom have provided significant amounts of aid to help improve general public sector policy and administrative management, decentralisation, financial sector development, privatisation and so on in Africa. Others, like Japan, have undertaken projects such as the Triangle of Hope, which works with the Government of Zambia to improve the overall business climate, particularly laws and regulations conducive for investment, by helping develop the capacity of the relevant government bodies. Portugal has been working with partner countries such as Angola to strengthen their capacity in statistics, land-use planning, and general investment policies, which is expected to have a positive impact on attracting investment (OECD, 2012c).

A number of international initiatives lay the groundwork for green FDI. The *OECD Guidelines for Multinational Enterprises* recommend that enterprises operating in foreign countries establish and maintain an environmental management system to: (1) collect and evaluate information on the environmental impact of firm activities; (2) establish measurable

objectives; and (3) monitor and verify progress towards environmental safety objectives (OECD, 2011b). The evidence tells us that the presence of an environmental management system does encourage good environmental performance and innovation (Johnstone, 2007; Dasgupta et al., 2000). Other international standards promoting responsible environmental behaviour by private firms include the International Organization for Standardization's ISO 14000 family, which addresses various aspects of environmental management,[5] the European Union's Eco-management and Audit Scheme (EMAS),[6] the International Council on Chemical Associations' Responsible Care programme,[7] and the United Nations Global Compact.[8]

In addition, pension funds, insurance companies and sovereign wealth funds can also potentially be a new source of capital to support green growth initiatives. In 2011, institutional investors managed USD 30 trillion in assets with annual inflows of USD 850 billion in OECD countries. However, today less than 1% of OECD pension fund assets are allocated directly to infrastructure projects and an even smaller slice goes to green infrastructure (Della Croce et al., 2011). Since the financial crisis, interest from these institutional investors in direct investment is picking up. Given the prevailing low interest rates and weak economic growth prospects in many developed countries, institutional investors are increasingly looking for different asset classes which can deliver more stable income streams. Beyond developed countries' sources of institutional capital are those in developing countries themselves, which are growing at a much faster pace given the younger and more rapidly growing work forces in these countries. Thus institutional investors in both developed and developing countries may be able to help supply capital for green infrastructure investment in developing countries.

Green infrastructure projects can potentially fulfil the desirable characteristics required by institutional investors, and investors are redefining their investment and risk allocation strategies accordingly (OECD, 2012d; Kaminker and Stewart, 2012). In late 2012 four regional climate change institutional investor groups announced the formation of the Global Investor Coalition on Climate Change (GIC) to represent the international investment community on climate change policy and investment issues at a global level. The GIC represents 285 investors with more than USD 20 trillion in assets and stresses the urgent need for policy action which stimulates private sector investment in climate change solutions and creates jobs. It stresses that this is essential for ensuring the long-term sustainability and stability of the world economic system.[9] PensionDanmark is another good example: they have a dedicated research team working on renewable energy and infrastructure investments and are planning to place up to 10% of their investments in tackling climate change; many of these activities will be taking place in developing countries. South Africa has also taken the innovative step in a decision to set aside 5% of its Government Employees' Pension Fund to invest in development projects, most of which will be infrastructure; some share of this will go to support those with explicit social and environmental policy objectives (Box 4.6; see also Box 4.13 on Norway's pension fund).

Moving from the current "short-term returns" mindset to a longer-term investment environment requires a change in investor behaviour. The market is unlikely to deliver such a change on its own. Major policy initiatives at the national level, as discussed in Chapter 3, are needed in a variety of areas to create the conditions for a shift in investment to "go green". As part of the necessary transformation in investor behaviour, institutional investors need to be brought into the debate with policy makers (OECD, 2012d).

Box 4.6. **South Africa: The Government Employees' Pension Fund and green infrastructure**

The Government Employees Pension Fund (GEPF) is Africa's largest pension fund, with over USD 138 billion in assets under management. The GEPF is also the single largest investor in the Johannesburg Stock Exchange listed companies. The GEPF has recently launched its Developmental Investment Policy, which outlines its approach to developmental infrastructure investments through the Isibaya Fund, managed by the Public Investment Corporation. The GEPF has set aside 5% of the fund's portfolio for investing in developmental projects – mostly infrastructure projects – in South Africa.

The Isibaya Fund provides finance for projects capable of generating good financial returns, while supporting positive economic, social and environmental outcomes for South Africa over the long term. The focus on developmental investments demonstrates the GEPF's commitment to its obligations as a signatory to the UN backed Principles of Responsible Investment. During 2010/11, the Isibaya Fund accelerated investments in developmental projects in the following areas:

- economic infrastructure, including projects in energy, telecommunications, logistics, commuter transport and water infrastructure;
- social infrastructure, including projects in education, affordable housing and healthcare;
- economic growth and transformation, investments in sectors that foster growth, job creation and broad based black economic empowerment, particularly in priority sectors identified by government's Industrial Policy Action Plan, including agriculture, agro-processing, alternative energy and environmental projects;
- environmental sustainability, with a focus on renewable energy generation and clean technology, as well as firms, funds and projects active in the environmental goods and services sector.

In each area, the Isibaya Fund will maintain a balance between social impact and financial returns. The GEPF has developed an environmental, social and corporate governance framework to measure the impact of Isibaya's unlisted investments on issues such as job creation, job retention, poverty alleviation, black economic empowerment and regional development.

Source: OECD (2012e), *G20/OECD Policy Note on Pension Fund Financing for Green Infrastructure and Initiatives*, OECD, Paris, *www.oecd.org/finance/private-pensions*, accessed 28 March 2013, citing the GEPF Annual Report 2011.

Strengthening international economic instruments

Green growth in developing countries can also be financed in part through the use of international economic instruments. These include use of the carbon market created under the Kyoto Protocol and now continuing under the UN Framework Convention on Climate Change. In particular, substantial private finance from developed countries is flowing to developing countries through Clean Development Mechanism projects as a means to purchase carbon offsets (Box 4.7).[10] To date most CDM projects have been implemented in the largest developing countries, such as China and India. There are few CDM projects in Africa, largely due to a lack of technical and institutional capacity; limited project pipelines, financing, experience and technical skills; and monitoring challenges (Wang, 2010; Desanker, 2005; Ellis and Kamal, 2007). The complexity of CDM rules also hinders engagement and participation by many developing countries and raises transaction costs.

Box 4.7. **The Clean Development Mechanism**

The Clean Development Mechanism (CDM) was established under the Kyoto Protocol. It has two objectives: (1) to assist developing countries achieve sustainable development and contribute to the ultimate objectives of the UNFCCC; and (2) to help industralised countries comply with their qualified emissions limitation and reduction commitments under the Kyoto Protocol. The second objective is achieved by allowing industrialised countries to meet part of their emissions caps using certified emissions reduction (CER) credits through CDM projects in developing countries. To date, more than 80% of CDM projects have been carried out in the Asia Pacific region, with less than 3% taking place in Africa. About 80% of the CDM projects are focusing on renewable energy and energy efficiency technologies (UNEP Risoe Centre, 2012). Most CDM projects claim several sustainable development benefits such as employment creation, the reduction of noise and pollution, and the protection of natural resources (UNFCCC, 2011).

Source: UNEP Risoe Centre (2012), "CDM Projects by Host Region", UNEP Risoe website, *www.cdmpipeline.org/cdm-projects-region.htm*; UNFCCC (2011), *Benefits of the Clean Development Mechanism 2011*, UNFCCC, Bonn.

Payment for ecosystem service programmes (PES, Section 3.2 in Chapter 3) are a form of economic instrument that are now more widely used in the global context to raise finance for sustainable natural resource management. PES programmes give cash and/or in-kind payments to farmers and other land managers as an incentive to conserve and enhance ecosystem services that derive from sustainable land management. Such programmes can cross national borders by providing international investors with the opportunity to co-finance activities that enhance the environment (OECD, 2010b). The recently established PES programme in the Los Negros Valley in Bolivia illustrates how ecosystem services in developing countries can meet both domestic and international demand. Downstream irrigators in the Municipality of Pamagrande, Bolivia pay for watershed services, while the US Fish and Wildlife Service pays for the protection of habitat for migratory bird species (Asquith et al., 2008). The REDD mechanism (Box 4.3) is another example of international PES. Under REDD, financial incentives are provided at the international level to developing countries to reduce greenhouse gas emissions from deforestation and forest degradation. Rough estimates suggest that as many as 25-50 million low-income households in developing countries could benefit from REDD by 2030 (Milder et al., 2010). However an international system to pay for REDD has not yet been agreed so this scale has yet to be achieved.

Further deploying international economic instruments for financing sustainable management of ecosystem services in developing countries will require action on at least three fronts. First, it requires fostering demand in developed countries for developing countries' ecosystem services. Second, it requires creating institutional and financial arrangements in developing countries to ensure supply is adequate and of sufficient quality (i.e. delivers the services it claims). Finally, transparent and standardised monitoring and accounting of ecosystem services will be essential for ensuring adequate and good quality supply (Karousakis and Corfee-Morlot, 2007).

Lessons for moving forward

Through development co-operation, foreign investment, public-private collaboration and other channels of finance, developed countries have begun to provide substantial financial and technical support to developing countries to enable and to boost investment

to support green growth. Several lessons have emerged from this experience that can help developed countries to make more effective use of their finance in providing support to developing countries:

- *Mainstream green growth thinking into all areas of development policy and planning.* This will help to provide more timely and targeted development co-operation through a range of aid instruments and modalities that meets the needs of different developing countries on their own terms and for their own priorities.
- *Work with partner countries to support domestic policy reform processes* designed to attract and boost private investment in green growth.
- *Use ODF to engage the private sector more effectively at early stages of development*. This includes working with domestic and multinational firms in developing countries. This can be achieved by using more lending (concessional and non-concessional), guarantees and other de-risking instruments; it may also include combining grants with non-concessional lending and technical assistance to attract private engagement and eventually investment. Public-private collaboration is another way for private sector players to mitigate risks faced in project investment.
- *Strengthen initiatives to support and attract FDI, especially green FDI,* in part by integrating clear environmental regulations into national policy reforms and working with businesses to report, track and manage environmental performance as part of their corporate policy and decision making.
- *Mobilise new sources of private and public capital for development,* such as through pension funds and other institutional investors, to support green growth infrastructure investment. Raise and channel new sources of public revenues into the greening of development co-operation activities (e.g. from auctioning emission permits in developed countries). Create and use targeted funds to assist donors to harmonise their activities in individual developing countries.

4.3. Pillar 2: Promoting green technology innovation through co-operation

Today's technology and consumer behaviour can only do so much to achieve green growth. Significantly more innovation – both the creation of new products, processes and technologies, as well as their diffusion and application – will be required to ensure that further growth does not increase environmental pressures (OECD, 2011c). Insufficient skills, funds, access to information and institutional frameworks all impede science and co-operation on green innovation and limit innovative capacity in developing countries. In terms of the share of professionals engaged in relevant research, even advanced developing countries have been found to be far behind high-income countries (OECD, 2011a). To address these problems, there is a need for policies, frameworks, and governance mechanisms for international co-operation to support rapid scientific progress, technological innovation and diffusion (OECD, 2011d). The international community can help developing countries push forward the technology frontier for green growth through support for education, science and research collaboration, technology co-operation and transfer, and support to regulatory frameworks for the protection of intellectual property rights (Figure 4.1).

Science and research collaboration

International science and research co-operation between developed countries and developing countries is a key element in a strong international enabling environment for green growth. It can:

- Enhance knowledge development and diffusion to promote green growth and innovation (OECD, 2011d).
- Help to realise economies of scale, create common pools of knowledge, expertise and funding to carry out relevant research. One important approach to share information, for example, is to develop common datasets for monitoring and forecasting green growth processes.
- Accelerate the building of local technical capacity to spur technology innovation and diffusion tailored to the needs of developing countries (Haščič et al., 2010).
- Help governments to design and implement policy frameworks that support investment in resource-efficient and clean production technologies (see Chapter 3).

Such collaboration can be achieved through academic partnerships and cross-border higher education exchange programmes. These can facilitate technology transfers, with positive knock-on effects for the local innovation system (OECD, 2011d). Support to training (for researchers and scholars) increases the capacity of developing countries to adopt new technologies. As noted, engaging the private sector is also critical because of its immense potential to lead and finance R&D activities and to disseminate new technologies. There is nevertheless a need to strike a balance between nurturing scientific and technological excellence while taking into account complex social and environmental problems. To be successful in developing countries there is a need for international science and research collaboration to remain focused, while also accommodating a large number of stakeholder viewpoints (see examples in Box 4.8). For example, it is crucial to ensure close involvement of developing country experts and government officials in setting priorities. Broad agreement also exists on the need for strong involvement of the private sector, non-governmental organisations, philanthropic organisations, and other stakeholders in the prioritisation and delivery of science and green innovation.

Box 4.8. **How the international community can promote green technology co-operation**

Various actors in the international community are facilitating collaboration between researchers in developed and developing countries to jointly develop intellectual property as part of efforts to conduct advanced research and deploy newly developed technologies for green growth.

The government of Japan collaborates on technology with developing countries through its Science and Technology Agency (JST). For example, through its co-operation programme on Low Carbon Society Scenarios for Asian Regions, it is working with the Government of Malaysia to develop relevant research and a policy roadmap for a low carbon society. It is also collaborating with the Indian Government to research and develop a Down-flow Hanging Sponge (DHS) reactor, which is a low-energy sewage treatment technology.

Box 4.8. **How the international community can promote green technology co-operation** *(continued)*

Another prominent example of international green technology collaboration is the use of implementing agreements by the International Energy Agency (IEA) to conduct joint research amongst developed and developing countries and public and private partners. IEA implementing agreements guide international science and technology co-operation with developing country participation in the following areas:

- SolarPACES is a technology agreement focused on concentrated solar power stations. Participants include the governments of China, Morocco and the United Arab Emirates, as well as the United States, European Commission and Mitsubishi Corporation.
- Ocean Energy Systems facilitates international co-operation to deploy and commercialise sustainable, efficient and reliable ocean energy technologies (e.g. tidal power) among coastal countries. Participants include the governments of Mexico, South Africa, United Kingdom and Canada.

Empirical work at the OECD indicates that being part of an IEA implementing agreement increases the rate of international co-invention significantly and at a lower cost, by cost sharing and task sharing among participating countries. Collaboration brings benefits of scale, permitting research in instances where the scale or scope is too large for a national project alone. Experience and results from the agreements are accessible to all participants and hence create a shared knowledge pool (Haščič et al., 2012).

The Consultative Group on International Agricultural Research is another example of a successful international research partnership that has had a large and positive influence on innovation in developing countries. It focuses on developing high-yielding crop varieties – a key area of innovation for green growth in agriculture (Gagnon-Lebrun, 2004).

Sources: Japanese Science and Technology Agency website, *www.jst.go.jp/global/english/kadai/index.html*; International Energy Agency website, *www.iea.org/techno/index.asp*; Haščič, I., N. Johnstone and N. Kahrobaie (2012), "International Technology Agreements for Climate Change: Analysis Based on Co-Invention Data", *OECD Environment Working Papers*, No. 42, OECD Publishing, Paris; Gagnon-Lebrun, F. (2004), "Case Study 2: Cooperation in Agriculture: R&D on High-Yielding Crop Varieties", *International Energy Technology Collaboration and Climate Change Mitigation,* OECD, Paris.

Technology transfer

Technology transfer is another effective way to support developing countries in adopting green technologies (Box 4.9). As mentioned in Chapter 3, and taking climate change as the example, the number of green patents in climate change mitigation and adaptation technologies still remains very small in developing countries. Between 1980 and 2011 there were over 200 000 patent applications in OECD economies for climate mitigation innovations, while for emerging economies the figure was just over 40 000 and for the rest of the world approximately 20 000. For climate adaptation the relevant figures are approximately 16 000 (OECD), 6 000 (emerging economies) and 1 000 (rest of the world) (OECD, forthcoming). The existence of endogenous or local capacity for innovation is a key driver of green technology transfer and co-invention in this area (OECD, 2011d). A key action for the international community might thus be to support programmes that build endogenous capacity for environmental science and green innovation, for instance through building or strengthening developing countries' policies that form "national innovation systems" in order to build the linkages among the actors involved in innovation and to encourage the flow of information and ideas (OECD, 1997; see also Chapter 3).

Developed countries also support developing countries to map out their climate research and technology needs – such as through UNFCCC's Technology Needs Assessment – which is a means to target further international technology co-operation for green growth.

Box 4.9. **Transferring technology for more effective building insulation in Senegal**

In 2012, the GEF initiated a USD 2.3 million project to facilitate the technology transfer of innovative thermal insulation materials using typha (a reed) in Senegal. The project was co-financed with USD 2.2 million from the United Nations Industrial Development Organisation and the Senegalese government. Typha is an invasive species in the Senegalese ecosystem, and proliferated in the Senegal River due to ecosystem changes caused by the construction of an upstream hydropower dam and a salt-wedge dam in the 1980s. To increase energy efficiency in the building sector, Senegal is in need of low cost building materials to insulate buildings. Research undertaken by European countries has shown that the combination of typha and cement offers a wide range of construction products. The project is specifically designed to tailor such technology to local circumstances, and will be demonstrated through retrofitting a government building. Certification and patenting, as well as the establishment of a local production chain, were part of the project, increasing the local profitability of the technology. The private sector has also participated in this project by committing USD 1.4 million to co-finance various related activities, which ensures the sustainability of this innovative local construction product under market conditions. As a result, the Senegalese economy is expected to benefit from (1) the establishment of a new market for building materials with related economic and local employment benefits; (2) greenhouse gas emission reductions from more efficient building insulations; and (3) biodiversity co-benefits from reduced typha dominance in the local ecosystem.

Source: GEF (Global Environment Facility) (2012), *Implementing the Poznan Strategic and Long-term Programs on Technology Transfer*, GEF, Washington, DC.

Protecting intellectual property rights

Well-functioning systems for protecting and enforcing intellectual property rights (IPRs) provide incentives for investment in innovation and establish the framework for IPR protection and diffusion. Ways that international community can provide technologies and know-how to developing countries include creating voluntary patent pools and other collaborative mechanisms for leveraging intellectual property, covering licensing fees or even buying out patents on key technologies. These mechanisms can reduce the cost of green technologies for developing countries. The use of public-private partnerships to support green technology research initiatives can boost the level of support for innovation and patenting in the face of limited resources (OECD, 2011d).

Lessons for moving forward

Technology innovation, development and diffusion is a major pillar for international co-operation for green growth in developing countries. Developed countries with advanced research capacity, innovation policies and technology dissemination experience can better target their technological support to developing countries by:

- *Working with developing countries to define their science and technology research agenda and priorities for international co-operation*. Developing countries need to pursue green growth based on their particular natural assets and development

challenges. Supporting developing countries to define their own research agenda is crucial for innovation that is most relevant to their economies and key challenges for greening growth.

- *Focusing on building innovation capacity within developing countries*. Ways to strengthen developing countries' own capacities to innovate, diffuse and use technologies include: (1) providing training to technical staff; (2) developing the research capacity of skilled workers, working in part through strengthened educational curricula; and (3) establishing joint research projects with universities and national research institutes.
- *Promoting IPR systems and encouraging knowledge sharing.* A strengthened IPR system can create local knowledge spillovers, promote innovation, increase trade and investment, and boost economic activities. Developed countries can help by creating voluntary patent pools and other collaborative mechanisms for leveraging intellectual property, covering licensing fees or even buying out patents on key technologies.

4.4. Pillar 3: Facilitating trade in green goods and services

The pursuit of green growth in many developing countries will require learning how to generate value in international markets from environmental or natural resource assets. For example, ecotourism in Costa Rica, organic farm products from Kenya and sustainable forest management in Guyana and Congo are all a means to provide marketable green goods and services. However the mechanisms and markets for maximising their value are still poorly developed. Some developing countries are concerned that trade could be affected if the green growth policy agenda is captured by protectionist interests. For example, trade rules for green products may lead to products from developing countries being excluded from the international market if they are not considered "green", and this could further encumber the Doha round of trade negotiations under the World Trade Organization (WTO). A related concern is the potential for eco-certification and eco-labelling to also act as non-tariff trade barriers to uncertified products. While trade protectionism encouraged by green growth policies has not been a major problem to date, continued efforts to facilitate international trade in green goods and services need to be further encouraged by fostering international markets for green goods and services and removing tariff and non-tariff trade barriers.

Fostering international markets for green goods and services

Developing countries can benefit from being both exporters and importers of green goods and services. The share of environmental goods and services[11] in global exports is rising in both developed and developing countries. As a subset of what might be considered "green", it is possible to estimate trade across a list of well-defined environmental goods and services. Such estimates show indicative trends. In 2004, trade in environmental goods and services was estimated to be worth USD 580 billion worldwide (Blazejczak et al., 2009). Since then, there has been a tremendous increase in global trade flows of such goods and services, despite the financial crisis of 2008. The OECD has estimated that global trade in environmental goods alone amounted to about USD 883 billion in 2011.[12] Data from 2007 to 2011 further indicate that the growth rate in export value of environmental goods from developing countries has been faster in recent years than from many developed countries. As developing countries have significant natural assets, this trend could indicate potential opportunities to profit from an expansion of the environmental goods and services

export market. Capacity to access and benefit from such markets can be enhanced by aid-for-trade programmes (Box 4.10). At the same time, developing countries could also benefit from importing environmental goods and services from developed countries. Specialist providers of environmental services,[13] such as those who clean up spills or dispose of household waste, typically have access to the latest know-how and technology. This is not only good for local communities but also encourages the transfer of knowledge, such as on pollution control, into the importing country. OECD research on exports of environmental services to developing countries suggests that when the environmental service provider establishes a commercial presence in a foreign country, it usually hires most of its staff locally, thus creating new job opportunities in developing countries (OECD, 2005).

Strengthening and extending regional trade agreements can help foster green growth, and by extension, markets for green goods and services. About 250 regional trade agreements were in effect worldwide in 2010 (WTO Regional Trade Agreements Information System, 2013). Environmental concerns are increasingly being incorporated into these agreements, either in the form of an assessment of the environmental impact of regional trade liberalisation, or in the form of better enforced environmental laws and standards. The evidence suggests that regional trade agreements with an environmental component can deliver environmental benefits that include mutual support of trade and environment policies; strengthening national action, such as the enforcement of environmental laws; raising the level of environmental standards; establishing or reinforcing environmental co-operation; and enhancing public participation in environmental matters (George and Serret, 2011). In some cases, the negotiation of a regional trade agreement incorporating environmental dimensions has driven reform and accelerated national environmental policy processes (e.g. the harmonisation of scattered environmental legislation) (OECD, 2007).

Demand-side policies, such as public procurement and campaigns to educate consumers, can also help foster markets for new products and services, including green goods and services (see Section 3.2 in Chapter 3). This can be achieved through demonstrating the ecological footprint of the products being consumed by developed countries from developing countries (see Section 5.2 in Chapter 5), and addressing gaps in the support of finance at the early stage (OECD, 2011a).

Box 4.10. **The role of Aid-for-Trade in fostering markets for green goods and services**

Motivated by the role of trade as an engine of economic growth and poverty reduction, the Aid-for-Trade Initiative was launched by a group of development co-operation agencies to reduce transaction costs and strengthen the capacity of developing countries for trade. It provides assistance for enhancing capacities in trade policy and regulations, and addressing adjustment costs incurred by trade reforms. It also provides support through trade infrastructure development and production capacity development projects, and through assistance in implementing trade agreements. The donor community increasingly considers the Aid-for-Trade Initiative as a mechanism for mitigating climate change and stimulating green growth in developing countries, in part because of the stringent environmental conditions attached to the trade agreements, but also because such support often targets capacities for trading green goods and services. Recently these programmes have helped developing countries adopt organic standards, enhance value chain development, train officials in trade policy for green goods and services and environmental protection measures, and participate in regional and multilateral trade and environmental negotiations (OECD, 2012f).

Source: OECD (2012f), *Aid for Trade and Green Growth: State of Play*, OECD, Paris.

Removing trade barriers

Liberalising trade and removing trade barriers can help to promote trade by developing countries in green goods and services. A number of tariff and non-tariff barriers impede trade between developed and developing countries and among developing countries themselves in key areas relevant to green growth. For example, recent data show that import tariffs imposed by developing countries on renewable energy technologies are significantly higher than those imposed by OECD countries, i.e. Indonesia applies a 10% import tariff to wind powered generating sets as oppose to 0% import tariff by Japan and Canada (Market Access Database).[14] However, given the higher technical standards and quality control of many of the developed countries' markets, some developing country exporters find it challenging to participate in the global value chains of green goods and services. Subsidies for fossil fuels also tend to limit trade and technology transfer to a larger extent than patent protection (or lack of it), for example (Hall and Helmers, 2010). There is evidence that eliminating tariff and non-tariff trade barriers in the top 18 greenhouse gas-emitting developing countries would increase imports into those countries of energy-efficient lighting products by 63%, wind power generation equipment and components by 23%, solar power generation equipment and components by 14%, and clean coal technologies by 4.6% (World Bank, 2007). Reforming environmentally-harmful subsidies and removing trade barriers would also foster more efficient competition, particularly in new green industrial sub-sectors, and help to bring about green growth on a global basis (OECD, 2011a).

Non-tariff trade barriers are in some cases more constraining to green growth in developing countries than tariffs (Golub et al., 2011). For example, if technical regulations applied by the importing country differ from international standards, this can add to manufacturing costs and often requires additional testing to demonstrate conformity to the standards. Evidence of these variations in technical regulations has been found in some sectors with high greenhouse gas emissions including energy, construction and manufacturing (Steenblik and Kim, 2009). Other restrictions to trade in environmental or green goods include poor IPRs in some major importing countries (often developing countries), restrictions on visas for expatriate technical staff and overly stringent customs procedures. Removing those constraints will create opportunities for green growth in environmental services, such as ecotourism (Steenblik and Kim, 2009). Eco-certification schemes for green products or carbon footprints can also become non-tariff barriers to trade, especially if they are overly stringent (Richards, 2004). This is because participating in certification programmes incurs significant costs which may not be recovered by the resulting price premiums on the certified product. For example, Ponte (2008) argues that certification according to the standards of the Marine Stewardship Council (MSC) marginalises small-scale fisheries in developing countries. This finding is echoed by evidence from South Africa (Standing, 2009). Resolving non-tariff trade barriers is even more important when considering the evidence presented in Section 3.2 of Chapter 3, which shows that eco-certification can be designed to both benefit the environment and increase the welfare of local farmers (and see Blackmore and Keeley, 2012).

A key to ensuring that certification programmes are both effective and fair to exporters in developing countries is to design them with the involvement of both developed and developing country interest groups (Box 4.11) (Kasterine and Vanzetti, 2010; Brenton et al., 2009). For example, Brenton et al. (2009) found that developing countries are more likely to be adversely affected by carbon certification if they: (1) export air-freighted (as opposed to marine-transported) agricultural goods; or (2) produce agricultural goods with only a seasonally favourable carbon footprint (e.g. apples imported from Latin America to Europe). These effects are larger for crops for which substitutes usually exist (e.g. green beans from

Kenya), but they are smaller for cash crops (e.g. coffee, cocoa, tea or bananas) for which substitutes do not exist. However, carbon certification does not necessarily reduce the scope for international trade of air-freighted agricultural goods altogether. For instance, the carbon footprint of cut flowers exported from Kenya to the United Kingdom is lower than for flowers cultivated in glasshouses in the Netherlands, even after taking into account the emissions from air transport. This result is explained by the large energy-intensity of flower production in the Netherlands and the relatively lower greenhouse gas intensity of flower production in Kenya (Williams, 2007).

Box 4.11. **Some initiatives to promote trade in green goods and services**

- UNEP, the International Centre for Trade and Sustainable Development and the International Trade Centre are currently identifying international trade opportunities that will promote green growth. They are analysing how countries, especially developing countries, can respond to growing international demand for environmentally-friendly food, products and services.
- The International Organization for Standardization and several international NGOs, such as the Marine Stewardship Council, Forest Stewardship Council, and the Fair Trade Labelling Organization, have made efforts to harmonise standards with the consent of the international community to avoid such schemes becoming barriers to international trade or risking green protectionism.
- The European Commission has adopted new legislation to counter the trade in illegally harvested timber. In an effort to tackle the problem of illegal logging across the world in order to mitigate deforestation and climate change, it prohibits the placing of such timber on the European market. The new law affects both imported and domestically produced timber and timber products and the aim is to put in place due-diligence and other procedures to minimise the risk of illegal wood being traded (European Timber Regulation, 2013).
- Unilever has been working closely with its large network of suppliers of raw materials to explore how to do business with smallholders in a way that it improves their livelihoods. To give one example, in 2011 Unilever's Magnum ice cream brand partnered with the Rainforest Alliance to work with farmers in key cocoa-producing countries such as Ghana, Ecuador and Côte d'Ivoire on sustainable agricultural practices. After just one year, over 10 000 farmers had achieved Rainforest Alliance certification. Buyers benefit a guaranteed supply of higher quality beans, which helps the brand image, and local farmers benefit from better harvests and higher incomes (Unilever website, n.d.).

Source: European Timber Regulation (2013), *www.ec.europa.eu/environment/eutr2013/index_en.htm*; Unilever (n.d.), Helping Smallholder Farmers, *www.unilever.com/sustainable-living/betterlivelihoods/farmers/.*

Lessons for moving forward

Supporting global trade in green goods and services is an important part of international co-operation for green growth. Given that developed and developing countries are closely connected by trade, developed countries could take the following three actions to bring green growth benefits:

- *Support open markets for green goods and services*. Developed countries can collaborate with developing countries through existing international treaties on trade and environment to set up clearer conditions and stronger international markets to promote trade of green goods and services. Attention should be given to ensure that policies that support renewable energy-based power generation also support open

trade and public procurement and that they do not include provisions favouring local producers, such as local content requirements. Such "localisation policies" increase costs and keep producers of renewable energy equipment from fully participating in and benefiting from global value chains.

- *Step up demand-side policies*. Consumers in developed countries (public and private sectors) have begun to take responsibility for managing their ecological footprints. Demand-side policies, such as sustainable public and private procurement policies and consumer education programmes, can be effective tools to help foster trade and grow markets for green goods and services in developing countries and inform consumers in developed countries about the pros and cons of different kinds of products.
- *Build capacity for developing countries to negotiate the removal of non-tariff trade barriers*. The rapidly evolving and wide variety of eco-labelling, certification and standard regimes entails high transaction costs for developing country producers and as such can be considered non-tariff barriers to trade. Governments in developed countries can provide support to build the capacity of developing country producers to follow and participate in international decision making to standardise eco-labelling, certification and environmental standard programmes. This would ensure that their concerns are raised and addressed, and would reduce the transaction costs of entering the international market.

4.5. Factors for success in international co-operation on green growth

Having discussed the three pillars of an international co-operation agenda for green growth, we now turn our attention to the four enabling factors that play a large role in determining its success (Figure 4.1):

1. capacity development;
2. multilateral conventions and voluntary agreements;
3. policy coherence for development; and
4. international partnerships.

Enhancing capacity for green growth

Capacity development can strengthen developing countries' ability to benefit from external finance and technology flows, and to make the most of international trade and the global market for green goods and services. The international community (bilateral and multilateral donor agencies and other civil society groups) could enhance capacities for greening growth in developing countries through:

- awareness-raising and educational programmes on the benefits of and skills for green growth;
- training and sharing experience with developing country policy makers on ways to implement specific green growth policy tools, enforce environmental laws and regulations, monitor and evaluate policy effectiveness over time, and green existing national plans and programmes;
- collaborating with technical institutions, universities and research organisations, vocational training centres and relevant government bodies in developing countries on green growth issues, notably on green innovation, green research and development, and the use and maintenance of specific green technologies;

- working with financial institutions, local financial communities and private sector associations to build up their understanding and interest in providing finance and directing investment to sectors related to green growth;
- empowering civil society and developing their capacities for engaging in green growth decision making; and
- building capacity across institutions relevant to green growth, rather than on a project-by-project basis (Box 4.12).

Box 4.12. **The holistic approach to capacity development in Mozambique**

In Mozambique, more than 70% of public investment comes from international development assistance. Development co-operation agencies therefore have an important role to play in greening national processes. This includes the recent consultation process facilitated by the African Development Bank and the UNDP in developing Mozambique's national Green Growth Action Plan. Support to capacity building in environmental governance has been provided through a number of projects. For example, the Netherlands and Denmark have provided capacity support to the Ministry of Co-ordination of Environmental Action, while the World Bank has helped create environmental units in various line ministries. However, there is still evidence that institutional capacity remains weak and core environmental functions are not yet fully effective. One of the problems is institutional complexity at the sector level. Another may be related to the fact that capacity-building initiatives funded by development co-operation agencies tend to be geared towards the delivery of project outputs rather than focused on the performance of core or programmatic environmental functions of the government. This has often resulted in duplication of work and poor co-ordination by the Ministry of Co-ordination of Environmental Action. A lesson from the Mozambique case is to target core environmental functions across multiple government domains rather than directing them towards a project's specific objectives and activities (OECD, 2012g).

Source: OECD (2012g), *Greening Development: Enhancing Capacity for Environmental Management and Governance*, OECD, Paris; Cabral, L. and D. Francisco (2008), *Environmental Institutions, Public Expenditure and the Role of Development Partners: Mozambique case study*, Final Report, DFID, London.

Capacity development for green growth requires setting specific priorities around a set of fundamental questions: capacity for what, by whom, why and how? Prioritisation can best be achieved through discussion with developing countries to develop a joint approach. These discussions can be guided by the following elements (OECD, 2012g):

- *Seek collaboration:* it is essential to have a shared understanding of objectives and priorities between the international donor community and developing countries. This allows the international community to gain a better insight into local activities, while ensuring developing country ownership and leadership of the change process.
- *Be transparent and talk with key stakeholders:* capacity development for green growth is a dynamic process and requires regular consultation and dialogue. Transparency requires the participation of key stakeholders (civil society groups, parliament, the media and others) wherever possible.
- *Start small, learn and adapt:* countries often tend to set overly ambitious targets but underestimate timeframes. Capacity development often responds well to more humble beginnings, more gradual learning and scaling-up.

- *Target "pockets of energy" and opportunities for "win-wins":* the most effective initial priorities for support are often those where readiness for change already exists and where win-win arrangements are possible for both developing countries and providers of the capacity development programmes.

While green growth is a relatively new concept, many development co-operation agencies and the broader international community have been providing capacity development support for environmental management and governance for several decades, sometimes under the label of "sustainable development". They have accumulated a wealth of experience and lessons on this critical agenda (OECD, 2012g). These include viewing capacity development for the environment as underpinning all development support and focusing on results. Experience also points to the importance of collaborating across agencies to maximise complementarities and harmonising approaches among providers of capacity development in each location.

A recent study estimated that development co-operation agencies alone spent more than USD 20 billion a year on capacity development for national planning and budgetary processes in developing countries (Otoo et al., 2009). To ensure that such large volumes of international support build real capacity for change, it is crucial to measure outcomes and long-term impact. Once capacity-building activities are clearly defined, it is easier to set targets for outcomes, prioritise resources, evaluate progress and build subsequent activities on lessons learned (OECD, 2012g).

Multilateral environmental conventions and voluntary agreements

Many natural assets – forests, coastal waters, rivers, etc. – cross national borders. In these cases, multilateral agreements are essential to co-ordinate country efforts to pursue green growth. They are also widely recognised as efficient instruments for securing global public goods and protecting the global commons (e.g. marine fisheries and the atmosphere) (Haas et al. 1993; Biermann and Dingwerth 2004; Vogler 2003). There is some evidence that the authority of state actors is considerably weaker today than in the past on issues of public concern, including on global environmental issues (Levy and Newell, 2005; Paterson et al., 2003), so both formal multilateral government-centric and more informal forms of civil society action are relevant for green growth. Many developing countries are already party to multilateral agreements with environmental implications, and implementing their commitments can help them pursue green growth. Multilateral environmental co-operation can take many forms, such as legally-binding agreements, which are negotiated and enforced at the level of the nation-state; and voluntary intergovernmental or non-state actor efforts to reduce human impacts on the environment. In this section we discuss some of the most relevant multilateral agreements for green growth.

UN Framework Convention on Climate Change

The UNFCCC and its Kyoto Protocol create an international architecture for climate change action. The convention involves a comprehensive package of measures that includes: (1) the use of financial transfers to encourage broad engagement by developing countries; (2) strengthened international co-operation for low-carbon technology development and transfer; and (3) institutional capacity building to support action in developing countries. It also recognises that international co-operation on climate change will need to ensure equity and fairness. These issues are addressed through the "burden sharing" elements of the international regime (OECD, 2012h). The importance of helping developing countries adapt to climate change is receiving increasing attention in the international negotiation process.

International financial support is a central part of the climate change process. The Global Environment Facility is the convention's main financial mechanism (Box 4.3). In addition, parties to the UNFCCC have established three new funds dealing with adaptation: the Least Developed Countries Fund, the Special Climate Change Fund and the Adaptation Fund. The Cancun Agreements established a Cancun Adaptation Framework with an associated Adaptation Committee to oversee progress.[15] The Green Climate Fund is also being set up by the parties to the convention to support projects, programmes, policies and other activities in developing countries. This fund in particular recognises the need for a balanced treatment of adaptation and mitigation (OECD, 2012g). Climate change finance is set to increase substantially throughout the next decade as developed countries scale up resources to meet their pledges under the UNFCCC (Box 4.1).

The UNFCCC process and the Kyoto Protocol have also established a framework for global emissions trading. By making progress towards putting an international price on carbon emissions, this offers another means for public and private financial transfers from developed to developing countries. Individual systems, whether trading on a regional, national or provincial basis, can also connect to an international market through the inclusion of greenhouse gas offsets under the CDM. As discussed above (Box 4.7), the CDM has benefited many developing countries by supporting clean energy and other low emission investments while also delivering steady income and many other local benefits (e.g. air quality and better health).

Convention on Biological Diversity

Like climate change, reducing biodiversity loss and the degradation of ecosystems services is a global environmental challenge. The Convention on Biological Diversity (CBD) is the main multilateral agreement to balance the benefits of conserving biodiversity – which accrue at local, regional and global scales – with the costs, which often fall largely on developing countries. In 2002 the CBD set a target to "significantly reduce the rate of biodiversity loss" by 2010. This target has not been met. However, there have been some areas of progress (OECD, 2012h). At the national level, 177 parties of the CBD, including many developing countries have made progress in establishing National Biodiversity Strategies and Action Plans[16] to bring together plans and activities for all sectors with an impact (positive and negative) on biodiversity. At the international level, the CBD Parties at the 10th Conference of the Parties in 2010 agreed a new package of measures that includes the Strategic Plan for Biodiversity 2011-2020, the Aichi Biodiversity Targets and a Strategy for Resource Mobilisation.

Voluntary initiatives to promote transparency

Along with the various legally binding multilateral environmental agreements described above, global voluntary initiatives are also helping in the transition to green growth. The Extractive Industry Transparency Initiative (EITI) is one of the most well known of this kind, ensuring that the billions of people who live in countries rich in natural resources can benefit from the revenues earned from extracting them. The EITI aims to strengthen governance by improving transparency and accountability in the extractive sector. Similarly the OECD has worked with the UN, local governments, the private sector, and civil society organisations, to formulate the Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict Affected and High-Risk Areas (OECD, 2011e). Multinational companies, along with their local suppliers and service providers throughout the mineral supply chain, are the main target audience for this guidance. They are expected to adapt their internal procedures to avoid contributing to conflict and maximise opportunities for

sustainable growth through responsible mineral sourcing. The Forest Law Enforcement, Governance and Trade Action Plan is another voluntary scheme which aims to ensure that only legally-harvested timber is imported into the EU from participating countries.

Several initiatives target corporate behaviour and good practice in environmentally responsible investment. They offer potential to strengthen the international enabling environment for green growth. One prominent example in the area of climate change is the Carbon Disclosure Project, which is used by thousands of companies and cities across the world to report and disclose their greenhouse gas emissions (Kauffmann and Tébar Less, 2010; Kauffmann et al., 2012). The project has also begun to cover corporate disclosure of climate change risk and water strategies to provide transparency about corporate environmental performance and companies' possible environmental "liabilities". Another recent example is the Natural Capital Declaration – a voluntary business-led initiative to guide the financial sector to mainstream natural capital value into corporate accounting and reporting procedures; this example indicates the importance that the business community already attaches to what have been to date "invisible assets" (Mulder et al., 2012).

National efforts to promote transparent reporting of natural resources can also have international implications. For example, Section 1504 of the US Dodd-Frank Act, made law in July 2010, requires oil and mining companies registered with the US Securities and Exchange Commission to publicly report how much they pay foreign governments for natural resources. This information will shed light on critical sources of income for resource-rich countries around the world, helping governments to collect what they are owed and citizens to realise the full benefits of their natural resource wealth.[17]

Voluntary initiatives to promote transparent reporting of environmental and social consequences of business operations are increasingly becoming mainstreamed in the business community, including in developing countries. Many companies now see sustainability as a corporate goal alongside profitability. This trend in corporate behaviour could improve both efficiency in the reporting process and environmental and social outcomes. Companies that effectively measure and report their environmental performance can identify opportunities to reduce emissions and save energy, and to increase awareness about potential and future environment and climate change-related risks in order to achieve sustainability throughout the supply chain (Kaufmann et al., 2012). It is likely that more reporting frameworks will be developed over time, raising the risk of fragmentation. This should be avoided through designing mechanisms to streamline reporting information.

Promoting policy coherence for development

The world economy is increasingly interdependent and the economic and environmental challenges we face are often global. Green growth in this context requires inclusive, collective, and coherent action by the international community. This will be vital for ensuring that developed country policies are coherent with development objectives in the areas of agriculture, trade, environment, labour, health and finance.

Policy coherence for development (PCD) is an approach that aims to ensure that a country's domestic policies are consistent with and support international development goals. Economic processes, investment, consumer behaviour and development can all be framed and influenced by national policies and international agreements, such as fair-trade schemes, standards, economic incentives, norms, and producer and consumer education. A PCD approach can serve as a unifying tool, joining the dots for a coherent international enabling environment. This is particularly useful in the context of green growth when many unprecedented changes are taking place in parallel.

Developed countries' green growth policies will affect both the pace of economic growth, development and poverty reduction in developing countries and the prospects for these countries' transition to green growth. This is because developed countries' public policies – regulation, taxation and incentive structures – will promote changes in the pattern of demand and production of goods and services that in turn have an impact on natural resources and the environment. Developed and developing countries' firms alike will seek to adjust their technologies, assets and market positions in response to policy changes and changing markets. Changes in trade patterns, technology demand, financial and investment flows, as already discussed earlier in the chapter, will provide both opportunities and risks for developing countries and their citizens, and hence will lead to both positive and negative impacts on development in developing countries.

The area of biofuels illustrates the policy coherence issue nicely. Driven by concerns over climate change, energy security and rural development, over the last decade many developed countries have adopted ambitious targets for the use of biofuels, often accompanied by policies designed to promote domestic production of these fuels through agricultural subsidies to raw materials, subsidies for producers and fuel-tax reductions or exemptions on sales of the fuels themselves. These policies are expected to drive a threefold increase in the consumption of biofuels in developed countries by 2030 (IEA, 2012).

However, depending on how they are designed and implemented, developed countries' biofuel policies can have both positive and negative implications for green growth in developing countries. They can create job opportunities and increase incomes on the one hand, but can also threaten food security. For instance, widespread incentives in developed countries for increasing the use of biofuels in transport have led to the diversion of arable land in developing countries from the production of food or animal feed to the production of biofuel feedstock such as maize or soybeans. This also drives up international prices for food commodities. This was one cause of the surge in food prices in 2007, which paralleled the rapid, policy-driven increase in biofuel demand from developed countries during that period (FAO, 2008a and 2008b; Headey and Fan, 2008). Other factors also contributed to the rise in food commodity prices, but the rising demand for biofuel crops helped to exacerbate supply and demand that in previous years could be more easily accommodated by the market. Net food-importing countries and net consuming households in poorer developing countries are made worse off by higher food prices because a larger percentage of their income is spent on food as an essential good. This case reflects clear policy inconsistencies for development, particularly when taking into account the fact that more than USD 8 billion in international aid were provided in 2007 to support food security objectives in developing countries (OECD, 2012i).

With the right design and management, policies to promote biofuels can become green growth opportunities for developing countries. The European Commission has set a target to limit to 5% the amount of food-based biofuels that can be counted towards the EU's biofuel target for 2020. This is a significant first step towards promoting more sustainable biofuel production. The measure is expected to stimulate the development of alternative biofuels from non-food materials, such as forest residues and straw. These emit substantially less greenhouse gas than fossil fuels and do not directly interfere with global food production. Certification schemes for biofuel imports from developing countries also offer the potential to help prevent ecologically important land, such as forests and wetlands, from being converted to biofuels production. Schemes to certify biofuels produced by small landholders may also create income opportunities to reduce poverty. However, these environmental, economic and poverty benefits can only be realised if strict rules are applied on the type

of biomass that can be used and the type of producers involved. Otherwise, certification to strict sustainability standards only serves to benefit those large landowners who can afford to participate in certification. Development co-operation programmes will also need to build sufficient financial and technical capacity in developing countries to actively participate in these emerging markets for biofuels (and other certified products) in such a way that they are beneficial rather than harmful to local economic development.

Coherent green growth policies in OECD countries can also help harness development objectives. New and improved technologies for the production of electricity from renewable energy sources – such as solar, wind, geothermal heat, biomass and small hydro – linked with new approaches to electricity generation and distribution, could play an important role in expanding energy access in poor developing countries and in reducing the costs of energy for the economy and for households in remote communities. OECD policies can promote the transfer of and investment in these technologies, as discussed in the earlier section, to bring more profound development outcomes. Some OECD countries have already begun to align their foreign investment policies with domestic investment policies in developing countries to ensure they are "doubly green" – i.e. that their investments in firms operating abroad and other investments in developing countries do not lead to environmental and natural resource degradation and are synergistic with their development support (Box 4.13).

Box 4.13. **Coherent policies for global forest conservation: the case of Norway**

Norway's USD 664 billion pension fund is thought to be the world's largest sovereign wealth fund (SWF Institute, 2013). It is funded through surplus wealth produced by Norwegian petroleum income. For decades, the fund has been used to invest in companies worldwide to promote economic growth. Until recently, the environment and natural resource implications of these companies' production and supply chain were not the key focus of investment selection criteria. In September 2012, the fund launched new investment criteria. These require companies in which the fund invests to disclose their impacts on tropical forests, as part of a broad Norwegian policy to reduce global deforestation.

The move could usher in broader reporting on the forest footprint of company operations and boost eco-certification in forestry initiatives. The new information disclosure policy initially targets companies "with operations or value chains in sectors and regions materially exposed to deforestation risk". The move came after several campaigners targeted the fund for continuing to invest in companies associated with deforestation, especially those engaged in timber, palm oil, mineral, or wood pulp production. They highlighted the fact that this was inconsistent with the recent Norwegian government commitment to spend roughly USD 522 million on protecting global forests for mitigation and adapting to climate change, making it the world's biggest patron of rainforest conservation (Rainforest Foundation Norway and Friends of the Earth Norway, 2012).

Some specific questions used in the new reporting policy include (Norges Bank Investment Management, 2012):

- Does the company disclose information on its tropical forest footprint? How does it monitor its impact on tropical forests over time, and assess whether this impact poses a risk to its business operations?
- Has the company, or its suppliers, committed to comply with international standards for sustainable production of agricultural commodities, or sustainable forest management?
- Does the company report on the implementation of its commitments to reduce tropical deforestation?

Box 4.13. **Coherent policies for global forest conservation: the case of Norway** *(continued)*

The new policy does not specify sanctions for non-compliance, but in recent years the fund has divested from six companies involved in especially egregious deforestation. To do even more for development and poverty reduction, the Norwegian initiative could integrate criteria such as community-based forest management and land tenure for small landholders into their reporting system, so to ensure their investments reach more poor people and their communities.

Source: SWF Institute (2013), "Norway Government Pension Fund Global", available at *www.swfinstitute.org/swfs/norway-government-pension-fund-globa*l; Rainforest Foundation Norway and Friends of the Earth Norway (2012), *Beauty and the Beast: Norway's Investments in Rainforest Protection and Rainforest Destruction*, Rainforest Foundation Norway and Friends of the Earth Norway Oslo; Norges Bank Investment Management (2012), *NBIM Investor Expectations: Climate Change Risk Management*, NBIM, Oslo.

These examples show how ignoring PCD could undermine the potential of green growth policies and diminish their long-term impact to protect the environment, preserve natural resources and deliver local and global public goods (e.g. development, human security and health benefits, and climate protection). However, the practice of PCD is complicated precisely by the challenge of quantifying causal chains from OECD policy implementation to impacts in developing countries. The analytical challenges are multiple and include:

- Trade-offs between development and environmental objectives, which mean it is not always obvious how to value the relative contribution of an OECD policy to industrialisation and development versus its impact on air or water pollution, or carbon emissions for example, or between agricultural production and biodiversity protection.
- Heterogeneity between and within developing countries, creating both winners and losers from changes in OECD policies. The same subsidy, tariff or certification system is likely to have different effects depending on the economic structure of the country, the level of incomes of the affected producer or consumer groups and their capabilities to adapt to these policy changes.
- Even "coherent" green growth policies may have negative effects on development when developing country institutions fail to successfully manage opportunities or to have sufficient safeguards in place to protect the poor or the environment (Barry et al., 2009).

Lessons for moving forward

The OECD has proposed a three-phased approach to guide its member countries in ensuring policy coherence for development (OECD, 2009b):

- *Setting objectives and creating awareness:* ideally the highest levels of government in OECD countries should have an overview across multiple policy objectives (linking environment, trade, finance, technology and development goals) to help balance the policy agenda and come up with creative solutions to possible problems.
- *Implementing ministerial and policy co-ordination mechanisms:* high-level authority also needs to acknowledge a wide range of actors involved in the policy process and ensure consistent dialogue between relevant stakeholders.

- *Enhancing monitoring and early engagement:* OECD countries need to review *ex ante* and *ex post* trends in the environment and social and poverty arenas. It is particularly important for OECD countries to build capacities in developing countries to collect data and gain relevant expertise in order to assess the degree of impacts that OECD policies may have on their development. It will also be essential for developing countries to have the capacity and resources to participate early and fairly in relevant international processes (e.g. setting international product certification standards).

Partnerships for green growth and development

Successful national green growth policies in developing countries are multidimensional: they involve different parts of government, non-government actors such as the private sector and civil society, individual consumers and producers and are supported by the international community. With such diversity, good harmonisation across national and international actors is essential. A number of partnership initiatives are already underway involving civil society, business, policy makers and academics:

- The Green Growth Knowledge Platform (GGKP) is a joint initiative of the OECD, UNEP, World Bank and the Global Green Growth Institute. It seeks to improve and strengthen the design and implementation of green growth policies by identifying and addressing knowledge gaps in research and practice through the exchange of experience, knowledge and information among researchers and development experts. The research results are intended to guide practitioners and policy makers in their choice of economic growth and sustainable development.
- The Green Growth Best Practice Initiative (GGBP) comprises 15 leading environmental and development co-operation organisations, including the OECD. The initiative is designed to help governments, particularly developing countries, strengthen the quality of green growth planning and implementation through analysis and peer-to-peer learning. It will provide insights into best practice at all levels of the policy-making process.
- The Green Economy Coalition was established in 2009 and is composed of a diverse set of organisations and sectors, ranging from NGOs, research institutes, UN organisations, business and trade unions. It is another initiative to facilitate knowledge sharing and international co-operation. It aims to (1) mobilise a civil society movement around green economy issues, ensuring that multi-sector perspectives and voices from the developing world are integrated into all discussions; (2) build and share knowledge on the green economy; and (3) influence policy discussions at the international level and jointly communicate policy messages to key audiences.
- The Green Growth Action Alliance (G2A2) was formed jointly by leading companies from the finance, infrastructure, energy and agriculture sectors along with public finance institutions following the 2012 G20 summit in Mexico. The G2A2 is promoting country pilots and unlocking financing for key technologies like renewable energy, energy efficiency, water infrastructure, sustainable agriculture and aviation biofuels. It intends to inform the global agenda on climate and sustainable financing by sharing results with key platforms such as the G20, the United Nations Climate Change process, and the International Development Finance Club of development finance banks. The World Economic Forum serves as the G2A2 secretariat.
- The Green Jobs Initiative was created in 2008 as a partnership between the United Nations Environment Programme, the International Labour Organization,

the International Organisation of Employers and the International Trade Union Confederation. Through its members, the initiative offers research, policy advice and technical assistance on decent work opportunities and the social implications of moving towards a greener growth pathway.

The catalytic role of these initiatives – in stimulating green growth research, investment, technology identification, capacity development and knowledge sharing – will help to maximise the positive outcomes for developing countries.

Notes

1. The OECD DAC has 24 members to date: Australia, Austria, Belgium, Canada, Denmark, European Union, Finland, France, Germany, Greece, Ireland, Italy, Japan, Korea, Luxembourg, The Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States. See *www.oecd.org/dac/dacmembersdatesofmembershipandwebsites.htm*.
2. See discussion on efforts in the climate change area in Clapp et al., 2012; and Buchner et al., 2011.
3. The policy statement is available at *www.oecd.org/dataoecd/52/29/50141822.pdf*.
4. World Bank, Asian Development Bank, French Development Agency, German Development Bank, Japan International Cooperation Agency and Korea Eximbank.
5. See *www.iso.org/iso/home/standards/management-standards/iso14000*.
6. See *www.ec.europa.eu/environment/emas*.
7. See *www.icca-chem.org/en/Home/Responsible-care*.
8. See *www.unglobalcompact.org*.
9. See *www.globalinvestorcoalition.org*.
10. Still, the exact share of private sector investment attributable to CDM projects is unclear partly because of methodological issues. For example: (1) some CDM projects are "unilateral" and thus developed on the basis of domestic investment only and not accounted for internationally; and (2) private finance flows may be purchasing the carbon offsets after the projects are up and running, rather than supporting up-front capital investment in the projects themselves (Corfee-Morlot et al., 2009).
11. In this report, the terms "green goods and services" and "environmental goods and services" are used inter-changeably. In 1999, the OECD and EUROSTAT produced a classification of environmental goods and services that divides them into three broad groups:

    1. The pollution management group: goods or services used for air pollution control, the management of wastewater and solid waste, the remediation and clean-up of soil and water, the reduction of noise and vibrations; and for environmental monitoring, analysis and assessment.
    2. The cleaner technologies and products group: goods that are intrinsically cleaner or more resource-efficient than available alternatives, and services related to the improvement, reduction, or elimination of the environmental impact of technologies, production processes or products. This group includes so-called environmentally preferable products, defined by the United Nations Conference on Trade and Development (UNCTAD) as "products that cause significantly less environmental harm at some stage of their life cycle than alternative products that serve the same purpose". Examples include improved solid-fuel cooking stoves and reusable shopping bags made of canvas or jute rather than plastic or paper.

3. Goods under the category of resource management are used to control indoor pollution, treat and purify potable water, or to help manage farms, forests or fisheries more sustainably. This group also includes goods used to conserve energy (such as double-glazed windows), and goods that help prevent or reduce the environmental impacts of natural disasters, such as fire-fighting equipment.

12. The estimation was calculated based on a list of 153 environmental goods that was submitted a few years ago to the WTO's Committee on Trade and Environment by a group of countries known as the "Friends Group".

13. The WTO's classification of environmental services, which dates from 1991, is considered by many experts to be overly narrow and out of date. Moreover, many of the services used to promote green growth fall under services categories, such as business services or construction and related engineering services (Steenblik and Geloso Grosso, 2011).

14. See *www.madb.europa.eu/madb/indexPubli.htm*.

15. See the Cancun Adaptation Framework webpage: *www.unfccc.int/adaptation/cancun_adaptation_framework/items/5852.php*.

16. See the CBD webpage *www.cbd.int/nbsap*.

17. For more information, see *www.sec.gov/spotlight/dodd-frank.shtml*.

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Chapter 5

Measuring progress towards green growth

Relevant information and statistics provide the foundation for policies that promote green growth, and are critical to monitoring progress and gauging results. This chapter describes a measurement framework for green growth created by the OECD, and describes how it can be adapted for use by developing countries. The framework includes relevant, succinct and measurable statistics that reflect the integrated nature of green growth: the environmental and resource productivity of the economy, the natural asset base, the environmental quality of life, and economic opportunities and policy responses. Some developing countries are already developing and applying these indicators, but for wider adoption by developing countries, greater statistical capacity will be essential. The international community has a role to play through collaborative initiatives, such as PARIS21, which are helping to build statistical capacity in developing countries. The System of Environmental-Economic Accounting (SEEA) can also ease statistical data collection in developing countries by providing a common framework for environmental-economic accounting. The OECD, along with other international and national initiatives, is also advancing the green growth measurement agenda by filling information gaps and improving data consistency.

Measuring progress towards green growth is an integral component of national and international agendas for action. Without robust statistics and measurement tools, countries and the international community will not know whether they are making progress towards green growth. Policies that promote green growth also need to be founded on a solid understanding of its determinants, as well as the trade-offs and synergies among them.

This chapter introduces a measurement framework for green growth developed by the OECD. It highlights some of the issues and considerations specific to developing countries, including practical challenges in putting in place indicators to track progress. It also describes a number of partnerships where developing countries are working with the OECD and with other international organisations to enhance statistical capacity and data collection to advance green growth measurement as part of a broader policy agenda.

5.1. Measuring progress towards green growth

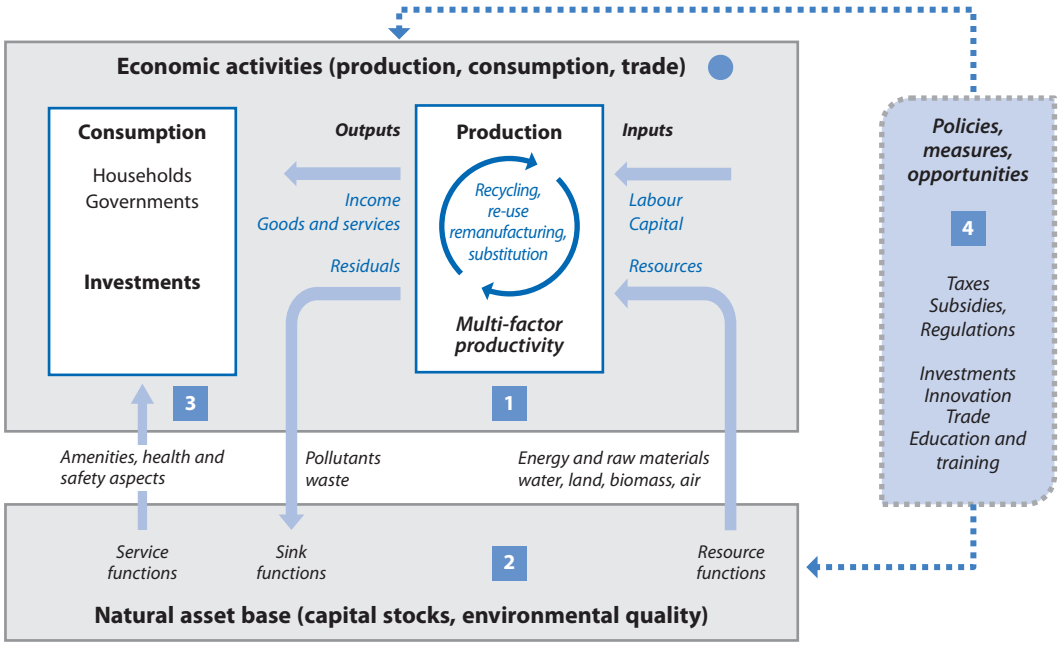
The cornerstone of monitoring progress towards green growth is to establish a conceptual framework that reflects the integrated nature of green growth and describes the main aspects that need to be monitored. Such a framework helps identify indicators that are useful to raise the profile of green growth issues, inform the public and decision makers, assess policies *ex ante*, and evaluate how well policies are performing. It also helps identify the statistics that are needed to calculate such indicators. The OECD has recently developed and is now testing a framework for monitoring green growth (Figure 5.1). This framework organises indicators into four groups (see also Annex 5.A1 for the full list of indicators and themes):

1. Indicators of environmental and resource productivity, including demand-based environmental services, track the extent to which economic growth is becoming greener (i.e. low-carbon and resource efficient). These indicators measure key aspects of the transition to a low-carbon, resource-efficient economy, and include inputs required for both production and consumption.
2. Indicators that monitor the natural asset base and whether it is being kept intact. These indicators aim to cover both direct inputs to production and indirect inputs provided by ecosystem services.
3. Indicators of the environmental quality of life that describe the direct and indirect interaction between people and the environment.
4. Indicators that capture both the economic opportunities arising from green growth and the policy responses that trigger them. These indicators aim to reflect the policy frameworks that influence the behaviour of producers and consumers, and the economic opportunities created by green growth such as innovation, production of green goods and services, and employment.

These four groups of indicators are complemented by indicators describing the socio-economic context. In the case of developing countries, socio-economic indicators may be particularly important as they provide a means to look at an essential part of the green growth policy challenge, for example to consider the interface between green growth and poverty reduction.

While a broad range of indicators is necessary to adequately capture the multi-dimensional nature of green growth, it can make it challenging to present a clear message on progress – both for high-level policy makers and the general public. To address this problem, the OECD has proposed a limited and balanced set of seven headline indicators (plus a placeholder for an indicator related to economic opportunities and policy responses; see Figure 5.2). They have

Figure 5.1. **A measurement framework for green growth**



1 Indicators monitoring environmental and resource productivity
2 Indicators monitoring the natural asset base
3 Indicators monitoring the environmental quality of life
4 Indicators monitoring economic opportunities and policy responses
● The socio-economic context and characteristics of growth

1	**The environmental and resource productivity of the economy**	• Carbon and energy productivity • Resource productivity: materials, nutrients, water • Multi-factor productivity
2	**The natural asset base**	• Renewable stocks: water, forest, fish resources • Non-renewable stocks: mineral resources • Biodiversity and ecosystems
3	**The environmental dimension of quality of life**	• Environmental health and risks • Environmental services and amenities
4	**Economic opportunities and policy responses**	• Technology and innovation • Environmental goods and services • International financial flows • Prices and transfers • Skills and training • Regulations and management approaches
	Socio-economic context and characteristics of growth	• Economic growth and structure • Productivity and trade • Labour markets, education and income • Socio-demographic patterns

Source: OECD (2011a), *Towards Green Growth: Monitoring Progress: OECD Indicators*, OECD Green Growth Studies, OECD Publishing, Paris.

Figure 5.2. **Proposed headline indicators**

Proposed Headline Indicator	Definition	Strength	Weakness
Natural asset base			
Index of natural resource use	Aggregated index of the changes in stocks of resources	+ in line with SEEA concepts, will be facilitated by its implementation. + In principle, easy to communicate (index).	– Work in progress – data availability problems to be resolved (pricing, stocks and flows of resources) – discount rate issues can hide away sustainability problems
Change in land use and coverage	Land use by category as share of total	+ potential use of satellite imagery, can proxy for biodiversity	– Communication – currently no single index. – Interpretation in light of different levels of development, geography and population density.
Environmental and resource productivity/intensity			
Carbon productivity	GDP/CO_2 emitted and Income/CO_2 in consumption	+ Widely used and accepted. + Data availability. + Area of major concern and policy relevance.	– Global interactions – displacement/ leakage issue (demand side measures can help, but more data issues) – Interpretation (levels of development, resource endowment, industrial structures, substitutibility, cyclicality)
Non-energy material productivity	GDP/Domestic Material Consumption and GDP/Raw Material Consumption (RMC)	+ Policy-maker interest. + Presentation (index) + RMC can account for materials embedded in trade.	– Currently environmentally meaningless aggregation (by tonnes of materials, regardless of scarcity or env. effects). – Problems of interpretation due to cyclicality, substitutibility, development. – data availability
"Green" multifactor productivity measure (MFP)	MFP adjusted for natural resource inputs and environmental "bads"	+ Promising way to incorporate the omitted environmental aspects into looking at productivity/ efficiency.	– Questions on interpretation and direct policy relevance (as in trandtional MFP). – Data availability problems to be resolved (pricing, stocks and flows of inputs and outputs). – Work in progress.
Environmental quality of life			
Population exposure to air pollution	Share of population exposed to health-threatening levels of $PM_{2.5}$	+ Area of key concern and policy relevance for green growth and well-being. + Country coverage and comparability (satellite image data). + Easily interpretable thresholds.	– Questions on updating (satellite image data). – coverage and comparability (monitoring station data) – cannot distinguish natural causes from human-activity related causes.
Policies and opportunities			
Indicator of environmental policies	Placeholder – not yet selected	+ Increasing amount of data on policies available.	– Data collection on comparative policies (ongoing) is a challenge.

Source: OECD (forthcoming), *Towards Green Growth: OECD Indicators* (update of 2011 version), OECD Publishing, Paris.

been selected according to several criteria, including the ability to capture the intersection of the environment and the economy, i.e. between "green" and "growth"; to be easy to communicate to multiple users; to be measurable and comparable across countries.

There are two important caveats concerning the OECD's list of proposed indicators. First, it is neither exhaustive nor final. It is a preliminary selection made on the basis of existing work and experience in international organisations, and in developed and partner developing countries. Gaps exist and some of the indicators are not currently measurable. Work continues to refine the indicator set as new data become available and concepts evolve. The second caveat is that not all of the proposed indicators are relevant for all countries. Emphasis will vary depending on the overall development status, priorities and particularities of each country. National circumstances such as economic and industrial structure, geography and climate will also influence the relevance, selection and interpretation of specific indicators.

5.2. Implementing green growth measurement in developing countries

Although development priorities may differ, a green growth measurement framework is a robust tool that is useful and relevant to any country: developed, emerging or developing. A number of developed and developing countries and regions have already begun using the proposed OECD framework, including the Czech Republic, Denmark, Germany, Korea, the Netherlands, the Slovak Republic and countries in the Latin American and Caribbean region (LAC). However, monitoring progress towards green growth in developing countries does require some special considerations. Developing countries face many different challenges that are less prevalent or acute in developed countries, such as their substantial dependence on natural assets, persistent and high levels of poverty, large informal economy and often weak institutional capacity, including basic functions to deliver good governance.

Beyond balanced coverage of the two dimensions of green growth – "green" and "growth" – achieving green growth in developing countries is also about increasing the economic and environmental *resilience* of society (Box 5.2) and ensuring that growth is *inclusive*. These important aspects of any green growth policy agenda in developing countries will also need to be reflected in an indicator set aiming to monitor progress. Below we consider some ways in which the groups of green growth indicators may need to be adapted for use in developing countries.

Indicators of environmental and resource productivity

Monitoring environmental and resource productivity is especially important for developing countries because of the significant role natural assets and environmental services play in their economies. The specific indicators selected in this group will vary across countries, but they should track the productivity of those natural resources that matter to domestic production. Natural resource productivity is defined as the ratio of real output (typically GDP or sectoral value-added) over natural resource use. Countries reliant on agricultural activities should monitor the productivity of natural assets such as water and soil nutrients. But some indicators will be common across countries, in particular those that are global in nature.

Rising productivity may be the result of the substitution of natural assets for other inputs (labour, produced capital) or an overall rise in the efficiency of the production process due to improved technology or organisation (i.e. a multi-factor productivity increase). This is highly relevant for developing countries because there is potentially very large scope for converting natural capital into human and man-made capital (e.g. investing the profits

from the extraction of metal ores in infrastructure, education or health). "Catch-up" gains from improved technology and organisation also offer much scope. While productivity indicators can show whether production has become greener in relative terms, they do not show whether environmental pressure has also diminished in absolute terms. From an environmental perspective it is thus useful to also monitor the presence of absolute decoupling[1] of economic growth from environmental harm. Absolute decoupling may not always be possible; for example, if a minimum threshold of per capita use of environmental services is required to meet basic human needs then population growth may lead to large environmental impacts despite significant improvements in productivity.

An area of growing interest and significance to both developing and developed countries is the use of "demand-based" measures of environmental services, such as ecological or carbon footprints, which are a sub-component of this indicator category. With globalisation, the international division of labour has broadened steadily, giving rise to global supply or value chains that are enabled through increased international trade and foreign direct investment. Associated with these developments is the increased physical distance between the location of production and of consumption activities and between where consumption and environmental impacts occurs. Consumers in importer countries enjoy the benefits of imported goods while the negative environmental impacts associated with producing those goods remain in the producer country (or countries). At the same time, countries producing goods for export benefit economically from their export activities, and it may be argued that these economic benefits are sufficiently large to enable producers to take responsibility to manage and limit the costs of environmental degradation related to their activities.

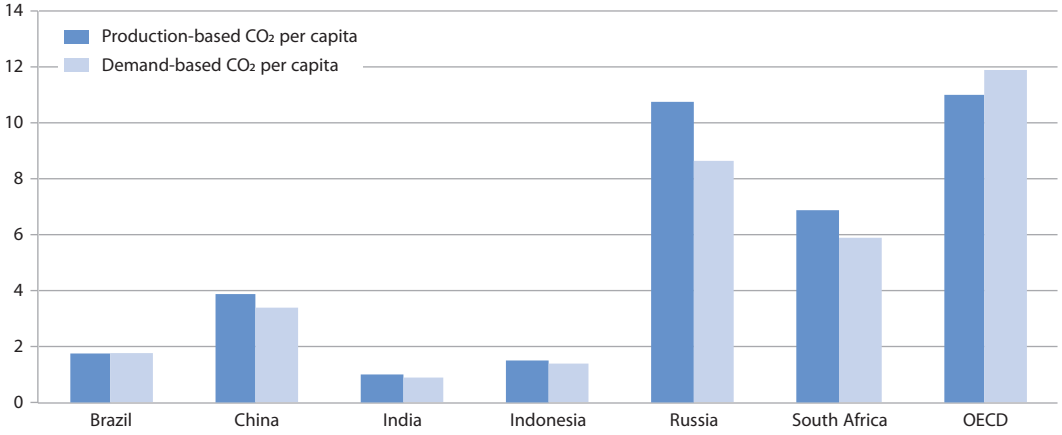
Demand-based indicators attempt to measure the flows of environmental services or emissions that result from a country's consumption (i.e. its environmental footprint).[2] Intuitively, demand-based approaches best lend themselves to environmental issues that are global in nature, as global environmental "goods" (or "bads") matter regardless of their location. Greenhouse gases are a clear example: they are a problem regardless of where they are emitted. This means that all emissions can be added together into a measure that remains analytically sound. The application and interpretation are less clear when it comes to local environmental assets, such as water. Water used in drought-prone environments does not have the same environmental implications as water used in areas where it is relatively plentiful. Adding the two together would provide a biased message about the environmental impact of water consumption.

The OECD has calculated the CO_2 emissions from fossil fuel use embodied in imports and exports of OECD and emerging countries (OECD, 2011a).[3] One of the key findings is that total emissions generated worldwide to satisfy demand in OECD countries rose faster than emissions from their own production, while the reverse holds true for the large emerging economies (Figure 5.3). This reflects a number of factors, including the increased use of imports to replace domestic production and the outsourcing of energy-intensive (fossil fuel-based) production from OECD countries to non-OECD countries. It may also reflect the impact of policies to mitigate greenhouse gas emissions in OECD countries, with less attention to this in large emerging economies.

Demand-based calculations are also being used in material flow analysis and accounting to estimate the material footprint of consumption. They do so by accounting for materials indirectly embodied in traded goods.[4] "Indirect flows" are the materials used in the production of goods (e.g. water, fuel, chemicals and ores) – but which are not physically embodied in the product itself – and the resulting outputs to the environment in the form of pollution and waste. A number of studies have investigated direct material flows and global

trade patterns, but poor data availability means that only a handful of studies focus on indirect (demand-based) flows. Not surprisingly, these studies find that material resources generally flow South-North, from emerging and developing to developed countries.

Figure 5.3. **Comparing the carbon footprints of OECD and emerging economies, 2005**
Tonnes of CO_2 emitted from energy use *per capita*



Note: The OECD figure is calculated based on weighted population data across OECD countries.

Source: OECD Input-Output Database and IEA CO_2 Emission Database.

StatLink http://dx.doi.org/10.1787/888932830084

The OECD has compiled estimates including some of the indirect flows of materials embodied in traded goods (OECD, 2011b; OECD, 2013a). In 2008, developing countries directly consumed 22 billion tonnes of materials to support their economies (i.e. biomass, fossil energy carriers, and metallic and non-metallic minerals). However, once indirect flows are included, the material consumption to satisfy demand in OECD countries grows to nearly twice as much, implying that OECD countries' exports are on average less material-intensive than their imports.[5] Conversely, the emerging economies' direct consumption has a smaller material footprint due to the material intensity of certain exports (e.g. coal from Indonesia). As with CO_2 emissions, accounting for embedded materials reveals that some of the productivity improvements in developed countries have been achieved by outsourcing material and energy-intensive production processes abroad. As national economies continue to grow in ways that increase their dependence on global value chains, there is a clear need for all countries to advance policies that encourage resource efficient production and environmentally sound consumption.

Indicators describing the natural asset base

The depletion of natural assets raises a major question about the substitutability between different types of assets (Box 5.1). Can a decline in natural assets (e.g. oil reserves) be offset by an increase in human capital (training teachers)? Can the addition of land for cultivation offset the loss of a natural forest? In a world of perfect measurement and perfect markets, the answer should be found in asset prices, which reflect society's preferences and allow the trade-offs between different assets to be weighed. But in practice, many natural assets are not priced (or not fully priced) and are often used when it is not economically or socially desirable to do so. In principle, and for purposes of indicator construction, social shadow prices could be estimated to value net investment in each natural asset. The challenge is to

develop the information base required to derive social prices. For some natural assets such as oil, gas and minerals this tends to be more within reach than for others (e.g. water, soil) because of the existence of markets, information about resource rents and relatively small

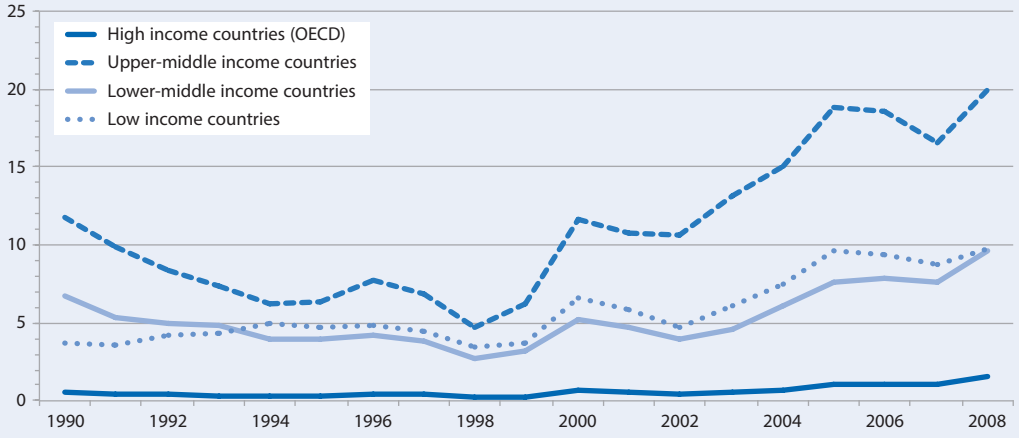
Box 5.1. **Genuine savings**

One approach to assessing whether society is growing or depleting its asset base is to calculate "adjusted net savings" or genuine savings. These measure the rate of domestic savings taking into account investments in all forms of capital, including human capital and natural assets. In standard national accounting, only investment in produced capital (fixed capital formation) increases the value of society's assets and only depreciation of produced capital (consumption of fixed capital) reduces it. A country may be a net investor based on information in standard national accounts, but a negative investor once the consumption of environmental assets is included.

The World Bank, through its programme on wealth accounting, has made a first broad attempt to estimate comprehensive net investment (World Bank, 2011). It has estimated adjusted net savings for over 120 countries using gross national savings from national accounts and adjusting them by capital consumption of produced assets, education expenditure, the depletion of natural resources (energy, minerals and forests), and pollution damage (urban air pollution and CO_2 emissions). It found that in 2008 close to 30 countries were running down their capital stocks (i.e. negative net adjusted savings) – not all of them resource-rich countries (below figure). Nearly half of the countries where a disinvestment is taking place are in Africa, reflecting an overall downward trend in net adjusted savings in sub-Saharan Africa. In contrast, capital investment is growing in South and East Asia along with per capita wealth.

Trends in energy, mineral and forest resource depletion, 1990-2008

Percentage of gross national income (GNI)



Although adjusted net savings can be used to assess the sustainability of a country's investment policies, unless broken down into its components it does not say much about change in the natural asset base. Adjusted net savings is based on the premise of *weak sustainability*, which assumes substitutability between different types of capital. A country could exhaust its mineral resources, but so long as profits are reinvested in other forms of capital, including human and produced capital, adjusted net savings would remain positive and there would be no change in national wealth. Therefore, the increasing adjusted net savings witnessed in South and East Asia do not necessarily imply positive investment in natural capital.

Source: World Bank (2011), *The Changing Wealth of Nations*, World Bank, Washington, DC.

externalities during production. Where it is not possible to develop social prices for natural assets, statistics on the physical evolution of natural assets provide a starting point, although this alone does not say very much about progress towards green growth. To get a clear picture, indicators of stocks and flows of natural assets and environmental services need to be considered along with other socio-economic indicators and with information on resource management policies (e.g. area of certified forest).

Indicators in this group should align with indicators of environmental and resource productivity by focusing on natural assets that matter to production. Some countries may wish to look beyond the sphere of commercial production and include natural assets that are critical to livelihoods or that are culturally significant. For example, non-timber forest products such as wild fruits, mushrooms, herbs and honey contribute to the subsistence of many people and could be monitored in conjunction with forest area and timber volumes. Resilience and vulnerability to environmental risks, including global climate change, are also important to consider when measuring the natural asset base (Box 5.2).

Box 5.2. **Monitoring environmental risks and climate resilience**

Environmental risks – and particularly risks arising from natural disasters and climate change – pose significant challenges to development and to realising the environmental, economic and social benefits of green growth. It is therefore important to understand both (1) exposure and vulnerability to environmental risks; and (2) how well these risks are being managed.

Understanding the risks that developing countries face

Environmental risks are made up of several components: the environmental hazard itself; the exposure of populations, natural capital or human assets to that hazard (i.e. what is at risk from the hazard); and the vulnerability of those populations and assets (i.e. the effect the hazard will have on them) (IPCC, 2012). Effective risk management needs to be based on an understanding of all these components, and how they interact. However, it is also technically challenging, time consuming and costly to fully evaluate these components. Few countries have so far begun to use detailed environmental risk indicators or invested in comprehensive quantitative climate change risk assessments. There are however a number of global risk indices which may provide a starting point by providing a broad indication of environmental and climate change risks and vulnerabilities for different countries or world regions. These include the Germanwatch *Global Climate Risk Index*, the DARA International *Climate Vulnerability Monitor* and the Global Adaptation Institute *GAIN Index*. Data sources and quality for these indices vary significantly (some are based solely on historic fatalities and economic damages, whereas others also include projected future impacts and wider economic, environmental and social impacts). Global risk indices only provide high-level assessments of impacts and typically do not break data down into the hazard, exposure and vulnerability components, nor do they necessarily provide information at a sufficient level of spatial detail to be useful for planning and implementing risk management measures. They can also be controversial, as they embed value judgements of what factors are important when assessing vulnerability. The more sophisticated of these indices can allow users to partially overcome this issue – for example the *GAIN Index* allows users to rank countries according to sub-components of vulnerability (e.g. ecosystems, food and infrastructure) and by capacity, exposure and sensitivity. More advanced approaches, such those used in the OECD's *Better Life Index* (see Box 1.5 in Chapter 1), could allow users to both select and choose weights for the issues they consider important, and help to remove embedded judgements on the importance of risk factors. However, global risk indices can usefully indicate "hot spots" or locations that are particularly at risk and where investment in more in-depth analysis and assessment to support risk management decisions may yield large benefits.

Box 5.2. **Monitoring environmental risks and climate resilience** *(continued)*

In-depth assessments of risks can provide greater levels of detail, though these benefits must be weighed against the costs and technical challenges of conducting such exercises. Conducting climate risk assessments requires significant technical and institutional capacity, and also requires prior assessments of socioeconomic baselines. Detailed climate risk assessments have been conducted for a number of developing countries (at national levels, and also for specific areas or ecosystems), such as Zimbabwe (Brown et al., 2012), Bangladesh (Department of Environment, 2006) and Attapeu province, Laos (Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme, 2005). These assessments are often facilitated or conducted by external actors, such as development partners and research organisations, often as part of development assistance activities and in collaboration with developing country officials. But while these arrangements provide highly technical outputs in the short term, they can risk hampering capacity development within national governments compared to approaches that are more country-driven. Developing countries can draw on a range of guidance documents for assessing environmental vulnerabilities, such as the World Bank's guidance on *Assessing Climate Risk* (World Bank, 2010), the CRiSTAL climate risk screening tool (IISD, 2012) and the CARE International *Climate Vulnerability and Capacity Analysis Handbook* (CARE, 2009). They can also learn from other countries' experiences in planning and implementing their own assessments, such as flood risk mapping exercises, national climate change risk assessments and sub-national planning exercises (e.g. city-level risk environmental assessments).

Monitoring and evaluating climate change adaptation

Monitoring and evaluation (M&E) of measures to manage environmental risks is important, both to ensure that measures are successful and to help guide future decisions so that responses to risks are as effective and efficient as possible. In recent years, development partners have turned attention to M&E of climate change adaptation, typically as part of their broader efforts to track the performance of aid projects and programmes. M&E approaches for adaptation in developing countries have drawn on qualitative, quantitative and binary indicators to try to track both progress in implementing project and policies, and their impacts (Lamhauge et al., 2012). For example, it is possible to measure qualitative indicators such as in which sectors or at which spatial scale adaptation policies have been put in place, quantitative indicators such as what share of new and renovated infrastructure projects funded by the public sector have been screened for and adapted to future climate risk, or what share of the population in a country lives in flood zones versus (past and current measures versus future projections). However, there are a number of challenges to successful M&E for climate adaptation: it can be costly; it can be restricted by limited data availability and limited technical capacity; it needs to be conducted over both long and short time horizons; it has to deal with the high degree of uncertainty around future climate change; it can be hard to measure what would have occurred without the policy; and it needs to be able to assess the effects of policies across sectors and different levels of government (McGray and Spearman, 2011).

Developing countries can learn from the M&E approaches being developed for use in international contexts and in some cases by developed countries in the context of development co-operation. Particularly relevant activities include the results frameworks developed by the Pilot Programme for Climate Resilience (Climate Investment Funds, 2013), by the Global Environment Facility (GEF, 2012) and by the Adaptation Fund (Adaptation Fund, n.d.), and the German development agency (GIZ) and World Resource Institute's high-level framework for producing an M&E system (McGray and Spearman, 2011). While these resources are designed primarily for climate funds and development partners working in developing countries, the International Institute for Environment and Development (IIED) is also developing a framework for jointly tracking adaptation and measuring development, which is targeted at national-level policy makers and which is currently being tested in a number of developing countries (Brooks et al., 2011).

Box 5.2. **Monitoring environmental risks and climate resilience** *(continued)*

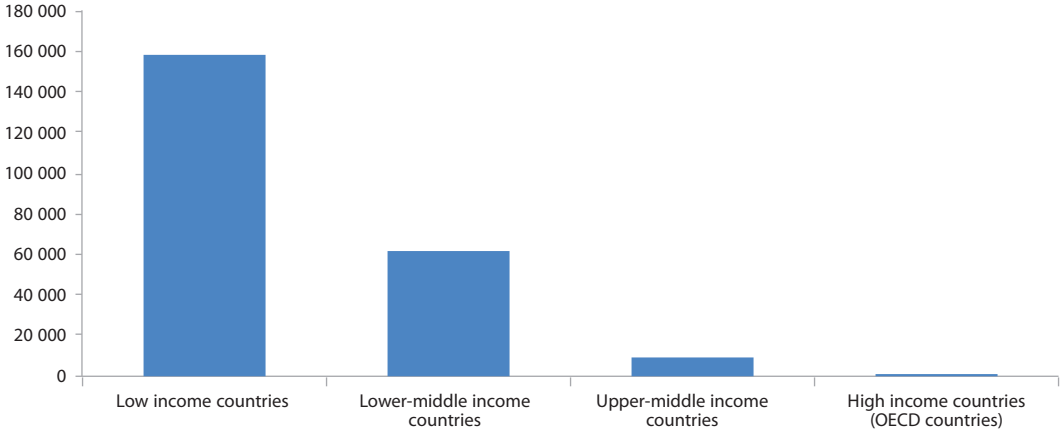
Sources: Adaptation Fund (2012), *Evaluation Framework*, Adaptation Fund, Washington, DC; Brooks, N., et al. (2011), "Tracking Adaptation and Measuring Development", IIED, London; Brown, D., et al. (2012), "Climate change impacts, vulnerability and adaptation in Zimbabwe", IIED, London; CARE International (2009) *Climate Vulnerability and Capacity Analysis Handbook*, CARE International, Geneva; Climate Investment Funds (2013), *Revised PPCR Results Framework*, CIFs, Washington, DC; Department of Environment (2006), *Bangladesh: Climate Change Impacts and Vulnerability – A Synthesis*, Climate Change Cell, Bangladesh Department of Environment, Dhaka; GEF (2012) *LDCF/SCCF Adaptation Monitoring and Assessment Tool (AMAT)*, GEF, Washington, DC; IISD (2012), *CRiSTAL User's Manual Version 5*, IISD, Manitoba; IPCC (2012), *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, New York; Lamhauge, N., et al. (2012), "Monitoring and Evaluation for Adaptation: Lessons from Development Co-operation Agencies", OECD Publishing, Paris; McGray, H. and M. Spearman (2011), *Making Adaptation Count: Concepts and Options for Monitoring and Evaluation of Climate Change Adaptation*, GIZ, Eschborn; Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme (2005), *Vulnerability Assessment of Climate Risks in Attapeu Province, Lao PDR*, Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme, Vientiane; World Bank (2010), Assessing Climate Risk, Guidance Note 3: Mainstreaming Adaptation to Climate Change in Agriculture and Natural Resources Management Projects.

Indicators monitoring environmental quality of life

Indicators in this group should reflect the most pressing environmental health issues and risks in developing countries and could usefully include indicators on access to basic services including environmental services or amenities. For example, incidence of waterborne disease and associated health costs should not be presented without including information on the share of the population with access to safe drinking water and sanitation services (Figures 5.4 and 5.5). Key environmental quality of life measures will vary with national circumstances, such as urbanisation rates, economic and industrial structure. In many developing country contexts, it will also be important to monitor access to energy,

Figure 5.4. **Overall disease burden attributable to poor water, sanitation and hygiene, 2004**

Disability-adjusted life years (DALYs) per 100 000 inhabitants



Note: Disability-Adjusted Life Years (DALYs) is a summary measure of population health that combines the years of life lost as a result of premature death and the years lived with a disease.

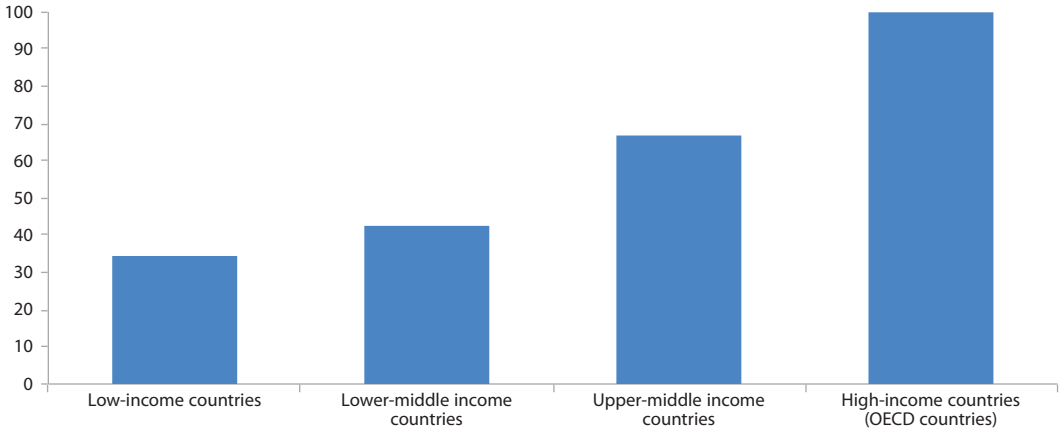
Source: World Health Organisation, Global health observatory repository, *http://apps.who.int/gho/data/view.main*; World Bank, Millennium Development Goals indicators database, *http://mdgs.un.org/unsd/mdg/Default.aspx*.

StatLink http://dx.doi.org/10.1787/888932830103

water and sanitation services for the poorest and most vulnerable of the population as well as the share and location of the population living in sub-standard or slum dwellings. With respect to risk management, there is a need to monitor exposure and vulnerability of population and infrastructure in developing countries to natural disasters and industrial accidents. For example, indicators may be designed to monitor flood or water scarcity today (see Box 5.2) and these indicators can then be used to help assess and plan for the future, i.e. by taking into account expected demographic and climate changes. Other indicators may be developed to monitor access to modern energy services (i.e. other than biofuels or charcoal), indoor and outdoor air pollution exposure, disability-adjusted life years (or DALYs – Figure 5.4), access to improved sanitation facilities (Figure 5.5) or premature deaths from air pollution exposure by type of air pollutant. For policy purposes, it may also be necessary to develop monitoring of such indicators by spatial scale, for example by water basin for water scarcity or by urban area for air pollution monitoring.

Figure 5.5. **Access to improved sanitation facilities, 2005**

Percentage of population



Note: Access to improved sanitation facilities refers to the percentage of the population with at least adequate access to excreta disposal facilities that can effectively prevent human, animal, and insect contact with excreta. Improved facilities range from simple but protected pit latrines to flush toilets with a sewerage connection.

Source: World Health Organisation, Global health observatory repository, *http://apps.who.int/gho/data/view.main*; World Bank, Millennium Development Goals indicators database, *http://mdgs.un.org/unsd/mdg/Default.aspx.*

StatLink http://dx.doi.org/10.1787/888932830122

Indicators describing economic opportunities and policy responses

Identifying indicators in this group is the most challenging for both developed and developing countries. The aim of this group of indicators is to monitor the economic opportunities arising from green growth and the incentives (policies and framework conditions) that trigger them. As described in Chapter 3, a wide range of opportunities and policy responses is possible, including those related to: technology and innovation (e.g. greening innovation policy); green goods and services (e.g. certification of sustainable production and trade); investment (e.g. greening investment policy); prices and transfers (e.g. payments for ecosystem services, environmental taxes); regulations and management approaches (e.g. sustainable public procurement); and training and skills development. These thematic areas will be of varying relevance across countries, but developing countries face some common measurement issues. For example, monitoring technology and innovation relevant to green growth is challenging regardless of the country in question because of the

difficulty in defining a "green" innovation or technology. However, the level of technology and innovation, as measured by conventional indicators such as R&D expenditure and the number of patents, is generally low in most developing countries. Different indicators of innovation are likely to be needed – for example to capture how capacity to innovate might be changing – alongside the conventional measures.

Work on how to measure green jobs continues. While several definitions have been proposed, no consensus has emerged and the OECD has not endorsed any specific definition. Most definitions take an industry-based approach and identify green jobs as employment in industries that produce green products and services. But the selection of those sectors is open to discussion. The International Labour Organization (ILO) defines green jobs broadly – as decent jobs that contribute to preserving or restoring the quality of the environment in agriculture, industry, service or administration sectors (ILO, n.d.). An incremental approach adapted to developing economies is used by the ILO to develop quantitative estimates of green employment relying on input-output tables of production in a national economy, together with uncertainties associated with estimates (ILO, 2011). Different policy scenarios are also examined to assess the changes that these will have on employment.

5.3. Developing country experience with green growth indicators

So far, indicators for green growth are at the pilot stage in developing countries. Based on recent experience from several LAC countries, some useful early lessons are emerging (Box 5.3). A pilot application of the OECD green growth indicators at the national level is also underway in Kyrgyzstan. Beyond this, the OECD has also started to collect indicators for emerging and developing Asian economies to fill statistical gaps and gain feedback on the indicators' policy relevance in these countries.

Box 5.3. Experience and implementation challenges with green growth indicators in the LAC region

Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Paraguay and Peru have sought to use and adapt the OECD green growth indicator framework to their country specificities. A considerable wealth of information has been compiled, processed and presented, guided by the OECD and United Nations Industrial Development Organization (UNIDO). Through the project "Monitoring green growth in the LAC region", UNIDO – in co-operation with OECD, CAF (Latin American Development Bank), SELA (Latin American Economic System) and UNEP – initiated a pilot study to test the applicability of the OECD green growth indicators in the LAC region. The selection of indicators and national aspects was based on institutional capacity, experience in the field of indicators and national industrial strategies. Continuous consultations, co-ordination and capacity building are essential to streamline and facilitate the work. Implementation challenges and ways to address them are summarised in the table on the next page.

Several valuable lessons emerge from this experience. The first is that clear communication is important and can be achieved in many different ways. Countries have opted for different solutions: producing user-friendly and visually appealing reports (e.g. Paraguay), adopting more concise and standardised reporting (e.g. Colombia, Mexico, Paraguay), complementing the indicator-based report with a summary for policy makers (e.g. Costa Rica) and highlighting concrete policy steps and their inter-linkages to facilitate application of the indicators in national policy agendas (e.g. Ecuador). A second lesson is that indicators will need to be adapted to the national context. For example, some countries (e.g. Mexico, Colombia and Paraguay) have added more indicators on a particular natural resource because of its national importance. Finally, exchange of experience and best practices between the participants is useful to help them address data challenges and measurability issues.

Box 5.3. Experience and implementation challenges with green growth indicators in the LAC region *(continued)*

Challenges in using the green growth indicators in the LAC region

Challenges	Ways to address the challenges
Indicator selection • Reflecting adequately national circumstances and policy issues. • Reflecting adequately the linkages between economic growth and environmental issues. • Assessing each indicator for its relevance, soundness, and measurability.	• Adapt the indicators to the national context by developing new indicators on aspects of particular importance to the country. • Ensure that the indicator set encompasses both indicators that are internationally comparable and indicators that are country specific.
Data compilation and measurement • Identifying data sources across different institutions and government levels, and remaining gaps. • Compiling the data and organising data flows. • Harmonising the data across national sources and addressing data quality issues, including discontinuity over time.	• Document the data and their quality using harmonised formats. • Ensure compliance with statistical standards. • Organise data flows in a way that enables regular updates. • Combine graphics and tables with diagrams and explanatory text to compensate for missing data.
Interpretation and communication • Placing the indicators in the country's socio-economic context. • Interpreting the results in view of underlying economic, social and political factors.	• Provide background information on specific national circumstances. • Be clear about the limitations of the indicators and their interpretation. • Release the indicators through user-friendly reports and public websites. • Use standardised ways of reporting that are adapted to the various audiences.
Institutional co-ordination and capacity building • Coping with limited (human, financial) resources. • Co-ordinating among national institutions at different levels. • Providing appropriate training and capacity building.	• Establish a network of data providers and indicator users • Exchange knowledge and learn from peers on: - indicator selection and calculation methods. - data management and quality assurance. - interpretation of indicators and ways to use and communicate them

Source: CAF-OECD-UNIDO (forthcoming), *Monitoring Green Growth in the LAC Region: Progress and Challenges.*

5.4. Building capacity to measure and monitor green growth in developing countries

One of the biggest obstacles to establishing a green growth monitoring framework in developing countries is weak statistical capacity. Over the past decade a number of initiatives (e.g. the Millennium Development Goals, Poverty Reduction Strategy Processes and the aid effectiveness agenda) have increased the burden on national statistical systems. Faced with so many pressing development priorities, some developing countries have experienced difficulties in mobilising the capacity and resources necessary to collect, produce, analyse and disseminate the information needed to support policy making. This is where development co-operation can play an important role (Box 5.4).[6]

Compiling a set of indicators to monitor progress on green growth need not increase the statistical burden for developing countries if existing statistical frameworks are drawn upon (Box 5.5). Although the concept of green growth is relatively new, green growth indicators themselves are not. Most overlap with existing sustainable development and environmental indicators (e.g. Millennium Development Goal indicators) or can be derived from economic, environmental and social statistics that are already collected and compiled by national statistical offices and other national and international bodies. Statistical activities to monitor a country's progress towards green growth can thus be streamlined with existing activities and priorities (e.g. national sustainable development strategies, economic-environmental accounting and environmental monitoring).

Box 5.4. **Modernising the Barbados Statistical Service**

The Government of Barbados has undertaken several initiatives to establish and improve its system of sustainable development indicators, beginning in 1994 with the establishment of the National Indicators Program and participation in the UN Testing Programme for Sustainable Development Indicators. Its 2006-25 National Strategic Plan includes the goal of "Building a green economy – strengthening the physical infrastructure and preserving the environment". However, institutionalising environmental indicators and, more specifically, data collection for monitoring this plan has remained a challenge. Some of these difficulties include:

- a lack of dedicated personnel;
- the fragmentation of institutions involved in data collection;
- inconsistency in the media used to collect data;
- the sensitivity of some data collected; and
- a lack of coherence in the format and structure of data requests from various regional and international institutions.

One of the aims of the Modernisation of the Barbados Statistical Service Project (MBSS) is to address these and other issues. Launched in 2008, the MBSS is a USD 6.25 million project jointly funded by the Government of Barbados and the Inter-American Development Bank to enhance the ability of the Barbados Statistical Service to provide relevant, timely and quality economic and social statistics. The MBSS is an important opportunity to improve the collection of environmental data and to better integrate the environment into core social and economic data and statistical systems.

Source: UNEP (United Nations Environment Programme), University of West Indies, and Government of Barbados (2012), *Green Economy Scoping Study – Synthesis Report: Barbados*, UNEP, Nairobi.

International co-operation

National Strategies for the Development of Statistics

Statistics lie at the heart of any national policy effort to green growth and several existing channels of international co-operation can be used to strengthen national statistical capacity. The Partnership in Statistics for Development in the 21st Century (PARIS21), for example, encourages and supports low-income and lower middle-income countries to design, implement, and monitor their National Strategies for the Development of Statistics (NSDS). Hosted at the OECD, this initiative also facilitates the mobilisation of resources to interested developing countries, working in co-operation with other international partners. It aims to enhance capacity in developing countries for inclusive and responsive statistical systems. PARIS21 was founded in 1999 – at a meeting hosted by the OECD Development Assistance Committee – as a global partnership of national, regional and international statisticians, analysts, policy makers, development professionals, and other users of statistics. It is a forum and network to promote, influence and facilitate statistical capacity development and the better use of statistics.

The NSDS is a strategic planning approach to co-ordinate national efforts to improve the mechanisms and processes (e.g. statistical activities, capacity development, and infrastructure improvements) needed to produce relevant statistics. By co-ordinating and rationalising the production of data across all sectors (e.g. environment, agriculture, health, education) and all

Box 5.5. **Uptake of environmental-economic accounting in developing countries**

There have been a number of initiatives focused on green accounting in a few developing countries, dating from the 1980s and ranging from India, China and Namibia to Indonesia and the Philippines.

- **Water accounting in Namibia.** In Namibia, which faces huge water scarcity, water accounting is seen as an important means of increasing knowledge of the interaction between water and human activity, and provides a tool for improved water management. The framework for physical flow accounts consists of two components: supply and use. The supply accounts show the abstraction of water from the environment by source (groundwater, perennial rivers, ephemeral rivers and recycled water) and by institution, and the redistribution of water among supply agencies. The use accounts record the use of water by each economic activity. The monetary accounts consist of the cost of water supply, the user-charges levied, and subsidies. One result is a ranking according to the sectoral value-added or sectoral employment per cubic metre of water used. The accounts show, for example, that less national income was earned for a given amount of water in 2001/02 than in 1997/98 (DWAF, 2006).
- **Green accounts in India.** The project Green Accounting for Indian States and Union Territories set out to build a framework of environmentally-adjusted national income accounts that cover the depletion of natural resources and the costs of pollution, and also capture additions to the stock of human capital. In a series of studies of different environmental aspects, the project has attempted to adjust national and state accounts for environmental loss, as well as for the contribution of education, over a 10-year period. It estimates that natural resources losses in India in 2002/03 were equal to 4.2% of GDP. The project has informed implementation of the system of fiscal transfer to states for forest environmental services (Gundimeda, 2011).
- **China's work on green GDP.** In 2002, satellite accounts for physical accounting of land, forest, minerals and water were established to complement the Chinese System of National Accounts. This was taken further in 2004, when President Hu Jintao endorsed the idea of green GDP – a new accounting system that would measure not only China's economic growth but also how it had protected and enhanced environmental and social welfare. The recently-established environmental pollution accounts fed into the green GDP calculation, indicating that losses due to pollution were equal to 3% of national economic output in 2004. The green GDP approach proved to be controversial and was later dropped. While the environmental agency endorsed the green GDP approach, the National Bureau of Statistics was sceptical about the ability to make accurate estimates. The leader of China's green GDP study is now working on a different approach – a GDP quality index which considers the impact of the loss of natural capital and social capital on GDP. The quality index consists of 15 indicators grouped into sub-indexes (Wenyuan, 2011).

Source: DWAF (Department for Water Affairs and Forestry) (2006), *Technical Summary of Water Accounts*, Department of Water Affairs, Ministry of Agriculture, Water and Forestry, Namibia; Gundimeda, H. (2011), "Green Accounting and its Implications for Development Policy", Presentation at *16th Poverty Environment Partnership workshop*, Vienna, 16-18 February 2011, available at *www.povertyenvironment.net/files/Green%20accounting%20and%20implications%20for%20policy%20development.pdf*; Wenyuan, N. (2011), "The Quality Index of China's Gross Domestic Product (GDP)", *Bulletin of Chinese Academy of Sciences*, 5.

components of the national statistical system (central statistical office, line ministry statistical units, central bank, civil registration systems), the NSDS approach enables countries to maximise resources and link data production more closely with the data needs of policy makers and the general public. The NSDS process has become the internationally-recognised benchmark in strategic statistical planning. A recent PARIS21 review of progress shows that 95% of low-income, lower middle-income and African countries have adopted the NSDS methodology (OECD, 2012b).

System of Environmental-Economic Accounting

The System of Environmental-Economic Accounting (SEEA) is the first international statistical standard for environmental-economic accounting (EC et al., 2012).[7] First initiated in 1993, then revised in 2003, the current version of the SEEA was adopted by the United Nations Statistical Commission at its 43rd Session in May 2012 and is the main instrument available to integrate statistics on the environment and its relationship to the economy into the core of economic statistics on national accounts (EC et al., 2012). Although not specifically a green growth initiative, the SEEA addresses one of the biggest issues in the green growth measurement agenda – the lack of a consistent accounting framework for compiling and presenting economic and environmental data. It can also ease statistical data collection in developing countries by providing a common framework for environmental-economic accounting. The SEEA framework follows a similar accounting structure as the System of National Accounts (SNA),[8] an internationally agreed standard set of recommendations on how to compile measures of economic activity. SEEA uses concepts, definitions and classifications consistent with the SNA in order to integrate environmental and economic statistics. Implementing the SEEA will help maximise international comparability and consistency of the data needed to calculate green growth indicators. The SEEA was developed through collaboration between international statistical organisations, notably at the UN and the OECD, both on the central framework and forthcoming volumes on experimental ecosystem accounts and on extensions and applications. Because the SEEA can be implemented incrementally it can be adapted to suit countries at different stages of development. Many developing countries are already beginning implementation, with the support and technical assistance of the United Nations Statistics Division and the OECD.

Advancing the measurement agenda

International co-operation is already supporting work with individual countries and in key international partners to address the measurement issues that constrain the full and timely production of green growth indicators. These measurement issues include important gaps in the information base and inconsistent data. For example, work being done in this area at the OECD includes:

- Measuring the effects of environmental conditions on quality of life and life satisfaction, in particular environmentally-induced health problems, risks and the related costs, and subjective measures of environmental quality of life.
- Improving a headline indicator for natural resource use, and coming up with better physical and monetary data for key stocks of natural assets, including mineral and energy resources, soil, timber and water in line with the SEEA.
- Improving a measure of multi-factor productivity, including environmental services.
- Developing accounts for land, in particular monetary valuation and volume measures.

- Improving biodiversity indicators, building on work done under the Convention on Biological Diversity and on biodiversity policy analysis.
- Improving physical data on material flow and resource productivity. This encompasses better measures of trade-related flows and of flows of waste and secondary raw materials. This also includes demand-based measures, akin to the methodology used to assess the CO_2 content of domestic final demand or demand-based measures of CO_2 to account at least partly for the so-called hidden flows of materials (see Section 5.2).

The OECD, UNEP, the World Bank and the Global Green Growth Institute (GGGI) have now jointly developed a common measurement framework under the Green Growth Knowledge Platform (see Section 4.5 in Chapter 4), which builds on the OECD framework outlined above (GGGI et al., 2013). It has a special focus on the economy-environment nexus. This effort represents an attempt to harmonise indicators and data collection efforts across multi-lateral institutions, so as to reduce the statistical burden on countries and increase the clarity of information on green growth.

Beyond green growth indicators, the OECD is also advancing the broader development measurement agenda through its work on measuring what matters to people. Through its Better Life Index, the OECD has proposed a means to measure well-being and fostering the progress of societies in a manner that includes "GDP and beyond" (see Box 1.5 in Chapter 1). The approach and its use have implications that go beyond developed countries to also include possible methods for example for setting and measuring progress on development goals in the post-2015 timeframe (OECD, 2012b; OECD, 2013b).

Notes

1. The term decoupling refers to breaking the link between "environmental bads" and "economic goods". In practice, the measurement of decoupling refers to the relative growth rates of a direct pressure on the environment and of an economically relevant variable to which it is causally linked. Decoupling occurs when the growth rate of the environmental pressure is less than that of its economic driving force over a given period. One distinguishes between absolute and relative decoupling. Decoupling is said to be absolute when the environmental variable is stable or decreasing while the economic variable is growing. Decoupling is said to be relative when environmental variable is increasing, but at a lower rate than the economic variable.
2. Estimating demand-based emissions involves tracking the emissions embodied in imports, adding them to the direct emissions stemming from domestic production and subtracting the emission content of exports. The results provide insight into the amount of environmental assets being used – directly and indirectly – to meet domestic demand, and into countries' respective contributions to pressures on the environment. Demand-based indicators are of equal interest to developed and developing countries. They capture the link between those countries supplying/using environmental assets and those consuming them.
3. Computations are based on earlier OECD work, notably in Ahmad and Wycoff (2003). A further update will be presented in a forthcoming OECD Statistics Division working paper (Ahmad and Yamano, forthcoming).
4. For examples see OECD (2011b) and Schaffartzik, et al. (2011).

5. In material flow accounting this indicator is referred to as raw material consumption. It is the sum of domestic material consumption and the indirect flows associated with imports and exports.

6. A lack of financial resources is a clear impediment to building statistical capacity, but cultural barriers are also important. A report on the Environment Strategy for the countries of Eastern Europe, Caucasus and Central Asia found a pervasive perception of information as an instrument of power, requiring secrecy, rather than as a management tool to support decision makers with relevant information (OECD, 2007).

7. See *www.unstats.un.org/unsd/envaccounting/seea.asp.*

8. See *www.unstats.un.org/unsd/nationalaccount/sna.asp.*

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Annex 5.A1

Green growth indicators and themes

Table 5.A1.1. **OECD Green growth indicators and themes**

Group/theme	Proposed indicators
The socio-economic context and characteristics of growth	
Economic growth, productivity and competitiveness	**Economic growth and structure** GDP growth and structure; Net disposable income **Productivity and trade** Labour productivity; multi-factor productivity Trade weighted unit labour costs Relative importance of trade: (exports + imports)/GDP **Inflation and commodity prices**
Labour markets, education and income	**Labour markets** Labour force participation and unemployment rates **Socio-demographic patterns** Population growth, structure and density Life expectancy: years of healthy life at birth Income inequality: GINI coefficient Educational attainment: Level of and access to education
Environmental and resource productivity	
Carbon and energy productivity	**1. CO_2 productivity** 1.1. Production-based CO_2 productivity GDP per unit of energy-related CO_2 emitted 1.2. Demand-based CO_2 productivity Real income per unit of energy-related CO_2 emitted **2. Energy productivity** 2.1. Energy productivity (GDP per unit of TPES) 2.2. Energy intensity by sector (manufacturing, transport, households, services) 2.3. Share of renewable energy in TPES, in electricity production
Resource productivity	**3. Material productivity (non-energy)** 3.1. Demand based material productivity (comprehensive measure; original units in physical terms) related to real disposable income • Domestic material productivity (GDP/DMC) - Biotic materials (food, other biomass) - Abiotic materials (metallic minerals, industrial minerals) 3.2. Waste generation intensities and recovery ratios By sector, per unit of GDP or VA, per capita 3.3. Nutrient flows and balances (N, P) • Nutrient balances in agriculture (N, P) per agricultural land area and change in agricultural output **4. Water productivity** VA per unit of water consumed, by sector (for agriculture: irrigation water per hectare irrigated)
Multi-factor productivity	**5. Multi-factor productivity reflecting environmental services** Comprehensive measure

Group/theme	Proposed indicators
Technology and innovation	**6. R&D expenditure of importance to GG** 6.1. Renewable energy (in % of energy related R&D) 6.2. Environment-related technologies (in % of total R&D, by type) 6.3. All purpose business R&D (in % of total R&D) **7. Patents of importance to GG** in % of country applications under the Patent Cooperation Treaty 7.1. Environment-related and all-purpose patents 7.2. Structure of environment-related patents
Natural asset base	
Natural resources	**8. Index of natural resources** Comprehensive measure
Renewable stocks	**9. Freshwater resources** Available renewable resources (groundwater, surface water, national, territorial) and related abstraction rates **10. Forest resources** Area and volume of forests; stock changes over time **11. Fish resources** Proportion of fish stocks within safe biological limits (global)
Non-renewable stocks	**12. Mineral resources** Available (global) stocks or reserves of selected minerals (tbd): metallic minerals, industrial minerals, fossil fuels, critical raw materials; and related extraction rates
Biodiversity and ecosystems	**13. Land resources** Land cover types, conversions and cover changes State and changes from natural state to artificial or man-made state • Land use: state and changes **14. Soil resources** Degree of top soil losses on agricultural land, other land • Agricultural land area affected by water erosion by class of erosion **15. Wildlife resources** • Trends in farmland or forest bird populations or in breeding bird populations • Species threat status: mammals, birds, fish, vascular plants in % species assessed or known • Trends in species abundance
Environmental quality of life	
Environmental health and risks	**16. Environmentally induced health problems and related costs** (e.g. years of healthy life lost from degraded environmental conditions) • Population exposure to air pollution **17. Exposure to natural or industrial risks and related economic losses**
Environmental services and amenities	**18. Access to sewage treatment and drinking water** 18.1. Population connected to sewage treatment (at least secondary, in relation to optimal connection rate) 18.2. Population with sustainable access to safe drinking water
Economic opportunities and policy responses	
Environmental goods and services	**19. Production of environmental goods and services (EGS)** 19.1. Gross value added in the EGS sector (in % of GDP) 19.2. Employment in the EGS sector (in % of total employment)
International financial flows	**20. International financial flows of importance to GG** (in % of total flows; in % of GNI) 20.1. Official Development Assistance 20.2. Carbon market financing 20.3. Foreign Direct Investment (tbd)

Group/theme	Proposed indicators
Prices and transfers	**21. Environment-related taxation** • Level of environment-related tax revenues (in % of total tax revenues) • Structure of environment-related taxes (by type of tax base) **22. Energy pricing** (share of taxes in end-use prices) **23. Water pricing and cost recovery** (to be determined) *To be complemented with indicators on:* • *Environment-related subsidies* • *Environmental expenditure: level and structure (pollution abatement and control, biodiversity, natural resource use and management)*
Regulations and management approaches	**24.** *Indicators to be developed*
Training and skill development	**25**. *Indicators to be developed*

Source: OECD (forthcoming), Towards Green Growth: OECD Indicators, OECD, Paris.

Chapter 6

Gearing up for green growth across the developing world

Green growth is the only way to secure sustainable development and combat global poverty in developing countries and at a global level. This chapter seeks to allay the main concerns expressed by developing countries about a shift to a green growth agenda: green growth can address poverty, social equity and other development priorities; developing countries can afford to implement green growth given the growing range of international financing opportunities available and the opportunities for creating stable and secure economic growth and development; developing countries can avoid conditions being imposed on them by donor countries by ensuring that they fully "own" and endorse green growth strategies and policies at the national level and tailor these to their specific needs; and there are many opportunities for developing countries to grow green by exporting their green goods and services. While there are many encouraging green growth initiatives already in the developing world, these have not yet reached the scale needed to bring about real change. With the world gearing up to pursue sustainable development goals in the context of the post-2015 development agenda, now is the time to seize the opportunity offered by green growth.

It is a strategic decision for developing countries to go green and make the sustainable supply of natural assets a public policy goal to guide their future development. They may do this for a variety of reasons, including: (1) to protect their own national wealth, particularly when natural assets risk diminishing over time and make up a relatively large share of this wealth; (2) to manage the adverse impacts of climate change on their economy; (3) to protect the livelihoods and income of the poorest segments of their population due to their high dependency on natural resources; (4) to address people's lack of access to energy, water and infrastructure; and (5) to reduce the risks of food insecurity.

The international community must work with developing countries to put green growth at the heart of development, so that green growth can deliver its promised benefits to sustain growth and development while promoting efficient use of resources and better health, and potentially reducing social equality.

6.1. Getting green growth to work for developing countries

Chapter 1 presents some common questions and concerns developing countries may have about green growth. This book has aimed to respond to these questions. These findings are summarised here:

How can green growth help address poverty, equity and other development priorities?

The answer to this depends largely on the design and implementation of policy. When green growth policies are designed to take into account the interests of the poor and of vulnerable groups, they can bring profound impacts to the economy, environment and, above all, poverty reduction and social equity. For instance:

- removing fossil-fuel subsidies can improve the living conditions of the poorest if the subsidies are re-assigned to providing cheaper public transport or more accessible health care services;
- sustainable certification schemes and eco-labelling programmes can become a new source of income in many developing countries with abundant forests and agricultural production if land tenure is secured and the certification schemes give special premium to community-managed forests or small landholders;
- payments for ecosystem services can reduce poverty if they explicitly target local communities and include capacity development to boost local households' ability to negotiate payment contracts; and
- greening investment, innovation strategies, and labour and skill development policies can have even more significant impacts on development and poverty if these cross-cutting policies are designed to take into account pro-poor criteria, such as affordability and scalability.

For these benefits to be realised, green growth policy needs to be based on good governance, reflect a sound understanding of local context and, importantly, be people-centred. Countries need to allow the voices of affected stakeholders to be heard in the policy design, implementation and evaluation.

How to manage the costs of implementing green growth?

For many developing countries, greening national growth (Chapter 3) may imply short to medium-term costs that could outweigh immediate benefits. However, the agenda

for international co-operation presented in Chapter 4 identifies many opportunities for financing developing countries' transition to green growth. For example, climate change finance is set to increase substantially throughout the next decade, as developed countries scale up resources to meet the target of USD 100 billion annually by 2020, and it will come from both public and private sources. The book details numerous other schemes that will offer funding for implementing the kind of activities needed for green growth. For example, rough estimates suggest that as many as 25-50 million low-income households in developing countries could benefit from REDD by 2030.

Developing countries can also benefit from the creation of international and national economic instruments, such as payments for ecosystem services, to deliver global environmental benefits, including biodiversity or carbon sequestration. Opportunities already exist to sell carbon credits to developed countries through the Clean Development Mechanism, and similar international schemes may be feasible for biodiversity. For example, Ethiopia has estimated that implementing its Climate Resilient Green Economy Strategy will cost USD 150 billion over the next 20 years, and a significant amount of that amount is expected to come from external development finance, including climate finance (Section 3.1 in Chapter 3). Donor countries are committed to stepping up their efforts to mainstream green growth into development co-operation. They can help developing countries strengthen strategic planning to better access available official development finance for green growth through a range of instruments: from sectoral support to budgetary support, and from grant instruments to risk guarantees designed to leverage private capital. Emerging evidence shows that investing in natural capital pays higher social dividends than investing in carbon-intensive conventional infrastructure, on which development programmes have largely focused in past decades. Technology co-operation and international commitment in removing tariff and non-tariff trade barriers for green goods and services are also important factors in easing developing countries' transition to green growth.

How to make development assistance work for green growth in developing countries?

There is a fear that providers of development co-operation could impose conditions on developing countries in the name of green growth that would reflect external policy prescriptions that are not central to their priorities for development. To avoid this, developing countries need to ensure that they fully "own" and endorse green growth strategies and policies at the national level, and tailor these to their specific needs. In this way they can establish their own conditions on how to use such development assistance effectively to support their own national development agendas. The development co-operation community has already pledged to support developing countries to develop and implement country-specific, nationally-owned, cost-effective and inclusive strategies that take into account trade-offs and political economy barriers, in line with the principles adopted in the Global Partnership for Effective Development Co-operation.[1]

How to make green growth and trade work together?

Trade protectionism encouraged by green growth policies has not been a major problem to date. In fact, data from 2007 to 2011 indicate that the growth rate in export value of green goods from developing countries has been faster in recent years than from many OECD countries. For example, the rapidly growing demand for organic agriculture provides opportunities for both domestic and export markets for many developing countries; in this sub-sector, 97% of the revenues in developing countries are generated in OECD countries, while 80% of all organic producers are from developing countries (Willer and Kilcher,

2009). Nevertheless, more needs to be done to foster international markets for green goods and services and to remove tariff and non-tariff trade barriers. Initiatives such as Aid-for-Trade are helping to reduce transaction costs and strengthen the capacity of developing countries to more actively engage in the international markets of green goods and services. Efforts by initiatives such as the Forest Stewardship Council, Roundtable on Sustainable Palm Oil and Fairtrade to ensure that smaller producers can be included in their certification programmes are also encouraging. Furthermore, OECD research suggests that when it comes to encouraging FDI in developing countries, foreign investors favour countries with transparent and well-enforced environmental regulations, such as for greenhouse gas emissions (Section 4.2). As a result, developing country governments interested in attracting FDI as part of a broad green development strategy may choose to strengthen and above all clarify environmental regulations and policies.

6.2. The time to scale up is now

Many pioneering environment and natural resource ministries in the developing world are already gathering evidence of the consequences of their existing growth model on the environment and are making the economic case for investing in natural assets for more sustainable growth. Many examples of such efforts have been presented in this book, from emerging economies like China, which is prioritising green development in its 12th Five-Year Plan, to least developed countries like Cameroon, which is using forest taxes to sustainably manage forest capital. Some of these national actions are succeeding; others will require improvement. However, one significant conclusion is that these efforts are still too marginal and piecemeal to bring about real change – either to the economy or the environment, or both. What is needed now is a systemic approach to greening national economies. For this, developing countries will need to:

- recognise green growth as an untapped opportunity to boost domestic fiscal revenues and attract quality investment for years to come;
- take full ownership of this transformative agenda;
- mainstream green growth objectives and policies into every government department and, most importantly, national budgets; and
- mobilise all stakeholders in the government, such as ministries of finance, development planning, labour affairs and line ministries, as well as incentivise the engagement of civil society groups, the private sector and individuals.

The three components of the agenda for national action for green growth in developing countries, presented in Chapter 3 belong to all stakeholders. This agenda recognises the importance of setting the vision and planning for a national strategy, implementing and reforming green growth policies, and establishing governance mechanisms to enable monitoring, capacity development and continuous learning over time. It is intended as a guide rather than a blueprint. Policy makers in developing countries can pick and choose the entry points and policy mixes best suited to their countries. The ultimate goal of this agenda for action is to help policy makers identify the policies that will provide the incentives, allocate fiscal budgets, assess opportunities and progress, and engage all stakeholders in decision making to sustainably manage natural resources and improve human well-being. Measuring progress is also an integral component of a national green growth agenda and plays a critical role in informing policymakers on their performance towards meeting green growth objectives. Context-specific indicators for individual countries should be carefully chosen to accompany the implementation of the national agenda for action to achieve green growth.

6.3. Moving forward together, with confidence

Successfully shifting to a new growth path that sustains natural assets over time will require the engagement of all countries. The international community can play a crucial role in facilitating developing countries' green growth transition. To start with, development assistance will need to apply a green growth lens to development co-operation activities and to support common global development goals.

Beyond working with the development co-operation community, academia, business and civil society groups also need to be part of the picture to support technology co-operation and create the enabling conditions to facilitate freer trade of green goods and services. Many valuable and instructive experiences, ideas and commitments are emerging today. For example, the Green Growth Knowledge Platform,[2] a collaborative initiative of the Global Green Growth Institute, the OECD, UNEP and the World Bank, brings together top researchers and policy makers from around the world and aims to deepen knowledge of the individual elements and implications of green growth in the global context. Similarly, the Green Economy Coalition,[3] a global network of international organisations, non-governmental organisations, research institutes, business and trade unions, was initiated to improve communication and share good practices of green growth in action.

Box 6.1. **A high-level political forum for green growth-led development?**

Global co-operation is needed at the highest policy level to mobilise political support for green growth in developing countries. There is also a need for support at the technical level to provide an evidence base and to support peer-to-peer learning to deliver the *Future We Want* (UN, 2012). Through international co-operation and new partnerships it could be interesting to periodically bring together policy makers at the ministerial level, along the lines of the Rio+20 or the more focused G20 discussions. The aim could be to focus primarily on the policy decisions needed for green growth, to share experiences and lessons learned, and for countries to work more closely with bilateral and multilateral co-operation partners on green growth policy issues. An important goal in developing countries is to build awareness, particularly at the highest levels of government, to strengthen capacities and catalyse national budgetary support for specific programmes. A routine forum led by countries on green growth may help to serve these purposes.

Working-level efforts could complement meetings, such as that in the G20, to maintain dialogue on green growth among countries with an active interest in greening their growth pathways and other development co-operation practitioners. Here the focus could be on the most effective development co-operation and national policies and practices, with the aim to promote learning. Key features of such a dialogue process could include:

- providing expert support to developing countries to turn macro-level green growth strategies into action-oriented implementation plans by contextualising the national green growth policy framework and identifying areas where international support is most needed;
- analysing existing development co-operation programmes in supporting green growth in developing countries and identifying good practice, areas lacking efficiencies and gaps in meeting developing countries' demand;
- involving academia and international organisations to also share experience and views from their perspectives, including on the contribution of green growth to poverty reduction, public (and private) financing for green infrastructure, and green skill development; and
- centralising information on international co-operation and initiatives for promoting green growth in developing countries.

This book and the many studies from which it draws demonstrate the significant co-benefits green growth can provide to developing countries. Now is the time to seize the opportunity and to deliver these benefits on a large scale. The Millennium Development Goals (MDGs), which have guided development co-operation efforts and development policies over the last decade, are due to expire in 2015. The international community is working towards a new development framework, which will incorporate the sustainable development goals (SDGs) agreed at the United Nations Conference on Sustainable Development in 2012 (Rio+20). Green growth is emerging as a guiding framework for delivering these goals and for scaling up efforts to achieve sustainable development. To truly "get to zero" on eradicating absolute poverty, a new commitment is needed from global leaders to combat poverty while greening national growth patterns. This would be a cost-effective way forward which will allow countries to benefit from greater efficiency and productivity of natural resource use, greater and more appropriate innovation to promote green growth and sustainable development, and new markets – international and domestic – for green technologies, goods and services. But more importantly, if we do not act today, the development achieved so far could be significantly eroded and future opportunities for growth seriously compromised. Green growth is not a luxury – it is a way of delivering sustainable development and global security for all.

Notes

1. See *www.effectivecooperation.org/index.html*.
2. See *www.greengrowthknowledge.org/Pages/GGKPHome*.
3. See *www.greeneconomycoalition.org*.

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Annex A

Index of developing country examples

Table A.1. **Index of developing country examples in *Putting Green Growth at the Heart of Development***

Region/Country	Green Growth Strategies/Policies/Programmes	Page number
	Regional examples	
African region	Solar Sister programme to provide clean energy access through rural women's networks	p. 87
East African region	East African Organic Products Standard (includes Kenya, Tanzania and Uganda)	p. 78
West African region	Strategic Environmental Assessment for the mining sector through the West Africa Mineral Governance Programme	p. 64
Latin America region	Pilot implementation of OECD Green Growth Indicator Framework in Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Paraguay and Peru	p. 169
Caribbean Region	Caribbean Catastrophe Risk Insurance Facility with 16 Caribbean countries	p. 91
	Country examples	
	Africa	
Benin	Strategic Environmental Assessment of Second Poverty Reduction Strategy 2011-15	p. 64
Cameroon	Forest taxation	p. 70, 71
Egypt	Environment, Social and Governance Index for private sector	p. 100
Ethiopia	Natural forest regeneration	p. 45
	Climate Resilient and Green Economy Strategy	pp. 62-63
Ghana	Sustainable business model for producing cooking stoves	p. 49
	Energy subsidy reform	p. 67
	Capacity development for integrating environment into the *Ghana Poverty Reduction Strategy*	p. 98
Madagascar	Sustainable fishing for better shrimp farming	p. 45
	Public Environment Expenditure Review	p. 65
Malawi	Public Environment Expenditure Review	p. 65
	Land tenure reform	p. 76
Mali	Retraining farmers for the green energy and transport sectors	p. 89
Mauritius	Using Strategic Environmental Assessment to assess the impacts of the removal of EU subsidies on sugar imports	p. 64
Mozambique	Public Environment Expenditure Review	p. 65
	Capacity development in environmental governance in public sector	p. 141
Namibia	Water accounting	p. 172
Rwanda	*Green Growth and Climate Resilient Strategy*	p. 49
	Land tenure regularisation	p. 75
	National strategic foodstock reserves procurement programme	p. 81

Region/Country	Green Growth Strategies/Policies/Programmes	Page number
South Africa	Green Fund to facilitate investment in green initiatives	p. 19
	Job creation through tackling invasive non-native plants	p. 44
	Medium-term expenditure framework for increasing the budget allocated to the environmental sector	p. 65
	Sustainability index for Johannesburg Stock Exchange	p. 100
	Pension fund for green infrastructure investment	p. 130
Tanzania	Public Environment Expenditure Review	p. 65
Tunisia	*National Solar Energy Plan 2010-2016*	p. 49
Uganda	Organic agriculture	p. 45
	Capacity development in climate finance by Uganda Carbon Bureau	p. 98
	Asia and Oceania	
Bangladesh	*Climate Change Strategy and Action Plan 2009*	p. 49
Bhutan	Using Strategic Environmental Assessment to mainstream environment into national development plans	p. 64
Cambodia	*National Green Growth Roadmap*	pp. 62-63
	Biomass gasifiers to generate power for rural industries	p. 84
	National Council for Green Growth	p. 46
China	Green Development target in the 12th Five-Year Plan	p. 19
	Pollution taxes and pollutant trading schemes	p. 70
	Payments for ecosystem services in sloping land conversion	pp. 73, 74
	Investment in clean energy	p. 80
	Green innovation in energy-efficient technologies	p. 87
	Shanghai Stock Exchange Sustainability Index	p. 100
	Green GDP framework	p. 172
India	Energy subsidy reform	p. 45
	Husk Power Systems biomass power generation	p. 87
	"Base-of-pyramid" strategies for green innovation	p. 88
	Skills strategy for low carbon growth in the 12th Five-Year Plan	p. 90
	Green accounting	p. 172
Indonesia	Energy subsidy reform	p. 67
	Forestry certification	p. 78
	Sustainability index for stock exchange	p. 100
Malaysia	Forest certification	p. 78
Nepal	Community Forest User Groups for job creation and better livelihood	p. 44
Philippines	Green public procurement policy	p. 80
	National Council for Sustainable Development	p. 96
Solomon Islands	Forest certification	p. 78
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