Green Growth and Developing Countries

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ACRONYMS AND ABBREVIATIONS

ASEAN	Association of South East Asian Nations
BRIICS	Brazil, Russia, India, Indonesia, China and South Africa
CER	certified emission reductions
CO2	carbon dioxide
DAC	Development Assistance Committee of the OECD
EITI	Extractive Industry Transparency Initiative
FDI	foreign direct investment
GG	green growth
GGGI	Global Green Growth Institute
GGS	Green Growth Strategy (OECD document)
GHG	greenhouse gas
GT	gigatonnes
IPP	independent power producer
IPR	intellectual property right
LDC	least developed country
NCSD	National Council for Sustainable Development
NSDS	National Strategy for the Development of Statistics
ODA	official development assistance
OECD	Organisation for Economic Co-operation and Development
PCD	Policy Coherence for Development
PER	public expenditure review
PEER	public environmental expenditure review
PES	payments for ecosystem services
PPP	purchasing power parity
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RSPO	Roundtable on Sustainable Palm Oil
RTA	regional trade agreements
SEA	strategic environmental assessment
SME	small and medium sized enterprises
SPP	sustainable public procurement
UNFCCC	United Nations Framework Convention on Climate Change
UNCSD	United Nations Conference on Sustainable Development
WTO	World Trade Organization

CHAPTER 1

AN INTRODUCTION TO THE DEVELOPMENT DIMENSION OF GREEN GROWTH

Executive Summary

The concept of "green growth" offers real opportunities for more inclusive growth in developing countries while protecting the environment. However, the concept is generating a great diversity of political positions, from enthusiastic to cautious, reflecting a lack of clarity and experience, and the different opportunities available to specific countries. This report responds to these concerns and acknowledges that developing countries face particular challenges in designing and implementing green growth strategies. It explores how green growth strategies can be applied, taking into account differences in natural resource endowments, levels of socio-economic development, sources of economic growth, and institutional capacity.

This introductory chapter looks at developing countries' views and concerns about the concept of green growth. It outlines the key components of a green growth framework that could address the growth and development challenges faced by developing countries and avoid locking in inefficient, costly and environmentally damaging technology and infrastructure. This framework does not just involve environmental policies, but also a broad range of economic and social policies. It will take significant long-term investment and innovation, both technological and organisational. For such investments and policies to work, appropriate governance arrangements must be in place. This will require capacity development and financial support. The chapter concludes by explaining how the OECD can help developing countries in designing their green growth strategies.

1.1 Introduction

The most serious problems facing the world today – water and food supply crises, extreme volatility in energy and food prices, rising greenhouse gas emissions, severe income disparity, chronic fiscal imbalances and terrorism (World Economic Forum, 2012) – either stem from environmental mismanagement or inequality, or both. Aside from the chronic fiscal imbalances that mostly concern the developed economies, developing countries are the most vulnerable to all of these risks. The key question is if (and how) environmental goals can be reconciled with growth and poverty reduction in the developing world. This report asserts that these goals can indeed be pursued simultaneously in a mutually-reinforcing way through green and inclusive growth.

National and international efforts have been intensifying to promote green growth as a new approach to increasing sustainable wealth. In 2009 the OECD, which promotes a comprehensive approach to resolving interconnected global problems, launched work on green growth as a way of tackling some of the most serious challenges facing the world. In June 2009, a Ministerial Declaration on Green Growth was signed by all OECD member countries. This acknowledged that "green" and "growth" can go hand-in-hand. The countries asked the OECD to develop a green growth strategy (GGS) 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. It suggests that green growth can open up new sources of wealth through encouraging greater efficiency and productivity of natural resources, innovation, and new markets for green technologies, goods and services.

The OECD GGS focuses mainly on common challenges for OECD countries and emerging economies, such as improving energy efficiency and shifting towards low-carbon development pathways. However, green growth as applied to developing countries – whose key preoccupations are providing basic education, food security, and delivering essential services such as water supply and sanitation – is explored less in the strategy. This report takes the first step in filling that gap, suggesting how green growth and poverty reduction can also lead to sustainable development for these countries.

The report provides a broad outline of the green growth concept in a developing country context, realising that green growth will rightfully be reinvented by developing countries themselves, using different language, and stressing different issues such as inclusiveness. It does not limit itself to one category of developing countries; rather it strives to be as relevant as possible to both low and middle income countries, and provides many examples from emerging economies and the developing world. As a major contribution from the OECD to the forthcoming United Nations Conference on Sustainable Development (Rio+20), this report will in particular identify how green growth could be used to meet these goals in developing countries.

This introductory chapter looks at the concept of green growth from the point of view of developing countries. It reflects on some of the concerns that these countries have expressed about the concept, and considers how green growth could address the growth and development challenges faced by developing countries. Finally it explains the OECD's motivation in undertaking this work and how it can help developing countries in designing their green growth strategies.

Chapter 2 reinforces the assertions made in Chapter 1 – that the world needs to shift to a green growth path, by taking stock of the global implications of a "business as usual" approach to growth. It assesses the far-reaching ramifications for the environment as well as the division of wealth and power between and within nations in the developing world. Chapter 3 proposes elements of a practical policy framework that will help developing countries make the transition to green growth. Chapter 4 extends this analysis by examining the international dimensions of some of the policy instruments and barriers to their

implementation. It highlights what is being done at the international level to stimulate global green growth, in particular in developing countries. Finally, Chapter 5 provides an overview of a measurement framework for tracking progress towards green growth. The framework has been developed by the OECD and highlights some of the issues specific to developing countries, including practical challenges in putting in place indicators to track progress. It also describes what the international community is doing to enhance statistical capacity in developing countries and advance the green growth measurement agenda.

Green growth and developing countries

Developing countries are the key to achieving global green growth. Although today most developing countries contribute only minor shares to global greenhouse gas (GHG) emissions, their emissions will increase if they follow the same path to economic growth as developed countries have followed. Increasingly developing countries are becoming sources of global economic growth, but accompanied by growing emissions and more intensive use of natural resources. The potential economic and social impacts of environmental degradation are particularly serious for developing countries given their dependence on natural resources for economic growth and their vulnerability to energy, food, water security, climate change and extreme weather risks. All these factors are challenging their ability to develop (Chapter 2).

Developing countries have the greatest opportunities for capitalising on the synergies between environmental and economic sustainability. A green growth approach is the chance for emerging and developing economies to leapfrog unsustainable and wasteful production and consumption patterns. They can still factor environmental issues into their infrastructure investment decisions and can further develop agriculture and other natural resources in a way that improves livelihoods, creates jobs, and reduces poverty. They are less constrained than developed countries, who are now locked into investment choices and sunk capital from previous decades. Adequate financing and capacity would offer developing economies the opportunity to lay down the infrastructure and networks needed to support a sustainable development path (Chapter 4).

Co-operation between the OECD and developing countries is essential in efforts to move towards global green growth. This requirement is clearly recognised in the GGS. But there is no "one-size-fits-all" prescription for implementing a green growth strategy. National development strategies must be based on each country's strengths, bottlenecks and constraints (OECD, 2012a). Developed, emerging, and developing countries will face different challenges and opportunities in greening growth, as will countries with differing economic and political circumstances (OECD, 2011a). Yet there are some common considerations that apply to all contexts. Greening the growth path of an economy depends on the institutional settings, level of development, resource endowments and particular environmental pressure points (Chapter 3).

1.2 What is green growth and why is it important for developing countries?

If we continue a "business as usual" approach to meeting the rising global demand for food, energy and infrastructure, the world will exceed its ecological carrying capacity. Volatile commodity prices, uncontrollable pollution, severe damage to human health, and irreversible loss of biodiversity systems will be the consequence of these business-as-usual investment decisions (see Chapter 2).

The concept of green growth reframes the conventional growth model and re-assesses many of the investment decisions in meeting energy, agriculture, water and the resource demands of economic growth. The OECD defines green growth as a means 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 (OECD, 2011a). In this concept, natural capital plays a significant role in ensuring that production and welfare gains are reaped (Box 1.1).

Box 1.1. 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;
- 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, which can help to drive progress towards achieving the Millennium Development Goals (MDGs). These include:

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

Given the centrality of natural assets in low income countries, green growth policies can reduce vulnerability to environmental risks and increase the livelihood security of the poor.

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

Green growth and sustainable development

Sustainable development provides an important context for green growth. Green growth has not been conceived as a replacement for sustainable development, but rather should be considered as a means to achieve it (OECD, 2011b). It is narrower in scope, entailing an operational policy agenda that can help achieve concrete, measurable progress at the interface of the economy and the environment. It provides a strong focus on fostering the necessary conditions for innovation, investment and competition that can give rise to new sources of economic growth, consistent with resilient ecosystems.

Green growth strategies need to pay specific attention to many of the social issues and equity concerns that can arise as a direct result of greening the economy – both at the national and international level. To achieve this they should be implemented in parallel with initiatives centring on the broader social pillar of sustainable development.

The goal for many developing economies is to achieve diversified and sustainable growth over time, which leads to poverty reduction, increased well-being and major improvements in the quality of life of its citizens. This is achieved by taking into account the full value of natural capital and recognising its essential role in economic growth. A green growth model promotes a cost-effective and resource efficient way of guiding sustainable production and consumption choices. Put simply, green growth will help developing countries to achieve sustainable development.

Green growth benefits for developing countries

Many developing countries face different and more difficult policy choices than developed countries in defining and implementing green growth strategies. Choosing not to bring more land under cultivation because of the high environmental costs will be difficult for a country with high levels of rural poverty. Though, options for increasing the productivity of existing cultivated land should be explored. Evidently,

systems to pay poor countries for ecosystem services and increase the economic and welfare benefit accruing to them and their citizens from maintaining environmental assets will be critical for the political feasibility of green growth strategies. Emerging evidence has reiterated that green growth activities can offer both short term and longer term benefits and opportunities to developing countries (Box 1.2). Payment for ecosystems services in Costa Rica, sustainable natural resource extraction in Azerbaijan, social enterprise to promote organic waste treatment in Bangladesh have demonstrated the economic opportunities from investing in natural resources and promoting sectoral sustainability.

In the short run, green growth policies are most likely to deliver local benefits in improved environmental management through sustainable waste treatment, better access to water and energy and more desirable health outcomes from controlled pollution. However, these short run benefits should be examined against the immediate costs of identified policies. Phasing out fossil fuel subsidies will trigger higher energy price which will burden both consumers and producers; air pollution controls will affect competitiveness and the prospects of specific sectors, potentially threatening jobs; providing fewer incentives for agricultural fertiliser usage to boost soil productivity and promote sustainable agriculture could decrease the income of many small-scale poor farmers. There are certainly trade-offs in the policy implications although the scale varies according to the nature of the economy and the implementation of the green growth measures. In many cases the poor are potential losers as a result of shifting to green growth. In some cases, powerful actors, including political parties, unions, and the private sector face disadvantages from shifting away from their country's current development plan (Resnick *et al*., 2012). Hence, the short-term benefits can become more visible if appropriate and targeted social complementary policies are implemented hand in hand with green growth measures.

In the longer run, the recognised infrastructure deficits to support economic activities are considerable, but there is potential for technology leapfrogging and climate-resilient implementation. Severe shortages of electricity supply and high urbanisation rates demand more efficient energy and public transportation systems in cities. There may be potential job creation, for instance, through sustainable management of natural resources which could on one hand release the tension of urban migration given most of these opportunities are available in rural areas; on the other hand to preserve local livelihoods from environmental impacts, in particular of climate change.

Box 1.2. Green growth: what can it bring developing countries?

Economic benefits

1. Increased GDP - production of green goods and services
2. Increased revenue from pricing ecosystem services (or their reduction prevented)
3. Economic diversification, i.e. improved management of economic risks and reduced vulnerability
4. Innovation, access and uptake of green technologies, i.e. improved market confidence

Environmental benefits

5. Increased productivity and efficiency of natural resource use
6. Natural capital used within ecological limits
7. Reduced adverse environmental impact and improved natural hazard/risk management

Social benefits

8. Increased livelihood opportunities, income and/or quality of life, notably of the poor
9. Decent jobs that benefit poor people created and sustained
10. Enhanced social, human and knowledge capital
11. Reduced inequality

1.3 How do developing countries view green growth?

The concept of green growth is generating a great diversity of political positions, ranging from enthusiastic to cautious. Such views reflect variously a lack of clarity and 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, but only where it can 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. The emerging economies are the most enthusiastic about the opportunities offered by green growth; many of them have access to the funds and technologies that can realise these opportunities. New "sustainability champions" in emerging-market economies – from the BRIICS (Brazil, Russia, India, Indonesia, China and South Africa) to Kenya, Egypt and Costa Rica – offer strong examples of how to successfully turn resource and other constraints into opportunities by innovating and mainstreaming sustainability considerations into their core business. For example, since 2008 China has been the largest producer of clean technology in financial terms, accounting for 1.4% of its GDP (ADB, 2012).

In comparison, many low-income countries (LICs) are cautious about the concept and are only just beginning to assess the opportunities, threats and indeed meaning of a green economic pathway. However, the policy ideas and technologies are neither easily accessible nor entirely relevant to their national developmental needs. A few countries have had a strongly adverse political reaction to the green growth concept. Where do their concerns stem from? Some issues relate to the international dimensions of green growth such as the risks of green protectionism and green conditionality for official development assistance (see Chapter 4). Questions have also been raised about the significance of green growth for meeting the economic development and poverty reduction objectives of many developing countries, in particular with regard to the potential welfare gains from preserving natural capital and opportunity costs of foregone economic development. Other critical questions include:

- Will green growth help address poverty 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 no discussion of the lack of inclusion of many poor countries and people within the informal economy in economic decision-making and in major economic opportunities. Not enough attention has been paid to the potential of more efficient use of natural capital. 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? The high initial costs for the transition to green growth appear to be beyond the reach of many developing countries e.g. solar power for rural communities. Even basic technologies are still lacking in most developing countries, particularly in the fields of wastewater treatment, household and hazardous waste management, energy efficiency 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 they will need to import technologies. The exchange of scientific and technical knowledge and removing the barrier of intellectual property rights are of great importance if a genuine transfer of green technologies is to take place between developed and developing countries.

The obstacles to realising green growth include the difficulty in changing behaviour, government and market failures, and limited access to capital. Overcoming these obstacles requires the right sort of knowledge, the right prioritisation, interaction between policy and political realities, engagement of the

private sector, and taking advantage of technology and innovations. 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 are needed to help them get ready. The international community plays an important role in providing an enabling environment for a transition to green growth, not only in building capacities but in providing financing and technical assistance, and through technology transfer and mutual learning (Chapter 4).

The concerns voiced in the developing country submissions to the United Nations Conference on Sustainable Development (UNCSD, 2012) reveal a policy uncertainty, diversity and flux that will make a definitive statement of an ideal green growth policy framework a real challenge, in the absence of a process of consultation, learning, and consensus building. This report attempts to offer one basis for constructing such a policy framework, and the consultations at Rio and beyond will provide one process for refining and building consensus on it.

1.4 A framework for making green growth happen

Achieving green growth requires a number of policies, and not just environmental policies. It also requires significant investment over a long period of time, taking advantage of technology innovations so that developing countries can avoid locking in inefficient and costly technology and infrastructure. For such investments and policies to work, appropriate governance arrangements must be in place. The following are the crucial building blocks for green growth in developing countries, and this framework is developed further in Chapter 3:

- *A green growth policy package of policy measures and regulation*. These include carbon pricing, green tax and phasing out environmentally harmful subsidies. Such policies correct "market failures", such as under-pricing natural resources without accounting for their social and environmental externalities, or over-subsidising environmentally harmful products to encourage excessive consumption. Pricing externalities through a combination of taxes, regulations, property rights, voluntary targets and awareness raising programmes will help remove these market failures.

- *Investment* – a considerable amount of investment is required to build climate resilient and low carbon elements into investment decisions in sectors such as transport, energy, water and agriculture. However, these costs are usually outweighed by the benefits from insuring the investment against future extreme weather events, or the savings made from avoiding higher fuel costs in the future. Along with traditional investment patterns, countries need to invest more in natural capital and bio-capacity, such as in carbon storage, ecosystem services and increasing land productivity. Diversified sources of investment, based on specific country and project contexts, are needed. Leveraging public sources of investment to stimulate private flows will also be important. Limited finance is holding developing countries back in advancing a green growth agenda. More capital should be optimised, shifted over and scaled up towards green growth actions both domestically and through international support.

- *Innovation* – technological innovation is crucial to increase productivity without consuming additional natural resources. Such innovation could both be 'high-end' technologies, or 'local solutions' to serve the needs of developing country markets. Innovation support instruments must be carefully designed to foster the emergence and uptake of efficient technologies while minimising the risk of technology lock-in, lack of competition or crowding out of private investment (OECD, 2011a). Organisational innovation is also important in ensuring adequate institutional arrangement is place to facilitate decision-making and implementation of green growth agenda.

- *Governance* – effective, inclusive and equitable governance is both a precondition for, and a measure of, development. This is particularly true for green growth, which will be a change process that will involve risk and opportunities with winners and losers. For green growth to reduce poverty, it is

especially important that the governance processes and mechanisms take into account the needs and interests of poor and vulnerable people. Furthermore, new systems for governing global public goods and new institutional structures will also be required for managing natural capital, in particular ecosystem services. This is because the generation of, and benefits derived from ecosystem services frequently cross political and geographic borders (UNEP, 2011).

• *Capacity development at all levels* – national leaders need to build capacity to understand how to reconcile 'green' and 'growth' policies to meet their development goals; ministries and government agencies need to build capacity to identify environmental opportunities in specific sectors; households need to build capacity to become more aware of the implications of their consumption behaviour on natural resources; labourers need to build capacity to become more flexible and skilful in undertaking green jobs; civil society groups also need to build capacity to ensure the empowerment of all citizens in advocating the transition to a green growth pathway (OECD, 2012b).

1.5 How can the OECD help?

Policy advice, dialogue and peer learning

The mission of the OECD is to promote policies that will improve the economic and social well-being of people around the world. The common thread of the OECD's work is a shared commitment to market economies backed by democratic institutions focused on the wellbeing of all citizens. The OECD member countries display great diversity in their situations, levels of development, and challenges. Yet all face a common challenge in managing global public goods and "bads", including climate change, violent conflict, and illicit financial flows. As the economic fortunes of different countries become increasingly intertwined, national policy makers will continue to need effective forums for multilateral coordination and exchange. Organisations facilitating policy dialogue and peer learning, such as the OECD, are strongly positioned to provide support to countries, both at the national level – aiding governments as they overcome individual challenges, and at the international level – as governments pursue joint management of collective, global issues (OECD, 2012a). The OECD is all about addressing common challenges on the basis of consultation, discussion and synthesis of good practices and evidence-based policy making. Increasingly the OECD is reaching out to emerging economies and developing countries for mutual learning.

The GGS notes a number of areas where OECD policy advice could be of use to developing countries in reforming inequitable and incoherent policies and generating resources through environmental fiscal reform. These areas require more detailed analysis and synthesis of good practices, tailored to the needs of developing countries and this study seeks to strengthen the development dimension of the strategy. In order for the GGS to be more applicable to developing countries, especially to meet more inclusive green growth objectives, additional measures are needed (for example, phasing out fossil fuel subsidies needs to be accompanied by some levels of cash transfer to minimise short term costs; levies on forest harvesting need to be under tight monitoring and specific tax collection procedures; promoting distributed renewable energy generation needs more financial support, etc.).

What is particularly needed for green growth to succeed is what the OECD can best provide, namely inputs into the policy making process and the design of market-based instruments. These latter are essential for getting the prices right to reflect the true value of natural resources, the costs of pollution, and provide incentives to change behaviour and encourage innovation. Moreover, good economic policy lies at the heart of any strategy for green growth. A flexible, dynamic economy is likely to be best for growth and to enable the transition to a greener growth path (OECD, 2011a). This report aims to connect developing countries to the wealth of OECD experience and expertise, to engage in a global discussion and to consult on the best ways forward in achieving sustainable development objectives through green growth.

Diagnostics, policy and measurement frameworks

There is an important role for OECD diagnostics, policy and measurement frameworks and ideas to help developing countries implement green growth measures and realise their green growth and sustainable development objectives. This report is the fruit of OECD experience and expertise in economics, environment, trade and agriculture, innovation, financial and labour affairs as well as development. It also builds on its strengths in statistics, policy advice and indicator development.

Development co-operation

The OECD has launched a Strategy on Development (OECD, 2012a), which seeks to achieve higher, more inclusive, sustainable growth for the widest number of countries. The OECD will strengthen its development efforts in strategic areas which respond to demands and needs of emerging and developing countries. Today these areas include aspects relevant to this report: innovative and sustainable sources of growth; mobilisation of resources for development; governance for development; measuring progress for development.

Development co-operation can play a catalytic role in supporting poorer developing countries to achieve their green growth and development objectives. Accompanying measures and compensation mechanisms should be put in place to ensure that welfare is improved by green growth strategies in the long run and not adversely affected in the short term. In essence, the OECD and donors have been promoting green growth in developing countries for a long time. They have taken steps to ensure that their development co-operation activities include strategies for assessing the environmental impacts, such as through the Environmental Impact Assessment and Strategic Environmental Assessment. There have been long-running concerns among OECD donors that without major action, irreparable damage would be done to the resource base and natural environment in developing countries. Donors have been concerned that environmental problems would become increasingly intractable and expensive, compromising current and future development prospects. In developing countries, poverty is both a cause and result of environmental degradation (ADB, 2012). “The imperative of protecting the environmental resource base for the benefit of today's and future generations is thus in itself a compelling reason for economic and social development. Without broad-based development, policies and practices securing sustainable use of natural resources will be difficult to attain” (Führer, 1994).

Partnerships

Despite its many advantages the OECD cannot entirely undertake this work on its own. It is working with the World Bank, UNEP and the Global Green Growth Institute (GGGI) through the Green Growth Knowledge Platform, facilitating knowledge exchange, highlighting existing research gaps and providing policy guidance where it is most needed. It is also collaborating with the GGGI on consultation efforts for this report to ensure that it is sufficiently grounded in the experience of developing countries. The draft report will also be reviewed by various stakeholders from developing countries as part of the review process.

While the OECD can do much to assist developing countries, success depends mostly on the actions of developing countries themselves. National leadership, the involvement of the public and private sectors, and civil society working towards a long-term vision are all indispensible. Many countries are already taking active steps in formulating green growth strategies and integrating green growth concepts into their national development plans, either independently or with support from international organisations and the donor community. Many developing countries, such as Ethiopia, Rwanda and Vietnam are already leading the way. Many of these initiatives will be discussed in Chapter 3. Firstly, however, Chapter 2 emphasises why current foundations for global growth must shift to a greener path.

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CHAPTER 2

PATTERNS OF GROWTH AND IMPLICATIONS FOR THE ENVIRONMENT

Executive Summary

The 2000s saw the resumption, for the first time since the 1970s, of strong growth by large groups of developing economies. Such growth based on manufacturing, fuel and other commodity exports is often carbon and natural-resource intensive. In many cases this has been accompanied by increased inequality within countries and by increased environmental pressures – on land and food production; on air, energy and water; and on the climate.

As this chapter describes, developing countries are particularly vulnerable to the impacts of climate change and resource depletion. These tendencies will have significant economic, social and health consequences, including reductions in agricultural yield, strains on freshwater availability, extreme weather events and premature deaths from uncontrolled pollution.

A green growth pathway represents a new approach that moves beyond business as usual to overcome some of the challenges described in this chapter. Some emerging economies and developing countries are already exploring ways to ensure that sources of growth are economically, environmentally and socially sustainable.

2.1 Introduction

Global growth patterns, the degradation of environmental capital and the distribution of wealth and risk – within and between countries – are strongly intertwined. This chapter reviews economic growth and environmental trends over recent years and speculates on how economic and social trends will evolve in the years to come. It takes stock of the changing global growth patterns, their far-reaching ramifications for the environment, as well as the division of wealth and power between and within nations in the developing world. It argues that continued growth patterns are not sustainable, either in terms of the environment or equity.

2.2 How are non-OECD countries fuelling their growth?

Since the early 2000s, the growth rates of non-OECD countries as a whole have outperformed those of the developed world (OECD, 2012). The 2000s saw the resumption, for the first time since the 1970s, of large strands of developing economies catching up with developed countries in terms of *per capita* income. The number of catching-up countries more than quintupled during this period, from 12 to 65, and the number of poor countries halved from 55 to 25 (OECD, 2010).[1] In *per capita* terms, middle-income countries saw the fastest growth in the 2000s, followed by low-income and then high-income countries. Strong economic growth in some developing countries has led to dramatic improvements in the lives of poor people (United Nations Secretary-General's High Level Panel on Global Sustainability, 2012). The most spectacular catching up has been observed in China and India, whose economies grew at three to four times the OECD average.

Two main global factors underlie this growth:

- The opening of the formerly closed large economies of China, India along with the Central and Eastern European economies (including the former Soviet Union), which provided a boost to the development of globally integrated supply chains and a massive increase in global labour supply. There has been notably a large shift of manufacturing capacity from OECD countries to East Asia.

- Until the turn of the century, continuing technological advances had prompted the widely held belief that global GDP had become "lighter", but this view has largely proved wrong as demand for commodities (fossil energy, metals and agricultural commodities) – notably from China – has soared. However, little purchasing power has been transferred to low-income commodity exporters because they lack market power or because income retention in the economy is minimal as are public revenues and market linkages related to their extraction processes. Moreover, where commodity exporters have seen sharp price increases the implications for inequality have often been adverse. As a result, many commodity exporting countries are depleting stocks of non-renewable natural capital without significantly building up other capital (human and physical) on which growth can be sustained.

In response to the surge in global economic integration during the past decade, non-OECD countries have adopted different growth strategies. These countries can be largely grouped into three "clusters"[2]: fuel exporters, non-fuel commodity exporters and manufacturing exporters (Table 2.1). Fuel exporters are strongly represented among the group of high-income countries. High-income fuel exporters are typically the oil exporters in the Middle East (such as Saudi Arabia) [3]. There are no fuel exporters among the low-income countries. On the other hand, the non-fuel commodity exporters are relatively over-represented in the low and lower middle-income groups. The comparative advantage of the poor countries is mainly in non-fuel commodity production. Manufacturing exporters are strongly represented among the middle-income countries, including the OECD's key partners – Brazil, China, India, Indonesia, and South Africa.

Table 2.1. Categorising non-OECD countries

	Low-income						Lower-middle income				
Fuel exporters							AGO	CMR	COG	IRQ	NGA
							SDN	SYR	TKM	YEM	
Non-fuel commodity exporters	BEN	ERI	ETH	KEN	MNG	MOZ	BOL	CIV	GHA	GTM	HND
	MMR	TJK	TGO	TZA	ZWE		MDA	NIC	PRY	PER	ZMB
Manufacturing exporters	ARM	BGD	KHM	KGZ	NPL		EGY	SLV	GEO	IND	IDN
							MAR	PAK	PHL	SEN	LKA
							UKR	VNM			
	Upper-middle income						**High-income**				
Fuel exporters	COL	DZA	AZE	ECU	GAB		ARE	BHR	BRN	KWT	OMN
	IRN	KAZ	LBY	RUS	VEN		QAT	SAU	TTO		
Non-fuel commodity exporters	ARG	CUB	PAN	URY							
Manufacturing exporters	ALB	BIH	BLR	BWA	BRA	BGR	HRV	CYP	HKG		
	CHN	CRI	DOM	JOR	JAM	LVA	MLT	SGP			
	LBN	LTU	MKD	MYS	NAM	ROM					
	SRB	ZAF	THA	TUN							

Note: For the full list of countries refer to Annex Table 2.1. List of 96 non-OECD countries: clustering by major export product group.

Source: World Bank, World Development Indicators Online; WTO; and national sources

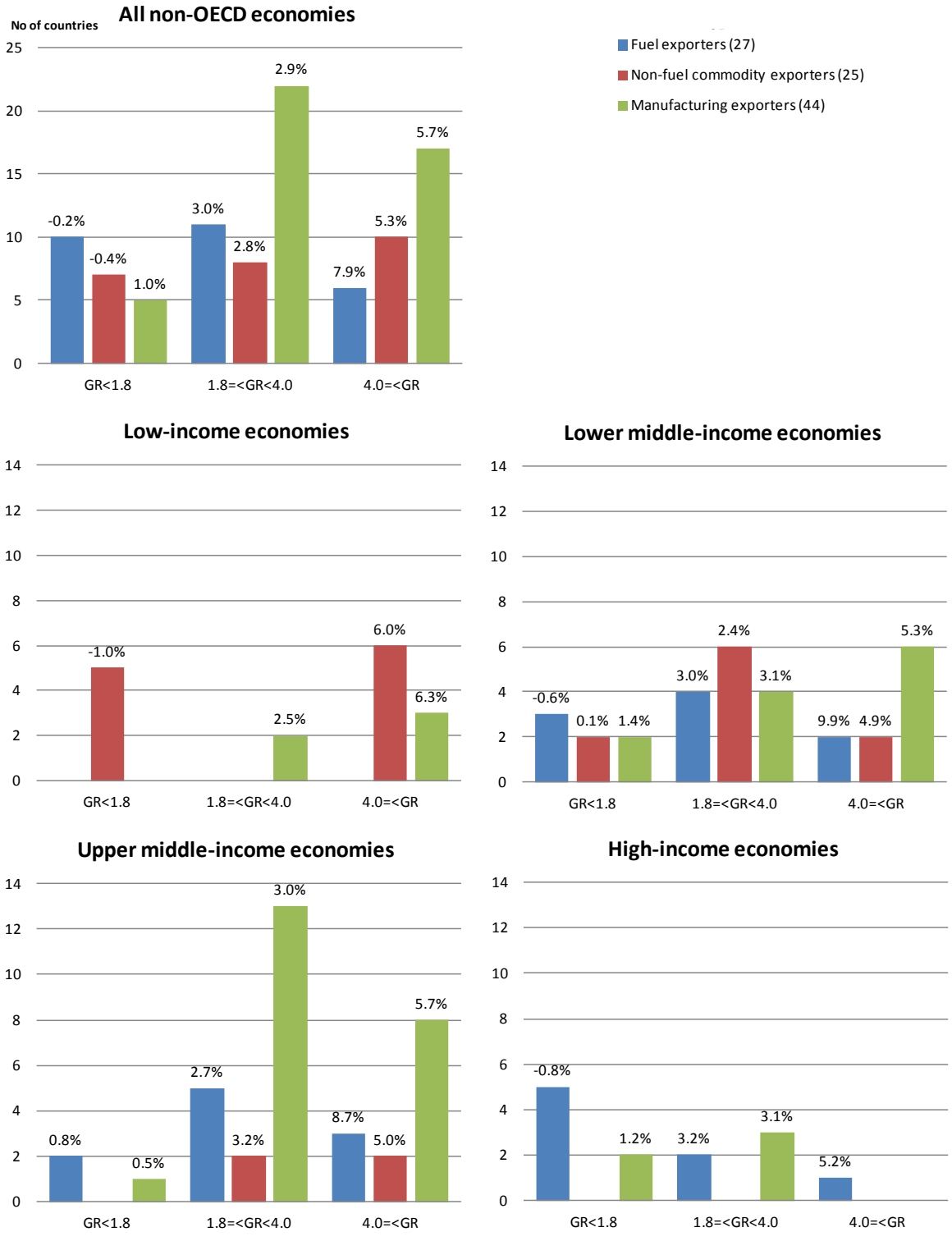
Manufacturing exporting developing countries tended to grow initially by manufacturing for offshored branches of developed country companies. This strategy offered a relative quick entry into global product markets, strategically using the opportunities of economies of scale and scope associated with globalisation. However, the strategy bears risks both for supplier and offshoring countries alike, including the disruption in supply chains due to natural disasters (as in the recent Japanese disaster), a dependence on a single product category, and a stronger exposure to exchange rate volatility and other sources of macroeconomic instability. This helps to explain why some of these countries (notably China) have adopted pegged exchange rate regimes, which are at the heart of the global imbalances in current account positions.

The growth of fuel exporters has been driven by the increases in energy prices, underpinned by the activities of the oil cartel OPEC. The strategy of these countries has often been to gradually convert their natural resource wealth into financial wealth in order to save it for future generations. In practice this strategy may not always be fully realised, for example if the natural resource benefits accrue to the ruling elite and/or are wasted, such as on subsidising domestic fuel. The wealth transfer, if there is one, can be conducted in various ways, the most prominent being the creation of "sovereign wealth funds". The investment strategy of sovereign wealth funds depends on the assessment of global investment opportunities and geopolitical constraints concerning the investment in "strategic" industries in recipient countries (for example defence industries).

Non-fuel commodity exporters have been generally less successful in adopting inter-temporal wealth sharing strategies. While higher commodity prices have a favourable impact on these economies in principle, this advantage is tempered by the increase in price volatility and cyclical variation in demand. In fact, these economies are often capital importers. An important trend associated with the emergence of the Asian giants has been the increase in foreign-direct investment (FDI) flows from manufacturing exporters to non-fuel commodity exporters ("South-South FDI"). Among these, China is by far the largest developing country outward investor, with its FDI stock having reached USD 1 trillion. Political forces are the main driver of the growing presence of China's state-owned enterprises in developing countries. Its aim is to secure access to resource assets, offshore manufacturing processes to hedge against the risk of protectionism and to acquire branches, technologies and distribution channels. However, the phenomenon is much broader, with growing FDI activity by multinationals based in Brazil, India, South Africa, Chile and Malaysia. Their multinationals are more likely to invest in countries with a similar level of development since they often have business practices tailored to developing countries.

While GDP *per capita* growth rates have been outpacing those of the advanced economies in the majority of developing countries, this pattern is not uniform across the three clusters and income groups in Table 2.1. The catching up is particularly widespread among the manufacturing exporters, most of which are middle-income countries. Among the vast majority of manufacturing exporters *per capita* GDP grows at solid rates in the range of 1.8% to 4% or by more than 4% a year (Figure 2.1). There is more variation among the non-fuel commodity exporters, with fewer countries growing at rates of over 4% per year or in the range of 1.8 to 4% *per annum*. There is also quite large variation among the fuel exporters, with more than one-third of these countries growing at low rates (less than 1.8%). The upshot is that many manufacturing exporters may be escaping from the "middle income trap", whereas this is less obvious for the non-fuel commodity exporters and the poorer fuel exporters[4].

Figure 2.1. Growth patterns among non-OECD countries[5]
(unit: percentage growth rate, GR)



Source: Calculated from the World Bank, World Development Indicators online.

2.3 Why business as usual is not an option

The flip side of the catching up phenomenon described above is the continuous pressures of environmental degradation and the failure to decouple the economic growth from carbon emissions, especially in the emerging economies. The increases in production, exports and national income in developing countries described above are usually unsustainable as they are often based on carbon and resource-intensive manufacturing, fuel and mineral extraction. Identifying new and sustainable sources of growth will therefore be critical for developing countries to maintain their growth. Some of the current economic, environmental and social challenges facing low income countries – such as population growth, internal migration, infrastructure deficits and the impacts of climate change – heighten the risk of food and energy insecurity and threaten economic and social progress. This will further jeopardise their ability to manage and restore the natural assets on which future economic growth, and ultimately all life, depends (Box 2.1).

Box 2.1. Environmental impacts on GDP performance - 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 and more than 2% of GDP. The health impacts of outdoor and indoor air pollution have been estimated at USD 4.6 billion per year or about 1.6% of gross national income. 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 GDP every year (World Bank, 2009).

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

The loss of biodiversity and degradation of ecosystems has already had dramatic consequences for countries and business. Annual economic losses caused by introduced agricultural pests in the **United States, the United Kingdom, Australian, South Africa, India and Brazil** exceed USD 100 billion (TEEB, 2010).

Land and food production

World population is expected to reach 9.3 billion by the middle of this century (34% higher than today) and to hit 10.1 billion by 2100. Essentially all this growth will take place in developing countries and will be predominately among the poorest in urban areas. The long-term challenges for world food security are acute, as a larger, more urban based and wealthier population will increase global demand for food (FAO, 2009 and 2011; Godfray *et al.,* 2010). This will increase pressure on natural resource management, land use and clean water provision and may potentially put a constraint on economic development in these countries (UN Population Division, 2011; UNFPA, 2011). Natural resource deterioration caused by over-production to meet the growing demand from forests, fisheries and agricultural land threatens future income and wealth in developing countries, in particular for those with the least resources to adapt to a changing climate. Climate change will affect developing countries disproportionately through higher and more variable temperatures, changes in precipitation patterns, and increased occurrences of extreme weather events such as droughts and floods. The Intergovernmental Panel on Climate Change (IPCC) warns that reductions in agricultural yield in some African countries could be as much as 50% by 2020 and crop revenues could fall by as much as 90% by 2100 due to changing climate patterns and associated extreme weather events (IPCC, 2007).

World food production has grown faster than population, and *per capita* food production is today some 18% higher than it was 27 years ago. Some countries, particularly those in Asia and Latin America — due in part to policy reforms and stronger economic growth, political stability and good

governance — have succeeded in making significant improvements to their food security situation (OECD, 2011). Nevertheless, the high numbers of undernourished people and recent food price spikes have renewed concerns about food and nutrition insecurity in developing countries. Small import-dependent countries, especially those in Africa, have been particularly badly affected by the food and economic crises. Overall, the Millennium Development Goal 1 to halve the numbers of undernourished people in developing countries from 20% in 1990-92 to 10% in 2015 has proved difficult to achieve.

Food production must increase by 70% by 2050 according to the UN's Food and Agriculture Organization (FAO) in order to maintain today's average global availability of food per person (FAO, 2009). This means an additional 1 billion of tonnes of cereals and 200 million tonnes of meat will be needed annually. Achieving this will require the total average annual net investment in developing country agriculture to increase to USD 83 billion to deliver the necessary production increases – 80% of yield increases would have to come from an increase in yields and cropping intensity and only 20% from expansion of arable land. Thus, agriculture will continue to place greatest pressure on biodiversity. And unless new policies are put in place the area of mature forests could decrease by a further 68% in South Asia, 26% in China and 25% in Africa (OECD, 2012).

Air, energy and water

In the energy sector, 1.3 billion people still do not have access to electricity and 2.7 billion people still rely on the use of traditional biomass for cooking. The World Health Organization (WHO) and the International Energy Agency (IEA) jointly project that household air pollution from the use of biomass in inefficient stoves would lead to over 1.5 million premature deaths a year (over 4 000 every day) by 2030, greater than estimates for premature deaths from malaria, tuberculosis or HIV/AIDS (IEA, 2010). Such risks will continue to grow if pollution increases with the level of economic activity. The negative impacts of uncontrolled pollution are large and often affect the developing world most strongly. Pollution, mostly water and air pollution, is responsible for millions of deaths every year (Table 2.2) The investment required to deliver universal energy access is equivalent to around USD 48 billion each year. Without this increase, the global picture in 2030 is projected to change little from today and in regions such as sub-Saharan Africa it will get much worse (IEA, 2011b).

Freshwater availability continues to decline in many regions, with 2.3 billion more people than today projected to be living in river basins experiencing severe water stress in 2050. This means in total over 40% of the world's population will be living in water stressed areas, especially in North and South Africa, and South 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). The pressure from such water shortages would hinder the growth of many economic activities, put ecosystems at risk and lead to groundwater depletion. This would further undermine agricultural yields and threaten urban water supplies (OECD, 2012).

Table 2.2. Percentage of deaths attributable to four environmental risks by region, 2004

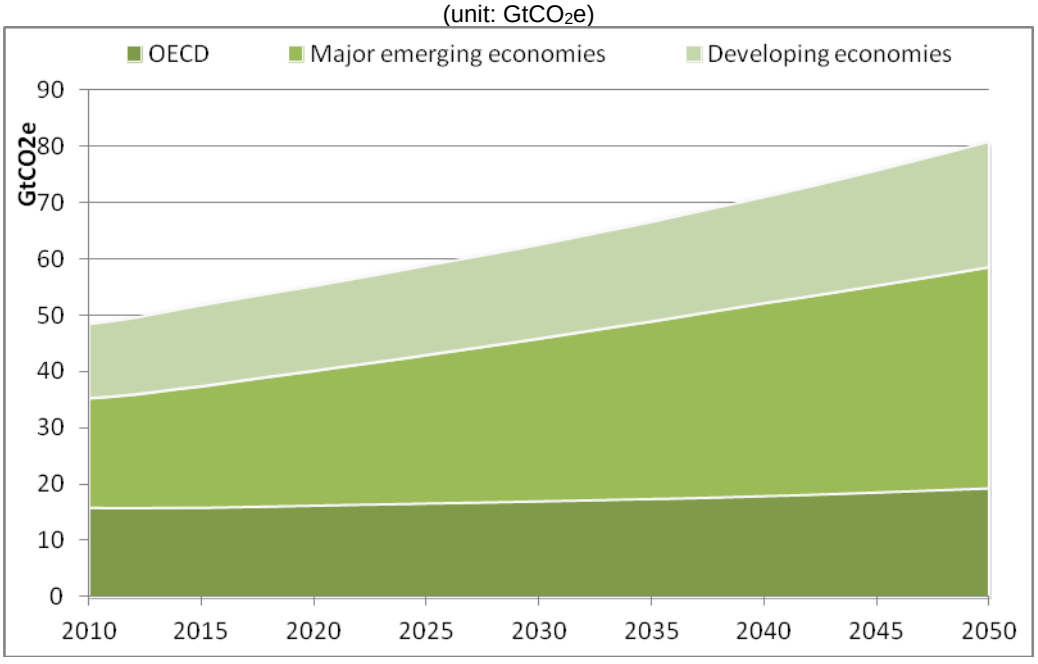
Risk	% Deaths		
	World	**Low & middle income countries**	**High income countries**
Indoor smoke	3.3	3.9	0.0
Unsafe water, sanitation & hygiene	3.2	3.8	0.1
Urban outdoor air pollution	2.0	1.9	2.5
Global climate change	0.2	0.3	0.0
All four risks	**8.7**	**9.9**	**2.6**

Source: WHO (World Health Organization) (2009), *Global Health Risks: Mortality and burden of disease attributable to selected major risks*, WHO, Geneva.

Climate change

The impacts of climate change on developing countries are already apparent. Climate change will have significant economic consequences in these countries given their high dependency on natural capital for employment and livelihoods – natural capital represents 26% of total wealth in developing countries, compared to only 2% in OECD countries (World Bank, 2006). Many developing countries themselves are already locked into energy sources that emit high levels of pollution and greenhouse gases (GHGs). Without deploying new sources of energy on a scale equivalent to the industrial revolution, the energy-related emissions of CO_2 are projected to double by 2050 (OECD and IEA, 2011; see Figure 2.2).

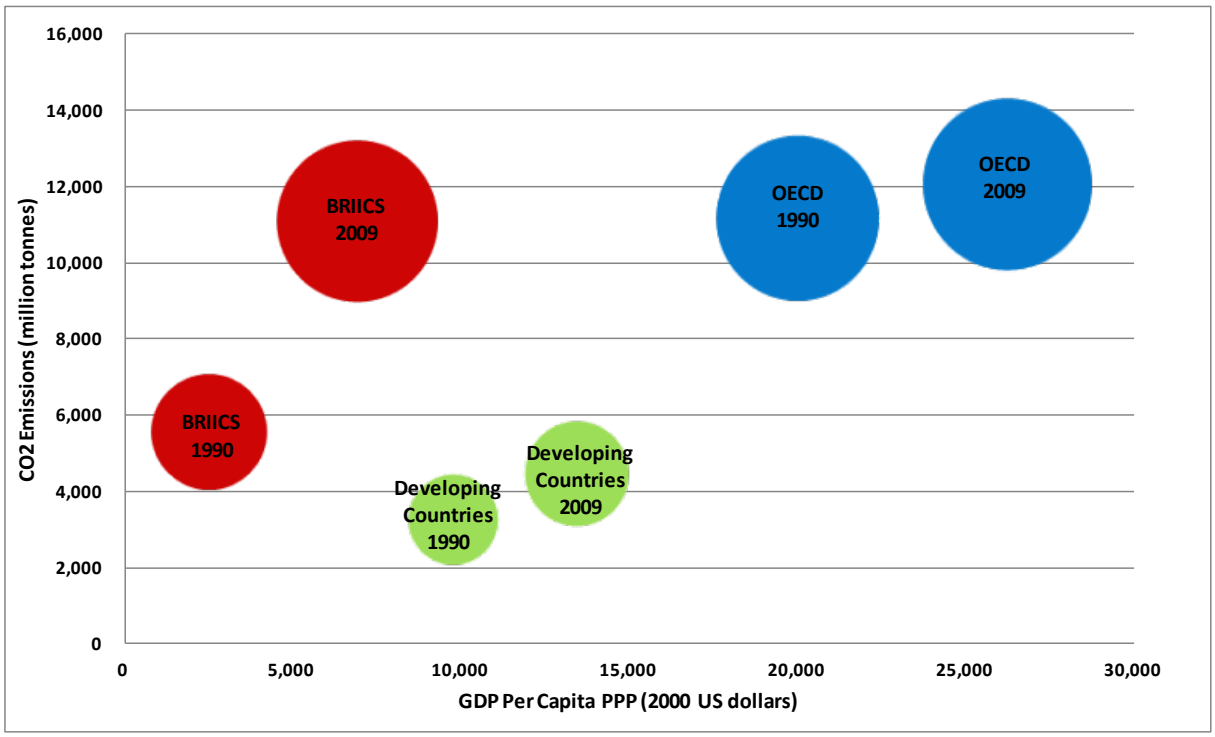
Figure 2.2. Business as usual GHG emissions 2010-2050
(unit: $GtCO_2e$)



Note: $GtCO_2e$ = Giga tonnes of CO_2 equivalent
Source: OECD (2012), *Environmental Outlook to 2050*, OECD, Paris.

Figure 2.3 illustrates the relationship between real *per capita* GDP levels and CO_2 emissions in 1990 and 2009 for OECD countries, the BRIICS and developing countries. The total amount of CO_2 emissions from the BRIICS increased by 3.7% a year during this period and reached 11 Gt in 2009. This amount was equal to 92% of the total CO_2 emissions from OECD countries in 2009.

Figure 2.3. CO_2 emissions in 1990 and 2009 by country group

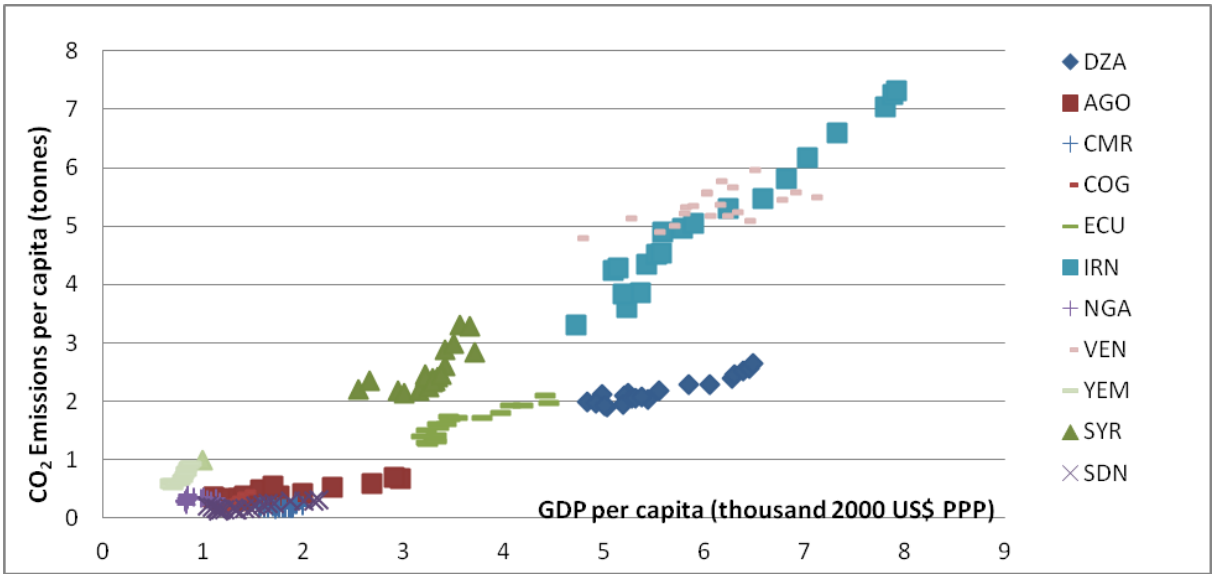


Source: IEA, *CO2 Emissions from Fuel Combustion*, 2011a.

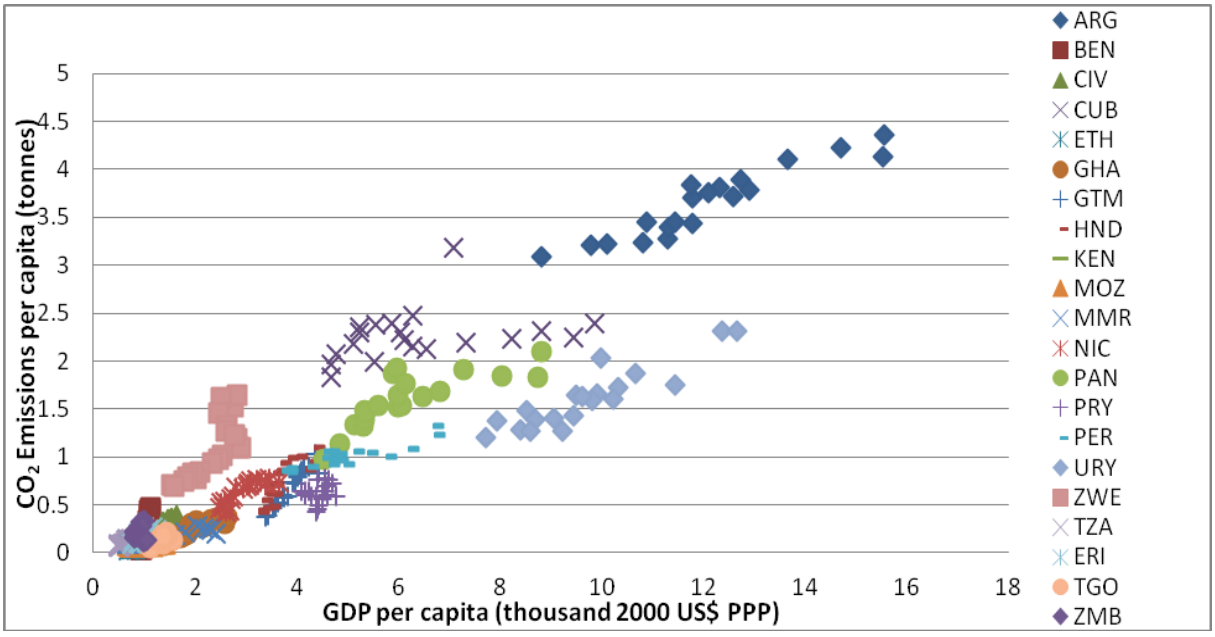
The growth trajectory measured in terms of CO_2 intensity differs markedly across the three clusters of low-and middle-income economies (fuel exporters, non-fuel commodity exporters and manufacturing exporters). Figure 2.4 depicts the relationship between real *per capita* GDP and *per capita* CO_2 emissions over the period of 1990-2009 for each cluster.[6] These two indicators tend to move in a linear fashion in the case of fuel and non-fuel commodity exporters (Panels I and II), though much steeper in the former group[7]. On the other hand, in the case of manufacturing exporters (Panel III) there appears to be two divergent patterns. One is a higher-intensity trend line represented by China, Malaysia, South Africa, Thailand, and Viet Nam. Another is a lower-intensity trend line followed by the other economies, including Brazil, Costa Rica and Dominican Republic. The degree of CO_2 intensity looks similar between this group of manufacturing exporters and non-fuel commodity exporters.

Figure 2.4. CO_2 intensity by cluster

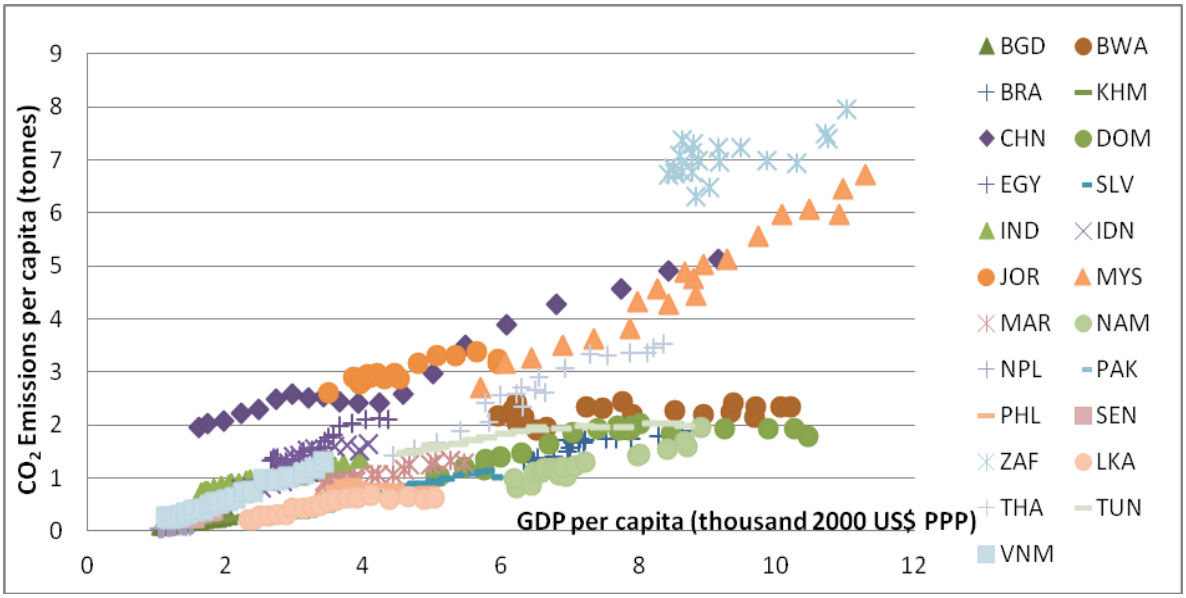
Panel I. Fuel-based economies



Panel II. Non-fuel commodity exporters



Panel III. Manufacturing exporters

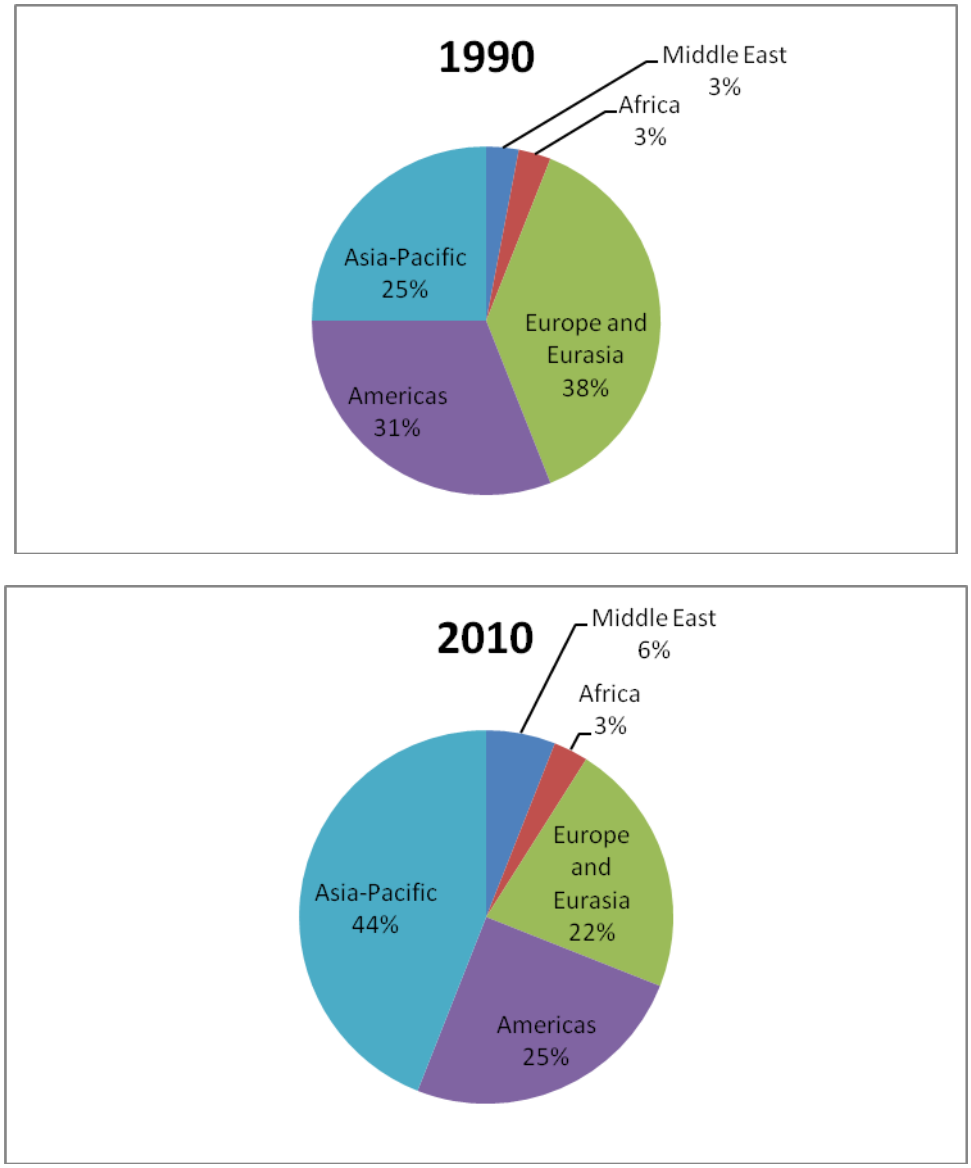


Source: IEA, CO2 Emissions from Fuel Combustion 2011a.

Asia's economic growth: climate implications

Asia's high economic growth in recent decades has resulted in the region's equally high growth in carbon emissions. As a consequence, a significant part of global carbon emissions are now coming from China, India, ASEAN (the Association of South East Asian Nations) and other Asian developing economies. Figure 2.5 compares the regional distribution of global CO_2 emissions between 1990 and 2010. Asia-Pacific's share in global carbon emissions jumped from 25% in 1990 to 44% in 2010. China alone more than doubled its share to 25%. Though relatively small individually, the ASEAN countries as a whole are expected to make a much larger contribution to global CO_2 emissions in the coming decades if the current emission trend continues. This could also increase other human costs, such as greater congestion and pollution, and further reduce resilience to external natural shocks, such as the extreme weather events which often hit the region badly. These Asian-Pacific countries therefore need to embrace policies that help achieve concrete and measurable progress towards the twin objectives of stimulating economic growth and promoting environmental sustainability in the next decades.

Figure 2.5. Global CO_2 emissions by region, 1990 and 2010

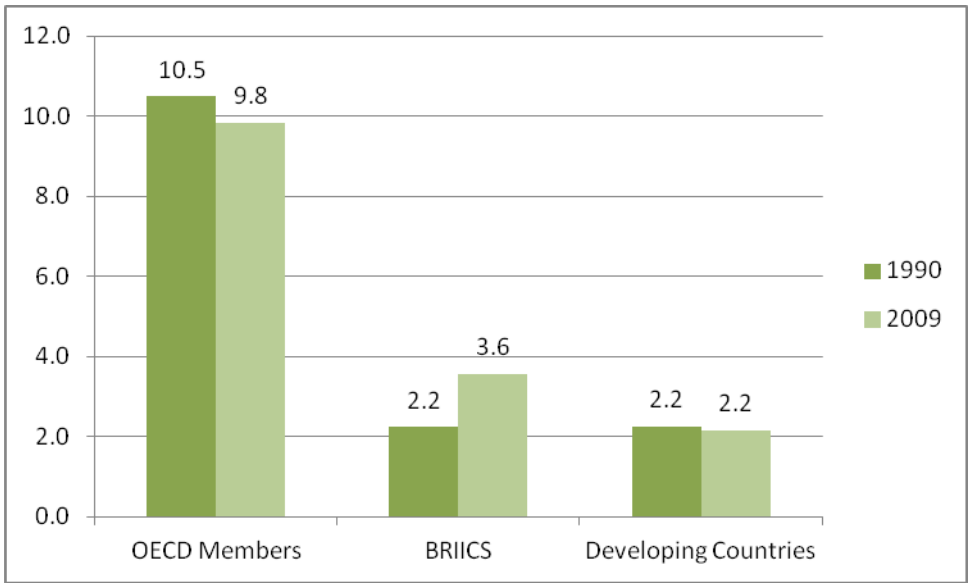


***Note*:** The carbon emissions above reflect only those through consumption of oil, gas and coal, and are based on standard global average conversion factors. This does not allow for any carbon that is sequestered, for other sources of carbon emissions or for emissions of other greenhouse gases.
Source: Calculated from data in the *BP Statistical Review of World Energy 2011, www.bp.com/statisticalreview*

China, India and several ASEAN countries have recently placed priority on national mitigation policies. Unlike developed countries, however, they have only made voluntary pledges to cut the emission intensity or reduce emissions below business-as-usual levels by 2020. Developing countries have been opposed to committing to mandatory emission targets, given that it was the developed countries that were responsible – at least until quite recently – for most of the emissions already accumulated in the atmosphere. The latter are still responsible for most emissions when measured on a *per capita* basis. For example, China's *per capita* emissions (5.1 tonnes of CO_2 in 2009) are roughly half the OECD average (9.8 tonnes), whereas India's are only 1.4 tonnes *per capita* (Figure 2.6).

Figure 2.6. Per capita CO2 emissions by country groups, 1990 and 2009

unit: million tonnes



Source: IEA, *CO_2 Emissions from Fuel Combustion 2011a*.

The emergence of the Asian giants and the associated rapid increase in the demand for commodities raises a number of environmental challenges through several channels:

- Increased desire for protein-rich food is making ever greater demands on arable land. At the same time, land availability is critically low and declining in both India and China. All this is good news for those developing countries which are food exporters and have abundant arable land (mostly in Latin America and Africa), but bad news for those developing countries which depend upon food imports. In 2010, 33 countries suffered from chronic food insecurity.

- Growing emissions of greenhouse gases from developing countries. This implies a global interest in securing a reduction in these emissions. However, this gives rise to difficult issues such as the international division of restrictions and costs of abatement. A central element is money: how much are developed countries prepared to offer to bring developing countries to the negotiation table? Developing countries pursue a coalition strategy with a shared opposition to northern insistence on emission caps, creating a block which represents half of the global population.

Implications for poverty and equity

Poverty reduction in the developing world at the aggregate level has been substantial in recent decades, largely due to rapid economic growth in China[8]. 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. However, the number of absolute poor in Africa has risen, and global poverty has become increasingly concentrated in sub-Saharan Africa and South Asia. Despite the strong growth performance of countries such as China and India, there are currently more poor people living in middle-income countries than in low-income

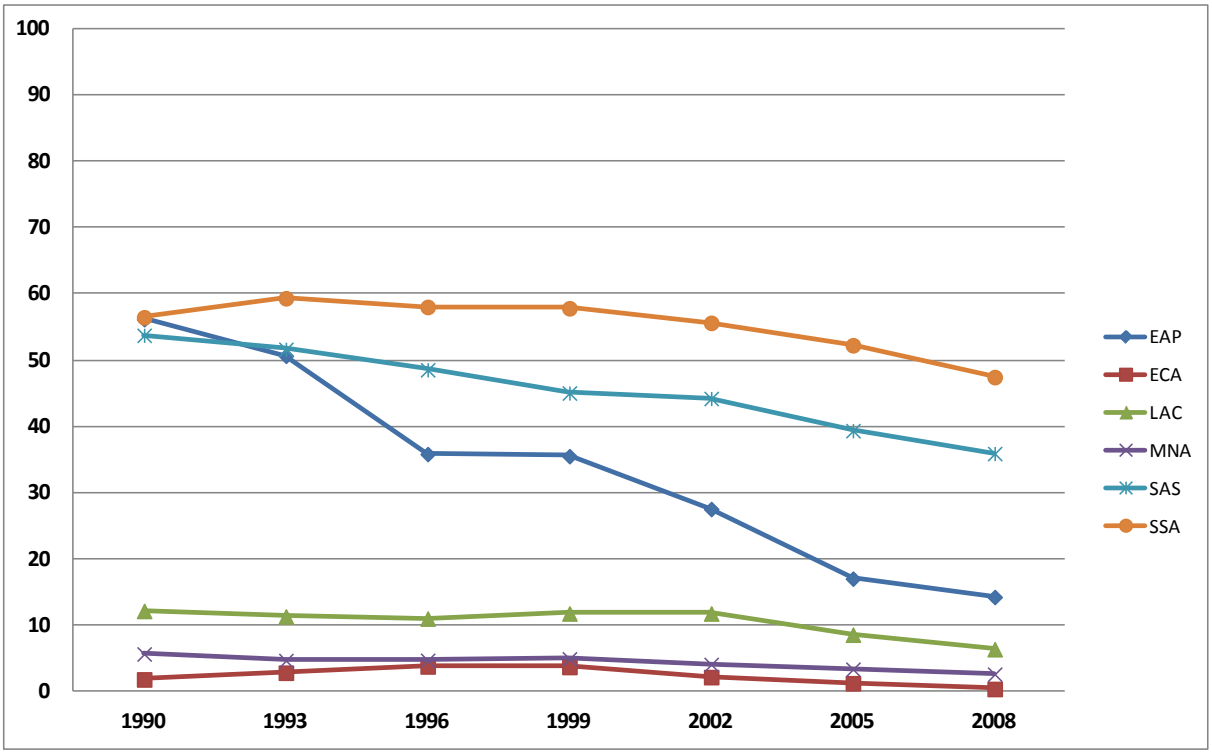
countries, while in the latter, many remain locked in poverty (OECD, 2012b). A similar trend can also be observed when the USD 2 per day poverty line is used (Figure 2.7).

Trends in poverty headcount ratios for the three clusters of non-OECD economies are provided in Annex Table 2.2. Among those countries that have poverty headcount ratios in the 1990s and 2000s mixed results are registered for fuel and non-fuel commodity exporters alike. In the latter, better performers in terms of reducing extreme poverty include Ethiopia, Ghana, Honduras, Nicaragua, Panama and Peru. On the other hand, declining trends in headcount ratios are clear for the majority of manufacturing exporters across developing regions. While one should refrain from drawing any sweeping conclusion, the experience of growth and poverty reduction in recent decades is indeed encouraging for manufacturing exporters.

Figure 2.7. Poverty headcount ratios by region, 1990-2008

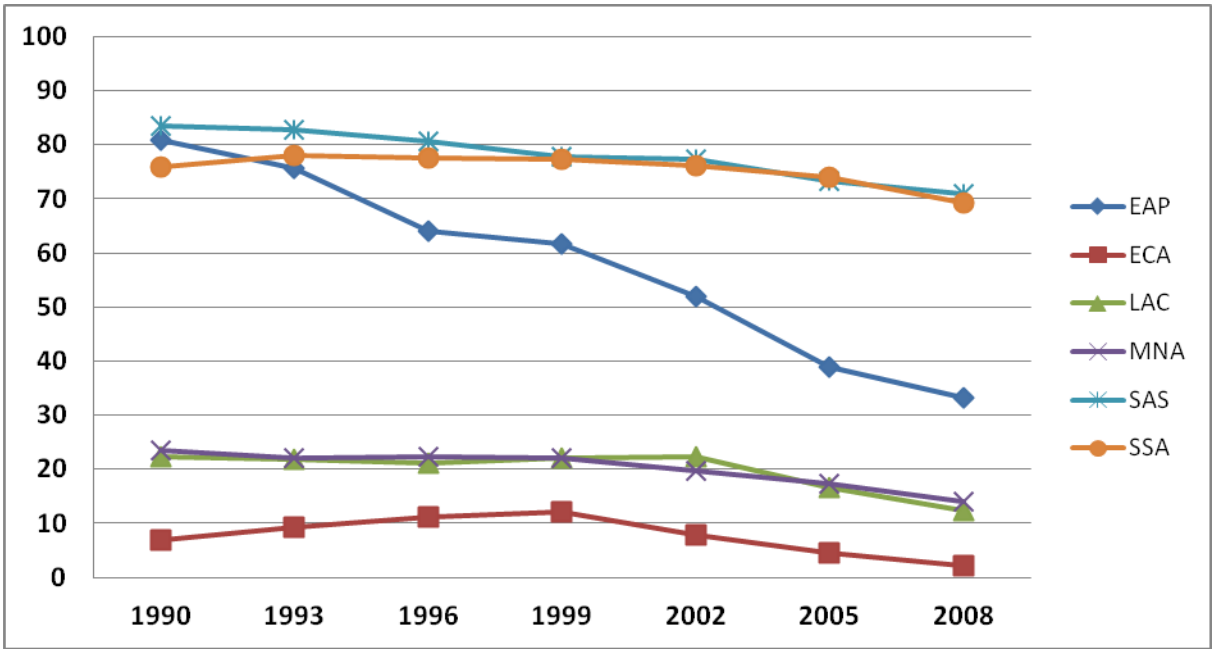
(unit: percentage of population

Panel I. Poverty headcount ratio at USD 1.25 a day (PPP)



Note: EAP - East Asia and Pacific (developing countries only); ECA - Europe and Central Asia (developing countries only); LAC - Latin America & Caribbean (developing countries only); MNA – Middle East and North Africa (developing countries only); SAS – South Asia (developing countries only); SSA (developing countries only).

Panel II. Poverty headcount ratio at USD 2 a day (PPP)



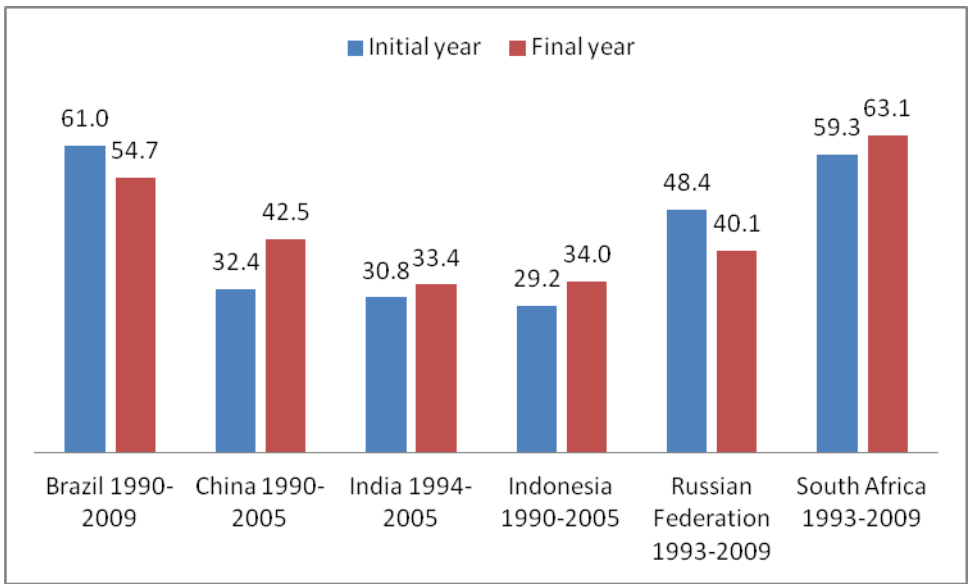
Note: EAP - East Asia and Pacific (developing countries only); ECA - Europe and Central Asia (developing countries only); LAC - Latin America & Caribbean (developing countries only); MNA – Middle East and North Africa (developing countries only); SAS – South Asia (developing countries only); SSA (developing countries only).

Source: Calculated from the World Bank, World Development Indicators online.

At the same time, the global middle class is growing rapidly, and according to one definition (those who spend between USD 10 and USD 100 per day), now contains almost 2 billion people. 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 Asian-Pacific area. But in many cases growth has also been accompanied by increased inequality (of *per capita* income or expenditure) within countries, as documented in Annex Table 2.3. Looking at the BRIICS countries, for example, China, India, Indonesia and South Africa experienced a rise in Gini coefficients (*i.e.* their income inequality increased) between the 1990s and the 2000s, while they fell in Brazil and Russia.[9] The level of Gini coefficients in Brazil, despite this fall, remains much higher than those in Asia (Figure 2.8). According to some measures of non-income inequality, such as access to education and health services, fast-growing countries have not necessarily been star performers.[10]

Figure 2.8. Changes in income inequality in the BRIICS

Gini coefficient



Source: World Bank (2011), *World Development Indicators 2011,* World Bank, Washington DC.

2.4 Moving beyond business as usual: sectoral and systematic potential for green growth

Looking ahead, rapid growth in developing economies is set to continue, and will increase the strain on the environment, if no action is taken (OECD, 2012b). There is a long-standing debate about the "environmental Kuznets curve," which is built on the premise that people will (or even should) put a low weight on the environment at in the early stages of development – the so-called "pollute now and clean up later" argument. This argument is misleading in several respects. First, in developing countries most of the infrastructure will be built in the coming decades; ignoring environmental issues will lock-in outdated polluting technologies. Second, the argument ignores the role of environmental irreversibility – *e.g.* biodiversity that is destroyed cannot be restored or global warming not stopped if GHG emissions are not reduced now. And third, people in developing countries may not take account of the fact that a clean environment leads to health benefits (and an associated greater output potential).

A green growth pathway represents a new approach that moves beyond business as usual to overcome some of the challenges described in this chapter. Developing countries have the opportunity to leap-frog the Kuznets curve by introducing greener and more efficient infrastructure, deploying smart grid technologies and a focus on developing off-grid renewable heating technologies and using more environmentally friendly farming techniques, while at the same time bringing to a halt the progression of deforestation and land degradation.

The majority of green growth potentials in developing countries will often reside in better use of natural resources, frequently the main source of their comparative advantage and also the main livelihood option for a large proportion of the rural population. Such natural capital makes up a high proportion of the wealth of poor countries – on average 26% of national wealth compared to only 2% in industrialised countries (World Bank, 2006), and it contributes substantially to growth if well-managed. While primary production also represents a much higher share of production, domestic trade, exports and national income in developing countries than in industrialised countries, better use

of natural capital can facilitate the shift to secondary and tertiary production/industrialisation which is usually a major part of the long-term vision of developing countries. This facilitation can be through value addition within the natural resource sectors, but crucially also generation of revenues for government to promote diversification to other sectors and address growth constraints, such as lack of infrastructure and reliable energy supply in particular.

At a macroeconomic level, low-income countries that have considerable endowments of natural resources (particularly mineral resources) have often had the lowest growth rates as a result of a failure to transform the benefits from these resources into other forms of capital – the so-called resource curse (Gylfason 2004; Collier 2007). The failure lies in economic issues, such as impacts of currency appreciation affecting the competitiveness of other sectors, and high volatility of commodity prices, as well as socio-political issues such as social conflict and corruption. However, some resource-rich developing countries, such as Botswana, have fared much better, indicating that with appropriate institutional and policy frameworks the natural resource curse can be avoided.

At a sectoral or enterprise level, introduction of sustainable practices to protect the resource base in the long term by setting limits on extraction and production may work against growth in the short term. Management of renewable resources such as forest resources and fish may require a reduction in offtake and agriculture may be restricted from expanding into areas of natural vegetation. In such circumstances, growth will depend on the ability to improve productivity and quality of products, to move up the value chain, and to capture value generated in the protection and enhancement of ecosystem services. This in turn will require linkages with other sectors, such as manufacturing and energy, and systems, such as urban and finance systems.

Green growth opportunities in developing countries thus lie across a number of often overlapping spatial and resource systems, each with its own technical characteristics and policy challenges. These correspond closely to the country clusters in the previous section.

Cluster 1 - Fuel exporters

- Non-renewable resources (oil, gas, coal, and minerals)

Cluster 2 - Non-fuel commodity exporters

- Exhaustible renewable resources (fisheries, natural forests, water)
- Cultivated renewable resources (crops, livestock, aquaculture, and forest plantations)
- Biodiversity and ecosystem service (*e.g.* watershed/climate regulation)

Cluster 3 - Manufacturing exporters

- Energy systems
- Urban systems
- Manufacturing systems

In the rest of this chapter we go through each of these areas, discussing their role in green growth, the policy challenges they raise, an agenda for greening policy in these areas and some examples of what developing countries are already doing in these areas.

Non-renewable resources

Their role in green growth: Green economies will be built on infrastructure and technologies that eschew obsolescence. A shift to electric power and ICTs will need rare earth metals and copper, a shift to well-designed cities will require steel, and shifting to cleaner fuel will see investment in gas exploration and exploitation as an interim green measure. For developing countries with stocks of such resources, green growth offers a big opportunity. There is increasing interest in carbon capture and storage (CCS) for coal-fired power generation, and countries which develop related technological expertise may benefit if and when this becomes mainstream.

Policy challenges: While using the returns from non-renewable capital to create other forms of capital, the biggest challenge will be to avoid the "resource curse" and negative environmental and social impacts of oil, gas and mineral exploitation. There is a risk that a focus on 'clean technologies' such as CCS may lead to further investment in fossil-fuel-based development and be a disincentive for investment in research and development of low-carbon technologies and systems. A further governance challenge is recognising the legitimate role of artisanal and small-scale mining for poor people's livelihoods, enabling it to compete in terms of social and environmental production standards whilst reducing associated burdens on miners.

The policy agenda: Green growth policy on non-renewable resources should centre on:

- Ensuring realistic rents and good rent capture;
- Reinvestment of rents to support inclusive green growth in other parts of the economy;
- Ensuring transparency in revenue accounting (*e.g.* EITI);
- Minimising environmental and eliminating social problems associated with production;
- Establishment of a means to smooth out volatile revenues *e.g.* fiscal stabilization funds;
- Management of life cycle issues in mineral supply chains with stakeholder input; and
- Compensatory biodiversity/ecosystem service offsets where tradeoffs are deemed allowable.

Green growth through managing minerals and other non-renewable resources: what developing countries are already doing

- Botswana's management of mineral resources: Botswana is frequently cited as an example of a country that has escaped the resource curse. Thanks to its abundant diamonds, the country's economy has experienced three decades of strong growth, moving from one of the poorest African countries to an upper-middle-income country in the late 1990s. However, long-term sustainability is not guaranteed. Despite providing over a third of GDP, the minerals industry contributes to less than 5% of employment, and the country still faces challenges in diversifying the economy (*http://www.imf.org/external/pubs/ft/staffp/2007/04/pdfs/Iimi.pdf*).

- Transparency in Azerbaijan: Half of Azerbaijan's population was in poverty in 2001, but the oil industry has helped the country to achieve middle-income status today. Azerbaijan formally signed up to the Extractive Industries Transparency Initiative (EITI) in 2003, and in 2009 became the first country to achieve full member status. All oil, gas and gold mining companies are obliged to report on how much they pay to government, while government reports on how much it receives. However, Azerbaijan needs to work more on fighting corruption and ensuring economic diversification (*http://pubs.iied.org/pdfs/G03343.pdf*).

Exhaustible renewable resources

Their role in green growth: Renewable natural resources generate primary goods and services, contribute substantially to the livelihoods of the poor, and have the potential to increase returns through value chains.

The policy challenges: The open-access characteristics of resource systems like forests and fisheries, which make them so important to the livelihoods of the landless, can also result in their capture by powerful and illegal private interests. Government control is weak in many countries, though there is evidence of progress in some countries. For forest resources, the main stumbling block seems to be forest governance regimes and institutions that are not yet able to assure the right balance of public and private benefits.

Water presents a special challenge. Economists have argued that water that is correctly priced will necessarily be allocated to the most economically efficient use. But this falls foul of the UN recognised human right to water or the many commitments to conserve landscapes or ecosystem services that accrue as public goods. Even in OECD countries, economic optimisation is rare and most water is allocated by government, rather than through a market. In developing countries, a demand for empowerment and equity between users predominates: current efforts to achieve equity in water access and use reveal a wider range of real, human values attached to water; which could prove useful in informing notions of a green economy that works for all.

The policy agenda: Green growth policy for exhaustible renewable resources should centre on governance of forests, fisheries and water bodies, specifically:

- Improving information on the ecological capabilities and limits of each of the exhaustible renewable resources;
- Improving information on local groups' management capabilities and limits.

Defining property rights that give incentives for long-term secure and sustainable management of both public and private goods (and clear mechanisms for water allocation). Such clarity of tenure would also support markets which improve allocative efficiency and create incentives for restoring degraded forests and water bodies;

- Supporting community-based natural resource management associations that adopt integrated approaches and do not mirror the 'environment' and 'development' silos that plague bureaucracies today.
- Helping primary producers move up the value chain, supported by locally appropriate sustainability standards and certification schemes. We emphasise 'locally appropriate' because there will be very distinct uses to which forests, fisheries or water bodies are put, and very specific constraints on them.

Green growth through forest, fish and water resources: what developing countries are already doing

- Invasive alien plants pose a threat to South Africa's biodiversity, but also to water security, the ecological functioning of natural systems and the productive use of land. The government's Working for Water programme has cleared more than one million hectares, providing jobs and training for approximately 30,000 people every year, over half of whom have been women (*http://www.dwaf.gov.za/wfw/*)

- Forests account for almost 40% of the land in Nepal. The Forest Act and Forest Rules recognize Community Forest User Groups as "self-governing autonomous corporate bodies for managing and using community forests". Community-owned forest now makes 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. (IIED, Investing in locally controlled forestry Pocketbook, 2012)

Renewable resources that are cultivated

Their role in green growth: Agriculture is the mainstay of the majority of poor countries and households, a situation that is likely to continue for at least another generation. It is thus critical to protect soils and supporting ecosystem services. The rapidly growing organic sub-sector provides opportunities for both domestic and export markets for many developing countries, given that 97% of the revenues are generated in the OECD countries, while 80% of the producers are from developing countries (UNEP, 2011).

Policy challenges: The trend at present is for intensification of farming. This may reduce encroachment on land (helping some biodiversity) but it may also increase external inputs such as water and chemicals (harming other biodiversity); and the technologies required (including 'green' technologies) may exclude poor smallholder farmers. The opportunities and challenges will be context-specific – depending on levels of urbanization, current dependence on agriculture for income and employment, and natural comparative advantage.

The policy agenda: Green growth policy for cultivated renewable resources should centre on:

- Organic and cyclical resource management that lowers external input requirements and make use of local labour and traditions;
- Together with information technologies that allow smarter, targeted application of water and other inputs;
- Reforming farm input subsidies where input overuse is already indicated;
- Compensatory biodiversity/ecosystem service offsets where tradeoffs are deemed to be allowed;
- Integrated 'landscape' planning approaches, including spatial zoning/dispersal policies, primarily to achieve multiple benefits, but also to avoid impacts on ecosystem services from concentrating intensive production facilities;
- Outgrower schemes especially in plantations, to avoid problems of concentration on wood production and also to maximize synergies with trees on farms;
- Better access to information, markets and transport for farmers; and
- Government support to technology development and extension.

Green growth through farming, plantation forestry and aquaculture: what developing countries are already doing

- Nepal's UNCSD submission notes its comparative advantage of small green enterprises and the 'promotion of collective organic farming – vegetables, vegetable seeds, spices, cash crops etc. – through contract/ leasehold and cooperative farming; production of organic essential oils such as chamomile, grass and natural fibres; tourism – rural/home-based/eco-tourism with training and investments on diversifying the tourism products' (UNCSD submission, Nepal, 2012).

- SiyaQhubeka Forests (SQF) in South Africa is a partnership between two forestry corporations Mondi (51%) and Safcol (25%), the black empowerment group Imbokodvo Lemabalabala Holdings (13.2%), the Gudlulwandle Trust representing local communities surrounding the plantations (5.4%) and the Qalakahle Trust representing small forestry growers who were participants of Mondi's outgrower scheme (5.4%). As part of the Government's privatisation strategy, SQF was awarded a government tender in 2000 to operate an area of commercial forestry land which borders the World Heritage Site of iSimangaliso Wetland Park. As such it has to meet both government developmental objectives and shareholder business objectives. It supplies up to 400,000 tonnes of timber per year to Mondi's mill and by 2010 was able to pay its first dividend to shareholders and repay all shareholder loans. (Source: SA Forestry 2010). According to WWF (2009), SQF has implemented an approach of site-specific plantation forestry within an integrated landscape plan, one element of which has been the rehabilitation of 4,000 ha of land to wetlands and grasslands. As well as improving biodiversity, this forms an effective buffer between the Wetland Park, and local communities and commercial farming areas. SQF's activities have also stimulated small and medium enterprise development in the Zululand region, including timber farming support schemes, honey production and firewood collection (WWF, 2009).

Biodiversity and ecosystem services

Their role in green growth: Biodiversity and ecosystem services provide the foundations of green growth: together they maintain the productivity, health and resilience of natural and social capital alike. With developing countries and rural poor groups often having rights over significant biodiversity and large ecosystems, there ought to be good potential to draw value from these assets, especially as many services are contiguous, *e.g.* high biodiversity tropical forests are often (though not always) soil-conserving and water-retaining, and therefore also high-carbon.

Policy challenges: Many of these assets are economically "invisible", or their value is only captured through marketed products, such as timber, and incentives for management are often weak as a result of low perceived value. The central policy pillar for biodiversity and non-provisioning services remains focused on protected areas such as national parks and reserves. Some direct value can be realized through tourism and water supply regimes, but attempts to valorise the services, for example through ecosystem service payment schemes, can result in exclusion of poor groups from access to their benefits. There is therefore much to be done to improve governance regimes and markets necessary to ensure that economies work better for and through biodiversity and ecosystem services.

The policy agenda: Green growth policy on biodiversity and non-provisioning services should centre on:

- Improving the knowledge base on biodiversity and ecosystem service stocks and flows;
- Incorporating economic values of these services in policy and investment decisions;
- Capitalizing on international policy/finance interest in GHG reductions by capturing those large GHG abatement potentials in land/water uses that also have co-benefits; and
- Supporting related markets or payment regimes, sometimes with cap and trade systems; and benefit-sharing.

Green growth through biodiversity and non-provisioning 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 incorporate less destructive production practices, such as not using pesticides, or introducing sustainable agroforestry systems (*www.proambiente.cnpm.embrapa.br*).

- 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 (*www.fonafifo.go.cr*; Porras, 2010).

Energy systems

Their role in green growth: CO_2 emissions from developing countries now exceed those of developed countries (IEA, 2011b), but 1.4 billion people lack access to electricity and 2.7 billion depend on traditional biomass for cooking (UNEP, 2011 citing IEA, 2010). At the same time, almost every country is hooked onto fossil fuels for economic growth – an average of 0.2 Kg oil equivalent for every USD of GDP, with few countries below this level. Clean energy therefore has a central role, both for lifting people out of poverty and for mitigating climate change and other environmental damages linked to conventional energy production.

Policy challenges: Barriers specific to investment in clean energy exist in most countries but are often particularly pronounced in developing countries. These obstacles include vague guidance on future energy policy; monopoly structures for existing service providers; lack of competitive structures, such as licensing of independent producers; lack of fiscal and regulatory incentives for clean energy generation, such as feed-in tariffs; weak environmental regulation and enforcement; and subsidies for conventional energy sources. In addition, the prevailing challenges that apply to 'large and lumpy' infrastructure investment pertain: the potential for co-benefits (*e.g.* arising from energy access by the poor) supports investment in the short term, but needs to be balanced against the risks of locking-in suboptimal, inefficient or environmentally damaging systems in the long term.

The policy agenda: Green growth policy for energy systems should centre on:

- ensuring clean energy access for all, and especially for poor groups;
- lowering the carbon content per unit of GDP output;
- lowering GHG abatement costs and using the associated investment to bundle in other GG benefits;
- supporting access to energy grids and markets by the producers of renewable energy;
- making the most of economies of scale – the emerging technological potentials for linking grids across large regions; and
- reducing other polluting emissions to the atmosphere.

Energy systems and green growth:
what developing countries are already doing

- Ghana is the largest *per capita* consumer of charcoal in West Africa. Toyola manufactures and sells cook stoves which are 40% more efficient than the traditional models, to date supplying 35,000 households, offsetting 15,000 tonnes of carbon dioxide emissions and employing over 200 employees. The business model is easily replicable in many countries (*http://www.greeneconomycoalition.org/glimpses/efficient-cooking-stoves-ghana-china*).

- Gasifiers in Cambodia have been filling gaps in the national grid, which is a patchwork of inefficient regional systems that extend from the major cities out into the countryside. Grid electricity in Cambodia is one of the most expensive in Southeast Asia, with costs in excess of USD 0.20/kwh. In the last two years biomass gasifiers have been pioneered to provide reliable, affordable and green electricity to Cambodia's small rural industries. The gasifiers use agricultural waste, such as rice husks, that is then converted into electricity for powering local industries. Electricity generated by a biomass gasification system can cost as little as half that of grid electricity. 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. (SME RE), has installed 32 gasifiers, eliminating the need for over 3 million litres of diesel fuel, and reducing carbon emissions by over 9,000 tonnes *per annum* (*http://www.greeneconomycoalition.org/know-how/rice-husks-green-energy-cambodia*).

- 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 is increasing their competitiveness and helping their economies become more resilient to the global energy market.

- Jamaica's renewable energy regulatory framework: Jamaica is planning to 'diversify... energy supplies by creating a stable regulatory framework to effectively facilitate the deployment of renewable energy technologies such as those related to wind, solar, and biomass among others, thereby simultaneously reducing the country's need to spend foreign exchange on the importation of fossil fuels' (UNCSD submission Jamaica, 2012).

- Tunisia's solar energy plan (2010-2016) aims to cut national energy consumption by 22% and to promote an increase in renewable energy 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 deliver electricity via the national grid and sell surplus energy to the national power utility (UNCSD submission, Tunisia, 2012).

Urban systems

Their role in green growth: Over the coming decades almost all population growth and most economic development in developing countries is expected to be urban.

The policy challenges: The barriers to shifting to 'green' urban systems and infrastructure in developing countries vary. In urbanizing countries, they include a tendency to plan for the short term, ignoring the realities of urban population growth and environmental change. They also often include a lack of sustainable finance for investing in urban infrastructure, a failure of conventional infrastructure investments to address either environmental or social priorities, or the inability of many governments to address social and environmental challenges in an integrated fashion.

The policy agenda: Green growth policy in urban contexts needs to pursue the following directions:

- taking advantage of agglomeration economies to improve urban resource efficiency, and reduce transportation needs;

- improving urban land rights and regulations, enabling land to be allocated to its most productive uses, while protecting environmental and social values;
- facilitating forms of residential densification that reduce environmental burdens without excluding low income households;
- supporting appropriate models of community land ownership and land tenure, neighbourhood organisation and collaboration, and local decision-making and management;
- enabling access to affordable services for low-income households and communities including transport, shelter, sanitation, health and education; and supporting the poor in designing, producing and maintaining these services where possible;
- improving resource efficiency for key resources including land, materials, energy and waste; this will often involve an integrated systems approach;
- consistent codes for buildings and infrastructure that integrate green principles along the 'delivery chain' for services;
- maximising employment opportunities with community contracts for low-income communities, training programmes to enhance labour productivity, and the incorporation of informal sector service providers;
- ensuring that the policies and institutions of municipalities, as well as the nation, are able to anticipate future urban expansion, prioritise central district redevelopment, and manage land use change on the urban fringe; this may require establishment of an effective land market.

Urban systems and green growth:
What developing countries are already doing

- WasteConcern, a social enterprise founded in 1995 in Bangladesh, transforms roadside organic waste into agricultural compost. WasteConcern calculates that from 2001 to 2006, USD 1.24 million in foreign currency were saved by avoiding the import of chemical fertilizer. 124,400 tonnes of waste was processed, 986 direct jobs were created annually, and USD 1.10 million was raised in compost sales. Based on its success, WasteConcern is now assisting 10 Asian and 10 African cities in replicating its model (*www.wasteconcern.org*).

- Brazil's National Housing Plan, Minha Casa, Minha Vida. Launched in 2009, the programme subsidises the cost of new, energy and water efficient homes for low income families. To date, one million homes have been constructed with subsidies equal to 1.2% of GDP coming from the Federal Budget and Brazil's social welfare programme. The construction is done by private firms and the demand is guaranteed by the government, providing that the housing adheres to the pre-specified values and construction guidelines. Having exceeded expectations, the programme is now moving into its second phase and has generated 18,000 green jobs. *http://www.caixa.gov.br/habitacao/mcmv/index.asp*

- In Karachi, Nairobi, Pune and many other cities, federations of 'slum' dwellers are working with local governments to improve housing conditions and reduce risks from disasters. They have demonstrated to governments their capacity to design and build housing and infrastructure that is cheaper and better quality than if governments engage contractors, as well as their capacity to undertake the enumerations and mapping of informal settlements needed for planning upgrading. Where local governments come to work with them, the scale of what can be achieved has increased greatly (Satterthwaite, 2011).

Manufacturing systems

Role in green growth: With globalisation, manufacturing has increasingly shifted to developing countries, giving them the opportunity to leapfrog inefficient technologies and introduce more sustainable models of production to gain competitive advantage.

Policy challenges: Barriers to transforming manufacturing include lock-in problems due to the capital-intensive nature of the industry and the long life of most plants. Eco-efficiency in SMEs is also a challenge due to a lack of economies of scale, incomplete credit markets and asymmetric information flows. The task for policy-makers is to manage the transition to a less carbon- and material-intensive process while preserving and creating decent jobs (UNCSD submission, India, 2012).

The policy agenda: To overcome the above barriers, policy must focus on:

- nationally appropriate strategies that take the manufacturing spread and sector differences into account;
- training and re-skilling;
- retrofitting factories to be more resource-efficient;
- economic zones to cluster enterprises and optimise resource flows between industries;
- creating the right enabling environment for the above through regulation, corporate disclosure, fiscal incentives and standards in sustainable manufacturing.

Manufacturing systems:
What developing countries are already doing

- Brandix, Sri Lanka's largest clothes manufacturer, has been widely recognised for its high social and environmental standards. The restructuring of its showcase EcoCentre factory brought a reduction of 80% in carbon emissions, 46% energy saving, 58% reduced water consumption, earning it the highest rating ever awarded under the US Green Building Council's LEED rating system (*www.brandix.com*).

- Many small enterprises, such as Oribags Innovations in Uganda (*www.oribagsinnovations.com*) and the Recycling Centre for Used Plastic Bags in Burkina Faso (*www.gafreh.org*) are successfully turning waste into marketable products while generating jobs in manufacturing and sales. Both have received international recognition through awards from the SEED Initiative.

The next question is how to scale up these individual actions already undertaken in different areas into an overall development framework. The next chapter outlines a potential overarching policy framework for green growth.

NOTES

1. *Perspectives of Global Development*: *Shifting Wealth* (OECD, 2010) 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 In Table 2.1, 96 non-OECD countries are classified into three clusters based on the dominant (equal to or more than 50 %) share of major product groups (fuels, non-fuel commodities and manufactures) averaged over 2001-2010 (or the latest year available). When no such dominant product group is identified, the largest export commodity group is used for clustering. In some countries, however, trade data are limited to only recent years. See Annex Table 2.1 for a full list of 96 non-OECD countries and these three clusters.

3 Note that Colombia is classified into the group of fuel exporters. There is no dominant product group in the country's merchandise exports, but fuel exports accounted for 43 % of total merchandise exports averaged over 2001 and 2010, followed by manufacturing (35%).

4 The term "middle-income trap" is generally described as a state of development in which developing countries successfully grew from low to middle-income levels and then become stagnant and fail to grow further to high-income levels. See for example Khara and Kohli (2011) for detailed discussions.

5 This Figure classifies 96 non-OECD economies by income level and export product group (as defined in this chapter) using two threshold annual growth rates, 1.8% and 4.0% per year. The former is the twice the average annual growth rate of real *per capita* GDP of the high-income OECD countries over the 2000-2001 period, while the latter is twice the rate calculated in the same way over the 1990-2000 period. The income levels used for tabulation are based on the World Bank's classification (November 2011) as follows: low income, $1,005 or less; lower middle income, $1,006-3,975; upper middle-income, $3,976-12,275; and high income, $12,276 or more.

6 Low- and middle-income countries in the former USSR are excluded here as these economies underwent significant downward adjustment in energy use per production in the 1990s.

7 Colombia is clearly an outlier in the group of fuel exporters. The country's growth trajectory measured in terms of CO_2 intensity resembles a lower-intensity trend line followed by several middle-income manufacturing exporters (Panel III).

8 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).

9 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).

10 See ADB (2012) on a detailed discussion of income and non-income inequality in a broad range of Asian developing countries.

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ANNEX

Table A2.1. List of 96 non-OECD countries

Clustering by major export product group

	Country name		Fuel exporters	Non-fuel commodity exporters	Manufacturing exporters
1	ALB	Albania			x
2	DZA	Algeria	x		
3	AGO	Angola	x		
4	ARG	Argentina		x	
5	ARM	Armenia			x
6	AZE	Azerbaijan	x		
7	BHR	Bahrain	x		
8	BGD	Bangladesh			x
9	BLR	Belarus			x
10	BEN	Benin		x	
11	BOL	Bolivia		x	
12	BIH	Bosnia and Herzegovina			x
13	BWA	Botswana			x
14	BRA	Brazil			x
15	BRN	Brunei Darussalam	x		
16	BGR	Bulgaria			x
17	KHM	Cambodia			x
18	CMR	Cameroon	x		
19	CHN	China			x
20	COL	Colombia	x		
21	COG	Congo, Rep	x		
22	CRI	Costa Rica			x
23	CIV	Côte d'Ivoire		x	
24	HRV	Croatia			x
25	CUB	Cuba		x	
26	CYP	Cyprus			x
27	DOM	Dominican Republic			x
28	ECU	Ecuador	x		
29	EGY	Egypt			x
30	SLV	El Salvador			x
31	ERI	Eritrea		x	
32	ETH	Ethiopia		x	

Table A2.1. **List of 96 non-OECD countrie**s (cont)

	Country name		**Fuel exporters**	**Non-fuel commodity exporters**	**Manufacturing exporters**
33	GAB	Gabon	x		
34	GEO	Georgia			x
35	GHA	Ghana		x	
36	GTM	Guatemala		x	
37	HND	Honduras		x	
38	HKG	Hong Kong, China			x
39	IND	India			x
40	IDN	Indonesia			x
41	IRN	Iran, Islamic Rep.	x		
42	IRQ	Iraq	x		
43	JAM	Jamaica			x
44	JOR	Jordan			x
45	KAZ	Kazakhstan	x		
46	KEN	Kenya		x	
47	KWT	Kuwait	x		
48	KGZ	Kyrgyzstan			x
49	LVA	Latvia			x
50	LBN	Lebanon			x
51	LBY	Libya	x		
52	LTU	Lithuania			x
53	MKD	Macedonia, FYR			x
54	MYS	Malaysia			x
55	MDA	Moldova		x	
56	MLT	Malta	x		
57	MNG	Mongolia		x	
58	MAR	Morocco			x
59	MOZ	Mozambique		x	
60	MMR	Myanmar		x	
61	NAM	Namibia			x
62	NPL	Nepal			x
63	NIC	Nicaragua		x	
64	NGA	Nigeria	x		
65	OMN	Oman	x		
66	PAK	Pakistan			x
67	PAN	Panama		x	
68	PRY	Paraguay		x	
69	PER	Peru		x	
70	PHL	Philippines			x
71	QAT	Qatar	x		
72	ROM	Romania			x
73	RUS	Russian Federation	x		
74	SAU	Saudi Arabia	x		
75	SEN	Senegal			x
76	SRB	Serbia			x

Table A2.1. **List of 96 non-OECD countrie**s (cont)

	Country name		**Fuel exporters**	**Non-fuel commodity exporters**	**Manufacturing exporters**
77	SGP	Singapore			x
78	ZAF	South Africa			x
79	LKA	Sri Lanka			x
80	SDN	Sudan	x		
81	SYR	Syrian Arab Republic	x		
82	TJK	Tajikistan		x	
83	TZA	Tanzania		x	
84	THA	Thailand			x
85	TGO	Togo		x	
86	TTO	Trinidad and Tobago	x		
87	TUN	Tunisia			x
88	TKM	Turkmenistan	x		
89	UKR	Ukraine			x
90	ARE	United Arab Emirates	x		
91	URY	Uruguay		x	
92	VEN	Venezuela	x		
93	VNM	Vietnam			x
94	YEM	Yemen	x		
95	ZMB	Zambia		x	
96	ZWE	Zimbabwe		x	

Note: This table presents three clusters of 96 developing countries, based on the largest share of merchandise exports by major product group averaged over 2001-2010 or the latest available year.

Source: World Bank, World Development Indicators online; WTO; and national sources

Table A2.2. Poverty headcount rations in three clusters of non-OECD countries

At USD 1.25 a day and USD 2 a day PPP, as % population

I	Fuel-based economies (27)		Poverty headcount ratio at USD1.25 a day (PPP) (% of population)						Poverty headcount ratio at USD2 a day (PPP) (% of population)					
	Country Code	Country Name	Initial year		Average 1990s	Average 2000s	Final year		Initial year		Average 1990s	Average 2000s	Final year	
1	DZA	Algeria	1995	6.8					1995	23.6				
2	AGO	Angola	2000	54.3					2000	70.2				
3	AZE	Azerbaijan	1995	16.3		3.4	2008	0.4	1995	39.1		15.0	2008	2.8
4	BHR	Bahrain												
5	BRN	Brunei Darussalam												
6	CMR	Cameroon	1996	24.9		10.2	2007	9.6	1996	51.8		31.4	2007	30.4
7	COL	Colombia	1991	8.2	10.9	14.3	2010	8.2	1991	17.3	20.2	25.2	2010	15.8
8	COG	Congo, Rep.					2005	54.1					2005	74.4
9	ECU	Ecuador	1994	14.1	15.6	9.1	2010	4.6	1994	26.3	28.3	18.1	2010	10.6
10	GAB	Gabon					2005	4.8					2005	19.6
11	IRN	Iran, Islamic Rep.	1990	3.9	2.2		2005	1.5	1990	13.1	9.9		2005	8.0
12	IRQ	Iraq					2007	2.8					2007	21.4
13	KAZ	Kazakhstan	1993	4.2	4.6	3.0	2009	0.1	1993	17.6	18.2	11.2	2009	1.1
14	KWT	Kuwait												
15	LBY	Libya												
16	NGA	Nigeria	1992	61.9	65.2	65.5	2010	68.0	1992	80.4	83.4	83.8	2010	84.5
17	OMN	Oman												
18	QAT	Qatar												
19	RUS	Russian Federation	1993	1.5	2.2	0.2	2009	0.0	1993	8.3	9.3	2.0	2009	0.1
20	SAU	Saudi Arabia												
21	SDN	Sudan					2009	19.8					2009	44.1
22	SYR	Syrian Arab Republic					2004	1.7					2004	16.9
23	TTO	Trinidad and Tobago	1992	4.2					1992	13.5				
24	TKM	Turkmenistan	1993	63.5			1998	24.8	1993	85.7			1998	49.7
25	ARE	United Arab Emirates												
26	VEN	Venezuela, RB	1992	4.4	8.8	13.4	2006	6.6	1992	9.7	18.5	24.9	2006	12.9
27	YEM	Yemen, Rep.	1998	12.9			2005	17.5	1998	36.4			2005	46.6

Table A2.2. **Poverty headcount rations in three clusters of non-OECD countries** (cont.)

II	Non-fuel commodity exporters (25)		Poverty headcount ratio at USD1.25 a day (PPP) (% of population)						Poverty headcount ratio at USD2 a day (PPP) (% of population)					
	Country Code	Country Name	Initial year		Average 1990s	Average 2000s	Final year		Initial year		Average 1990s	Average 2000s	Final year	
1	ARG	Argentina	1991	0.6	2.9	5.3	2010	0.9	1991	2.5	6.0	10.0	2010	1.9
2	BEN	Benin					2003	47.3					2003	75.3
3	BOL	Bolivia	1991	5.2	13.6	19.1	2008	15.6	1991	19.2	25.3	29.3	2008	24.9
4	CIV	Cote d'Ivoire	1993	17.8	21.0	23.5	2008	23.8	1993	43.5	46.9	46.6	2008	46.3
5	CUB	Cuba												
6	ERI	Eritrea												
7	ETH	Ethiopia	1995	60.5		47.3	2005	39.0	1995	84.6		82.0	2005	77.6
8	GHA	Ghana	1992	51.1	45.1		2006	28.6	1992	77.7	70.5		2006	51.8
9	GTM	Guatemala	1998	16.2		19.6	2006	13.5	1998	30.1		33.0	2006	26.3
10	HND	Honduras	1990	46.9	29.7	22.5	2009	17.9	1990	65.0	47.7	35.5	2009	29.8
11	KEN	Kenya	1992	38.4	28.8		2005	43.4	1992	59.3	51.9		2005	67.2
12	MDA	Moldova	1992	17.0	24.6	7.6	2010	0.4	1992	39.2	48.8	22.3	2010	4.4
13	MNG	Mongolia												
14	MOZ	Mozambique	1996	80.6		67.1	2008	59.6	1996	92.6		85.9	2008	81.8
15	MMR	Myanmar												
16	NIC	Nicaragua	1993	18.3	15.4	13.1	2005	11.9	1993	36.1	33.7	33.1	2005	31.7
17	PAN	Panama	1991	20.9	16.5	9.9	2010	6.6	1991	28.6	23.4	18.0	2010	13.8
18	PRY	Paraguay	1990	1.0	10.0	9.3	2010	7.2	1990	3.5	16.9	17.8	2010	13.2
19	PER	Peru	1994	12.9	11.0	8.8	2010	4.9	1994	28.4	23.3	19.5	2010	12.7
20	TJK	Tajikistan	1999	49.4		19.4	2009	6.6	1999	83.7		45.6	2009	27.7
21	TZA	Tanzania	1992	72.6		76.2	2007	67.9	1992	91.3		91.6	2007	87.9
22	TGO	Togo					2006	38.7					2006	69.3
23	URY	Uruguay	1992	0.9		0.7	2010	0.2	1992	3.0		3.1	2010	1.2
24	ZMB	Zambia	1991	61.1	61.0	65.8	2006	68.5	1991	75.6	78.0	83.1	2006	82.6
25	ZWE	Zimbabwe												

Table A2.2. **Poverty headcount rations in three clusters of non-OECD countries** (cont.)

III	Manufactures exporters (44)		Poverty headcount ratio at USD1.25 a day (PPP) (% of population)						Poverty headcount ratio at USD2 a day (PPP) (% of population)					
	Country Code	Country Name	Initial year		Average 1990s	Average 2000s	Final year		Initial year		Average 1990s	Average 2000s	Final year	
1	ALB	Albania	1997	0.2		0.6	2008	0.6	1997	6.5		6.6	2008	4.3
2	ARM	Armenia	1996	17.5	17.8	8.1	2008	1.3	1996	38.9	43.8	31.0	2008	1.3
3	BGD	Bangladesh	1992	70.2	65.6	50.8	2010	43.3	1992	93.0	89.3	80.4	2010	76.5
4	BLR	Belarus	1993	0.0	0.4	0.3	2008	0.1	1993	0.1	1.6	1.0	2008	0.2
5	BIH	Bosnia and Herzegovina	2001	0.1		0.1	2007	0.0	2001	0.3		0.3	2007	0.2
6	BWA	Botswana	1994	31.2					1994	49.4				
7	BRA	Brazil	1990	17.2	13.8	8.8	2009	6.1	1990	30.0	24.4	16.4	2009	10.8
8	BGR	Bulgaria	1992	0.0	0.6	0.9	2007	0.0	1992	0.0	1.8	3.3	2007	0.4
9	KHM	Cambodia	1994	44.5		30.9	2008	22.8	1994	75.2		59.8	2008	53.3
10	CHN	China	1990	60.2	51.0	19.2	2008	13.1	1990	84.6	73.8	39.3	2008	29.8
11	CRI	Costa Rica	1990	8.5	6.7	4.4	2009	3.1	1990	15.3	12.5	8.5	2009	6.0
12	HRV	Croatia	1998	0.1	0.1	0.1	2008	0.1	1998	0.1	0.2	0.1	2008	0.1
13	CYP	Cyprus												
14	DOM	Dominican Republic	1992	4.7	4.8	4.7	2010	2.2	1992	14.6	12.2	12.7	2010	9.9
15	EGY	Egypt, Arab Rep.	1991	4.5	3.5	1.8	2008	1.7	1991	27.6	27.0	17.8	2008	15.4
16	SLV	El Salvador	1991	17.1	14.0	10.2	2009	9.0	1991	29.3	24.0	18.5	2009	16.9
17	GEO	Georgia	1996	4.7	12.1	16.8	2008	15.3	1996	14.0	25.5	35.5	2008	32.2
18	HKG	Hong Kong, China												
19	IND	India	1994	49.4		37.2	2010	32.7	1994	81.7		72.2	2010	68.7
20	IDN	Indonesia	1990	54.3	49.9	23.5	2010	18.1	1990	84.6	81.9	56.2	2010	46.1
21	JAM	Jamaica	1990	1.3	2.7	0.3	2004	0.2	1990	13.1	12.4	7.0	2004	5.4
22	JOR	Jordan	1992	2.8	2.1	0.4	2010	0.1	1992	14.9	13.2	4.5	2010	1.6
23	KGZ	Kyrgyz Republic	1993	18.6	25.2	13.1	2009	6.2	1993	30.1	45.4	36.5	2009	21.7
24	LVA	Latvia	1993	0.0	0.2	0.2	2008	0.1	1993	0.2	2.9	0.7	2008	0.4
25	LBN	Lebanon												
26	LTU	Lithuania	1993	2.2	0.8	0.3	2008	0.2	1993	16.9	6.4	1.4	2008	0.4

Table A2.2. **Poverty headcount rations in three clusters of non-OECD countries** (cont.)

III	Manufactures exporters (44)		Poverty headcount ratio at USD1.25 a day (PPP) (% of population)						Poverty headcount ratio at USD2 a day (PPP) (% of population)					
	Country Code	Country Name	Initial year		Average 1990s	Average 2000s	Final year		Initial year		Average 1990s	Average 2000s	Final year	
27	MKD	Macedonia, FYR	1998	0.0		0.9	2009	0.0	1998	3.9		4.9	2009	5.9
28	MYS	Malaysia	1992	1.6	1.4	0.2	2009	0.0	1992	11.2	9.7	4.3	2009	2.3
29	MLT	Malta												
30	MAR	Morocco	1991	2.5	4.6	4.4	2007	2.5	1991	15.9	20.2	19.2	2007	14.0
31	NAM	Namibia												
32	NPL	Nepal	1996	68.0		39.0	2010	24.8	1996	89.0		67.3	2010	57.3
33	PAK	Pakistan	1991	64.7	47.3	25.5	2008	21.0	1991	88.2	79.3	63.8	2008	60.2
34	PHL	Philippines	1991	30.7	26.8	21.4	2009	18.4	1991	55.4	50.6	43.8	2009	41.5
35	ROM	Romania	1992	0.4	2.4	1.6	2009	0.4	1992	1.2	11.6	7.9	2009	1.7
36	SEN	Senegal	1991	65.8	59.7	38.8	2005	33.5	1991	81.5	80.3	65.8	2005	60.4
37	SRB	Serbia	2002	0.2		0.2	2009	0.3	2002	0.6		1.0	2009	0.7
38	SGP	Singapore												
39	ZAF	South Africa	1993	24.3	22.9	19.1	2009	13.8	1993	41.1	40.5	36.7	2009	31.3
40	LKA	Sri Lanka	1991	15.0	15.7	10.5	2007	7.0	1991	49.5	48.1	34.4	2007	29.1
41	THA	Thailand	1990	11.6	5.3	1.3	2009	0.4	1990	37.1	22.5	9.7	2009	4.6
42	TUN	Tunisia	1990	5.9	6.2	2.0	2005	1.4	1990	19.0	19.7	10.4	2005	8.1
43	UKR	Ukraine	1992	0.0	1.5	0.2	2009	0.1	1992	0.0	7.5	1.0	2009	0.2
44	VNM	Vietnam	1993	63.7	56.7	26.6	2008	16.9	1993	85.7	82.0	54.3	2008	43.4

Table A2.3. Gini coefficients in three clusters of non-OECD economies

I	Fuel-based economies (27)		Gini Index					
	Country Code	Country Name	Initial year		Average 1990s	Average 2000s	Final year	
1	DZA	Algeria	1995	35.3				
2	AGO	Angola	2000	58.6				
3	AZE	Azerbaijan	1995	35.0		35.1	2008	33.7
4	BHR	Bahrain						
5	BRN	Brunei Darussalam						
6	CMR	Cameroon	1996	40.7		39.7	2007	38.9
7	COL	Colombia	1991	51.3	54.6	57.9	2010	55.9
8	COG	Congo, Rep.					2005	47.3
9	ECU	Ecuador	1994	54.3	54.3	52.8	2010	49.3
10	GAB	Gabon					2005	41.5
11	IRN	Iran, Islamic Rep.	1990	43.6	43.6		2005	38.3
12	IRQ	Iraq					2007	30.9
13	KAZ	Kazakhstan	1993	32.7	34.0	32.8	2009	29.0
14	KWT	Kuwait						
15	LBY	Libya						
16	NGA	Nigeria	1992	45.0	45.7	45.9	2010	48.8
17	OMN	Oman						
18	QAT	Qatar					2007	41.1
19	RUS	Russian Federation	1993	48.4	44.0	39.5	2009	40.1
20	SAU	Saudi Arabia						
21	SDN	Sudan					2009	35.3
22	SYR	Syrian Arab Republic					2004	35.8
23	TTO	Trinidad and Tobago	1992	40.3				
24	TKM	Turkmenistan	1993	35.4			1998	40.8
25	ARE	United Arab Emirates						
26	VEN	Venezuela, RB	1992	42.1	46.3	47.7	2006	44.8
27	YEM	Yemen, Rep.	1998	33.4			2005	37.7

Table A2.3. **Gini coefficients in three clusters of non-OECD economies (**cont.)

II	Non-fuel commodity exporters (25)		Gini Index					
	Country Code	Country Name	Initial year		Average 1990s	Average 2000s	Final year	
1	ARG	Argentina	1991	46.6	47.9	49.5	2010	44.5
2	BEN	Benin					2003	38.6
3	BOL	Bolivia	1991	42.0	52.9	58.5	2008	56.3
4	CIV	Cote d'Ivoire	1993	36.9	39.1	44.9	2008	41.5
5	CUB	Cuba						
6	ERI	Eritrea						
7	ETH	Ethiopia	1995	40.0		29.9	2005	29.8
8	GHA	Ghana	1992	38.1	39.4		2006	42.8
9	GTM	Guatemala	1998	55.8		56.0	2006	55.9
10	HND	Honduras	1990	57.4	54.6	58.0	2009	57.0
11	KEN	Kenya	1992	57.5	47.3		2005	47.7
12	MDA	Moldova	1992	34.3	37.5	35.7	2010	33.0
13	MNG	Mongolia						
14	MOZ	Mozambique	1996	44.5		46.4	2008	45.7
15	MMR	Myanmar						
16	NIC	Nicaragua	1993	50.4	47.8	41.8	2005	40.5
17	PAN	Panama	1991	58.2	58.0	54.8	2010	51.9
18	PRY	Paraguay	1990	40.8	53.2	54.0	2010	52.4
19	PER	Peru	1994	44.9	48.1	51.4	2010	48.1
20	TJK	Tajikistan	1999	29.0		32.4	2009	30.8
21	TZA	Tanzania	1992	33.8		36.1	2007	37.6
22	TGO	Togo					2006	34.4
23	URY	Uruguay	1992	40.1		46.3	2010	45.3
24	ZMB	Zambia	1993	52.6	51.9	49.2	2006	54.6
25	ZWE	Zimbabwe	1995	50.1				

Table A2.3. **Gini coefficients in three clusters of non-OECD economies (**cont.)

III	Manufactures exporters (44)		Gini Index					
	Country Code	Country Name	Initial year		Average 1990s	Average 2000s	Final year	
1	ALB	Albania	1997	29.1		31.7	2008	34.5
2	ARM	Armenia	1996	44.4	40.2	34.2	2008	30.9
3	BGD	Bangladesh	1992	27.6	30.5	32.9	2010	32.1
4	BLR	Belarus	1993	21.6	26.9	28.7	2008	27.2
5	BIH	Bosnia and Herzegovina	2001	28.0		33.3	2007	36.2
6	BWA	Botswana	1994	61.0				
7	BRA	Brazil	1990	61.0	59.7	57.3	2009	54.7
8	BGR	Bulgaria	1992	30.7	28.1	30.6	2007	28.2
9	KHM	Cambodia	1994	38.3		41.4	2008	37.9
10	CHN	China	1990	32.4	35.7	42.5	2005	42.5
11	CRI	Costa Rica	1990	45.3	46.2	49.2	2009	50.7
12	HRV	Croatia	1998	26.8	27.3	31.3	2008	33.7
13	CYP	Cyprus						
14	DOM	Dominican Republic	1992	51.4	49.2	50.3	2010	47.2
15	EGY	Egypt, Arab Rep.	1991	32.0	31.1	31.9	2008	30.8
16	SLV	El Salvador	1991	54.0	52.4	49.4	2009	48.3
17	GEO	Georgia	1996	37.1	39.3	40.7	2008	41.3
18	HKG	Hong Kong, China	1996	43.4				
19	IND	India	1994	30.8			2005	33.4
20	IDN	Indonesia	1990	29.2	29.7	31.9	2005	34.0
21	JAM	Jamaica	1990	42.2	40.6	46.9	2004	45.5
22	JOR	Jordan	1992	43.4	39.9	36.5	2010	35.4
23	KGZ	Kyrgyz Republic	1993	53.7	44.8	35.9	2009	36.2
24	LVA	Latvia	1993	27.0	31.0	36.4	2008	36.6
25	LBN	Lebanon						
26	LTU	Lithuania	1993	33.6	32.0	34.0	2008	37.6
27	MKD	Macedonia, FYR	1998	28.1		40.0	2009	43.2
28	MYS	Malaysia	1992	47.7	48.4	43.4	2009	46.2
29	MLT	Malta						
30	MAR	Morocco	1991	39.2	39.3	40.8	2007	40.9
31	NAM	Namibia	1993	74.3			2004	63.9
32	NPL	Nepal	1996	35.2		38.3	2010	32.8
33	PAK	Pakistan	1991	33.2	31.6	31.1	2008	30.0
34	PHL	Philippines	1991	43.8	44.3	44.4	2009	43.0
35	ROM	Romania	1992	25.5	27.7	31.2	2009	30.0
36	SEN	Senegal	1991	54.1	47.8	40.2	2005	39.2
37	SRB	Serbia	2002	32.7		30.9	2009	27.8
38	SGP	Singapore	1998	42.5				
39	ZAF	South Africa	1993	59.3	58.0	62.8	2009	63.1
40	LKA	Sri Lanka	1991	32.5	33.9	40.7	2007	40.3
41	THA	Thailand	1990	45.3	44.0	41.5	2009	40.0
42	TUN	Tunisia	1990	40.2	41.0	41.1	2005	41.4
43	UKR	Ukraine	1992	25.7	32.3	28.2	2009	26.4
44	VNM	Vietnam	1993	35.7	35.6	36.4	2008	35.6

Source: Calculated from the World Bank, World Development Indicators online.

CHAPTER 3.

POLICY FRAMEWORKS FOR GREEN GROWTH IN DEVELOPING COUNTRIES

Executive summary

Green growth will require systemic adjustments to better link economic, environmental and social policies and institutions – as far as possible identifying synergies, but also being clear about trade-offs and uncertainties, and the political economy of the changes required. As such, the formation of national green growth policy frameworks will be a critically important exercise. This chapter describes the potential elements of a national green growth policy framework that support and complement the resource/sector policies outlined in Chapter 2:

1. *Mainstreaming green growth approaches into national planning*. This involves building on existing economic, environmental and sustainable development strategies and plans; addressing synergies and gaps; and ensuring the overall policy environment is enabling of a green growth approach.
2. *Policy instruments that deliver green growth for key sectors/resources*. The chapter assesses eight specific policy instruments that that create the right incentives and controls to meet the green growth goals identified for particular resources and sectors in Chapter 2. They emphasise government taking a lead – covering subsidy and fiscal reform, public procurement, and payments for ecosystem services, but include market mechanisms and the roles of non-government players.
3. *Institutional mechanisms that link the actors and support continuous improvement*. These develop the collaborative institutions needed to keep green growth, and its goal of sustainable development, at the top of the political and policy agenda, and support the learning and continuous improvement needed for improving effectiveness and reducing scientific, technological and market uncertainty.

3.1 The developing country challenge – integrating growth and environmental policy to achieve green growth

As described in Chapter 2, there is growing convergence around the notion that the current economic system is not only unsustainable and inefficient in its resource use, but moreover is inequitable in its distribution of costs and benefits. Green growth in developing countries is a matter of both economic policy *and* sustainable development policy. It tackles two key imperatives together: the continued economic growth needed by developing countries to reduce poverty and improve wellbeing; and improved environmental management needed to tackle resource scarcities and climate change. When green growth began to be promoted through the 2008/09 economic stimulus packages of many G20 countries, some governments approached it from a short-term growth perspective – the potential to boost jobs and incomes through increased investment in particular green (notably low-carbon) technologies. Others approached green growth from an environmental perspective – the potential to internalise environmental externalities by mainstreaming sustainable development requirements into economic decisions, notably through resource pricing and land use/infrastructure choices. A third imperative, of equity and inclusion, has more recently been expressed, especially by developing countries, *i.e*. that green growth should serve those excluded from the current economic system. The informal economy is very large in many developing countries; it tends to increase in both times of growth and times of recession, and its potentials and hazards need to inform any transition to green growth.

Green growth will require systemic adjustments to better link economic, environmental and social policies and institutions – as far as possible identifying synergies, but also being clear about trade-offs and uncertainties, and the political economy of the changes required. As such, the formation of national green growth policy frameworks will be a critically important exercise.

3.2 A green growth framework for developing countries

This chapter offers an initial suggestion for the elements of a national green growth policy framework (Figure 3.1).

We recognise that individual countries will have very different starting points for exploring green growth. For example, a concern to return to growth through investing in major new green energy infrastructure, transportation systems or other such single ‘green growth’ engines implies a different set of drivers and challenges than a concern for tackling the entrenched environmental or employment problems of multiple existing ‘brown’ industries. While it is difficult at this stage to comprehend the vast scope of policy change ultimately required for green growth, given the lack of precedent, it is also clear from consultations to date that most countries want to make some kind of start, according to their priorities. Thus we suggest a framework which allows for step-wise progress and an informed approach to uncertainty and risk.

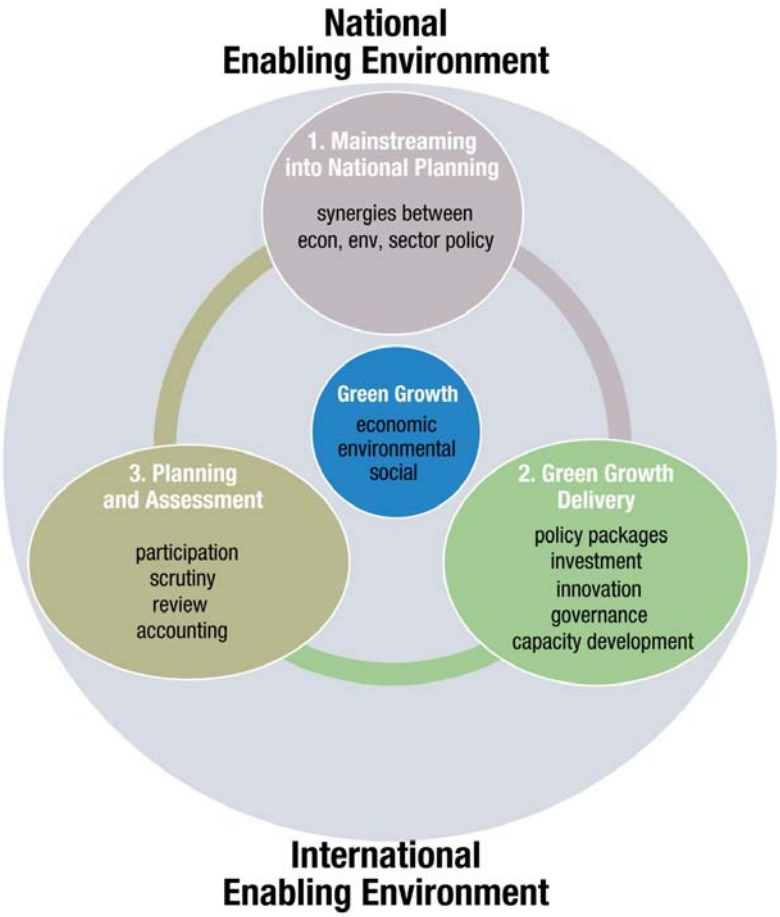
The framework is designed to deliver the kinds of green growth benefits that developing countries are increasingly intending to pursue (presented in Box 1.2 in Chapter 1). The framework involves:

1. Mainstreaming green growth approaches into national planning, by building on existing economic, environmental and sustainable development strategies and plans, and addressing synergies and gaps (described in Section 3.3).
2. Developing broad economy-wide enabling policies to create the right incentives and controls to deliver green growth (Section 3.4).

3. Deploying green growth institutional mechanisms that continuously and regularly link the actors into the collaborative institutions needed to keep green growth, and its goal of sustainable development, at the top of the political and policy agenda (Section 3.5).

Ideally, this chapter would be informed by an analysis of experience of green growth policies and instruments. In the absence of extensive experience in developing countries, we instead draw on policy initiatives that have emerged from discussions about the green economy in a small but diverse range of developing countries; on government and stakeholder submissions to Rio+20 (UNCSD); on recent national dialogues on the subject held by IIED and the Green Economy Coalition; and on the more practical, if sometimes inconclusive and patchy, experience from economic growth and sustainable development policy and practice in a diversity of developing countries.

Figure 3.1. Elements of a national green growth policy framework



3.3. Mainstreaming green growth into national planning

To date, mainstream policy has tended to favour and promote short-term economic growth. A green growth pathway requires it to be adjusted to:

- conserve the natural and closely-associated social capital that will support long-term, resilient growth;

- invest in particular 'green growth engines' that, over the longer term, have potential to realise individual countries' comparative advantage, but have often been ignored due to the upfront costs, technology barriers, or skills and finance deficits.

A generic approach to integrating environment and development has been proposed by the International Institute for Environment and Development (IIED), following analysis of the experience of sustainable development strategies or similar in 13 developing countries (Dalal-Clayton and Bass, 2009). Four principles can be drawn from this analysis:

1. *The importance of getting green growth into the mainstream national development plan 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. Many such projects currently being discussed may end up favouring narrow interests of large business, central government and foreign investors, rather than poor groups, local authorities and local knowledge systems.

2. *The need to acknowledge different interests (notably in growth and sustainable development)* – especially given the range of existing strategies which people may be actively pursuing. An effective green growth 'strategy' is likely to be about finding synergies between policy objectives, as well as at the operational level between industries whose input-output analysis suggests potentials for efficiency. It will be constructed in a participatory manner.

3. *The need to handle uncertainty, and include a learning and continuous-improvement approach* – especially given that operational approaches to green growth are unprecedented in most countries, and operate under conditions of considerable scientific, technological and market uncertainty. They will need to be regularly reviewed in predictable ways, particularly so that businesses can anticipate them and market confidence improves.

4. *The need for prioritisation criteria consistent with the above* – especially as there are potentially huge numbers of changes, of varying degrees of cost and benefit. For developing countries, prioritisation criteria might encompass: urgency, potential for immediate benefit, avoiding expensive lock-in, precedent, synergy, attractiveness to foreign investment, administrative and political feasibility, and comparative advantage (the latter implying benchmarking against e.g. neighbouring countries and trading competitors).

Build on what is there already

While many mainstream policy arenas can and should support inclusive green growth – fiscal, developmental, technology, trade and foreign policy – it is politically and administratively difficult to orchestrate the simultaneous improvement of each of these policy areas to achieve green growth. Therefore the best bet may be to start with a green growth mainstreaming process based on what already exists. The process provides an opportunity to map common objectives and gaps, identify approaches that work, and mobilise the various actors. This report does not intend to offer full guidance, but suggests illustrative steps that those in charge of national economic and development planning can consider taking. These should not be pursued mechanically; mainstreaming is as much about understanding political economy and psychology as it is about conducting the following tasks:

1. *Identify the plans that direct national policy, institutions and public expenditure*: Generally the national development plan (e.g. the five-year 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 sustainable development strategies (e.g. NSDS, as called for by Agenda 21) and environment/climate strategies (including those linked to the UNFCCC);
    - low-carbon development strategies;
    - spatial strategies (*e.g*. urbanisation and land use plans).

2. *Assess the degree to which each of the above plans aims at GG outcomes* – whether detailed intentions (specific, budgeted activities and targets) or mere mention. Table3.1 offers a checklist to aid in this assessment.

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 policies* required to deliver green growth benefits (Section 3.4), without which specific policies and investments may not be taken up or produce adequate leverage.

7. *Develop resource/sector policies* (Chapter 2) *and particular instruments for delivery* (Section 3.4), together with an assessment of the likely impacts of those policies on green growth outcomes (or economic, environmental and social impacts).

8. *Establish mechanisms for continuous improvement* in mainstreaming green growth over time (Section 3.5). Where an initial green growth strategy can mobilise stakeholders through its predictability (clear goals) 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).

There are at least two possible outcomes from this process:

- *Green growth mainstreaming strategy:* Incorporating green growth principles and goals into a wide range of *existing* plans and strategies, emphasising those that already lay a good foundation for green growth. This involves building on, and 'wiring together' existing policies, initiatives and institutions so that they work better together, with a focus on those which have proven effective or promising for green growth to date. It is likely to require some kind of umbrella strategy, at least initially, 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.

- *Stand-alone strategy for green growth 'engines':* This approach focuses on key technologies and investments that a country can most profitably get started with, and develops a time-bound plan. This can be more immediately attractive in countries where the growth imperative is especially high, but it is risky if mainstreaming has not already been achieved at the level of principle.

We are not yet aware of an established approach to mainstreaming green growth into national development plans that follows all of the above steps, though several initiatives have covered some of the steps. The multi-stakeholder green economy dialogue process used by the Green Economy Coalition is one recent example (more in chapter 4.3). Box 3.1 describes how Ethiopia has planned for green growth using a stand-alone strategic process to realise a range of greenhouse gas abatement potentials that could provide green growth engines and are attractive to international finance; though they link to wider developmental priorities, it is not a fully mainstreamed approach. Some recent climate-compatible development planning attempts to closely follows a mainstreaming approach, such as Korea's Low-Carbon Green Growth Strategy (Box 3.2) and Rwanda's National Strategy for Climate Change and Low-Carbon Development, which is rooted in the national plan.

Table 3.1. Checklist for assessing the degree to which national plans include a focus on green growth

STEP 1
(example)

Assess level at which GG benefits are addressed in existing strategies, e.g.:

- High: includes budgeted activities
- Medium: general aspiration
- Low: not addressed at all

	Existing strategies				
GG benefits included?*	**National vision**	**Economic growth**	**Development**	**Environment/SD**	**Spatial / urbanisation**
Capital levels improved?					
Efficiency of resource use?					
Resilience to shocks?					
Distribution of cost/benefit?					
Wellbeing – jobs, income?					
Innovation for productivity?					

STEP 2
(example)

Assess policy coherence clashes and gaps across each GG benefit, i.e.:

- Strategies are very coherent
- Medium coherence
- Low coherence

	Existing strategies				
GG benefits included?*	**National vision**	**Economic growth**	**Development**	**Environment/SD**	**Spatial / urbanisation**
Capital levels improved?					
Efficiency of resource use?					
Resilience to shocks?					
Distribution of cost/benefit?					
Wellbeing – jobs, income?					
Innovation for productivity?					

Notes: *For simplicity's sake, in this matrix we have summarised the 11 green growth benefits in Box 1.2 (Chapter 1) into 6 broad areas:

1. Net increase in the quantity and quality of natural, physical, human, social and financial capital
2. Improved efficiency in the use of capital, notably natural capital
3. Improved resilience and reduction of risks
4. More equitable distribution of the associated costs, benefits and risks
5. Improved wellbeing in terms of jobs, poverty reduction, and cultural/social
6. Stimulus to continued innovation that will improve productivity and reduce costs/risks.

Box 3.1. Case study: Ethiopia's climate resilient green economy strategy

This initiative is a collaboration of the Government of Ethiopia and the Global Green Growth Initiative, with support from several partners. It has produced a practical strategy that is:

- Rooted in the government's existing Growth and Transformation Programme, 2010-15.
- Mainstreamed across seven sector ministries, and developed with participation at decentralised levels.
- Focused on practical initiatives with high greenhouse gas abatement potential, especially in four key sectors important to the economy – power generation, soil management, livestock and forestry.
- Aimed at attracting foreign direct investment that is interested in the potential returns available from supporting GHG abatement, through initiatives that leapfrog 'brown economy' mistakes of the past.
- Prioritised for development needs, not only GHG abatement.
- Aimed at adaptation to climate change (though this element has yet to be fully detailed).

Developed with the active leadership of Prime Minister Meles Zenawi, the Climate Resilient Green Economy Strategy emphasises screening about 150 technological options against GHG abatement and development criteria, which aim to meet the energy portfolio and land use targets of the government's Growth and Transformation Programme.

The strategy's four-step process helped to achieve this kind of legitimacy and relevance. Each of the sector technical sub-committees developed a business as usual (BAU) projection of economic growth and associated emissions for their respective sectors. This projection extended to 2030 to allow enough time to include long-term infrastructural investments and achieve the middle-income status to which the country aspires. They identified and analysed the potential of green economy initiatives or levers. Potential initiatives had to contribute to growth and development targets as well as to the reduction of GHG emissions, compared with BAU development.

More than 60 initiatives were individually prioritised across seven sectors. GGGI (2011) gives detailed information on the methodology, which covered:

- Suitability for the Growth and Transformation Programme (impact on poverty reduction, food security, real GDP, domestic capital formation, exports, public finance and employment).
- Technical and institutional feasibility in the Ethiopian context.
- Cost and funding requirements
- Abatement potential ("a critical resource and opportunity for monetisation of a country's contribution to combat GHG emissions").

As a result, some initiatives were selected by the government as fast-track priorities, notably:

- Developing a financing strategy for the Ethiopian power sector.
- Promoting advanced cooking technologies on a large scale in rural areas.
- Increasing efficiency of livestock handling, including upgrading the meat value chain, mechanising draught power and switching some of the meat consumption to lower-emission sources of proteins.

The next steps will likely include a two-year implementation plan, during which responsibility will be mainstreamed in the sector-specific organisations, and a central Climate Resilient Green Economy organisation will be formed to support co-ordination and funding.

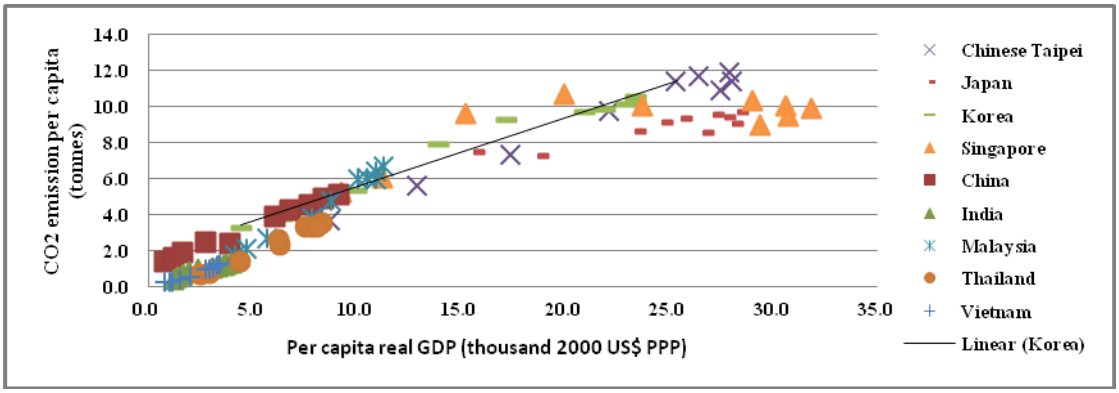
The strategy stands out as being particularly focused on GHG abatement and the technology and investment that is needed for this: "because the ability to obtain international funding from building a green economy depends, at least partially, on verified emissions reductions, the [strategy] prioritizes initiatives that contribute to reducing emissions." The strategy does not, as yet, provide a comprehensive policy framework for all the dimensions of green growth. However, the focus on investment may mean it will generate more interest than the more abstract sustainable development policy initiatives of the past – and hence kick-start a long-term process of real change.

Source: Global Green Growth Institute (2011), *Green Growth in Ethiopia: Project report,* Global Green Growth Institute, Seoul.

Box 3.2. case study: Korea's Low-Carbon Green Growth Strategy

This example, though from an OECD country, illustrates much that is relevant to developing countries. Few countries can match Korea's post-war development experience in terms of the level and speed of "catching up". It is widely known that the country's rapid growth and poverty reduction since the early 1960s have been based on outward-oriented industrialisation with alternations of leading export industries, starting from simple labour-intensive sectors before evolving to more capital- and knowledge-intensive ones. Yet, the Korean development experience may look less spectacular when viewed in the light of carbon intensity (see Figure 3.2). The economy was becoming locked into inefficient conventional technologies and production and consumption patterns heavily dependent on fossil fuels. It is against this background that the Korean government embarked on its low-carbon green growth (LCGG) strategy in 2008.

Figure 3.2. Carbon intensity: Korea and other Asian economies 1990-2007



Korea's LCGG strategy is composed of three pillars: to reduce GHG emissions through the introduction of market-based instruments (e.g. an emissions trading system by 2015) and regulatory reforms; to develop green technologies and products through provision of business incentives; and to enhance consumers' awareness and demand for green products. Shifting away from a long-standing traditional growth paradigm heavily dependent on fossil energy requires both strong political support from the top and institutionalizing the new approach across government. Efficient role-sharing and co-operation among public and private stakeholders in the process of planning, budget preparation and implementation are major components of Korea's LCGG strategy.

Source: Adapted from OECD (2012b), Southeast Asian Economic Outlook 2011/12, OECD, Paris.

Ensure an enabling environment for green growth

Green growth will be possible only if policy and market conditions are conducive and stakeholders are confident and equipped to make the changes required. Unfortunately, such conditions do not always apply, and the risk is that green growth is pursued through one or two high-profile projects that are not able to exert their potential to leverage system-wide financial, technological and behaviour change.

Making the policy environment more enabling for green growth will entail identifying the drivers of green growth and the actions/interventions necessary to harness them or overcome constraints. Tackling the constraints to the drivers of green growth can be more straightforward (if not easier) in many developing countries than some OECD countries, because the government is often still the main investor and/or policy innovator.

Six economy-wide policy challenges need to be addressed in the context of developing a national green growth strategy, in each of which governments can exercise leadership. (Foundations such as political stability, rule of law, macroeconomic stability, predictability of exchange rate regimes, monetary policy and interest rates also apply). Broadly speaking, they encompass the enabling conditions for economic growth, reinforced by enabling conditions for inclusiveness, and tempered by the enabling conditions for environmental protection:

- *Government expenditure plans* to shift away from activities that waste, overuse or degrade environmental assets – because such a 'disabling' environment makes green investments less competitive. Government can best focus on sectors (a) for which financial viability is dependent on public involvement, i.e. where there are externalities and market failures, such as environmental service sectors; (b) where there is a chance of leading change at scale, as in infrastructure; and (c) where there are genuine long-term potentials so that investors can be confident, credible markets can be built up and innovation encouraged, as in ICT and – for many low-income countries – natural resource enterprise

- *More effective legislation and its enforcement*, in part as a driver of green investment – because weak enforcement reduces long-term investor and market confidence and gives little incentive for most businesses to improve. As far as possible, the legislation base should be strengthened with the key elements of sustainable development law such as free prior and informed consent, polluter pays principle, and freedom of information. Given the need for integrated approaches at the landscape level and in urbanisation patterns, legislation in support of multiple-use land use planning and urban land markets may be needed. It may also need loosening to avoid entrenchment of technologies and support innovation

- *Shifting science, research, educational and training priorities to support the transition to a green economy* – because new knowledge and skills will be needed for government decision-makers, professionals and workers, down to local levels; the structural employment and institutional changes required may also warrant support for the fair transitional costs of organisations and their employees.

- *Resource and land rights regimes that safeguard the interests of those with informal rights* – because too many regimes favour powerful actors who are able to claim rights and/or emphasise technical efficiency of resource allocation, and do not support inclusion and equity for those who have a special dependence on the resource in question; this is especially critical in assuring rights to water or traditional lands.

- *Creating enabling conditions for psychological and behaviour change*. Green growth faces an understanding gap – it has not yet been widely discussed or fully considered at any level – from politician to the public, from farmer to major business. Green growth will not take off through bureaucratic measures and investments alone – the current psychology of decision-makers and lobbyists, producers and consumers, rich and poor alike have been shaped and entrenched by the current economic model. Framing green growth as a social goal, narrowing choices towards greener approaches, 'nudge' techniques to help people make better decisions on those choices, and tailoring information to match with stakeholder incentives and approaches to learning. The government has an important role; so also do civil society organisations with access to local knowledge, and values in support of green growth – encouraging fora, exchanges, watchdog functions, and education of the public. Culture shapes people's aspirations, organisation and approaches to public goods and cultural actors can be important for changing the zeitgeist.

- *Facilitating businesses to fully integrate sustainability and equity concerns*. Whether corporate, SME or social enterprise, businesses are a key part of the transition to green growth, through their capacity to innovate, introduce efficiencies, and influence consumers and trading partners. Many companies are increasingly concerned to secure a social licence to operate, and to ensure stable supplies of materials. A small but powerful minority of businesses have been reasserting their social purpose, are revising their approaches to advertising and, through value chains, are encouraging a wider take up of business models compatible with green growth (see *e.g.* www.corporation2020.org). Yet, generally speaking, there is an information gap and invisibility of GG opportunities. Governments and other stakeholders can facilitate new business models through provision of information – and coordinating research to supply it where there are knowledge gaps, capacity building – especially to adopt best available technologies and meet standards, enabling technology access – through reducing trade barriers where necessary, providing finance – or PPPs that share risk and cover upfront costs, and improving accountability – widening reporting requirements.

3.4. Green growth delivery – selected policy instruments

Having discussed the framework and enabling conditions necessary for green growth, in this section we assess eight specific policy instruments that are relevant to green growth in developing countries against their ability to achieve the set of green growth benefits listed in Box 1.2, Chapter 1. Most are already in use in some countries, and have proven benefits, despite some implementation problems. However, evidence of the impact of most of these instruments is limited in developing countries, and whether an instrument works or not is often highly context-specific.

Therefore this selection of policy instruments should be understood as a snapshot of interventions or 'best bets' that might be used in different combinations and degrees according to the national context. Given developing countries' emphasis on the equity aspects of green growth, we have deliberately focused on the implication of each instrument for supporting small producers, alleviating poverty and encouraging job creation. As not all these instruments are fully proven, or relevant to all circumstances, we also identify the likely risks of each.

GG Policy Instrument 1: Payments for ecosystem services

Overview: Payments for ecosystem services (PES) are schemes that give cash and/or in-kind payments to farmers and other land managers as an incentive to conserve and enhance ecosystem services. These payments may be made by those who directly benefit from healthy ecosystem services – for example a soft drinks bottling company, heavily dependent on supplies of clean water which benefits from efforts to maintain forest cover in its catchment area – 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 a few farmers and a few hundred hectares to thousands of farmers and millions of hectares.

Relevance to green growth: PES aims to increase the efficiency of land management by taking into account the value of normally unpriced ecosystem goods and services that are protected or enhanced. Thus, PES can increase the production of these goods and services. Whether this translates into an increase in GDP depends on factors such as the source of payment, national or international, the cost of delivery and the impact on land management outside of the areas targeted by the scheme. Significant potential for contributing to growth lies with international PES schemes which could channel finance from developed countries to developing countries to pay for global public goods, allowing these countries to optimise use of their natural capital, such as forest ecosystems.

Uptake in developing countries: A selection of large-scale PES schemes is presented below (Table 3.2). The majority of schemes focus on forest ecosystems and are receiving growing attention in the preparations for REDD+.[1]; However schemes incorporating agriculture are increasingly common. Many have a regional dimension, international support and a pro-poor focus.

Table 3.2. Large-scale PES schemes

Country/Scheme	First year of payments	Size (hectares)	No. of participating landowners	Total amount transferred to participants (scheme costs)	Source
Costa Rica *Pago por Servicios Ambientales* Bundled services – carbon, water, biodiversity, landscape	1997	860 000 + 3.77 million trees (agroforestry component)	13 000 contracts	USD 277 million	Porras *et al*., 2012
Ecuador *Programa Socio Bosque* Biodiversity, soils and water, carbon	2008	320 000 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.
Mexico Watershed services	2003	2.36 million (as of 2009)	3 336	USD 303 million over 5 years	TEEB, 2011
China Sloping Lands Conversion Programme Watershed regulation	1999	9.27 million cropland 13.67 million waste land	15 million by 2005	(USD 7 billion by end of 2003)	Bennett, 2009 (size) Xu *et al*., 2010
Lam Dong, Vietnam Payment for Forest Environmental Services Water regulation, soil conservation, landscape	2009	209 705	9 870 households and 22 Forest Management Boards and forestry businesses by December 2010	USD 4.46 million	Winrock International, 2011

Impact

Social: Evidence on the social and economic impacts of PES schemes is varied in terms of the extent to which the poorest groups participate in the schemes and the extent of net benefits for those that do (Engel *et al*., 2008; Porras *et al*., 2008). Some small, local schemes have generally achieved a good level of participation from smallholders and poor communities partly because they have been able to adapt to local circumstances, taking time to build up trust amongst the landowners and find ways around obstacles such as lack of clear land title (Robertson and Wunder, 2005) or high costs of carbon monitoring (Lager and Nyberg, 2012). Some PES programmes , such as the Rewarding Upland Poor for the Environmental Services they provide (RUPES) schemes in Asia (http://www.worldagroforestrycentre.org/regions/sea/projects/RUPES), and Plan Vivo focused on the voluntary carbon market have deliberately targeted poor and marginalised groups in order to demonstrate the potential of PES to achieve both poverty reduction and environmental goals (see www.planvivo.org The pro-poor impact of large-scale national schemes has been variable. In Costa Rica, in spite of efforts made to prioritise the poorest regions of the country, small farmers are not well-represented in the scheme (Porras, 2010). In contrast in Mexico, where much forest land is common property, a substantial share of the payments went to marginalised groups, as much as 72% in 2003 and 83% in 2004 (Muñoz-Pina, 2008). Reviews of the evidence on livelihood benefits of PES schemes for those participating (e.g Bond *et al* 2009;Porras *et al* 2008; Engel *et al* 2008; have generally been positive although concerns are raised that in some schemes cash payments in appear to be insignificant when compared with opportunity costs or with household income. Non-financial benefits such as capacity building in both productive activities and social coordination and strengthening of land and resource tenure are also considered important. The impacts can also be quite location-specific within a scheme. One recent study of the Sloping Lands Conversion programme in China, focused on Zhouzhi County, a remote rural area in Shanxi Province, found significant positive impacts on household income, particularly for low and medium income households (Li *et al.*, 2011. But earlier studies in other areas found that payments set by the SLCP fell short of opportunity costs for 24% and 77% of households sampled in Ningxia and Guizhou provinces respectively (Uchida *et al*., 2004) and 7%, 49% and 30% in Shanxi, Gansu, and Sichuan provinces respectively (Xu *et al*., 2010)

Environment: Evidence of the impact of PES schemes on protecting ecosystem services is scanty and mixed, with evaluations rarely going beyond monitoring land-use change and management practices. Evidence from Costa Rica and Mexico suggests reductions in deforestation, but causality is difficult to prove. Research also highlights the danger of 'mismatching', whereby the schemes failed to target degraded lands or areas at risk from deforestation. For example, the Sloping Lands Conversion Programme in China mismatched up to 21% of land (Xu *et al.*, 2010).

Economic: Studies in countries that have a track record with PES such as Costa Rica have shown little impact on GDP (Ross *et al*., 2007). Simulations carried out by UNEP of the potential impact of forest-based PES schemes at the global level suggest an increase in global GDP of USD 0.5 trillion over business as usual and an increase of 5 million in the number employed in the forest sector between 2011 and 2050 (UNEP, 2011).

Lessons for moving forward*:*

- The main risk for PES is that global public goods regimes are not yet strong enough to support a large and effective international market for investment or government-to-government financial transactions. Without this, the growth potential from PES will be relatively modest. The PES landscape is continually changing as new schemes come on

board that attempt to learn from the experience of previous schemes. Key lessons that have emerged include:

- Successful PES requires careful design and planning and adaptive management; too rapid expansion can compromise effectiveness.
- To ensure that the poorest landowners can voluntarily participate and benefit, PES design should be informed by lessons from existing schemes on how to overcome obstacles such as high transaction costs for such participants.
- Enabling policies, such as land use planning and agricultural extension, are key to the success of PES schemes in developing countries (Porras *et al*., 2010; Xu *et al*., 2010).

GG Policy Instrument 2: Sustainable public procurement

Overview: Sustainable public procurement (SPP) can stimulate demand and supply of products that contribute to social and environmental objectives. By exploiting the power and scale of government purchasing, the state can lead markets in ways which are quicker and more certain than relying on market mechanisms.

Relevance to green growth: 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% Brazil (IISD, 2008). SPP is a tool to shape consumption and production trends, generate new domestic markets and provide examples of good practice for business and consumers. While SPP practices are more often associated with OECD countries, they are equally relevant to developing economies for improving resource efficiency, generating cost-saving opportunities, supporting compliance with labour laws, supporting SMEs and creating jobs.

Uptake in developing countries*:* To date, interest in SPP often exceeds uptake in developing countries due to problems of adequate sustainable supplies of environmental goods and services and limited government capacity to operate SPP in an effective, equitable and transparent way. For example, in 2004 the Philippines government announced a green public procurement policy but the initiative was not launched until 2012 due to the lack of technical knowledge and the lack of 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 are helping to drive SPP in some countries; for example, *India's Energy Conservation Act* (2001) mandates notification of energy efficiency standards by the Bureau of Energy Efficiency. Developing countries including South Africa, Malaysia, Thailand, India and Brazil have used SPP to help achieve a range of social and economic goals including the support of small local businesses and empowering ethnic minorities. However, implementation remains a challenge (see Box 3.3).

Impact: Most developing country SPP initiatives are still in their infancy, and so evidence of impact on the ground is limited. Where there has been sufficient time and political commitment, the instrument has steered government spending towards target suppliers (see Box 3.4), but schemes have been criticised for their lack of transparency and monitoring (Perera, 2007).

Box 3.3. China's SPP of eco-friendly products

In China in 2006 the Environmental State Protection Agency and the Ministry of Finance published environmental criteria listings for eco-friendly products and producers, which include 14 product groups including office equipment, furniture, building materials and interior decorating materials. By 2009 some categories required compulsory procurement including lighting products and air conditioning units. Despite the advanced policy framework, field studies show that the relative weight given to the criteria was very low (*e.g*. for 'energy-efficiency' it was 5-6%), almost all contracts were decided instead by purchase cost. The lack of understanding of the issues by government departments has been a considerable obstacle (Qiao and Wang, 2011).

Box 3.4. South Africa's SPP of products that empower disadvantaged groups

In 2006, South Africa's Department of Trade and Industry (DTI) aligned its public procurement rules with the Broad-based Black Economic Empowerment (BEE) policy framework, which aims to support disadvantaged groups and communities, particularly black people, women and rural communities. This means that companies hoping to work with the government have to obtain a certificate which identifies 'empowerment' points awarded to the bidder. The scheme has been effective in steering government spending – for example, the City of Cape Town spends 48% of its budget on BEE suppliers, although it has been criticised for enriching rather than empowering target groups (Perera, 2007).

Lessons for moving forward: SPP is still controversial in many developing countries because of the perceptions of additional costs and the lack of supplier base. SPP also risks:

- developing supplier monopolies on key products and services, which in turn can deter innovation and entrepreneurship elsewhere in the market;
- capture by vested interests as a result of non-transparent selection processes;
- being constrained by lack of capacity in the public sector.

Experience of SPP in developing countries suggests that initiatives should:

- identify and prioritise high-impact goods and services rather than taking a 'blanket approach' to public procurement;
- consider pilot initiatives to build capacity in local and central authorities and ensure multi-stakeholder collaboration between the public and private sector from the outset;
- provide the markets with advance information on future needs, and early engagement with potential suppliers so they can adjust their business models in good time;
- include incentive-based instruments as part of the SPP programme to encourage on-going competition between suppliers.

GG Policy Instrument 3: Shifting subsidies from "brown" towards green growth

Overview: In many developing countries, products such as energy and water are subsidised by governments on the basis that they are key inputs for productive activities, or that they provide basic human needs. Subsidies can include direct financial transfers, preferential tax treatment, and provision of services by government at less than the actual cost. The aim of these subsidies is variously to assist poor households, to reduce prices for end users, to buffer shocks from global price spikes, or to promote development of certain productive sectors. In some cases, subsidies can form a large part of government budgets.

Relevance to green growth in developing countries: Where existing subsidies support the "brown" economy, the challenge is to reform subsidies towards the green economy instead. In the short-term, reducing any subsidy may depress production and consumption as it will raise prices and costs of production. Most single country macroeconomic studies that model the impact of subsidy reform (or associated increases in energy prices) in developing countries find that both GDP and employment are likely to decline, and that the poor are particularly affected (ESMAP, 2004; IFPR,I 2011). In the longer term, however, reduction of subsidies may encourage greater efficiency in production, and force a more rapid rate of technological change (Ellis, 2010). Subsidy reform can also free up funds for governments to spend on actions that can promote growth, such as infrastructure development and human capital development.

Fossil fuel subsidies can lead to higher levels of consumption and therefore emissions, making it harder for more renewable energy options to compete. Energy subsidies affect investment decisions on physical plant that typically has long lifetimes. The subsidies lead to selection of more energy-intensive plant and so high energy consumption is entrenched for a long period into the future (Bacon *et al.*, 2010). It is notable that energy efficiency in non-OECD countries tends to be lowest where subsidies are the highest (Ellis, 2010).

However, in a developing country context, GHG emissions may not be high in absolute terms and their reduction may not be as high a priority as other more local environmental impacts. Moreover, there is the possibility that removing subsidies on fossil fuels could lead to greater use of biomass with potential adverse effects for forests and emissions from forest degradation and indoor air pollution (Ellis, 2010, citing von Moltke *et al.*, 2004).

This issue is on the current agenda of the G20 countries, who on 25 September 2009 stated they "commit to rationalise and phase out over the medium term inefficient fossil fuel subsidies that encourage wasteful consumption" (G20, 2009). A key challenge in this effort will be finding effective alternative mechanisms.

Uptake in developing countries: There are many examples of countries taking measures to phase out energy subsidies, including Indonesia, Colombia, Ghana, Malaysia, Turkey, Zimbabwe and Iran, but they often encounter difficulties. Even those that are successful initially tend to unravel as elections loom or world prices increase.

Impacts: Most recent studies of subsidy reform have focused on the implementation process, the package of complementary measures, and the factors leading to the abandonment of the policy reform or to its maintenance. There has been very little *ex post* analysis of its impact partly because few reforms have remained in place long enough for impacts to be detectable. Evidence from Indonesia is useful, however (Box 3.5).

Box 3.5.The impacts of fuel subsidy reform in Indonesia

In 2005, the Indonesian Government concerned about the increasing pressure that fuel subsidies were placing on the state budget increased household fuel (gasoline, kerosene and LPG) prices in March and then again in October by an average of 29 per cent and 114 per cent respectively. These increases were accompanied by a number of welfare programmes to reduce the impact on the poor such as cash transfers and improved health services as well as a public information campaign to raise awareness about these compensating benefits.

Securing public acceptance: The unconditional cash transfer programme that accompanied the subsidy reform, designed to pay around USD 10 per month for six months, was considered a success both in terms of making the public aware of the efforts to assist low-income households and the high level of satisfaction reported by recipients of the transfer. Unlike earlier attempts at subsidy reform, there were no major riots. However, there was some unrest associated with dissatisfaction of non-qualifying families about the village officials' selection procedure.

Benefits to low-income households: Targeting of the cash transfer to low-income households is considered to have been fairly accurate. It is less clear whether the compensation was sufficient to offset the rise in households' living costs. Government statistics on the percentage of people below the poverty line showed a slight increase from 16.66% in 2005 to 17.75% in March 2006, compared to predictions that the subsidy reform without an accompanying cash transfer programme would lead to a rise in the poverty rate to 22%. But village leaders and officials were more concerned about the temporary nature of the cash transfer and its focus on consumption rather than productive capacity – the subsidy provided "fish rather than a fish-hook" (Hastuti *et al.*, 2006).

Reduction of the fiscal deficit: The reduction in fossil fuel subsidies saved the government USD 4.5 billion in 2005 and a further USD 10 billion in 2006. The associated cash transfer programme cost about USD 2.3 billion excluding organisational and administrative costs.

Source: Beaton, C. and L. Lontoh, (2010), *Lessons Learned from Indonesia's Attempts to Reform Fossil-Fuel Subsidies*, Global Subsidies Initiative, International Institute for Sustainable Development, Winnipeg.

Lessons learned for moving forward: The main risk involved in subsidy reform is that the short-term effect on certain groups of the population will be socially and politically unacceptable, leading to social conflict. Subsidy reform therefore needs to be accompanied by social protection measures targeted at the poor, such as means-tested social safety-net programmes, cash transfers and other measures to protect low-income consumers from the increase in energy prices (Laan *et al*., 2010). Also needed are measures to facilitate the transition to green alternatives or to increased efficiency in resource use for both consumers and industry for example through credit programmes or support to research and development on clean, resource-saving technologies

GG Policy Instrument 4: Environmental taxes/environmental fiscal reform

Overview: A range of fiscal instruments can be good for the environment *and* raise revenue for governments. They include taxes or royalties on natural resource extraction, and user charges for services such as water supply and waste management to recover costs. Pollution charges can provide incentives to reduce pollution while also raising revenue for governments. Subsidy reform (GG Policy 3) may also be closely linked.

Relevance to green growth in developing countries: Tax instruments, including taxes, fees, subsidies and tradable permits, have been used extensively in developed countries in a wide range of environmental domains. As market-based instruments that make use of price signals and incentives, these environmental tax instruments (ETIs) can more closely achieve environmental goals at a lower cost to society than older command-and-control instruments such as quotas and mandates.

Environmental taxes can increase efficiency in environmental management and the use of natural resources. For example, taxing the emissions to air or to water of an industrial activity provides a continuing incentive for innovation in production processes to reduce emissions. The resulting improvements in environmental quality can support those productive activities which rely on

environmental inputs, for example clean water provision, and build up human capital through positive impacts on health. The revenue raised can be used for environmental and poverty reduction programmes and/or to reduce the taxes imposed on labour and capital which have more negative distorting effects. This is the so-called double dividend.

Uptake in developing countries:

- *Taxes and royalties* on extraction of publicly-owned natural resources – such as minerals, timber, and fish – are very common for revenue-raising but are often considered to be set too low. This reduces the potential for raising revenue and may discourage careful resource management. Less common is the attempt to link taxes and royalties directly to environmental goals. For example, Cameroon 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). As well as changing the fiscal structure, for example shifting the tax basis from the product to the area of the concession, the new regime has introduced auctioning of harvesting rights, regulations limiting the area that can be harvested to 1/30th of the concession area, and a ban on log exports (*ibid*). The impacts are discussed below.
- Setting *user charges* to ensure cost recovery has been common in the water sector, although often as part of increasing private sector participation as a means of improving finances in the sector. Marin (2009) has identified 65 developing countries that have embarked on water public-private partnerships over the past two decades; however 24 of these countries had reverted to public management by 2007 – see below under "Impact".
- *Pollution charges* are less common. Well-known examples are (1) the Chinese pollution levy introduced in 1982, generally considered to have been set too low to influence polluter behaviour (Yun Ping, 2003); and (2) the Colombia water pollution charge which operated at a national level until 2003, when difficulties in securing the compliance of municipalities led to it being drastically scaled down (Acquatella, 2009).
- Some countries operate *product charges* primarily for revenue-raising purposes, for example the fuel tax in Costa Rica, a portion of which provides funds for the national payment for environmental services scheme (Porras *et al.*, 2008).

Impact

Because these instruments are particularly context-specific, it is not useful to make general assessments of their impact. Instead, we offer case studies that illustrate some of the potential positive and negative impacts:

Natural resource taxes and royalties: The World Bank (2005) presents the Cameroon forest sector reform as a positive case study of environmental fiscal reform. 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. A later evaluation of the reform finds that since 1992 the tax burden has increased significantly for all types of wood products, although the sector continues to provide substantial revenues for the government despite the fact that commercial harvests declined by more than 32% (Topa *et al.*, 2009). Employment also increased slightly with a greater share going to processing. In 1998 a provision was introduced, requiring 50% of the area tax to be shared with local councils and communities, but major difficulties in ensuring a fair and efficient allocation system remain (*ibid*). 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.

User charges: The impact of user charges has often been examined in the context of private sector participation and there can be difficulties of attribution. For countries that are considered to have had a successful experience of PPP (Chile, Colombia, Côte d'Ivoire, Morocco and Senegal), PPP was part of a wider sector reform to support financial viability and accountability and there were already clear policies to move towards cost-recovery tariffs in a sustainable and socially acceptable manner (Marin, 2009). Many PPP projects in West Africa inherited tariffs that were relatively high for developing countries and already quite close to cost recovery levels (Marin, 2009). Guinea Conakry's water utility was an exception as tariffs were well below cost recovery levels and as related in World Bank (2005) it was in a low level equilibrium trap – a chronic shortage of funds leading to insufficient investment in infrastructure, degrading of service provision, lowering willingness to pay and hence revenue. A solution was devised to enable attraction of a private sector operator, the tariff was increased only gradually and the shortfall in revenue made up from an initially high but declining subsidy from the government. In the first six years there was marked improvement in access and 600,000 people gained access to piped water. The arrangement with the private sector operator did not work out however for reasons to do with difficulties in coordinating civil works between the private operator and the public asset-holding company. One of the problems was that the price of water became very high due to low collection rates (Menard and Clarke 2000). The contract was not renewed after its expiration in 1998 and management reverted to the public sector (Marin 2009). In other countries, the success of PPP might mean that tariffs go down in real terms as a result of greater operational efficiency: for example, in Gabon tariffs fell by 50% in real terms (Marin 2009).

Pollution charges: The Colombia water pollution charge provides an example of the potentials and pitfalls of these charges. By 2002, 24 Corporación Autónoma Regional (CARs) regional environmental regulatory authorities were invoicing companies and municipalities discharging wastewater into their watershed) and 21 were collecting payments. Some companies responded to the charge by improving their pollution abatement. One chemical company estimated the annual pollution charge 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 (ECLAC) revealed other significant accomplishments: the generation of approximately USD 15 million since the initiative's inception, low administrative costs (approximately 15% of collected charge 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, 2009).

Lessons for moving forwards: The main risk involved in environmental taxes and charges is that the revenue-raising goal may take precedence over the environmental goal. The case studies show that the context in which the environmental tax is introduced and the *package of accompanying reform measures* are extremely important. Thus, in Cameroon, forest fiscal reform provided revenue to help enforce and implement measures for sustainable forest management, but accompanying measures were needed to establish revenue-sharing with local government and challenges still remained in ensuring that benefits reached local communities. Also, Blackman (2006) argues that the reduction in water

emissions in Colombia may have had more to do with the improvements in permitting, monitoring and enforcement that accompanied the introduction of the pollution charge, than the charge itself. A recent study on Southeast Asia indicates that ETIs are at an early stage of development in ASEAN countries but have great potential to support the region's objectives for green growth (OECD, 2012). Wider use of ETIs will depend in part on further development of ASEAN tax systems and improvement in environmental information bases and standards. Use of ETIs is constrained by the more limited development of tax systems compared to developed countries, by the extensive use of subsidies on fuel in some countries, as well as by concerns over their effects on poverty and international competitiveness. This will present a key area of co-operation among ASEAN countries and with their development partner countries and institutions, which could bring considerable benefits in supporting green growth in the region.

GG Policy Instrument 5: Green energy investment frameworks and incentives

Overview: Green investment will require the development of a sound framework of fiscal, financial and legislative instruments. This is particularly the case in the energy market, which requires significant government support for renewable energy to establish an initial market share, to gain access to the national electricity grid and other energy infrastructure; and to attract investment. These framework policies include:

- *Key investment principles*: These should be applied to entry, establishment, mergers and acquisitions, and investment incentives in green energy sectors. Domestic investment policy also needs to be attractive to foreign investors, given that developing countries depend to a large extent on foreign investment.
- *Introducing stronger competition in countries' energy – and especially electricity – sectors:* This can have substantial positive effects on green energy investment if properly managed. Countries such as Kenya and Uganda, that have opened their power generation sector to independent power producers (IPPs), have managed to increase both the amount of electricity generated and the share of renewable energy in the national energy mix. Power sector restructuring by separating generation, transmission and distribution services, for instance, can have a significant effect on electric power technologies, costs, prices, institutions, and regulatory frameworks. Such unbundling can create more space for renewables in the national energy mix. Similarly, deregulating power generation and taking the step towards wholesale power markets can allow IPPs to compensate for biases that traditional utility monopolies may have against renewables. Opening the generation sector to IPPs can also favour green and decentralised private sector-led solutions to energy access, since connecting isolated rural communities to the grid is often costlier than off-grid investments.
- *Subsidy reform* measures which aim to remove, reduce or phase out fossil fuel subsidies and so influence the relative competitiveness of renewable energy (see section above).
- Improving PPP legislation and increasing public sector capacity to deal with such arrangements. The guidance provided by the OECD Principles on Private Sector Participation in Infrastructure can be helpful in this respect.
- *Financial sector regulation* also has a strong influence on the extent to which large investment projects can access private funding. In general it is difficult for renewable energy projects to obtain private finance, given the perceived risky nature of the investment. Moreover the tightening on bank lending introduced by Basel III is making it increasingly difficult for green investors to rely on bank loans.

Relevance to green growth: With global investment in renewable energy expected to reach USD 343 billion by 2020 and USD 630 billion by 2030 (Asian Development Bank, UNESCAP and UNEP, 2012), green energy investment offers huge potential for growth in developing countries, many of which have more appropriate conditions for renewables. In developing countries, where connecting isolated rural communities to the central electricity grid is often costlier than decentralised off-grid investments in renewable energy, investments that promote both clean energy development and wider access to energy can be cost-effective options that can contribute to poverty reduction, reduce GHGs, and stimulate economic activity.

Uptake in developing countries: The majority of developing countries have renewable energy expansion targets, which are often very ambitious. For example, South Africa aims to install 1 million new solar water heaters by 2014, Guatemala is hoping to have 60% of its total electricity generated by hydro and geothermal by 2022, and India's ambition is to install 20 000MW of solar power by 2020. Such targets are usually linked with renewable energy plans which lay out the set of policy measures being put in place to achieve the targets. Policy measures include (REN21, 2011):

- renewable energy funds (in 26 medium and low income countries);
- capital investment subsidy, grants or rebate (about 20 medium and low income countries);
- tax credits on investment, import duty reductions and other tax incentives (39 medium and low income countries);
- feed-in-tariffs (30 middle and low income countries have these in place, or plan to introduce them; see Box 3.5);
- renewable quota or renewable portfolio standard – where the government obliges utility companies to provide or use a pre-determined minimum share of renewable energy sources (only seven middle and low income countries are using these);
- mandates for installing solar hot water in new constructions: India's nationwide energy conservation code requires at least 20% of water heating capacity from solar in residential buildings, hotels and hospitals with centralised hot water systems; in Brazil, the *Minha Casa Minha Vida* programme is targeting 300 000-400 000 solar water heaters in social housing projects.

Impact: In most cases, the biggest challenge is to take renewables to scale. Financial innovation and private sector involvement are the two main factors that tend to explain high rates of uptake (Palit and Sarangi, 2011). For example, solar PV technologies in Bangladesh, Sri Lanka, Nepal and India were successfully scaled up through access to capital, development of effective after-sales service, customer-centric market development and regular stakeholder involvement (Palit and Sarangi, 2011). However, there have been difficulties in reaching low income households, for whom high interest rates are a barrier (Palit and Sarangi, 2011). Nevertheless, Bangladesh's *Grameen Shakti Renewable Energy Scheme* supports the uptake of solar home systems in off-grid communities through micro finance loans and after-sales support . More than 850 000 systems have been installed to date, with installation continuing at a rate of more than 20 000 per month. In addition to the energy benefits, Grameen Shakti has created thousands of jobs in energy and related businesses (see *www.gshakti.org*).

Box 3.6. Thailand's experience with renewable energy promotion

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 MW had supplied power to the grid, but of this only 14% 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 led to 20 new SPPs with capacity of about 240 MW – all of them biomass projects as these were cheaper than other renewable energy projects (Ruangrong, 2008). In 2006, the government set a target of 530 MW for purchase 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 : *www.palangthai.org*, accessed March 2012; 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.

Lessons for moving forward: Green energy technologies and investment patterns are still developing, and thus risks and challenges include:

- *Unpredictability of green investment flows.* Green investors rely on project finance even though there are significant risks associated with their initiatives (which are R&D- and capital-intensive, subject to environmental hazards, involve long pay-back periods, etc.). These risks can ultimately deter financial sponsors, making risk mitigation instruments for green investors crucial.
- *Limited sources of private green investment.* While investments from pension funds and institutional investors have high potential in developing countries, their involvement has been limited to date.
- *Renewable energy systems can be prohibitively expensive for the poor*. Policy makers should explore alternative models to that of ownership. For example, TERI's Light a Billion Lives programme in India sets up solar charging stations in poorer villages and rents out lanterns on a daily basis.[2]

Green investment strategies should therefore consider:

- *Greater linkage with carbon financing* – A review of solar energy programmes in South Asia estimates that at a carbon price of USD 12/t CO_2, around 1% of the cost of solar heaters can be recovered annually through sale of Certified Emission Reductions (CERs) – this money could be used for post-installation maintenance (Palit and Sarangi, 2011). But they note that although there is huge potential only a few projects in South Asia have accessed the carbon market. This is because of transaction cost barriers given the small size of the emission reductions per system.
- *Introduction of renewable energy certificates (REC) for off-grid power systems* –state utilities with renewable purchase obligations could meet them in part by buying REC certificates from owners of off-grid systems (Palit and Sarangi, 2011).

GG Policy Instrument 6: Certification of sustainable production and trade

Overview: Since the 1990s there has been a marked increase in the range of certification schemes in both developed and developing countries, notably in the forest, agriculture, fisheries and tourism sectors. A more recent development is the introduction of schemes to certify good practice in new ecosystem service markets, in particular reducing carbon emissions. The global demand for many certified products has been growing rapidly, driven largely by consumer concern to avoid purchasing goods that damage the environment.

Typically, a certification scheme consists of the following elements:

- A s*et of standards* for what constitutes best/acceptable practice, usually agreed through a multi-stakeholder process.
- 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.
- *Labelling* of the product so that consumers can identify it.

Relevance to green growth: Certified "green" products in the marketplace can increase their market value and share for participating producers, thus contributing to economic growth while improving environmental practices and helping to ensure the long-term sustainability of the resource.

Uptake of certification in developing countries: Uptake has been limited for most certified products: in developing countries 1.2 million hectares have been certified as of 2010 by Fairtrade (FLO 2011); 13.4 million hectares are certified organic (Willer *et al.*, 2011, and 1.3 million hectares are certified under the Roundtable on Sustainable Palm Oil (RSPO www.rspo.org). While the majority of certified agricultural land is in developing countries, it represents only a tiny fraction of total cultivated land in those countries (Willer *et al.,* 2011). Of the total area of certified forest land, only about 5% is in developing countries (FAO, 2011; ITTO, 2011).

Impact:

Social: Many studies have investigated the 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 'organisational progress' 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).

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 practice such as riparian buffer zones, 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 in their review of impact studies of organic certification (213 of which examined environmental impacts) find overwhelming evidence for wide-ranging environmental benefits of organic agriculture over conventional agriculture but many of these studies are from developed countries.

Economic: The conversion period for organic certification can mean a decline in yields in the short term. This has proved problematic for smallholders, but they tend to recover over time. Schemes such as Fairtrade have been shown to provide an important economic safety net when prices are low, though minimum prices have declined in real terms and may need adjustment (Blackmore *et al*., 2012). Case studies on forest certification in Malaysia (Shahwahid, 2006), Indonesia (Muhtaman and Prasetyo, 2006) and Solomon Islands (Wairu, 2006) reported premiums on certified timber products, suggesting market benefits of certification.

***Lessons learned for moving forward*:** The main risk posed by certification is the requirements these schemes impose on producers, which 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 help the situation, the Forest Stewardship Council, RSPO and Fairtrade are working on group certification, step-wise approaches and other means to include smaller and/or less organised players. However, the continued proliferation of environmental and social standards creates a complicated and demanding policy arena, sometimes necessitating numerous reporting requirements.

In order for certification to become a viable green growth policy tool in developing countries, policymakers need to consider the following:

- How to ensure that schemes 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.
- How to increase *demand for certified products* while retaining the appropriate degree of rigour in the standards and assessment.
- How to ensure that *smallholders* can access and benefit from certification, and that certification supports the potentials of the informal economy without requiring it to be formalised.

GG Policy Instrument 7: Green innovation

Overview: Innovation, in its broadest sense, is one of the keys to ensuring that environmental improvements can be obtained without sacrificing economic growth. It embraces not only the development and diffusion of new and patented technologies, but also technology collaboration between countries and different groups, and new approaches to planning and work practices ("soft technology") that can also contribute to greener growth.

Relevance to green growth: As many developing and emerging economies are still in the process of establishing their infrastructure, energy systems and transport systems, there is an imperative to innovate towards greener solutions from the outset. Frugal, low-cost innovation makes products accessible for a larger share of the population in ways that are also often greener than other products. There are also important market opportunities for green innovation: 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. Indeed, innovation and profit, together, may have more potential to drive green growth in the business sector than the more limited notions of corporate social responsibility (CSR).

Evidence of impact: There has not yet been a major process of green technology transfer from developed to developing countries, or between developing countries; indeed this is one of the enduring complaints of developing countries in international negotiations on climate finance and its use. The

lack of strict environmental and climate legislation in developing countries is not the only explanation for the lower rates of climate-mitigation technology transfer to these countries, as there is a similar pattern of low diffusion for all technologies. More general factors such as openness to trade and foreign direct investment, the intellectual property rights (IPR) system, and local absorptive capacities (*e.g.* human capital) also help to explain why technology diffusion is concentrated in developed countries. The search for solutions to global challenges would benefit from a closer involvement of the developing world in science and technology co-operation, and from the building up of research and technology capacity in these countries.

South-South flows of green technology are increasing, *e.g.* in plantation technology from Brazil, and solar power from China. But "softer" forms of innovation are more notable. For example, bottom-up, frugal *Jugaad* improvisation approaches from India are attracting interest, where readily available technologies are merged in ways which produce new and low-cost solutions (Radjou *et al.*, 2012) – doing more, with less, for more people. These and other "base of pyramid" innovations are often led by social enterprises (see Policy Instrument 8), in sharp contrast to the highly structured and costly corporate innovation processes in developed countries. Community management regimes for common property resources, for both public and private benefit, have improved around the world, thanks to networks in which developing countries play lead roles.

Lessons for moving forward: Green innovation is an area of huge potential for developing countries. A systematic approach is desirable: a focus on isolated technologies can prove to be much less effective than developing ways to improve systems – energy, transport, value chains, etc. – and then linking innovations as nodes in the new system. Innovation is prone to a number of other risks:

- large-scale innovation projects can struggle to match local skills and capacities;
- there is still uncertain evidence as to the numbers, quality and sustainability of "green jobs" that can be created as a result of green innovation – much of which is designed to be labour-saving;
- development of green technologies is at risk if policy signals change too much, which dissuades potential innovators and adapters from undertaking the necessary investments.

Policies to foster green innovation in developing countries need to be adjusted to national circumstances, but should include:

- applying price signals more widely to reflect the true value of natural resources and the costs of pollution, and thus provide incentives to encourage innovation;
- focusing the national public R&D effort more on fostering green innovation, notably for local needs such as water scarcity, soil loss, etc. – all of which are also important for green growth;
- strengthening local capabilities to absorb technology from abroad and adapt it to local needs – some of this will include non-patented technology that is embodied in equipment purchased;
- 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;
- developing multi-stakeholder strategic fora on green innovation, particularly at national level, bringing together both informal and formal innovators.

GG Policy Instrument 8: Inclusive green social enterprise

Overview: Social enterprises aim to generate both economic and social benefits from their operations. These enterprises span the divide between non-profit and for-profit business models, often emerging from NGO or community initiatives.

Relevance to green growth in developing countries: Increasingly, social enterprises aim at achieving "triple bottom line" economic, social and environmental returns, and thus address many of the green growth criteria that are important to developing countries. Social enterprises that focus on overcoming technological challenges or cost barriers contribute to innovation are an important driver of green growth. Many offer opportunities for small-scale producers and microenterprises, including those operating outside the formal economy, and thus contribute to poverty reduction and improved livelihoods. Social enterprises can teach more traditional profit-oriented business about the potential benefits of a more socially and sustainably-oriented approach.

Uptake in developing countries: Social enterprise has been a major aspect of the work of environment and development NGOs and community organisations throughout the developing world for decades. Large NGOs such as BRAC, Practical Action, International Development Enterprise (IDE), and Development Alternatives in India (see Box 3.7) have nurtured hundreds of small enterprises that have generated numerous social and environmental co-benefits. Community-based social enterprises exist throughout the world: examples range from Nature Seekers in Trinidad (McIntosh *et al.*, 2008), which turned the protection of nesting sea turtles into a profitable ecotourism enterprise generating jobs for unemployed youth; to ASMARE, a co-operative of informal waste pickers in *Belo Horizonte*, Brazil that now operates a major recycling enterprise for the city (Diaz, 2011).

Social enterprises are becoming increasingly common in the private sector also, particularly in countries with large demand for green or socially oriented products and services. For example, a number of alternative energy enterprises in India, such as SELCO, NEST and SKG Sangha, have a strong social and environmental mission that pervades their business plans.

Programmes such as the Ashden Awards for Sustainable Energy and the SEED Initiative (http://www.ashden.org/ and http://www.seedinit.org/) have highlighted the potential of social enterprises, the scale that is achievable and the challenges they face, many of which stem from the hybrid nature of these enterprises. They require different finance mixes than other enterprises, often including grants and donations to open up new markets and reach poor target beneficiaries. Their start-up costs are often steep and include skills development for their product and service providers, access to technological capacities and resources, and marketing support. They often fall into a policy vacuum between the regulatory and support structures for NGOs or community groups and those for private businesses. In virtually all countries, social enterprises must decide whether to be registered and operate as a non-profit or a for-profit company; there is no legal category for social enterprise. Although grants are available to NGOs for innovation of green products/services and incubation of delivery models, a grant-based model is not always sufficient for continuity and scaling up – a business approach to growth is needed.

Box 3.7. Case study of a green social enterprise: Development Alternatives Group, India

Development Alternative (DA) Group's belief in the power of enterprise and the utility of the market to achieve social and environmental goals has led to the establishment of its own green businesses. These businesses are designed to trail-blaze low-carbon and resource-efficient pathways to inclusive growth in areas such as rural housing, renewable energy, water management, sustainable agriculture, waste management and recycling, from the local to the global scale. Technology and Action for Rural Advancement (TARA), a part of the DA Group, has been incubating decentralized micro-enterprise based models working in these diverse fields.

The DA Group's social enterprises have made a portfolio of development services available to poverty stricken communities in over 150 villages in the Bundelkhand area of Central India. In circumstances where oppressive social structures and extreme environmental degradation had held back development, these enterprises have delivered:

- Empowerment: 1.3 million people can access their entitlements.
- Clean technology: 50 000 affordable houses built using eco-friendly materials and elements.
- Basic needs: 60 000 rural women able to read.
- Green jobs: 1 million green jobs created.
- Enterprise development: 1.25 million school children running 48 000 environmental initiatives.

Keys to success include:

- Being rooted in the local economy, ecology, and society – investing in mobilising the skills and resources of a local economy, and exploring the needs of the majority.
- Business growth and recycling local assets – generating business solutions that grow using local natural, human, knowledge and financial capital with a specific input of external grants and technology transfer.
- Aiming to inform government policy and practice as much as people's livelihoods – there is evidence of national natural resource inventory and policy being improved.

Source: Development Alternatives, www.devalt.org.

Lessons for moving forward:

- *Social enterprises need policy frameworks that recognise their special characteristics:* Neither for-profit nor non-profit legal status can offer these enterprises the kind of policy support that is fully appropriate to their needs or help in their integration into the mainstream economy. Governments should consider developing "social enterprise" institutional and policy frameworks that include appropriate tax regimes and incentives, business support programmes that are tailored to the needs of the sector, and access to public sector technological expertise and R&D.
- *Social enterprises need to draw on both non-profit and for-profit finance models:* These enterprises face unrecoverable start up and scale up costs related to their social and environmental missions, on top of the typical finance needs of any business. They will need to draw on grants, commercial loans, "soft" loans and investment at relevant phases in their development – but they need an enabling environment which supports this.
- *Social enterprises may need protection and incentives to maintain their market share and social objectives:* Success for social enterprises can be a double-edged sword, as it can attract larger, less socially oriented competitors that can threaten the enterprises' viability or adherence to triple bottom line principles and practices. To preserve the co-benefits generated by social enterprises, it may be necessary to introduce regulations and instruments that protect them from undercutting competition and encourage their attention to generation of co-benefits.

3.5. Green growth institutional mechanisms for continuous improvement

Generated in an evidence-based, participatory way, a national green growth strategy based on mainstreaming green growth goals into the main development plans (as described in Section 3.1) is indeed a good way to draw together analysis, recommendations and operational plans involving many mainstream actors. However, creating a stand-alone strategy as the only vehicle for green growth risks privileging certain actors and immediate opportunities, side-lining other possible actors and future activities. There is evidence that other mechanisms are as important for integrating environmental and economic objectives.

Green growth will not occur overnight; it will require gradually building the institutions and systems that link environment and development goals and stakeholders. In this section we introduce four types of cross-cutting mechanism that together could be catalytic in mobilising stakeholders, tracking, planning, budgeting and accounting for green growth in a way which is holistic and supports continuous improvement. These steps are an essential complement to what might otherwise be a "paper plan" approach.

For example, learning groups of national experts in finance, development, environment and poverty reduction in a range of developing countries have revealed several effective entry points for integrating development and environment interests (Bass, 2010). Such mechanisms should help to shift planning towards outcomes such as wellbeing and away from "priority" sectors or single targets. They place greater emphasis on longer-term and cross-cutting planning, and on assets and wealth, not only flows and income.

Four mechanisms that have proven particularly valuable or promising are listed below and discussed in greater detail in the remainder of this section:

- *National councils for sustainable development* are good multi-stakeholder planning and review mechanisms; given their prevalence in many countries, there is potential to develop some of these into "green growth councils", or to set up new green growth councils.
- *Green accounting* mechanisms that keep track of stocks and wealth, and offer information on if and how growth contributes to wealth. There is particular need for natural capital or environmental accounting, perhaps on a step-by-step basis according to priority issues. This links to initiatives to measure development differently, beyond GDP.
- *Public budget and expenditure review processes*, especially those that include environmental and climate change questions and provisions; the lessons of dedicated public environmental expenditure reviews can be built on to assess the wider outcomes for green growth.
- *Assessment mechanisms that identify policy trade-offs and synergies* – countries have found enhanced cost-benefit analysis, multi-criteria analysis, 'robust decision-making' and strategic environmental assessment to be effective. Here, we focus on SEA as its added value has been well proven.

GG Institutional Mechanism 1: National Councils for Sustainable Development

Overview: The Brundtland Commission report (WCED, 1987) suggested that countries may "...consider the designation of a national council or public representative or 'ombudsman' to represent the interests and rights of present and future generations". This prompted the 1992 Rio Earth Summit to call on all countries to establish multi-stakeholder structures and mechanisms to follow up on

commitments made through Agenda 21. These are generally known as National Councils for Sustainable Development, or NCSDs.

Relevance to green growth: NCSDs could be very helpful in making the transition to green growth. They already provide a valuable mechanism for a co-ordinated and principled working relationship among government, business and civil society. They can facilitate the integration of the multiple dimensions of sustainable development into planning and strategy formulation, policy making, programme implementation, and monitoring and evaluation (M&E). They can provide a critical means for reconciling priorities at local to national (and global) levels, facilitating the translation of global commitments into national and local initiatives and SD priorities into concrete policies and actions. And many NCSDs have served as forums for resolving conflicts among different interest groups, facilitating alliances for private-public action and investments (Antonio, 2009).

Uptake in developing countries: By 2002, some 100 NCSDs had already been created worldwide, and many more Councils for Sustainable Development (CSD) have been created at various levels and sectors since then. A majority of developing countries have established CSD and Commissions, variously by presidential or ministerial decree or cabinet decision, and sometimes by law. However, their work has more often been focused on environmental governance issues than economic governance. It is useful to recall that the Brundtland Commission also stressed that "what is needed now is a new era of economic growth – growth that is forceful and at the same time socially and environmentally sustainable". It is suggested that these same NCSDs, or similar mechanisms, now need to attend more to growth issues, as Brundtland originally intended.

Impact: CSDs have a wide range of *constitutional bases* (see above). Those created under legal statute are more permanent, have greater power and influence, and are highly stable. Where a CSD is a political entity, it can easily be used differently or abolished (if not created by law) or made moribund by new government administrations with a different agenda. The Philippines CSD is a good example which illustrates the above strengths and weaknesses. It led the way in framing the ambitious Philippines Agenda 21 sustainable development plans, and 18 local level equivalents. It established multi-stakeholder dialogue as a norm for ambitious development plans, with stakeholder groups nominating their own representatives, and gave rise to a parallel civil society PCSD with equal status. It became a model for setting SD governance arrangements and agendas, and the PCSD has since been asked to mentor a number of other countries (Antonio, 2009).

Lessons for moving forward: It is clear that some kind of high-level, multi-stakeholder, policy co-ordinating and review body will be desirable for green growth. Given the newness of the green growth concept, the asymmetry of information, and the increasing number of (international) institutions proposing particular approaches – not all of which will be suitable – a national body may well be needed to "own" a national green growth strategy and manage its continuous improvement. One good start might be the kind of multi-stakeholder green economy dialogue process used by the Green Economy Coalition. 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. None the less, lessons from existing NCSDs can be useful for setting up something more specifically suited to green growth:

- *Leadership is critical to success:* The NCSD should include the highest level of leadership (e.g. President or Prime Minister) – this is essential. However, it should also include a minister with an oversight function (e.g. planning or finance). "Champions" beyond the chairperson (from amongst all stakeholders) can play a key role in pushing the agenda of the NCSD and strengthening its relevance and indispensability.

- *Clearly stated role and function:* Conflict or duplication of functions with other bodies results in confusion and "forum shopping" by other interest groups. Eventually, this can render the NCSD inactive. Hence, it is imperative to clearly identify the niche or appropriate roles and functions of the NCSD vis-à-vis other existing bodies to make it relevant and stable.

GG Institutional Mechanism 2: Green accounting processes and alternative development measures "beyond GDP"

Overview: The idea of integrated environmental and economic accounting has long been recognised as a crucial ingredient for development policymaking, on the basis that measuring growth using GDP can be misleading if the capital base on which GDP growth depends is being undermined. The Rio Earth Summit proposed a programme to develop national systems of integrated accounting in all countries (Bartelmus, 2007).[3] While a range of resource and wealth accounting approaches has developed, we use the term "green accounting" in a more general sense to refer to the integration of environmental and social information into systems of national economic accounts with the aim of giving a more accurate picture of the state and progress of the economy.

Relevance to green growth: The maintenance of living standards or quality of life requires the constant or increasing *per capita* production of goods and services, which implies, in turn, the maintenance or enhancement of the capital base (Pearce *et al.*, 1996). A central concern underlying the analysis of conventional national accounts is the relation between income and capital and the need to ensure that increases in consumption do not reduce the capital base (Bartelmus, 1997). However, this is focused on produced capital only – notably financial and built capital. Extending the concept of capital to other types of assets: natural, human and social – and particularly to natural capital, some of which is non-substitutable – helps to answer two key questions: (1) can growth be sustained over time or are we living off our capital? and (2) how is the portfolio and composition of our capital changing? Development in most nations involves a general shift over time in the composition of the portfolio from natural to produced capital, but that portfolio is rarely tracked in detail. Only some aspects of produced capital are measured in the conventional national accounts.

For developing countries the challenges of setting up green accounting are daunting. This could be tackled at various levels of ambition, including:

- Compiling physical accounts of important assets, *e.g.* forest and fisheries stocks and off-take and growth rates (see Namibia example below). Integrating these physical accounts with national systems of economic accounting to indicate trends in, or sectoral comparisons of, resource efficiency and emissions intensity of GDP.
- Integrating physical account data into macroeconomic models for economic planning and policy analysis.
- Conducting an economic valuation of ecosystem services, losses or enhancement in different locations to build up an evidence base.
- Conducting an economic valuation of the changes identified in physical accounts to come up with a single monetary figure for comparison with GDP, or adjustment of GDP to Green GDP.
- 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).

- Changing the basis of accounting beyond GDP towards alternative indices that aim far more squarely at human and ecosystem wellbeing.

Uptake 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, Namibia to Indonesia and the Philippines.

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 of sectors according to the sectoral value-added or sectoral employment per cubic metre of water used. The accounts showed, for example, a trend of producing less national income for a given amount of water in 2001/2 than in 1997/98 (DWAF, 2006).

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 account for the depletion of natural resources and the costs of pollution, and also reward additions to the stock of human capital. In a series of studies covering different environmental aspects the project has attempted to adjust national and state accounts for different types of environmental loss and the contribution of education over a 10-year period. It has estimated that natural resources losses in India in 2002/3 were equal to 4.2% of GDP (Gundimeda, 2011). The project informed the system of fiscal transfer to states for forest environmental services that was set out in the 13th Financial Commission (Gundimeda, 2011).

In 2002, satellite accounts for physical accounting of land, forest, minerals and water were established to complement the ***Chinese*** System of National Accounts. The high rate of growth in China was prompting concerns that this economic success might be at the expense of the environment. In 2004 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 the fact that losses due to pollution were equal to 3% of national economic output in 2004. This 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 cost of natural capital and social capital on GDP generation (Wenyuan, 2011). The quality index consists of 15 indicators grouped into sub-indexes (*ibid.*; and *The Guardian*, 2011) that are similar to the green growth benefits we list in Chapter 1:

- economic quality, which considers the amount of resources and energy needed to generate a unit of GDP;
- social progress, which includes income inequality;
- environmental quality, which assesses the amount of waste and carbon generated per unit of GDP;
- quality of life, which includes life expectancy and other human development indicators.

Impact: Most developing countries have struggled to maintain national resource accounting initiatives. Although there have been many pilot studies, no developing country regularly publishes officially adjusted aggregate indicators in their systems of national accounts (Alfsen *et al*., 2006).

Lessons for moving forward: Green accounting remains an area of extensive, if isolated, experimentation rather than routine practice. A new World Bank-facilitated partnership, Wealth Accounting and Valuation of Ecosystem Services (WAVES), is aiming to identify and mainstream best practice, in large part to support emerging initiatives such as payments for ecosystem services and green growth plans. OECD country partners of WAVES assert that green accounting is both workable and useful, and does not need perfect data to be in place before making a start.

Above all, green accounting needs to be seen as a means to improve decision making in a variety of areas rather than as an end in itself, such as producing a single green GDP figure. The Commission on the Measurement of Economic Performance and Social Progress has concluded that a single index of progress is not a realistic goal. It proposes instead a "dashboard" approach involving a mix of economic and environmental indicators and with monetary aggregation focused on "items for which reasonable valuation techniques exist such as physical capital, human capital and certain natural resources" (CMEPSP, 2009). Considerable work is needed in most developing countries on the building blocks of green accounting, such as:

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

Finally, lessons can be learned from *stock exchange indices* in some developing countries (Box 3.8), many of which are guided by the United Nations Principles for Responsible Investment (UNPRI), an initiative that focuses on mainstreaming sustainability issues into investors' decision-making processes.

Box 3.8. Green stock exchange indices in developing countries

The Johannesburg 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.

Source: www.jse.co.za/About-Us/SRI/Introduction_to_SRI_Index.aspx; and EIRIS, 2010.

Brazil's BM&FBOVESPA was the first stock exchange worldwide to sign the Global Compact's ten principles in the areas of human rights, labour, environment and anti-corruption in 2004. It then signed the UN Principles for Responsible Investment (UNPRI) 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 (ISE) in 2005, which remains the only sustainability index in Latin America.

Source: www.bmfbovespa.com.br/en-us/bmfbovespa/sustainability/sustainability.aspx?idioma=en-us;
www.world-exchanges.org/sustainability/m-6-2-1.php

Further stock exchanges in developing countries which lead the way include: the Indonesian stock exchange with its sustainability index (KEHATI-SRI); Shanghai's SRI index; the Egyptian Exchange which developed the S&P/EGX ESG Index as the first in the Middle East; and most recently the Mexican *Bolsa de Valores* launched a sustainability index in 2011 (EIRIS, 2010; EIRIS, 2011).

GG Institutional Mechanism 3: Public expenditure review

Overview: A public expenditure review (PER) assesses whether government resource allocations match policy priorities. The data and insights it yields can be valuable for designing policy reforms, government budgets, and investment projects. Improving the PER to encompass green growth criteria, building on the experience of satellite public environmental expenditure reviews (PEER), can help improve how ministries and departments make decisions.

Relevance to green growth: A PEER can be organised 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 exists. PEERs have not routinely been conducted. But they have almost always helped finance ministries and other key economic decision makers to understand the cross-cutting nature of environment. Often they have highlighted the mismatch between environmental policy and plans and levels of spending. And in some cases, they have helped to redistribute spending towards institutions responsible for environmental priorities, towards longer-term goals rather than short-term, and in some cases have helped to considerably increase environmental budgets. 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). Both a stand-alone PEER, and the routine inclusion of environmental questions in PERs, can help to identify progress and priorities for green growth.

Uptake in developing countries:

- In *Madagascar* – A PEER highlighted both a financing gap for the protected area system and 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 *Colombia* a PEER compared current expenditure to the results of a stakeholder survey of upcoming priorities, thereby providing the justification for a major World Bank sustainable development loan (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 the cost of environmental degradation, halving Malawi's net national wealth accumulation; but this is not yet routinely measured (Bass *et al.*, 2011).
- In *Tanzania* the 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 (Aongola *et al.*, 2006).
- In the *Philippines* and *Morocco*, as well as an increasing number of developing countries, specific climate change PEERs are being conducted (World Bank, 2012).

Lessons for moving forward: Past experience of PEERs suggests that there is a wide range of possible uses – environmental effectiveness, fiscal prudence in environmental spending and revenue-raising, and/or management efficiency in terms of making the best investments in the right programmes. A good PEER will be tailored to meet the needs of individual countries. Moving forward, the kinds of questions asked by PEERs might usefully be enriched with green growth criteria. Furthermore, a routine and integrated approach is desirable, mainstreaming green growth criteria into the overall public expenditure review.

GG Institutional Mechanism 4: Strategic Environmental Assessment (SEA)

Overview: Although green growth policies, plans and programmes should have underlying positive environmental aims, the strategic and potentially unforeseen wider environmental considerations still should be assessed and taken into account in an integrated way along with linked economic and social concerns. Indeed strategies and proposals specifically aimed at delivering environmental benefits are often exempt from assessment, despite evidence that they can be poorly thought-through and sometimes counter-productive, and initiatives initially appearing green can, in practice, have negative environmental and social impacts.

Strategic environmental assessment (SEA) is an umbrella term for analytical and participatory approaches to integrate environmental (and linked social and economic) considerations into policies, plans and programmes and assess their potential development effectiveness and sustainability. Its focus on identifying trade-offs among environment, social and economic objectives makes it potentially valuable in assessing whether apparently 'green' policies, or major programmes such as subsidy reform, or the introduction of specific green technologies could have unintended consequences. Its focus 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).

Relevance to green growth: SEA is now one of the most prominent instruments for environmental mainstreaming and its potential to play a key role in both advancing green growth is increasingly being recognised. The International Association for Impact Assessment made "*Transitioning to the Green Economy – contributions of Impact Assessment*" the focus of its 2010 annual conference (http://www.iaia.org/iaia10).

Strategic environmental and social assessment (SESA) – a form of SEA promoted by the World Bank which also deliberately targets social issues – might be the most appropriate for understanding the diverse environmental and social impacts of GG approaches such as REDD+ (Slunge, 2010).

Uptake in developing countries: There is growing uptake of SEA around the world (Dalal-Clayton & Sadler, 2005). Over 60 countries at all levels of development now have legislation, policies, directives or regulations prescribing the application of SEA, and many more are introducing it as part of their policy toolkits. In the *Paris Declaration on Aid Effectiveness* adopted in 2005, donors and partner countries committed to "develop and apply common approaches for SEA at the sector and national levels". In response, the role and potential of SEA in development co-operation was set out in guidance published by the OECD DAC (OECD, 2006), and recent experience of its application in development co-operation is described in a new report by the SEA Task Team (OECD, 2011).[4]

Impacts: Many developing country SEA initiatives are relevant to green growth (OECD, 2011):

- In *Benin*, the Second Poverty Reduction Strategy 2011-15 has been accompanied by a participatory SEA 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 a SEA of its strategy to respond to the removal of EU subsidies, which assisted growers to adapt to a 36% reduction in market prices.
- In *Vietnam*, the sixth National Power Development Plan was designed to meet Vietnam's growing energy demand. An SEA of the plan, rather than EIAs of individual plants, was commissioned under a revised law in 2005. The SEA has helped to clarify strategic economic choices and raise government awareness of biodiversity and tourism issues.
- In *Bhutan*, SEA is being applied to mainstream environmental concerns in national five-year plans and sector policies. The SEA process is supporting the realisation of the Kingdom of Bhutan's unique approach towards sustainability by addressing all seven pillars of gross national happiness (Annandale and Brown, 2010).

Lessons for moving forward: Major "green growth engines" such as green national infrastructure investments and/or policy and technology changes are likely to have system-wide implications. Not all of them will be desirable, despite the best intentions. For example poor groups risk being excluded and there may be knock-on effects of changing resource demand. SEAs should be conducted for every major green growth engine or policy proposal. SEA's process for technical evaluation of environmental, social and economic implications can reveal a range of trade-offs. And it can also open 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 created strong demands for a more permanent multi-stakeholder platform which could follow up on the integration of environmental and social concerns in the implementation of the West Africa Mineral Governance Programme (Loayza *et al.*, 2011).

Achieving green growth will be a long, and sometimes challenging, journey. Implementing green growth in developing countries will require support at the global level, and in turn will also generate innovations and insights of global value. The next chapter details how developing country efforts can be supported by the international community through existing mechanisms, coherent policies, development co-operation, technology co-operation, trade in green technologies and trade in environmental goods and services.

NOTES

[1] 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.

[2] See http://labl.teriin.org/

[3] In 1993 the United Nations published a *Handbook of National Accounting: Integrated Environmental and Economic Accounting*. It was revised in 2003 (available at: http://unstats.un.org/unsd/envaccounting/seea.asp). A further revision is imminently being published as guidance for implementing the agreed System of Environmental-Economic Accounts, as endorsed by the UN General Assembly.

[4] For information about the SEA Task Team visit www.seataskteam.net.

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CHAPTER 4

AN INTERNATIONAL ENABLING ENVIRONMENT FOR GREEN GROWTH

Executive Summary

This chapter provides an international perspective for helping developing countries adopt a green growth pathway. This is a vital perspective, given that many challenges to green growth (*e.g.* climate change, biodiversity loss) require co-operation on a multilateral scale. The chapter outlines the three main areas where green growth can be promoted at the international level – (1) international environmental agreements like the Kyoto Protocol; (2) providing finance for developing countries to take the first steps towards green growth; and (3) trade, technology and intellectual property.

For each of these it first assesses the current obstacles to green growth, followed by an assessment of what the global community can do to remove these obstacles and further assist developing countries to adopt green growth.

These measures include enforcement on international agreements, innovative financing, capacity development support, development co-operation, technology transfer and knowledge sharing. Finally an international enabling environment will mean ensuring that developed countries' policies do not undermine developing countries' right to development.

4.1 Introduction

Co-operation on a multilateral scale is the only way to deliver public goods (climate change mitigation, the protection of biodiversity) and to protect the global commons (the environment, fisheries) for several reasons: (i) no single country can successfully address climate change and other global problems alone; (ii) costs and benefits of action (and inaction) are not evenly shared; (iii) uncoordinated efforts by individual countries are more expensive than co-operative efforts; (iv) in a globalised world, policies pursued in one country are likely to have impacts far beyond its borders. They often have global reach and impacts on developing countries.

Creating a global architecture which is conducive to green growth will require further strengthening of arrangements for managing access to the global commons, maintaining the quality of global public goods, increased co-operation in the field of science and technology, provision of finance to support action by developing countries, and facilitating the diffusion of clean technologies. Increased efforts to boost global trade and investment flows would also help to underpin sustained growth. At the same time, there is a need for increasing vigilance around the potential spill-over effects of OECD countries' policy measures on developing countries, and the potential for incoherent policy which undermines development prospects in low-income countries.

This chapter extends the analysis of the previous chapter by examining the international dimensions of some of the policy instruments and barriers to their implementation. It highlights what is being done at the international level to stimulate global green growth, especially in developing countries. In doing this it provides details of the concerns about the international dimensions of green growth which have been expressed by developing countries. The key elements of an international enabling environment that would help developing countries to deal with these issues are then presented in the international environmental agreements, financing that need to be in place and the trade and investment barriers that need to be removed.

An international enabling environment will help send the right policy and market signals. It will create momentum for green growth by setting environmental regulations and standards, stimulate the demand and supply of environmental goods and services, catalyse green growth efforts in energy, transportation, agriculture and other sectors. It will make it easier to access financing, technology and innovations. Furthermore, an international enabling environment for green growth will facilitate the international exchange of knowledge about green growth issues or the co-operation in science, technology, and innovation. Effective and comprehensive knowledge sharing platforms are important for the international transfer of technologies to developing countries.

What international mechanisms are already in place to support green growth? To answer this question, this chapter first reviews major international agreements and other initiatives promoting the international environmental management process. It will describe existing agreements (legally binding and voluntary) in climate change, biodiversity and natural resource management. This is followed by a discussion of the various mechanisms for financing green growth, through Green foreign direct investment (FDI), official development assistance (ODA)[1] and climate finance. Steps then need to be taken and barriers removed to stimulate technology co-operation, trade in green technologies and trade in environmental goods and services. With international agreements creating incentives for investment, and following the removal of barriers which inhibit the diffusion of green growth, the international community can do much to further assist developing countries to adopt green growth. These measures include capacity development support, development co-operation, technology transfer and knowledge sharing. Finally an international enabling environment is about choosing the right policies both in OECD countries and developing countries. Policy

coherence for development will draw the chapter to a close by identifying how policy incoherencies can be addressed.

Developing country concerns about the international dimensions of green growth

As we saw in Chapter 1, most governments are generally receptive to the idea of green growth at the national level; however, the submissions by developing country governments to the UNCSD indicate some significant concerns about the implications of an international agenda on green growth (UNCSD, 2012). The most vocal concern registered by governments relates to the implications of green growth policies on international trade – the fear that green growth may lead to "green protectionism". It is suspected by many developing countries that additional OECD trading rules for green products may lead to products from developing countries being excluded from trade if they are not considered "green"[2], and would further encumber the Doha round of trade negotiations under the World Trade Organization (WTO). They fear that sustainable public procurement and global certification schemes and standards will have an impact on the trading capacity of developing countries, many of whom rely on the export of natural resource-based products. The potential for certification and eco-labelling to act as non-tariff barriers are also a concern.

Other concerns focus on the extent to which green growth can help to tackle fundamental developmental priorities. There is a sense amongst many low-income countries that the shift to green growth, while potentially producing some benefits, will not tackle the critical issues that continue to beleaguer their prospects for development. Many least developed countries have expressed concerns about the difficulties they face in embracing green growth due to capacity constraints, inadequate access to financial support, partial fulfilment of ODA commitments, constant marginalisation in the international trading system, lack of substantial debt relief measures, negligible FDI inflows, and lack of a holistic approach to development.

Further concerns centre on whether green growth could produce unwelcome biases in development assistance: developing countries note the danger that green growth policy prescriptions could place extra conditions on bilateral and multilateral development assistance. They also fear that green growth may be directed by external policy prescriptions. In particular, there is a concern that external policy demands will require a rapid transition strategy which is beyond the capacity of most governments: they would prefer incremental or phased shifts. As discussed in earlier chapters, any green growth strategy should be defined and applied by each country based on its specific circumstances.

For many developing countries, their main green growth opportunity stems from generating value from environmental assets, especially those which produce global public benefits. However the mechanisms and markets available to do this are still poorly developed. An international enabling environment for green growth would help to deal with these concerns by countering green protectionism, easing the transfer of technology, stimulating green investment and leveraging financial support through ODA, climate finance and the private sector. The next section looks at what this international enabling environment looks like.

4.2 An international enabling environment for green growth: key elements

Environmental agreements

International environmental agreements – legally binding intergovernmental efforts to reduce human impacts on the environment – are important features of global environmental governance. They set the stage for a long-term environmental management process that is commonly defined and pursued by many countries at the global level, supported by both institutional and legal frameworks to advocate co-ordinated actions in tackling these environmental challenges and hence to support countries to transit towards green

growth. A good example is the Montreal Protocol on the Substances that Deplete the Ozone Layer, widely considered to be one of the most successful international environmental agreements. The protocol led to the development of an entire industry focused on the replacement and phase-out of ozone-depleting substances (UNEP, 2011a). This section reviews progress in formal climate change and biodiversity agreements as well as the potential of voluntary initiatives, and outlines what changes may be needed if they are to do more to promote green growth.

Climate change agreements

Climate impacts and the largest benefits of mitigation action are distributed rather unevenly across countries. Developing countries are likely to suffer most from unabated climate change, but they also have the least capacity to adapt. This means that although at the global level benefits of climate action are significant, individual country incentives to mitigate climate change are not sufficient to trigger the deep and urgent levels of mitigation required (OECD, 2009a). These "free-rider" problems are causing individual regions and countries to delay action and concerted international co-operation will be needed to overcome them. There is rising recognition of the importance of addressing this challenge through the established international process of the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol. Creating an international architecture to advance climate change requires a comprehensive package which includes the use of financial transfers to encourage broad engagement by all economies, and even stronger co-operation for low-carbon technology transfer and institutional capacity building to support action in developing countries. To be successful and widely accepted, international co-operation on climate change will also need to address equity and fairness concerns, issues which are often referred to as the "burden sharing" elements of the international regime (OECD, 2012a).

Based on these principles, global leaders have agreed to work together to tackle the impacts of climate change. The agreed aim is to limit the global average temperature increase to 2 degrees Celsius (^{o}C) by the end of the century compared to pre-industrial levels. This is to be achieved by reducing domestic emissions of GHGs, as well as the transfer by developed countries of finance, technology and capacity support to developing countries. To fulfil this commitment, countries have made pledges under the Convention and its Protocol. Almost all countries today have climate change policies in place that deal with both adapting to the impacts of climate change and reducing emissions; all industrialised countries and 49 developing countries have made specific mitigation pledges to 2020 and 118 countries now have renewable energy policies in place (Figueres, 2012). These policies either have a specific focus on climate change, or sectoral challenges that limit its impact. They have already contributed to the promotion of green growth.

At the recent 17th Conference of the Parties (COP17) in Durban, countries made further progress in renewing their commitments to combating climate change. The second commitment period under the Kyoto Protocol has now been agreed and along with it a voluntary process under which 80% of global emitters will carry out mitigation plans until 2020. A future legal framework, expected to cover all nations, should be brought into effect from 2020 onwards.

Adaptation to climate change received much less attention in the international negotiation process until COP7 in 2001. Parties of the UNFCCC established three funds dealing with adaptation, the Least Developed Countries Fund, the Special Climate Change Fund and the Adaptation Fund. Since then, adaptation has received more attention and the Cancun Agreements established a Cancun Adaptation Framework with an associated Adaptation Committee. The Green Climate Fund has been set up to support projects, programmes, policies and other activities in developing countries. This fund also recognises the need for a balanced treatment of adaptation and mitigation (OECD, 2012a).

While these frameworks provide important elements of a green growth enabling environment, recent analysis suggests there is a long way to go in the fight against climate change. Current pledges and commitments are unlikely to be sufficient to stay within the 2°C goal (OECD, 2012a; UNEP, 2010); and developing countries, in particular small island states and countries in sub-Saharan Africa, will continue to suffer from more frequent extreme weather events, food, water and energy security challenges and threats to human life. However, the UNFCCC process and the Kyoto Protocol have successfully put a clear, credible and long-term price on carbon emissions, whether the emission trading scheme is at regional, national or provincial levels. Furthermore, the Clean Development Mechanism (CDM) has benefited many developing countries through improved technology and increased investment in new sources of energy generation leading to better air quality and better health (Box 4.1).

Box 4.1 The Clean Development Mechanism

The Clean Development Mechanism (CDM) was established under the Kyoto Protocol. There are two objectives of the CDM, (1) to assist developing countries in achieving sustainable development and in contributing to the ultimate objective of the UNFCCC; and (2) to assist parties included in Annex I in achieving compliance with their qualified emissions limitation and reduction commitments under the Kyoto Protocol. The second objective is achieved by allowing Annex I countries to meet part of their caps using certified emissions reduction (CER) credits through CDM emission reductions 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).

Several attempts have been made to understand how a CDM project contributes to sustainable development. As a result, most CDM projects claim several sustainable development benefits such as employment creation, the reduction of noise and pollution, and the protection of the natural resources. The type of benefit claimed has not changed significantly over time, but the mix of benefits claimed is somewhere different by host country and project type. However, trade-off was also recognised between the goals of the CDM in favour of producing low –cost emission reductions at the expense of achieving sustainable development benefits (UNFCCC, 2011).

Source : UNEP Risoe Centre (2012), *http://www.cdmpipeline.org/cdm-projects-region.htm*; UNFCCC (2011), *Benefits of the Clean Development Mechanism 2011*, Bonn.

Biodiversity

Addressing biodiversity loss and degradation of ecosystems services is a global challenge, similar to climate change. Balancing the benefits of biodiversity, which accrue globally, with the opportunity costs of maintaining biodiversity which are highest in developing countries, is a problem which requires global action. The Convention on Biological Diversity (CBD) is the main global environment agreement dealing with this issue. It set a 2010 Biodiversity Target to "significantly reduce the rate of biodiversity loss". Although this target, agreed by CBD Parties in 2002, has not been met, there have been some areas of progress both at the national and international level (OECD, 2012a).

At the national level, a number of countries have made progress in establishing national Biodiversity Strategies and Action Plans to ensure mainstreaming of planning and activities of all those sectors whose activities can have an impact (positive and negative) on biodiversity. At the international level, a new package was agreed by the CBD Parties at the 10th Conference of the Parties in 2010. This includes the Strategic Plan for Biodiversity 2011-2020, the Aichi Biodiversity Targets and a Strategy for Resource Mobilisation. These strategies and targets call for more effective and urgent action to halt the loss of biodiversity, although the level of implementation will depend on the level of co-ordination between parties, the effectiveness of the enforcement mechanism and the availability of financial and technical resources at country and regional levels.

Voluntary agreements: incentives for green growth

To complement the various legally-binding agreements described above, global voluntary initiatives are also helping in the green growth transition. 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 revenues from harvesting these resources. The EITI aims to strengthen governance by improving transparency and accountability in the extractive sector. The FLEGT Action Plan is another voluntary scheme, which aims to ensure that only legally-harvested timber is imported into the EU from countries agreeing to take part. The Carbon Disclosure Project, with a strong focus on climate change impacts, has given incentives to thousands of companies and cities across the world's largest economies to measures and disclose their GHG emissions, climate change risk and water strategies to ensure the capital which these institutions invest is allocated to create long-term prosperity rather than short-term gain at the expense of the environment. Other international parallel tracks working towards social and development goals, such as the UN Millennium Development Goals, the International Labour Agreement and the International Social Security Agreement, will also affect progress on global green growth.

The success of all these agreements in achieving green growth depends on the ability of the international community to agree on targets, put in place well-defined enforcement mechanisms, build capacity to deploy technologies and policy instruments, and mobilise sufficient funding to tackle financial constraints.

Finance for green growth in developing countries

Green growth requires substantive finance and investment in clean infrastructure, natural resource management, and capacity and skill development to ensure a smooth transition. For developing countries, domestic resource mobilisation is one way of meeting the costs required; however, it is unlikely to be sufficient in the short term. It will therefore be essential to scale up foreign financing sources, such as FDI, ODA and other innovative financing, to cover the costs of getting green growth actions started.

Green foreign direct investment

Since the technical knowledge on the control of pollution or other environmental services mainly exists in multinational enterprises in developed countries, FDI has the potential to disseminate this knowledge in developing countries (Popp, 2009). Green FDI involves transferring to developing countries green technologies and management processes that directly translate into environmental benefits. This dissemination enables developing country producers to produce in a less polluting and more resource-efficient manner. In fact, FDI in developing countries has been found to be almost always at least as environmentally friendly as domestic investment. This is especially true in the agricultural, manufacturing, and mining sectors. Furthermore, green FDI may have positive spillover effects, in that the clean technologies they introduce are also adopted by domestic competitors or other suppliers in the host developing countries (Gallagher and Zarsky, 2007).

However, little attention has been paid to green FDI so far, making it difficult to define (Golub *et al*., 2010). Green activities are often not related to a particular good or service but rather to a certain process. In addition, companies produce many goods, of which some are green while others are not; and many goods have several uses, of which only some are green. Nevertheless, FDI has been found to greatly exceed ODA in the last decade. This is especially true for industries that strongly contribute to pollution and global warming (agriculture, forestry, mining, manufacturing, energy, transport, and construction) (Corfee-Morlot *et al*., 2009). In general, an increasing number of the largest companies are taking a proactive stance

towards reducing GHG emissions (Kauffmann and Tébar Less, 2010). The private sector has responded to incentives created by the Kyoto Protocol and the CDM.

The role of green FDI is expected to further increase in the future via the CDM and emission trading (Box 4.1). These mitigation measures have been created to turn environmental issues in developing countries into new investment opportunities. Investment is likely to accelerate as CDM projects can be used to reduce investment risk and increase the profitability of investment activities by strengthening the cost efficiency of related projects. CDM projects are often implemented in the energy and the agro-forestry sector and in other domains which have traditionally not been supported through private investment in Africa (Desanker, 2005). They are expected to create jobs and offer scope for income generation from carbon credits, particularly when involving the implementation of bioenergy projects (Silveira, 2005). However, to date most of the CDM projects are implemented in countries like China and India. There are few CDM projects in Africa due to a lack of financing, experience and technical skill, unclear land titling and monitoring challenges, and the complexity of CDM rules (Wang, 2010; Desanker, 2005).

In most countries, trade barriers to environmental goods and services are relatively low and transparent but policies towards FDI tend to be quite variable and sometimes restrictive and unclear (Golub *et al*., 2010). Foreign investors favour predictable and transparent regulations on GHG emissions rather than the absence of regulation (Kauffmann and Tébar Less, 2010). Dean *et al.* (2004) even found that Chinese-foreign joint ventures were attracted to areas with more stringent environmental regulations. As a result, FDI may encourage changes of regulations in developing countries. For example, in Chile, foreign investors convinced the government to impose clear regulations in the mining sector (OECD, 2002).

A number of international initiatives are helping to promote green FDI (Box 4.2). The OECD has established *Guidelines for Multinational Enterprises* (OECD, 2000), which recommend that enterprises operating in foreign countries establish and maintain an environmental management system (EMS) 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. There are a number of studies indicating that the presence of EMS is positively related to environmental performance and innovation (Johnstone, 2007; Dasgupta *et al.*, 2000). Other guidelines also promote responsible environmental behaviour by companies. These include the International Organization for Standardization's ISO 140001 and ISO 14001, and the European Union's Eco-management and Audit Scheme (EMAS), which requires firms to publish environmental performance statements. Other examples include the Responsible Care programme, focusing on sector-specific environmental impacts, and the United Nations Global Compact.

Box 4.2. The OECD Freedom of Investment Roundtable

The Freedom of Investment (FOI) Roundtable is hosted by the OECD and has been established to monitor governments' investment practices against environmental goals. It brings together some 50 governments from around the world to exchange information and experiences on investment policies at regular roundtables. It ensures that new environmental measures observe the principles of international law, such as non-discrimination. The forum also discusses the role of international investment in promoting green growth, along with areas such as "vigilance against green protectionism" or "encouraging business' contribution to greening the economy". These discussions are important for addressing the concerns expressed by developing countries about the possible risks of a global green growth agenda.

Source: OECD (2011a), *Freedom of Investment Process: Harnessing Freedom of Investment for Green Growth*, Investment Division, OECD, Paris. See also *www.oecd.org/daf/investment/foi*

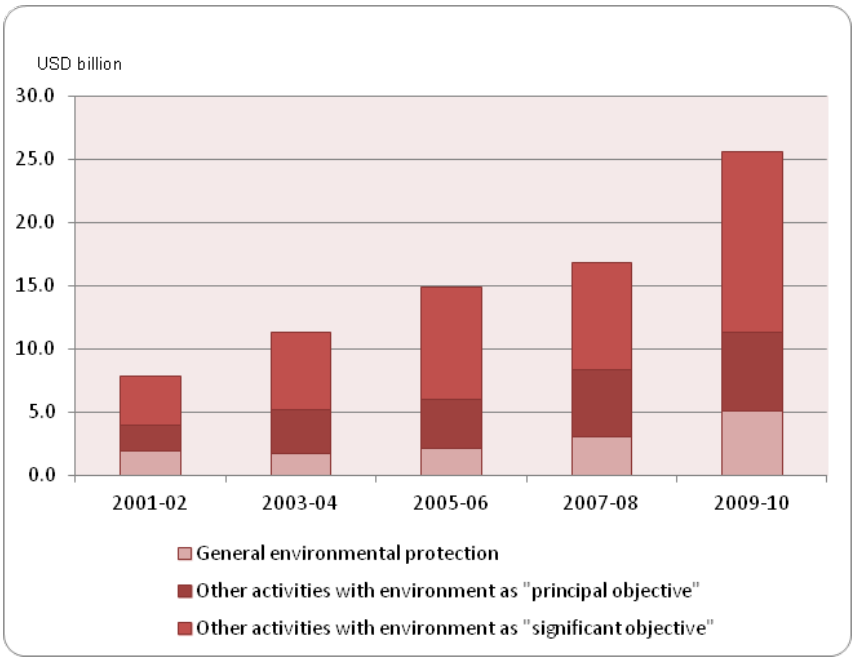
Green ODA

Beyond the aggregate trends described in the previous section, in many poor developing countries ODA still exceeds FDI and thus remains an important source of finance for green investments. ODA is essential for creating the enabling conditions for green growth by "targeting areas where incentives for private investment are limited and flows are scarce, including essential infrastructure and human and institutional capacity building" (OECD, 2011b). Donor countries and development agencies have many decades of experience stimulating and promoting sustainable development in developing countries. ODA finances major projects in renewable energy, sustainable agriculture and low-carbon transportation networks. It also supports smaller but potentially catalytic efforts such as feasibility studies, pilot projects and technical training. For countries with underdeveloped capital markets, ODA will be an important source of investment capital.

The OECD's Creditor Reporting System tracks the volume and purposes of official development assistance given by OECD donor countries. It has been tracking aid given for environmental purposes for over two decades, and since 2000 it has also been tracking aid targeted to the three Rio conventions (on biodiversity, desertification, and climate change). These data show that bilateral ODA given by the OECD Development Assistance Committee (DAC) members for general environmental protection grew from USD 1.9 billion in 2001/02 to USD 5.1 billion in 2009/10. Support for other environmental sustainability activities rose from USD 5.8 billon to USD 20.3 billion over the same period (Figure 4.1). Many of these activities specifically target the objectives of the Rio conventions. For example, aid for climate change mitigation amounted to USD 14 billion in 2009/10 (Figure 4.2). In 2011, ODA from DAC donors declined slightly, the first drop (excluding debt relief) since 1997. Indicative forward spending surveys indicate that ODA will grow slowly at best over the coming years. While there have been increases in the level of ODA dedicated towards the environment, the scope for further increases may be somewhat limited.

Figure 4.1 Environment focused ODA from DAC members, 2001-2010

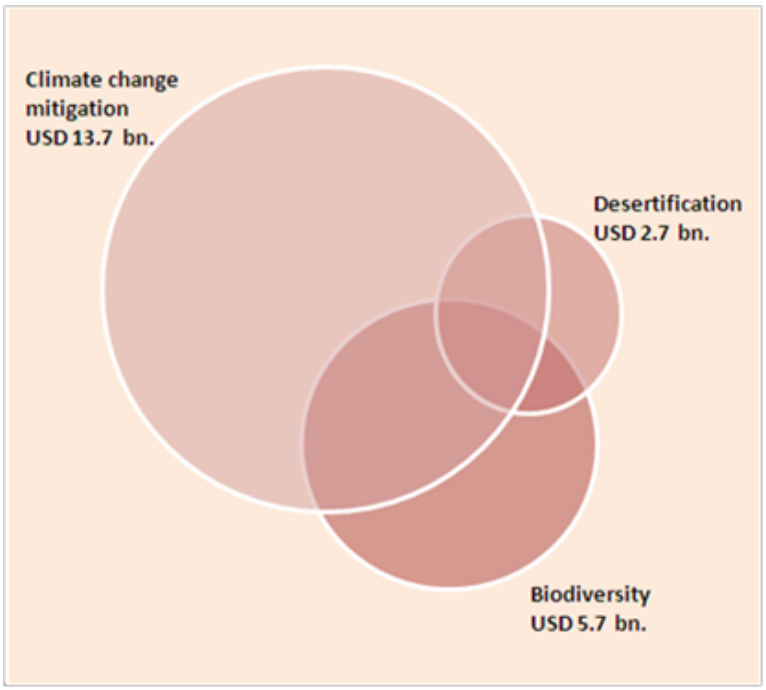
2001-2010 commitments, constant 2010 prices



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

Figure 4.2 DAC members' aid activities targeting the three Rio Conventions, 2009/10

2009-10 average commitments, constant 2010 prices



Notes: An activity can have more than one policy objective and can therefore be targeted to several Rio conventions at the same time. Total amounts targeting different objectives should not be added up to avoid double counting. This figure demonstrates the overlaps in 2010 (including aid activities marked both for principal and significant objectives).

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

Infrastructure

ODA can be used to finance green growth initiatives in a number of key sectors such as transportation, energy and agriculture; ODA to these sectors has been increasing. Many developing countries are constrained by weak infrastructure (*i.e.* transport, communications and energy). While addressing these bottlenecks is important, the implications for GHG emissions also need to be considered, and infrastructure should also be resilient to anticipated climate change impacts (OECD, 2009b). For instance, the World Bank's Clean Investment Funds are already working to provide developing countries with low-emission public transportation systems. Other donors are also providing support for a range of low-carbon transport options, particularly urban public transport, although mostly in middle-income countries.

Access to energy is another key growth constraints for poorer regions. Growth diagnostic studies and business surveys in many developing countries regularly identify lack of grid electricity as a major constraint. Typically, levels of investment in the electricity sector in developing countries are around 50% of needs. Credit constraints mean that the cheapest available options are often chosen as opposed to those that deliver environmental benefits. This suggests that donor involvement in renewable energy technologies can result in a win-win situation for developing countries: reducing costs and reducing emissions. New and improved technologies in energy production – such as solar power, biomass, micro-hydro power and biofuels – linked with new approaches to electricity generation and distribution could reduce costs and improve the technical feasibility of energy supply in poor developing countries, allowing non-oil producing countries to become more energy self-sufficient. They would also bring a range of

benefits, including reduced dependence on fossil fuels, reduced poverty and lower energy bills for firms and households (OECD, 2011b).

Sustainable food production to deal with climate change

Climate change threatens to shift world patterns of comparative advantage in the production of many crops and livestock products. It is already affecting agriculture production (OECD 2012e). Climate impacts on developing countries are likely to be diverse and each region will have to adapt its production processes to future conditions. Donors are actively involved in a number of projects to climate proof agricultural development: from improving water availability, efficient spray irrigation systems, irrigation technology transfer and best practice, self-sufficiency for water and support to urban farming. In 2009 25% of all agricultural development project support and 40% of support to agriculture water resources had an environmental objective.

Public-private partnerships

ODA flows are guided by a country's development needs and its ability to put ODA to its most productive and beneficial use (UNCTAD, 2010). In contrast to ODA, inward FDI depends on a country's locational advantages in terms of, for instance, market access, resource availability, production costs and the availability of human capital and (institutional) infrastructure (UNCTAD, 2010). As such, FDI may reduce efforts related to climate change adaptation (Gupta *et al.*, 2010). ODA can strengthen those locational advantages that attract inward FDI into sectors that are essential for green growth. This, however, requires comprehensive and cross-sectoral assessments of a country's overall institutional and economic conditions in terms of underlying strengths, weaknesses, opportunities, and threats. Public-private partnerships potentially offer a model for using public funds to mitigate risks and attract private investment (Box 4.3). This could be particularly useful in sectors where investment has been limited by concerns over technology, regulatory and market risks and a high cost of financing.

Box 4.3. 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 funding from the US Agency for International Development (USAID) of USD 100 000. 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 the other project of slightly smaller scale, costing USD 380 000. The initial USD 100 000 investment in this partnership thus brought in project finance of approximately USD 1.3 million, a leverage ratio of 1:13 (World Economic Forum, 2011).

Source: World Economic Forum (2011), *Financing Green Growth in a Resource-Constrained World: Partnerships for Triggering Private Finance at Scale,* WEF, Geneva.

Climate change 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 UNFCCC. Over the next eight years, funding for climate change adaptation and mitigation will have to increase tenfold. 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.

Key elements to ensure the effectiveness of climate finance include avoiding fund fragmentation, ensuring country ownership, and channelling finance through national country systems (*e.g.* public financial management system). There is much to be learned from the experience of ODA, which is now guided by the Paris Declaration on Aid Effectiveness. In addition, finance from public sources needs to leverage private finance to maximise its impact.

Other financing for green growth

In addition to green FDI and ODA, there are other channels of financing available today to promote green growth. REDD and REDD+ (see Chapter 3) – practical examples of payments for ecosystem services – are creating incentives for developing countries to protect and better manage their forestry resources for combating global climate change, while generating new sources of financing. While international climate negotiations continue, the mobilisation of considerable resources has already taken place outside the formal negotiations. In June 2010, 69 governments, including all major forest-rich countries, joint efforts in the REDD+ Partnership. 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, particularly for readiness and capacity building. This demonstrates the future potential of REDD+ activities (UNEP, 2011b). In addition to global financing platforms, national initiatives are also likely to make a useful contribution (Box 4.4).

Box 4.4. Financing model: International Climate Initiative

The International Climate Initiative (ICI), initiated by the German Government, is an example of an innovative approach to financing climate change projects. Since the ICI was launched in 2008, it has raised EUR 556 million from auctioning emission allowances. This has been used to fund 256 projects (as of November 2011) in Asia, South America, the Middle East and Africa on (1) building a climate-friendly economy, (2) adapting to climate change, and (3) contributing to REDD and REDD+.

Source : BMU (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety) (2012), *International Climate Initiative*, www.bmu-klimaschutzinitiative.de/en/news (accessed, 29 March 2012). See also *http://www.bmu-klimaschutzinitiative.de/en/news.*

Pension funds, along with other institutional – and ethical– investors, also can bring a new stream of financing for green growth initiatives. With USD 28 trillion in assets held by private pension funds in OECD countries, and annual contribution inflows of around USD 85 billion, pension funds could be key sources of capital (Della Croce *et al.*, 2011). Some pension funds and other institutional investors are already investing in climate change related assets; more are interested in doing so. The P8 Group consists of 12 of the world's leading pension funds, collectively managing USD 3 trillion. It is one of the pioneers in this area. The aim of the group is to create viable investment vehicles that could be used to simultaneously combat climate change and promote sustainable growth in developing countries. It also intends to lobby for the best possible regulatory and financial environment for such investments, hence contributing to creating the enabling conditions for green growth (Della Croce *et al.*, 2011).

Trade, technology and intellectual property

The global effort required to promote green growth can be partly achieved by accelerating the dissemination of green technologies on an international scale. Dissemination is important, as the development of climate change mitigation and adaption technologies in many developing countries is at a very low level. For example, in Africa only a very few climate change mitigation technologies have been developed and patented. The volume of interventions amounted to only 0.3% on average between 1980 and 2009, 84% of which emerged in South Africa, followed by countries like Egypt, Algeria, Morocco and

Kenya (OECD, 2012c). Climate change mitigation technologies developed in Africa include biofuels, marine and tidal energy, waste-to-energy and solar thermal energy. Nuclear energy technology also has some importance, but exclusively in South Africa due to its high upfront investment cost. With respect to climate change adaptation technologies (*e.g.* desalinisation, off-grid water supply, dispersed electricity transmission or remote energy services), these are much more likely to be developed and made available in sub-Saharan and Northern Africa as compared to South Africa.

As noted in Chapter 3, governments can do much at the national level to strengthen their own capabilities for green innovation. However, it is also essential to tap into knowledge and technologies developed abroad, benefiting from the escalating international competition and co-operation in the growing market for green products and technology. The problem is that numerous tariff and non-tariff barriers to trade in green technologies are preventing the free flow of such goods (see below). Some developing and emerging economies have high import tariffs on energy-consuming goods. These combine with subsidised electricity prices to encourage consumers to favour appliances that are cheap to buy but relatively inefficient to operate. Openness to trade and investment is important to ensure that the best technologies are available for use. More open trade may also make it easier for producers to access international value chains. Better and extended market access may induce producers in developing countries to invest in and adopt technologies that promote food safety or green production.

Multilateral action may be needed to reduce the cost of green technologies for developing countries, *e.g.* by covering licensing fees, or even buying out patents on key technologies. Experience in other areas, such as health, shows this can work if well designed and involving the private sector from the beginning. Enabling all countries and firms to build more systematically on the findings of basic research undertaken by public institutes would also help. Finally, international co-operation, including through development co-operation, is another important way to share knowledge and make it widely available.

Intellectual property rights

Green technology transfer can also be impeded by intellectual property rights (IPRs). The number of green patents based on climate change mitigation technologies remains very small worldwide. While in the high-income countries, some 1 500 patents were granted in 2010, this number amounted to only 100 in the developing world between 2006 and 2010. A group of nine emerging countries – including Argentina, Brazil, China, Hungary, India, Malaysia, Mexico, the Russian Federation, and South Africa – accounted for almost 80% of all US green patent grants in this period. Only 10% of the African inventions seek patent protection in African markets; a relatively higher percentage seeks protection in the US, Canada and Europe (OECD, 2012c). Well-functioning systems for protecting and enforcing IPRs provide incentives for investment in innovation and establish the framework for IPR protection and diffusion.

To accelerate the diffusion of innovation, new mechanisms that enhance technology transfer to developing countries are currently being developed. They include voluntary patent pools and other collaborative mechanisms for leveraging Intellectual Property. Some good practice already exists, but significant scaling-up is needed. Furthermore, covering licensing fees or even buying out patents on key technologies could reduce the cost of green technologies for developing countries. Involving the private sector from the beginning might be helpful, and public-private partnerships can provide effective solutions in the face of limited resources (OECD, 2011c).

Science and technology co-operation

Although global environmental challenges differ by country, some common strategies for international co-operation are emerging. These include: strong involvement of the private sector, non-governmental organisations, philanthropic organisations, and other stakeholders in the prioritisation and

delivery of science and innovation and the use of new financing mechanisms (*e.g.* securitisation, risk sharing, advanced market commitments) to provide incentives for global and local innovations. Research collaboration between OECD and developing countries can be effective in enhancing knowledge diffusion (OECD, 2011c). But the search for solutions to global challenges would benefit from a closer involvement of developing countries in agenda and priority setting; improved mechanisms to access and utilise research outcomes; and from the building of research and technology capacity in these countries.

Science and co-operation can accelerate technology development and diffusion, realise economies of scale, create a common pool of knowledge, use complementary expertise and pool resources for research funding. It can also help to develop datasets for monitoring and forecasting processes related to green growth. In addition, it can build capacity in developing countries through skills training or improved education, thus enabling the more widespread adoption and implementation of green technologies. However, insufficient skills, limited funds, limited access to information and ineffective institutional frameworks impede science and co-operation and green innovation in developing countries. Even advanced developing countries have been found to be far behind high-income countries in terms of the share of professionals engaged in research. There is often an underinvestment in research and development with respect to climate policy, for example (OECD, 2011b). Academic partnerships and cross-border higher education exchange programmes can facilitate technology transfers, with positive knock-on effects for the local innovation system. Policies, frameworks, and governance mechanisms that deliver rapid scientific and technological progress and that lead to a quick and wide diffusion of innovation will need to be identified and implemented (OECD, 2011d).

Removing barriers to green trade

Green growth can be promoted by removing existing barriers to trade and the dissemination and transfer of technologies. Openness to trade is a key factor for high technology adoption rates. However, a number of barriers impede trade and the diffusion of green technologies and innovation via trade into developing countries. The literature suggests that tariffs on renewable energy technologies and subsidies for fossil fuels limit technology transfer to a larger extent than patent protection (Hall and Helmers, 2010). There is also evidence that eliminating tariff and non-tariff barriers in the top 18 GHG emitting developing countries would increase imports by 63% for energy-efficient lighting, 23% for wind power generation, 14% for solar power generation, and 4.6% for clean coal technology (World Bank, 2007). Thus, green growth is expected to be promoted by liberalising trade and by removing trade barriers.

A major impediment for trade liberalisation is the failure to conclude the WTO Doha Round. Disputes on the extent and scope of liberalisation are slowing progress in the negotiations on agricultural trade and preventing environmentally conscious trade liberalisation. As a consequence, agricultural tariffs and subsidies in this sector remain high compared to those in manufacturing, undermining investment in and the adaptation of efficiency promoting technologies (OECD, 2011c). A number of industrialised countries also have important trade barriers on biofuels. Removing these subsidies and trade barriers would foster more efficient competition and help bring about green growth (OECD, 2012d).

The efforts needed to boost global trade include not only the resolution of the current Doha Round negotiations, but are increasingly directed towards regional trade agreements (RTAs). The number of RTAs signed by countries has significantly increased and there are now more than 200 RTAs worldwide. Environmental concerns are increasingly being incorporated into their negotiations. While some countries ask for an assessment of the environmental impact of regional trade liberalisation, others specify the need to enforce environmental laws and standards. The evidence suggests that these RTAs promote environmental benefits including mutual support of trade and environment policies, strengthening the enforcement of environmental laws, raising the level of environmental standards, establishing or reinforcing environmental co-operation, and enhancing public participation in environmental matters. In

some cases, the negotiation of an RTA incorporating environmental dimensions has driven reform and accelerated internal environmental policy processes (*e.g.* the codification of scattered environmental legislation) (OECD, 2007a).

Liberalised trade in environmental goods and services can also have environmental benefits, such as reducing air and water pollution, improving energy and resource efficiency, or facilitating solid waste disposal. On the one hand, it opens export markets for producers of green products, and on the other it gives importers access to environmental products. The share of environmental goods and services in global exports is rising. This is true not only for developed countries, but also for developing countries. Some developing regions like East Asia or Latin America export almost as many environmental goods as high-income countries. This suggests a significant potential for developing countries to grow their economies based on the export of environmental goods and services. In 2004, trade in environmental goods and services was estimated at USD 580 billion worldwide (Blazejczak *et al.*, 2009).

What are the constraints to increasing the green growth potential offered by trade in environmental goods and services? Tariff barriers to trade in environmental goods are already generally low in developed countries (Golub *et al*., 2011). Therefore, reducing tariffs on goods related to solar, wind, biomass, and other renewable energy sources is unlikely to increase demand much (Jha, 2009). Differences in technical standards are a constraint, however, especially in developing countries. Evidence for this has been found in some sectors with high GHG emissions including energy, construction and manufacturing (Steenblik and Kim, 2009). Furthermore, poor IPRs, restrictions on visas for expatriate technical staff and customs procedures have been identified as further restrictions to trade in environmental goods. Removing those constraints will also create opportunities for green growth in environmental services trade, such as ecotourism.

Many local and national PES (payment for ecosystem services) programmes provide both global and local ecosystem services. PES schemes give cash and/or in-kind payments to farmers and other land managers as an incentive to conserve and enhance ecosystem services. Such programmes provide international investors with the opportunity to co-finance activities which enhance the environment (Chapter 3 and OECD, 2010). This concept and practice is also one way to facilitate the trade of environmental services, which more and more developing countries are exploring today.

There are many challenges ahead: while market forces can offer the potential to provide efficient and effective means of maintaining and enhancing ecosystem services, the issue of scale must clearly be addressed when considering ecosystem services and beneficiaries at the global level. To overcome the challenge, it is critical to address both market demand and supply by (1) building and enhancing consumer motivation in developed countries to scale up demand, and (2) setting up the institutional and financial arrangements in developing countries to ensure supply is adequate. One example of where this has been undertaken is in a recently established payment for ecosystem services programme in the Los Negros Valley in Bolivia. The programme involves the simultaneous purchase of two ecosystem services: watershed protection and bird habitat. While downstream irrigators through the Municipality of Pamagrande are paying for watershed services, the US Fish and Wildlife Service is paying for the protection of habitat for migratory bird species (Asquith *et al.*, 2008).

Certification

Certification schemes or carbon footprints may at times affect the trade capacity of developing countries and thus become non-tariff barriers to trade, especially if they are overly stringent (Richards, 2004). This is mainly due to the high production and certification costs on the one hand and low price premiums on the other hand. In fact, Ponte (2008) argues that certification according to the standards of the Marine Stewardship Council (MSC) marginalises small-scale fisheries. Evidence from South Africa also

indicates that small-scale fishers are excluded from MSC certification. However, there are also many studies showing that certification benefits the environment and increases welfare of the farmers.

Kasterine and Vanzetti (2010) suggest that carbon certification and footprint (*e.g.* food miles) initiatives could be ineffective and unfair to exporters from developing countries if not appropriately designed. Brenton *et al.* (2009) found that countries are more likely to be adversely affected by carbon certification if they (1) export air-freight 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 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 greenhouse flower production (Williams, 2007).

To address some of these barriers, capacity needs to be further developed. Beyond this, other forms of assistance will be required, as well coherent policies. These issues and their contribution to an international enabling environment will be further analysed in the next section.

4.3 How can OECD countries promote green growth in developing countries?

Building capacity for national green growth planning

As described in the framework presented in Chapter 3, the cross-cutting nature of green growth demands approaches that shape policy development and investment decisions and make all stakeholders aware of the importance of the sustainable use of natural resources for growth and development. Achieving this requires a broad range of skills and knowledge on the part of individuals and organisations, and an enabling environment that supports this process (*e.g.* international regimes, national policies, rule of law, accountability and transparency) (OECD, 2012b). OECD countries can help developing countries to build and enhance these capacities. The lack of capacity in developing countries is a key obstacle to green growth. This has been widely recognised throughout this report. Capacity is central to sustainable national development – for creating a regulatory climate conducive to economic and social development and for delivering basic public services. Capacity for green growth has many dimensions, including the capacity to:

- Undertake environmental risk assessment.
- Make the economic case for greening growth.
- Incorporate environmental issues into decision making.
- Co-ordinate across sectors and institute environmental fiscal reform.

Support efforts could largely focus on the capacities needed to integrate green growth considerations into national development planning, national budgetary processes and key economic sectors (Table 4.1).

Table 4.1. Capacity needs for building a framework for green growth

Green growth areas	Specific capacity needs
National development planning	• Policy makers involved in national policy dialogues need to recognise the link between green and growth • Planning agencies need institutional mechanisms for including environmental agencies and green growth issues in planning • Planning and sector staff need to be able to take account of environmental data in the planning process and to carry out green accounting • Environmental agencies need the analytical skills to identify and cost green growth measures and to implement planned objectives
National budgetary process	• Environment stakeholders need access to the institutional process for preparing the national budget • Ministry of finance staff have incentives to include green growth priorities and measures from the national plan in the budget formulation • Environment staff need the analytical and presentational skills to communicate the benefits of budgeted green growth measures, economic instruments and mechanisms for environmental fiscal reform • The national audit system needs to function well to promote good management of expenditures by all government agencies
Key economic sectors	• Line ministries need better understanding of the green growth and sector linkages and key environment stakeholders need the capacity, incentives and opportunities to participate in the sector planning processes • Sector staff, with support from environment agencies, need to identify and cost environmental policies and activities to implement sector plan objectives, *e.g.* using SEA • Skills and knowledge to deploy specific green growth policy measures, such as regulations, tax incentives and payments for ecosystem services to the right context • A well-functioning system is needed for monitoring sector plan implementation

Source: Adapted from OECD (2012b), *Greening Development: Enhancing Capacity for Environmental Management and Governance*, OECD, Paris.

Many such capacity building initiatives have provided some valuable lessons (Box 4.5). These include that capacity development efforts work best if they are country-owned, priority-driven and use developing countries' own multi-year development planning processes as a vehicle for systematically integrating green growth into national processes. They should aim to build both the functional and technical skills of a range of stakeholders, not just environmental staff, in order to achieve long-term sustainability in promoting green growth. Competing and overlapping capacity development initiatives should also be avoided to ensure efficiency. Efforts to harmonise support to these initiatives should be encouraged and mechanisms should be created to facilitate such harmonisation. Last but not least, to deliver good capacity development initiatives for green growth, efforts should specifically target developing country's enabling conditions – their institutional arrangements at the organisational level – rather than solely focusing on individual skills and expertise. Many donor country development co-operation agencies have also carried out specific capacity building programmes to assist developing countries in gaining a better understanding of their green growth potential (See Box 4.5).

Box 4.5. Capacity development for green growth: some examples

In 2002, with support from the United Kingdom and the Netherlands, the Ghana National Development Planning Commission and the Environment Protection Agency undertook a strategic environmental assessment (SEA) 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 exposed to SEA processes and guided on how to incorporate environmental issues into policy formulation. As a result of this capacity development support, the 2006-2009 GPRS was drafted with direct inputs from the SEA 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).

With support from the Government of Australia, the Asia-Pacific Forestry Skills and Capacity Building Programme provides field-based instruction to company and government agency staff in improved forest management practices through 15 projects. It has provided support for training in the development of forest policies and approaches to reduce illegal forest activities, promoted regional exchange of information and increased general debate and awareness of the implications of a post-2012 global agreement on climate change for forest-dependent people (Australian Government Department of Agriculture, Fisheries and Forestry, 2010).

Source: OECD (2006), "Applying Strategic Environmental Assessment: Good Practice Guidance for Development Co-operation", *DAC Guidelines and Reference Series*, OECD, Paris; and Australian Government Department of Agriculture, Fisheries and Forestry (2010), *Making Headway with Sustainable Forest Management to Help Combat Climate Change*, Asia-Pacific Forestry Skills and Capacity Building Programme, Australian Government of Agriculture, Fisheries and Forestry, Canberra.

Building capacity for green growth planning is a complex, long-term endeavour. In some cases, governance reform will be required to facilitate this process. OECD countries and international organisations which aim to provide such support need to ensure that it is based on good analysis of opportunities and risks. They should also be able to identify and assess promising entry points, the potential role of champions, the complexity of institutional processes, and the practicalities of learning-by-doing (OECD, 2012b). The Green Growth Knowledge Platform (GGKP) – a joint initiative of the OECD, UNEP, World Bank and the Global Green Growth Institute – seeks to improve and strengthen the design and implementation of green growth policy by identifying and addressing knowledge gaps in green growth research and practice through the exchange of experience, knowledge and information among researchers and development experts. The research results are envisaged to guide practitioners and policy makers in their choice of economic growth and sustainable development.

Integrating green growth into development co-operation

As discussed earlier, ODA already plays a significant role in promoting green growth, both financially and technically; but to increase the benefits, green growth thinking should be fully integrated into development co-operation.[3] For example, climate proofing and disaster risk reduction approaches should be mainstreamed into aid-funded public investments. Donors could use high-level dialogue to raise the profile of climate adaptation with senior officials in key ministries in partner countries like finance and planning. They could also contribute to a horizontal fund for adaptation managed by a central body such as one of these ministries, into which sectoral ministries could tap to meet the additional costs of integrating adaptation measures into their planned activities and investments (OECD, 2009b). Aid for climate change mitigation should aim to stimulate growth in relevant markets and sectors that also provide livelihoods and jobs for poor people. Existing programmes and projects demonstrate how this can promote green growth objectives. Such initiatives range from local projects to develop markets for solar cook stoves, to sectoral level mainstreaming of responsible tourism principles, to enhancing competitiveness and contributing to Social Economic Development Plans, to national level technical assistance for developing low emission development strategies. Successful practices should be replicated and scaled up where appropriate.

Similarly, aid for poverty reduction needs to help build livelihoods that are more secure and resilient to climate change and environmental degradation. 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). Such social and environmental integration through development co-operation practice has already delivered tremendous benefits. Some examples include cash transfer for ensuring vulnerable children are not withdrawn from school or unable to access healthcare following a climate-induced livelihood shock; safety net programmes to provide seasonal employment in public works in exchange for a cash or food transfer to protect household assets and smooth a shift away from emergency food aid towards more predictable and targeted safety net; weather-indexed crop insurance to provide protection against crop failure caused by drought or excess rain and enable farmers to access credit in order to purchase quality seeds and fertilisers in order to maximise output.

Finally, aid-funded investments in public infrastructure and services should leverage private investment in sustainable production systems and value chains. This could be achieved by reducing bottlenecks that inhibit financial flows via strengthened governance systems and contribute to an enabling business environment. Using the financial assistance from development co-operation as loan guarantees and policy insurance are just some examples of how the risks of private sector investment could be bought down in order to make investment in green growth more attractive. The Aid-for-Trade Initiative aims at reducing transaction costs and strengthening the capacity of developing countries for trade. It is motivated by the role of trade as an engine of economic growth and poverty reduction. It provides support through trade infrastructure development and production capacity projects, and through assistance in implementing trade agreements. It also provides assistance for building capacities in trade policy and regulations, and addressing adjustment costs incurred by trade reforms. Development co-operation increasingly consider the Aid-for-Trade Initiative as a mechanism for facilitating climate change adaptation and stimulating green growth in developing countries.[4]

Technology transfer and knowledge sharing

OECD countries can help developing countries promote green growth by removing the barriers to the dissemination and transfer of technologies. In addition, support to developing countries for science and development in green technologies helps to advance innovation and technology developments. It can reduce the cost and risks of private sector investment in new technologies, thus building private sector confidence (OECD, 2011b). Furthermore, donors can help developing countries to map out their research and technology needs – such as through UNFCCC'S Technical Needs Assessment – and to identify and implement policies, frameworks, and governance mechanisms that deliver rapid scientific and technological progress and that lead to a quick and wide diffusion of innovation. Support to training (for researchers and scholars) increases the capacity of developing countries to adopt new technologies. Joint research projects and research collaboration with developing countries help to address local needs or global challenges, which can also help to diffuse knowledge (Box 4.6).

OECD countries can help governments to design and implement policy frameworks that support investment in resource-efficient and clean production technologies. They can also provide strong incentives to eliminate distorting policies such as subsidies, and to eliminate gaps in the financial support structure of green investment and in the capacities, knowledge, and skills of governments and firms (UNIDO, 2010).

Box 4.6. Green growth initiatives to boost international co-operation

New organisations like the Global Green Growth Institute (GGGI) play an increasing role in developing and distributing green technologies in developing countries. The GGGI aims at supporting developing countries in their efforts to define and implement green growth strategies at the national and local level. Its support includes analytical tools and training. In addition, it provides institutional capacity building and involves stakeholders in an international process of mutual learning during their development of a green growth policy (see *www.gggi.org* for details).

The Green Jobs Initiative seeks to define policies and programmes promoting green and socially-sound employment for green growth. This initiative builds on the recognition that the transition to green growth reduces employment in conventional areas such as mining, fossil fuels, and smokestack industries, while at the same time offering employment opportunities in new "green" industries such as the renewable energy sector (UNEP/ILO/IOE/ITUC, 2008). The smooth transition of workers towards greener jobs depends partly on the availability of (re)-training programmes, at least temporarily. Training is one component of the International Labor Organization's (ILO) Green Jobs Initiative. There is also a Learning Forum that seeks to stimulate the generation of green jobs by disseminating knowledge, tools, and examples of good practices (ILO, 2011). Capacity building involves, for instance, the exchange of information on the type and amount of investment needed to promote green jobs (UNEP/ILO/IOE/ITUC, 2008). In addition, the ILO maintains an internal Green Jobs Network to strengthen co-operation among ILO departments to make sure all ILO initiatives consistently accommodate and address environmental concerns and issues. See *http://www.unep.org/labour_environment/features/greenjobs.asp* for details.

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 (*www.greeneconomycoalition.org*).

Facilitating trade in environmental goods and services

New opportunities can be created for green growth in developing countries by building international markets for ecosystem services. OECD countries can adopt policy approaches to the pricing of environmental externalities that allocate adequate portions of the consequent revenues to paying for, and thereby creating demand for the production of, the ecosystem services expected for developing countries.

The participation of developing countries in international trade is also facilitated by the international harmonisation of standards. This includes environmental, sanitary and phytosanitary standards, as well as technical standards for certification schemes or trade in environmental goods. The Standards and Trade Development Facility (STDF), the International Standard Organization next to some international NGOs (*e.g.* Marine Stewardship Council, Forest Stewardship Council, Fairtrade Labelling Organization) has made major efforts in this area. Standards that are harmonised with consent of the international community avoid such schemes becoming barriers to international trade or risking green protectionism, thereby reducing the scope for countries to trade and for green growth.

A role for consumers

Consumers can also have a major impact on green growth. Supporting environmental goals by purchasing products that have environmental characteristics such as energy efficiency or recyclability can have a significant impact. Pricing the use of environmental resources has proven to be a powerful tool for influencing consumer and household decisions. Evidence suggests that households charged for water consume approximately 20% less water than those who are not. Similarly, high fuel costs decrease car use and waste charges encourage waste reduction (OECD, 2011f). Increased consumer demand for green

products will also help to reduce production costs (Ishaswini and Datta, 2011). This will be reflected in the production patterns and processing behaviour of companies, and the impacts will be transmitted throughout the value chains.

International action is needed to raise consumer awareness about green goods and services, and the effects of their own consumption behaviour and lifestyle choices. This applies to consumers in developed and developing countries alike. Households need to be encouraged to take actions to support environmental goals. Activities needed include the provision of information about the environmental characteristics of products, environmental and health effects, increasing awareness about the production of waste products at the household level.

Coherent policies for green growth

In a context of an increasingly interdependent and shifting world economy, the global economic crises, and the global nature of climate change, there is an urgent need for inclusive, collective, and coherent action by the global community and for ensuring that policies are coherent with development objectives in multiple areas: agriculture, trade, environment, labour, health, and finance. According to the UN Declaration on the Right to Development (UN, 1986), developed countries have a duty to ensure that their policies do not undermine developing countries' right to development. This means that OECD countries must make sure that their policies in areas other than development co-operation support and do not undermine developing country efforts to improve natural resource management, agriculture, economic development, and sustainability.

Policy coherence for development (PCD) is an approach that aims at ensuring that one country's domestic policies do not have negative consequences for others, do not contradict national and international priorities and development goals, and do not impede sustainable development in other, especially developing, markets. As we have seen above, economic processes, investment, consumer behaviour and development can all be framed and influenced by policies and international agreements, *e.g.* fair trade schemes, standards, economic incentives, norms, and education. A PCD approach can serve as a unifying tool and contribute to creating a coherent international enabling environment which does not undermine political, economic, and social standards and goals set in developing countries. This cross-cutting approach can play an important role in creating an international enabling environment for green growth policies and development. PCD implies mutually reinforcing policy actions across government departments and agencies in one or several countries.[5]

Combining a PCD approach with a focus on green growth can help assess developed countries' policies and their influence on green growth and development. The systematic application of PCD can ensure that the development dimension is taken into account at all stages of policy making. Political commitment and policy statements to green growth, policy co-ordination mechanisms, and systems for monitoring, analysis and reporting of the impacts of policies can contribute to an enabling environment.

Integrated into a multi-sectoral, whole-of-government approach and an international context of both developing and developed economies, green growth policies can be cross-cutting, maximise synergies, co-benefit other sectors, and positively influence poverty alleviation, employment, the design of standards, and social development while at the same time doing justice to the global impact of climate change and global warming. Intensive ex ante analysis, whole-of-policy approaches, a good and profound knowledge of the economic, social, and investment portfolio of developing and emerging markets, as well as throughout, timely, and ex post analysis of the impacts of green growth policies, can be helpful in order to maximize opportunities of green growth.

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Domestic green growth policies in developed economies will affect both the pace of economic growth and poverty reduction in developing countries and the prospects for their transition to green growth. The economies of poorer developing countries will be affected by the global shifts towards green growth, which will be driven by, and largely occur in, the developed and emerging economies. These changes will be driven by a mix of public policies in relation to regulation, taxation and incentives structures to promote change in energy demand and production and the response of firms to those policies and changing markets in seeking to adjust their technologies, assets and market positions. The changes in the global economy will provide both opportunities and risks for developing countries and their citizens. The extent to which they result in opportunities for economic growth and poverty reduction will be significantly influenced by policies in the developed and emerging economies.

Efforts in developed economies to reduce the environmental impact of production and consumption have delivered results within national boundaries. However this appears to have been accompanied by a significant outsourcing to developing countries of carbon intensive and polluting portions of the supply chains for developed country consumption. When the progress towards green growth is measured in terms of the environmental footprint of consumption in developed countries, thereby including the net imported footprint, it appears that the environmental cost has in fact been increasing. (Hoffman, 2011). In the case of carbon, although the total levels of emissions in developed countries reduced by 0.3 Gt per annum between 1990 and 2008, emissions related to net imports from developing countries (*i.e.* developing country emissions arising from producing of goods and materials exported to developed countries less the developed country emissions arising from producing exports to developing countries) rose by 1.2 Gt. Over the same period, the proportion of total developing country emissions associated with net exports to developed countries rose from 6.5% to 14.5%. (Peters *et al*, 2011).

The impacts of OECD country policies on environmental sustainability and on growth and poverty reduction in developing countries are interlinked. The shift in environmental footprint to developing countries, whatever the causality, has been associated with opportunities for increased exports, growth and poverty reduction. New more globally effective green growth policies aimed at decoupling consumption in

developed countries from environmental impact are necessary, but they must be designed in ways that protect the economies of developing countries and stimulate new greener growth opportunities for them. OECD policies will need to avoid constraints to developing country growth, such as a new green protectionism, and promote new economic opportunities, such as through developing global markets for ecosystems services, like carbon trading, that pay for environmental services in developing countries by pricing global environmental externalities in developed countries.

OECD country policies can help ensure that global changes involved in green growth provide more opportunities than threats for development. There may be, for example, increased demand for agricultural production in developing countries to provide raw materials for a growing biofuel[6] industry. This could be a driver of poverty reduction among poor smallholder farmers. Conversely, promoted in the wrong way it could result in poor rural people being in competition for land and water resources with energy sector investors.

New and improved technologies in energy production, such as solar power, biomass, micro-hydro power and biofuels, linked with new approaches to electricity generation and distribution, could expand energy access in poor developing countries and reduce costs to the economy and to households. OECD policies can promote the transfer of and investment in these technologies.

While these impacts are important to developing countries and their citizens, including the poor, the risk is that they are likely to be relatively unimportant considerations in designing, or scoping the progress of global green growth strategies. Combining a PCD approach with the focus on green growth can help assess developed countries' policies and their influence on green growth and development. The systematic application of PCD to the design and appraisal of policies can ensure that the development dimension is taken into account at all stages of policy making. Clear political commitment and policy statements around green growth, policy co-ordination, and systems for monitoring, analysis and reporting of the developmental impacts of OECD policies can be an important contribution to an enabling environment.

A role for the OECD

Horizontal harmonisation of green growth policies across the whole of government and among the policies of the international community is of great importance. The OECD, with its comparative advantage in facilitating exchange and knowledge-sharing, is well positioned to take a leading role on PCD, act as a unifying platform, and help avoid negative impacts from green growth policies through policy and portfolio analysis.

The OECD promotes PCD at several different, but complementary, levels: 1) working with emerging and developing countries to build and strengthen their capacities to design more coherent policies for their own development; 2) raising awareness of PCD in OECD member countries through evidence-based analyses of the benefits of coherence as well as on the costs of incoherence; 3) strengthening members' capacities to design mutually reinforcing policies with positive impacts for development; and 3) monitoring and assessing the development impact of OECD policy recommendations, practices and instruments (OECD, 2011g).

However, despite the major role developed countries can play in creating an international enabling environment for green growth, PCD can only be achieved through a collective effort and an open and inclusive framework, based on the active involvement of all players, *i.e.*, emerging economies, developed and developing countries, and international organisations. In the long run, the implementation of effective green growth policy mixes will depend on political leadership, widespread public awareness and acceptance that changes are both necessary and affordable (OECD, 2012f). In this process, the OECD can

serve as an important, common platform to benefit the exchange and help find global, coherent, benefiting and cross-cutting solutions.

NOTES

[1] ODA is a term coined by the Development Assistance Committee of the OECD to measure aid. ODA needs to contain three elements: (a) be given by the official government sector; (b) to have the promotion of economic development and welfare as the main objective; and (c) be given at concessional financial terms (if a loan, having a grant element of at least 25%).

[2] Countries may also try to achieve a competitive advantage by promoting green technologies. In fact, several disputes concerning green growth elements have been brought to the World Trade Organization (WTO). The first one refers to the Province of Ontario which requires solar developers to use local content for being eligible to participate in its feed-in tariff programme. The second dispute relates to the decision in the US to extend subsidies for domestic ethanol producers while increasing the tariffs on imported ethanol. A third dispute concerns China's Special Fund for wind power manufacturing (World Economic Forum, 2011 cited in OECD, 2011e).

[3] Members of the OECD DAC endorsed a Policy Statement for the Rio+20 Conference at its Senior Level Meeting on 3-4 April 2012, which reiterates their commitments in supporting developing countries' efforts towards green growth transition. The Policy Statement is available at *http://www.oecd.org/dataoecd/52/29/50141822.pdf*.

[4] This view is only partly shared by developing countries, who perceive aid for trade as an instrument for strengthening and expanding competitiveness, economic infrastructure, export diversification, among others (OECD, 2012e).

[5] For more details see *www.oecd.org/development/policycoherence*.

[6] Incentivising biofuel use may also be a factor exacerbating food price volatility.

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CHAPTER 5

MEASURING PROGRESS

Executive Summary

Without a measurement framework or robust statistics, countries will not know whether they are making 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, which provides developed and developing countries alike with a way to organise thinking about indicators and to identify relevant, succinct and measurable statistics. The framework reflects the integrated nature of green growth and describes the main aspects that need to be monitored – the environmental and resource productivity of the economy, the natural asset base, the environmental quality of life, and economic opportunities and policy responses – as well as some of the measurement challenges involved. It describes how the tool can be adapted to developing country circumstances and priorities.

The chapter recognises that for developing countries to adopt this framework, enhancing statistical capacity will be essential. Faced with other pressing priorities, developing countries have experienced difficulties in mobilising the capacity and resources necessary to collect, produce, analyse and disseminate relevant information to support policy development. The OECD has a role to play through collaborative international initiatives like PARIS21, which are helping to build statistical capacity in developing countries. 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.

5.1 Introduction

Policies that promote green growth need to be founded on a solid understanding of the determinants of green growth, as well as the trade-offs and synergies. They also need to be supported with appropriate information to monitor progress and gauge results. Indicators can be used to raise the profile of green growth issues, inform the public debate and gauge how well policies are performing.

This chapter provides an overview of a measurement framework for green growth developed by the OECD and 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 what the OECD is doing to enhance statistical capacity in developing countries and advance the green growth measurement agenda.

5.2 Measuring progress towards green growth: The OECD approach

The cornerstone of the OECD approach to monitoring progress towards green growth is a conceptual framework that reflects the integrated nature of green growth and describes the main aspects that need to be monitored. This framework provides a useful tool to organise thinking about indicators and to identify relevant, succinct and measurable statistics. The measurement framework organises indicators into four groups[1] (Figure 5.1):

(1) Indicators of **environmental and resource productivity**, including demand-based environmental services (footprint approaches), track the extent to which economic growth is becoming greener (*i.e.* low-carbon and resource efficient).

(2) Indicators that monitor the **natural asset base** and whether it is being kept intact. –

(3) Indicators of the **environmental quality of life** – the direct and indirect interaction between people and the environment.

(4) Indicators that capture both the **economic opportunities and the policy responses** that arise from green growth.

These four groups of indicators are complemented with indicators describing the socio-economic context.

The measurement framework was used to guide the development of a proposed list of green growth indicators for OECD countries (OECD, 2011a). There are two important caveats concerning the list. First, it is neither exhaustive nor final. It is a preliminary selection made on the basis of existing work and experience in the OECD, the International Energy Agency (IEA), other international organisations, as well as OECD member and partner 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 industrial structure, geography and climate will also influence the relevance, selection and interpretation of specific indicators.[2]

Figure 5.1. OECD framework for green growth indicators, indicator groups and themes

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

5.3 Adapting the measurement framework to developing countries

Monitoring progress towards green growth in developing countries requires some special considerations. Developing countries face many different challenges – poverty, weak institutional capacity, food insecurity, gender inequality, poor infrastructure – that are less prevalent or acute in developed countries. Although development priorities may differ, the OECD green growth measurement framework is a robust tool that is useful and relevant to any country: developed, emerging or developing. It provides a starting point for formulating a set of green growth indicators for developing countries.

A key principle in drawing up a set of green growth indicators for OECD countries was to achieve a balanced coverage of the two dimensions of green growth – "green" and "growth", with particular attention given to indicators capturing the interface between the two. For developing countries, green growth is about more than the interaction between the environment and the economy; it is also about increasing the economic and environmental *resilience* of society and ensuring that the growth that is taking place is *inclusive*. These are two important aspects of green growth that need to be reflected in an indicator set for developing countries.

Indicators of environmental and resource productivity

Monitoring environmental and resource productivity is especially important for developing countries because of the significant role resources and environmental services play in their economies. Primary production (*i.e.* the extraction and harvesting of resources such as minerals, timber or fish) makes up a significantly higher share of production and exports in developing countries than in developed countries (OECD, 2009). Many developing countries are agriculture-based, making the productivity of soil and water resources of upmost importance. The environmental and resource productivity of developing country economies is also important because the potential for productivity gains is large. A recent study estimated

that 70 to 85% of potential global energy and resource productivity opportunities are to be found in developing countries (McKinsey & Company, 2011).

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 a ratio of real output (typically GDP or sectoral value-added) over natural resource use. Countries with large extractive industries should track the productivity of the specific energy, metallic and/or non-metallic minerals (*e.g.* coal, copper, gold, diamonds, phosphate rock) that matter most to the economy. Countries reliant on agricultural activities should monitor the productivity of natural assets such as water and nutrients in soil. But some indicators will be common across countries, in particular those that are global in nature. Take for example climate change. The atmosphere's capacity to absorb greenhouse gases is a global asset and the generation of greenhouse gas emissions is relevant independent of the country or region in question. Similarly, energy is a critical input into almost all economic activities, and energy productivity is important around the world.

Changes in these indicators need to be carefully interpreted. 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; converting natural forests into sustainably managed plantation forests). "Catch-up" gains from improved technology and organisation also offer much scope. Also, while productivity indicators and decoupling trends can show whether production has become *greener* in relative terms, they do not show whether environmental pressure has also diminished in *absolute* terms. For an environmental perspective it is thus useful to also monitor the presence of absolute decoupling. From a socio-economic perspective, absolute decoupling may not always be possible, however, if a minimum threshold of *per capita* use of environmental services is required to meet basic human needs. This is particularly the case for countries experiencing strong population growth.

Indicators describing the natural asset base

Natural resources form the largest component of the asset base in many developing countries. Natural capital is estimated to account for 30% of total wealth in low-income countries, 20% of wealth in middle-income countries and only 2% of wealth in OECD countries (World Bank, 2011).

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 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. Indicators of stocks and flows of natural resources and environmental services need to be read along with other socio-economic indicators and with information on resource management policies (*e.g.* certified forest area).

Indicators in this group should align with indicators of environmental and resource productivity by focusing on natural assets that matter to production. Consequently, indicators will vary across countries according to their natural asset base. 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.

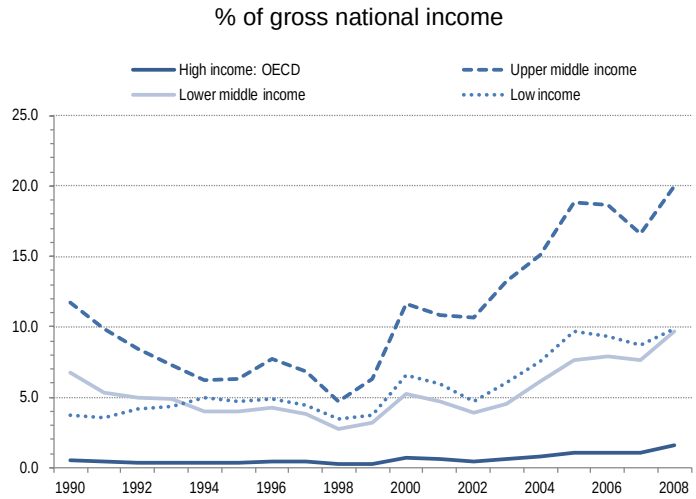
Box 5.1. Genuine savings

One approach to assess 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. 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 (Figure 5.2). 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.

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 whether the natural asset base it being kept intact. 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, adjusted net savings would remain positive and there would be no change in national wealth. Therefore, increasing adjusted net savings witnessed in South and East Asia does not necessarily imply positive investment in natural capital.

Figure 5.2. Energy, mineral and forest resource depletion, 1990-2008



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

Indicators monitoring the environmental quality of life

Environmental quality of life issues are critical to developing countries. Human exposure to environmental pollution and risks is relatively high in some developing countries. Indoor and outdoor air pollution (exposure to particulate matter) is much higher in some of the emerging and developing economies than in OECD countries and larger shares of the population in these countries live under medium to severe water stress (OECD, 2012b). People living in developing countries are also disproportionately vulnerable to risks from natural hazards, such as flooding, drought, and landslides, due to a combination of natural (geography, climate) and human-made factors (settlement patterns, urbanisation, deforestation). At the same time low levels of public access to environmental services and amenities, such as clean water and sanitation, contribute to premature death and preventable diseases. The impacts of global warming, including decreased agriculture yields, increased water stress, and loss of biodiversity, are expected to disproportionally affect developing countries, further exacerbating these economic and health challenges.

Although these issues are often particularly acute in urban areas where growing populations are placing increasing pressure on environmental services, they are not limited to cities. Energy poverty is an important issue, especially in rural areas. According to the International Energy Agency (IEA, 2010) 85% of the estimated 1.4 billion people worldwide who lack access to electricity and about 82% of the 2.7 billion reliant on traditional biomass for cooking live in rural areas in developing countries. An estimated 1.45 million people die prematurely each year from household air pollution due to the inefficient combustion of biomass.

Indicators in this group should be selected to reflect the most pressing environmental health issues and risks, and this should be mirrored in the presentation of information on environmental services or amenities. For example, incidence of waterborne disease and associated health costs should not be presented without including information on population access to safe drinking water and sewage treatment (Figure 5.3). Key issues will vary with national circumstances, such as urbanisation rates and industrial structure.

Figure 5.3. Population access to sanitation and years of life lost attributable to water, sanitation and poor hygiene

a. Disability-Adjusted Life Years (or 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.
b. 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; World Bank, Millennium Development Goals indicators database.

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.* green energy investment), environmental goods and services (*e.g.* certification of sustainable production and trade), international financial flows (*e.g*. aid), 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.

One area that is garnering considerable interest is the environmental goods and services sector (see Chapter 4).[3] Growth in this sector has the potential to alleviate poverty while at the same time generating economic growth and employment and is a key focus of other related international initiatives such as the UNEP's Green Economy initiative. An important caveat from both policy and measurement perspectives is that the environmental goods and services sector represents only one aspect of the green transformation of the economy. Changes in "traditional" industries can also move an economy towards a low-carbon, resource-efficient growth path, such as increased energy efficiency through new modes of organisation or product innovation that reduces their energy intensity. These changes can have a big impact, even if they are driven by cost or competitiveness considerations rather than environmental concerns. For example, a recent study estimated that improved energy efficiency in iron and steel making alone could account for 4% of the total financial benefits stemming from improving global resource productivity by 2020 and greater efficiency in steel end use could account for another 4% (McKinsey & Company, 2011). In developing countries, the scope for such productivity gains in production processes is large because of the potential to leap frog into newer and more efficient technologies, unlike developed countries, which are locked-in to older, less efficient ones.

5.4 Measuring the global impact of consumption

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. With globalisation, the international division of labour has broadened steadily, giving rise to global production chains, enabled through increased international trade and foreign direct investment. Associated with these developments is the increased distance between production and consumption activities and between consumption and environmental impacts. This raises concerns over the equitable distribution of environmental burdens. 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). From a production perspective, countries importing goods for consumption may appear to be reducing their use of environmental services while in terms of final demand the use of environmental services is (indirectly) increasing.

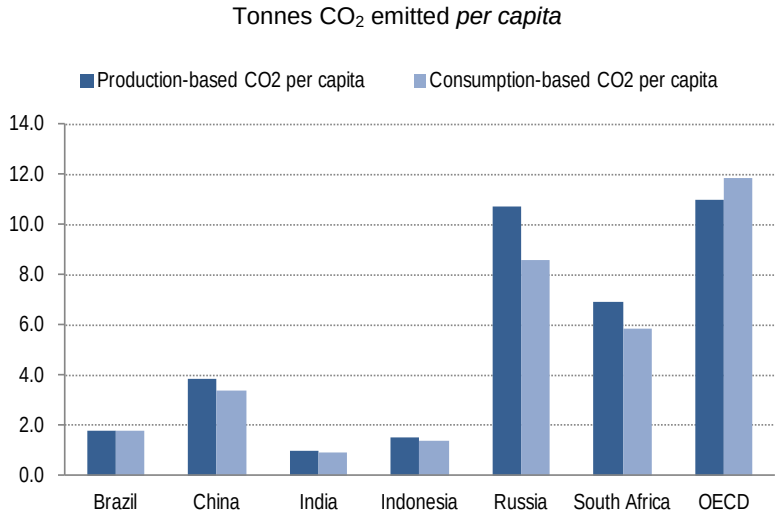
Demand-based indicators attempt to measure the flows of environmental services or emissions that result from a country's consumption (*i.e.* its environmental footprint). For example, estimating demand-based emissions involves tracking the emissions embodied in imports, adding them to the direct emissions 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 on countries' respective contributions to potential 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. In general, developing countries are global suppliers of environmental assets, while industrialised countries are global demanders.

Intuitively, demand-based approaches best lend themselves to environmental issues that are global in nature, where environmental "goods" (or "bads") matter equally regardless of their location (*i.e.* they can be easily aggregated). Greenhouse gases are a clear example; they are relevant regardless of where they are emitted. Emissions can be aggregated into a measure that remains analytically sound. The application and interpretation is 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 with relatively plentiful resources. Adding the two together would provide a biased message about the environmental impact of water consumption.

The OECD has computed the CO_2 emissions from fossil fuel use embodied in imports and exports of OECD and emerging countries.[4] The most recent results were presented in *Towards Green Growth: Monitoring progress – OECD Indicators* (OECD, 2011a). One of the key findings is that total emissions generated worldwide to satisfy domestic demand in OECD countries rose faster than emissions from domestic production, while the reverse holds true for the large emerging economies (Figure 5.4). This reflects a number of factors, including the increased substitution of domestic production by imports and the outsourcing energy-intensive (fossil fuel-based) production from OECD countries to non-OECD countries.

Figure 5.4. Comparing the carbon footprints of OECD and emerging economies, 2005

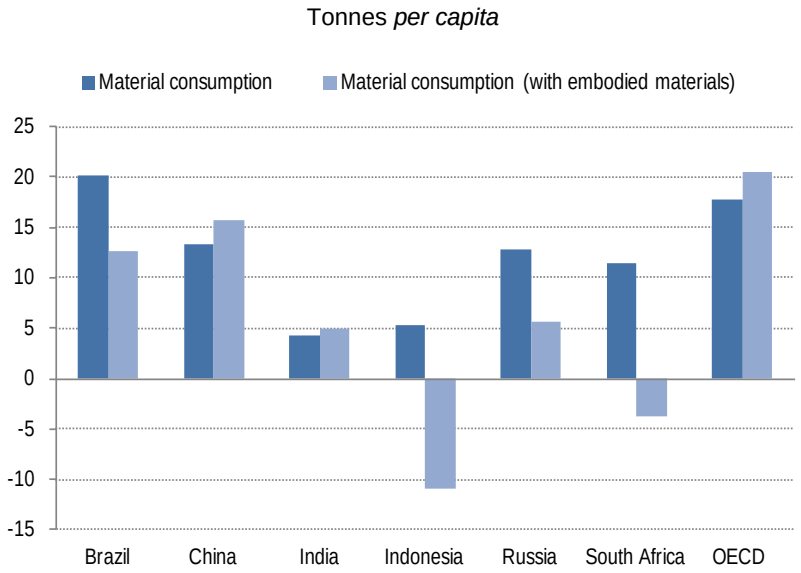


Source: Ahmad and Yamano (forthcoming), "Demand-based CO_2 emissions", *OECD Statistics Working Paper Series*, OECD, Paris.

Demand-based computations are also being used in material flow analysis and accounting to estimate the material footprint associated with consumption by accounting for materials indirectly embodied in goods. [5] "Indirect flows" are the materials used in the production of goods (*e.g.* water, fuel, chemicals) 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 due to data availability only a handful of studies focus on indirect (demand-based) flows. Not surprisingly, these studies find that material resources generally flow South-North, from developing to developed countries. There are also indications that over the last 30 years indirect trade flows have grown more rapidly than direct trade flows.

The OECD has compiled data on the indirect flows of materials embodied in traded goods for OECD countries and emerging economies for selected years (cited in OECD, 2011b). In 2008 OECD countries directly consumed 22 billion tonnes of materials (*i.e.* biomass, fossil energy carriers, and metallic and non-metallic minerals), but the material footprint of consumption was nearly 25 billion tonnes, implying that OECD countries' exports are less material intensive than their imports (Figure 5.5).[6] Conversely, the emerging economies' direct consumption of 30 billion tonnes of materials has a smaller material footprint – 27 billion tonnes – 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.

Figure 5.5. Comparing the material footprints of OECD and emerging economies, 2008



Source: OECD material flows data

5.5 Putting in place a green growth measurement framework

Putting in a place a monitoring framework is an integral component of any green growth strategy. For developing countries compiling a set of indicators to monitor progress on green growth need not increase the statistical burden if existing measurement frameworks are drawn upon. 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 measuring social, environmental and economic policy priorities (*e.g.* national sustainable development strategies, economic-environmental accounting, environmental monitoring).

One of the biggest obstacles to establishing a monitoring framework for green growth in developing countries is overall 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 placed an increased 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 (Box 5.2).[7]

Initiatives to modernise and improve national statistical systems, such as the example in Box 5.2, provide an important opportunity to mainstream green growth, particularly environmental considerations, into economic and social information systems. One avenue through which this can be done is the National Strategy for the Development of Statistics (NSDS) framework, a process co-ordinated by the Partnership in Statistics for Development in the 21st Century Consortium (PARIS21, described below). The NSDS is a strategic planning platform to co-ordinate national efforts to improve the mechanisms and processes needed to produce relevant statistics (*e.g.* statistical activities, capacity development, and infrastructure improvements). The process enables countries to 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, with 95% of low-income, lower middle-income, and African countries having adopted the NSDS methodology (OECD, 2012).

Box 5.2. Measuring progress towards a green economy in Barbados

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. More recently, as part of its 2006-2025 National Strategic Plan the government has initiated consultations on indicators. Goal 4 of the strategic plan is "Building a green economy – strengthening the physical infrastructure and preserving the environment", making it particularly relevant to this discussion. However, despite these efforts, institutionalising environmental indicators and, more specifically, data collection 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, University of West Indies, and Government of Barbados (2012), *Green Economy Scoping Study – Synthesis Report: Barbados*, UNEP, Nairobi.

What the OECD is doing

Collaborating to enhance statistical capacity in developing countries

Statistics lie at the heart of the OECD's work and the organisation is internationally recognised and respected for its statistical expertise and experience. Leveraging this core strength, the OECD is working with developing countries to enhance capacity for inclusive and relevant statistical systems through PARIS21. The PARIS21 Consortium 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. Through its Secretariat (hosted by the OECD's Development Co-operation Directorate), PARIS21 encourages and supports low-income and lower middle-income countries to design, implement, and monitor their NSDS (OECD, 2012).

Advancing the measurement agenda

The OECD is working with member countries and international partners to address the measurement issues that constrain the full and timely production of green growth indicators. These include important gaps in the information base and inconsistent data. Work being done 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.

- Developing monetary values for changes in key stocks and flows of natural assets to support extended growth accounting, the development of more comprehensive balance sheets and measures of "real income" (adjusted for growth and depletion of natural assets).

- Better physical data to support improved material flow analysis, including the extension of demand-based measures.

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 established itself as the leading international organisation in the field of measuring well-being and fostering the progress of societies.[8] The generation of these data has implications that go beyond member countries (OECD, 2012).

International co-operation on monitoring green growth

Several international organisations are also working to advance global knowledge about the measurement of green growth. Co-operation among organisations is essential for avoiding duplication and maximising mutual learning opportunities.

The integrated ***System of Environmental Economic Accounts*** (SEEA) is the first international statistical standard for environmental-economic accounting.[9] 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. SEEA will help maximise international comparability and consistency. It will be the primary framework from which to derive green growth indicators. The OECD has worked with the UN in the development of the SEEA, both on the central framework and a forthcoming volume 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 moving forward with implementation with the support and technical assistance of the United Nations Statistics Division.

The ***Green Growth Knowledge Platform*** **(GGKP)** is a joint initiative of the OECD, the United Nations Environment Programme (UNEP), the World Bank, and the Global Green Growth Institute to co-ordinate, create and disseminate knowledge on green growth and the green economy.[10] The GGKP is a global network of researchers and development experts that identifies and addresses major knowledge gaps

in green growth theory and practice. It aims to provide practitioners and policy makers with better tools to foster economic growth and implement sustainable development.

The UNEP-led ***Green Economy Initiative***, launched in late 2008, provides analysis and guidance to countries on policy reforms and investments to achieve a green transformation of key sectors of the economy. The main output, the *Green Economy Report* (UNEP, 2011), was released in February 2011 and two separate publications on the framework for measuring progress towards a green economy and green economy indicators are being prepared in 2012. The OECD is working with UNEP to identify commonalities and synergies between the two frameworks.

NOTES

[1] The measurement framework is described in detail in the OECD's 2011 report: *Towards Green Growth: Monitoring Progress: OECD Indicators.*

[2] Even among OECD countries, which are more homogenous than developing countries, there are differences when it comes to indicator selection. For example, both the Netherlands and the Czech Republic have published green growth indicator reports based on the OECD framework. The two reports are largely consistent, but indicators of the natural asset base reflect national circumstances (*e.g.* coal and water for the Czech Republic; natural gas and fish for the Netherlands) as do policy responses and economic opportunities (*e.g.* expenditure on R&D in the Czech Republic; carbon emission trading in the Netherlands).

[3] The System of Environmental-Economic Accounts (SEEA) defines the environmental goods and services sector as all producers of environmental and resource management specific services (*e.g.* waste and wastewater management and treatment services, energy saving activities), environmental sole purpose products (*e.g.* catalytic converters, solar panels), adapted goods or goods that have been modified to be "cleaner" or more environmentally friendly, and environmental technologies (*e.g.* pollution controls).

[4] 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).

[5] For examples see OECD (2011b) and Schaffartzik, *et al.* (2011).

[6] In material flow accounting this indicator is referred to as raw material consumption (RMC). It is the sum of domestic material consumption (DMC) and the indirect flows associated with imports and exports.

[7] 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 that attitudes that see information as an instrument of power, requiring secrecy, rather than a management tool to support decision makers with relevant information remain pervasive (OECD, 2007).

[8] See *www.oecdbetterlifeindex.org*.

[9] See *http://unstats.un.org/unsd/envaccounting/seea.asp.*

[10] See *www.greengrowthknowledge.org*.

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