Prospects for Mainstreaming Ecosystem Goods and Services in International Policies

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Netherlands Environmental Assessment Agency

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Foreword

Ecosystems provide goods and services essential for human well-being. These ecosystem services are estimated globally to be worth trillions of euros every year. Although often unrecognized, many of these goods and services, from flood protection by coastal mangroves to the pollination provided by insects or climate regulation of forests, represent nature's value to economic sectors and most forms of human activities on the planet.

Slowing down, halting and reversing the decline of ecosystems that provide these vitally important services are essential for sustainable development. While the recognition is not new, deteriorating ecosystem and biodiversity trends, and indeed the growing cost of the degradation of ecosystems in terms of human well-being and prosperity, are proof that past responses from government, business and civil society have been inadequate.

There is growing urgency to find policy levers and sustainable market frameworks that would help guard against ecosystem goods and services (EGS) degradation far more effectively at the level of root causes and at a large scale. Many of the policies and practices that affect EGS are local, but they are often embedded in or influenced by a broader international policy context, as in the case of tropical forests and climate change. This report, produced by a joint PBL and IISD team, brings attention to the influence of international policy mechanisms that often define the framework for policy-making and action at the national or local level. While some of these included environmental and biodiversity policies, others have no explicit environmental dimension, even if they have a major impact on EGS and, through that, an impact on human well-being.

The report identifies the relevance of key international policy areas such as trade and investment, development assistance and climate change to EGS in the context of poverty reduction; points out problems; and recommends specific measures that can help build consideration of EGS into future policies. Many involve the application of tools that have already been proven at the pilot scale and beyond, but in order to live to their full potential, they need to be mainstreamed. This requires detailed technical work, building the right institutional capacity and political will. This can be challenging, but institutions behind international policies must take up the challenge.

Professor Maarten Hajer
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Executive summary

Main findings

- Integrating Ecosystem Goods and Services (EGS) into various international policy domains conveys significant opportunities to contribute to reducing poverty while improving EGS delivery at the local level. Mainstreaming (integration) EGS can become an important element of natural resource and biodiversity policies.
- Although most management decisions affecting ecosystem services are made at a local level, these local decisions are conditioned by national and international policies. International policy domains – including development assistance, trade, climate, and the policies of international financial institutions – provide clear opportunities to mainstream EGS in ways that can support poverty reduction.
- Positive poverty reduction and EGS outcomes cannot be taken for granted; in many cases trade offs between decreasing poverty and EGS delivery will occur. A major challenge is to ensure that loss of EGS at least results in sustainable improvements in social or economic development of the poor. Consistent policies across scales and policy domains based on analysis of the local situation are necessary to minimize these trade offs and prevent loose-loose situations.
- Mainstreaming EGS is starting to happen. Tools for mainstreaming are available in various policy domains. However, evidence of proactive consideration of EGS in international policy design is scarce.
- Tools developed within the Convention on Biological Diversity (CBD) support mainstreaming EGS in international policy domains. Although the CBD could play an important role in mainstreaming EGS, its current influence on other sectors is weak.

Importance of EGS for poverty reduction and development policy

Ecosystems produce a variety of goods and services that we all depend on. This includes all our food and water, our timber and a great deal of the fibres used in manufacture. Ecosystems may moderate the effects of extreme weather events and reduce the impacts of climate change. They break down our wastes, purify our water supply and regulate all life on the planet, through photosynthesis, nutrient cycling, and soil formation.

The risk of loss of EGS is increasingly evident and affects especially the poorest people of the world. There are clear threats to ecosystem integrity and to the quality and quantity of goods and services ecosystems can deliver. Society needs to invest ever more heavily in substitutes, or, when none exist, in EGS restoration. The challenges of improving EGS are particularly severe in the poorest regions of the developing world. Here, the resource base is fragile and degrading, and resource users have few practical livelihood options. Conflicts among resource claimants frequently exacerbate the pressures. These marginal areas are home to probably 25% of the world population, almost all of whom are very poor. These people will feel the impacts of dwindling ecosystem goods and services most directly.

Although EGS are more likely to be covered by environmental and biodiversity policies, these policies may not have much influence on ecosystem use in actual practice. The goal of this study is to increase understanding of the importance of international policy mechanisms beyond environmental policies in sustainably delivering EGS to benefit human well-being at sub-national and local levels. For this report, we explored the links between local delivery of selected EGS and priority international policy domains. In addition, options and conditions have been identified to integrate (mainstream) EGS in various international policy domains beyond the

domain of environmental and biodiversity policies. We consider mainstreaming as a potentially important element of nature conservation and biodiversity policies.

From local-level EGS delivery to international policy-making

Most management decisions affecting ecosystem services are made at a local level, but these decisions are conditioned by national and international policies. Common features of ecosystem degradation include the role of trade in driving land use conversion locally, and the failure of conventional resource tenure policies in creating incentives for sustainable ecosystem management. While private business plays an important role in these processes, for example through private investments, intellectual property rights and certification, this study has not looked into the (changing) roles of companies in these issues. Examples from three key biomes illustrate the way positive and negative EGS outcomes are related to national and international policies.

In *drylands*, land degradation is fostered by policies favouring agricultural development in high-risk areas, by land use conflicts, and by inappropriate agricultural practices. These may be exacerbated by trade liberalisation and by export-oriented development projects (trade policies) if not accompanied by technical and extension support and incentives for sustainable practices (development policies).

Degradation of *tropical forests* is most often a direct result of agricultural colonisation, mostly linked to road construction or to commercial forestry. These processes are aided by national policies to subsidise infrastructure, credit and land conversion. Incentives to align the value of forest EGS with economic returns to local users need to include resource tenure and supportive institutions for collective management, and policies against EGS conservation must be changed.

In *coastal wetlands*, land-use conversion to urban or industrial uses, or intensive aquaculture, is a major threat to ecosystem goods and service delivery. Better assessment of the economic value of these ecosystem services would be helpful, as would support for appropriate local intensification measures (either aquaculture or agriculture). Rehabilitation of wetlands is very difficult once they have been developed for a certain purpose, so protective strategies are preferred.

Successful contributions of EGS delivery to poverty reduction have typically required combinations of local responses, including: technical – community based - innovations (new or improved production techniques); policy reforms (modifying incentives and cost structures to reward sustainable practices); access to improved production technology and extended services; and building new institutions (multi-scale processes and governance mechanisms to reinforce local ecosystem-based management). These practices can be supported by consistent national and international policy measures.

The role of EGS in international policy-making

Integrating EGS into various international policy domains provides significant opportunities to contribute to reducing poverty while improving EGS delivery at the local level. The basis for mainstreaming EGS can be found in many goals and policies already agreed upon by governments. This study identifies clear opportunities for mainstreaming EGS in international policy domains like development assistance, climate change and trade that can support poverty reduction through EGS delivery. These will be elaborated in more detail in the next sections. Many of these opportunities can act as a double-edged sword: depending on ecological, institutional, cultural, economic, or policy context, they may have either positive or negative impacts on the poor. This study confirms the need for consistent policies on all scales and across policy domains, based on assessment of local conditions as a starting point for the analysis.

Despite the well-documented problems and the emerging evidence of links between EGS and various international policies, the treatment of EGS issues in international policy mechanisms is still ad hoc, at best. There is only scant evidence for proactive use in international policy design of the potential that EGS offer to contribute to poverty reduction and development. Reasons for this include the relative novelty of the concept, the difficulty of bridging practices on a scale ranging from local to global and the increasing complexities that occur when relating policy domains. The problems are further hampered by the lack of a well-articulated and practical conceptual framework and clear examples of operational mechanisms linking these endeavours on the various scales, as well as the lack of systematically collected and independently verifiable information on the dynamics of EGS. A final barrier is that the accrued benefits from ecosystem exploitation are enjoyed by a different group of people than those bearing the costs of EGS degradation. Often these differences cross national and generational boundaries. Different actors and countries have different motivations for taking policy action, and strong international consensus is rare.

Policy coherence is critical. While individual policies matter, consistent constellations of policies across scales and policy domains will be needed for positive impact on both poverty reduction and EGS delivery. There needs to be an upfront consideration of why EGS are important in international policy domains, in what policy tracks mainstreaming can take place, what priority issues should be to focus and which tools can support such exercise. We show several ways to do this in our analysis of various policy domains in the next sections, which includes development assistance, climate change, trade, and the role of international financial institutions. More specific recommendations can also be found in the conclusions of the respective chapters.

Mainstreaming EGS in development assistance policies

- EGS provide important assets for the rural poor, whereas a lack of natural resources and sustainable EGS delivery increases their vulnerability. Investment in conserving and

strengthening ecosystem service delivery can contribute to poverty reduction for the rural poor. Development assistance can play a key role in this. The potential contribution of EGS to poverty reduction and development is increasingly recognised in development assistance, but implementation is still in its initial phase.

- The implementation of the Millennium Development Goals, various forms of financial and technical development assistance and increasing efforts to enhance 'policy coherence for development' all provide opportunities to include EGS in international efforts to support poverty reduction and development.
- Development assistance can help to mainstream EGS delivery in national development polices, like the poverty reduction strategies. Development assistance could focus on raising the profile of EGS in national development mechanisms, contribute to building capacity for implementing EGS concerns in financial and planning ministries, scaling up investments in food security and agriculture and improving tenure and access to natural resources for local people.
- Several tools for mainstreaming EGS to identify appropriate improvements in relevant development policy frameworks and implementation processes are becoming available. These include country assessments, public expenditure reviews and strategic environmental assessments. However, these efforts need to be strengthened and replicated on a large scale.

Mainstreaming EGS in international climate policy

- Strengthening EGS in the forestry and agriculture sectors is consistent with emissions mitigation and supportive of ecosystem-based adaptation, both important potential elements of international climate policy. These connections have not been widely appreciated in climate policy development. EGS options for delivering climate policy objectives are important because they are relatively low cost and could deliver very large emission reductions.
- The best opportunity for integrating EGS in climate policy is through the proposed UNFCCC programme for *Reduced Emissions from Deforestation and Forest Degradation* (REDD). This programme offers, for the first time, a market-based mechanism that could create economic values for standing forests that rival the value of alternative uses of forest lands. However, there are methodological and institutional issues that need to be resolved in order to assure effective implementation. Particularly, the question is how to avoid "leakage" by ensuring benefits are captured locally and agricultural colonization is not simply displaced. Other opportunities for incorporating EGS in climate policy include Nationally Appropriate Mitigation Actions (NAMA) and adaptation policy frameworks and finance related to the UNFCCC.
- In order to improve forest and agricultural EGS through climate policy, institutions and incentives for ecosystem conservation need to better counter the complex drivers of deforestation, which can vary significantly by context. An important element of this puzzle is a restored emphasis on agriculture as both an instrument of ecosystem management and of climate policy, as well as sustainable food production. This requires greater investment and incentives for sustainable agricultural systems, including agricultural intensification.
- Governance and institutional systems for forest management need to be strengthened to ensure local benefit and long-term effectiveness of the REDD incentives. REDD implementation will be determined by the UNFCCC process, which needs to devote more attention to developing implementation tools, measures and standards that take into account the local EGS perspective. More attention is needed to sharing basic knowledge about equitable forest management mechanisms and effective carbon management in agriculture.

Mainstreaming EGS in international trade policies

- The impact of trade policy measures, including tariffs and non-tariff measures like intellectual rights and standards, on ecosystem goods and services will depend on how and in which context the measures are applied. International trade policy plays an important role in setting the framework for their application, and, thereby, influencing the resulting EGS impacts.
- Opportunities for mainstreaming EGS considerations into international trade policy exist in the context of the WTO (for example subsidy reform for agriculture and fisheries or Trade Related Intellectual Property Rights in relation to CBD), bilateral and regional free trade agreements and multilateral environmental agreements. While some progress has been made in these fora, environmental considerations remain an add-on rather than an integral part of trade policy-making.
- The EGS approach can be useful in mobilising political interest in mainstreaming environmental considerations in trade policy, by helping to strengthen the economic argument for environmental protection and allay fears among developing countries over Northern protectionism.
- Promising tools for mainstreaming EGS considerations into trade policy include sustainability impact assessments (provided the findings are indeed implemented), EGS markets (such as carbon credits or tradable pollution allowances) and improved coordination mechanisms between multilateral trade and environment fora.

Mainstreaming EGS through policies of international financial institutions

- EGS are important for International Financial Institutions (IFIs) to consider, partly because through their lending practices and the attached conditions they provide incentives and/or disincentives that affect EGS, and partly because the status of its EGS is an important element of a country's overall risk profile.
- Dialogue on the reform of IFIs, initiated by the G20, provides an opportunity to raise the profile of EGS concerns. The process has gained momentum because of the need to support the global economic recovery. However, limited access by the broader international

community and lack of binding commitments with regard to the environment lead to reduced expectations.

- A central issue is the need to recognise EGS and their economic value, in national accounts and the economic models that guide IFI policies and practices. Initiatives to complement current national account systems with environmental and social indicators can help shift attitudes.
- IFIs already have tools, such as strategic environmental assessments, the World Bank environmental safeguard policies, valuation and payments for EGS, country environment analyses, and portfolio screening. These and other tools would need to be systematically used by both public and private sector lending arms of IFIs.

Tools for mainstreaming

Mainstreaming EGS is starting to happen. Tools for mainstreaming are becoming available in various policy domains. Some early initiatives are underway to identify options for guiding decision-making at different levels, to better attend to ecosystem goods and services. New opportunities are also emerging in the context of policy tracks, such as REDD, poverty reduction, sustainable development plans and development assistance, and through certification schemes in trade. New tools also emerge, such as full cost accounting and payments for ecosystem goods and services.

Positive poverty reduction and EGS outcomes cannot be taken for granted and require careful policy design. Considering the inherent complexity of connections between international policies and local level EGS outcomes, it is reasonable to expect not only successes with tools and policies, but also failures. While the risk of failure should certainly be minimised, particularly in cases where irreversible ecosystem impacts are possible, it is equally important to have adaptive mechanisms in place, so that tools can be adjusted and modified as information about the effectiveness becomes available. This requires, among other things, a close monitoring of their impacts on EGS delivery and the conditions of underlying ecosystems where impacts may appear earlier, and flexible policy mechanisms where change and learning is expected and embraced.

Role of Convention on Biological Diversity

The Convention on Biological Diversity (CBD) could play an important role in mainstreaming EGS, but its current influence on the behaviour of economic actors is too weak to do so. The CBD has been actively trying to mainstream EGS into various policy domains, but with limited success. Given the CBD's mandate and biodiversity's essential role in influencing EGS, mechanisms under the CBD have the advantage of being able to target EGS delivery most directly. Their weakness, however, is that the CBD has a very limited impact on those underlying economic development-related factors that are some of the most important determinants of EGS.

Tools developed within CBD could support mainstreaming EGS in other policy domains. Biodiversity integration has been a key obligation for CBD parties since the Convention came into force, and a number of initiatives and tools have been developed with regard to the international, national and local levels. Lessons learnt from their implementation so far indicate that an objective, such as mainstreaming of EGS, cannot be left to the constituency supporting conservation objectives alone. Inter-sectoral participation in the preparation of National Biodiversity Strategies and Action Plans (NBSAP) could increase awareness of EGS issues outside the more traditional environment agencies and build support for implementation.

This report has shown that to secure the essential services provided by ecosystems, policy responsibilities must be equally and broadly based. Most economic sectors and actors have a direct effect on local ecological integrity. International policies dealing with these sectors need to consider these effects, and responsible agencies need to be held accountable for reducing their unintended impacts. The arguments for mainstreaming EGS could likely be extended to other policy domains not covered in this study, including public health, peace and security, migration and food security. Governments have already committed to much of this through the CBD. But the necessary accountability and compliance mechanisms have not yet been put in place.

1 Introduction

Ecosystems, even if heavily modified by humans, produce a variety of goods and services that we all depend on. This includes all our food and water, our timber and a great deal of the fibres used in the manufacture of clothing, paper and other essential products. Ecosystems may moderate the effects of extreme weather events and reduce the impacts of climate change. They break down our waste and purify our water supply. Ecological factors are primary tools for control of many infectious diseases. Ecosystems provide people with recreational opportunities, they are a source of aesthetic quality and spiritual fulfilment. Finally, ecosystems provide services that regulate all life on the planet, such as photosynthesis, nutrient cycling, and soil formation.

The extent and immediacy of the loss of ecosystem goods and services (EGS) is becoming increasingly evident. The Millennium Ecosystem Assessment (2005a) documented recent changes in the ability of global ecosystems to deliver 24 services fundamental to human well-being. While the delivery of some provisioning services (chiefly agriculture) has increased, about 60% of the services delivered by ecosystems are degrading, and the rate of degradation in most cases is accelerating. The result is that we need to invest ever more heavily in substitutes, or, when none exist, in restoring EGS. A major challenge is to ensure that loss of EGS at least results in sustainable improvements in social or economic development of the poor. Improving EGS is especially challenging in the poorest regions of the developing world, where the resource base is fragile and degrading, resource users have few practical livelihood options, and conflicts among resource claimants over resources of higher quality frequently exacerbate the pressures (Tyler, 2006a). Such marginal areas are home to probably 25% of the planet's people, almost all of whom are very poor. They will most directly feel the impacts of losing ecosystem goods and services.

While EGS is a new concept, concern about the loss of environmental amenities has resulted in a growing assortment of targeted policy responses going back decades. Many of these responses were reactive, but over time it has been recognised that the cost of addressing environmental degradation once damage has already occurred is usually more costly. While anticipating problems and costs is never easy, preventive measures and the integration of the environment into decision-making and policy-making processes became an increasingly important part of the environmental management toolkit.

Environment policy alone, however, will not stop the factors driving the degradation of EGS (Malayang III, Hahn et al., 2005). These factors have more to do with economic drivers, livelihood choices, demographics, the structure and function of markets, conditions of local security, and the multi-dimensional links between various actors making decisions on investment, consumption and land use in distant corners of the planet, when there are no mechanisms to identify and attribute ecological costs. In contrast, environmental policies often deal with environmental problems in a narrower sense, and they are executed by agencies with a mandate that is too limited to effectively address deeper structural causes. In an increasingly globalised world, the way international and national policies reflect such linkages can make a huge difference to outcomes on the ground. More careful design of policies beyond the environmental policy domain with respect to EGS will have positive effects for their delivery on the ground.

The objective of this study is to increase understanding of the linkages between the provision of EGS and the international policies and multilateral organisations. Reducing the rate of degradation of ecosystem services can help reduce the vulnerability of the poor who are most dependent on them, and contribute to the realisation of the Millennium Development Goals (MDGs). There are many policy options directly concerned with nature and biodiversity conservation and sustainable natural resource management, as part of poverty reduction policies. This study intends to broaden this portfolio of policy options beyond the domain of environmental and biodiversity policies and strengthen the case for mainstreaming EGS in other international policies, including development assistance, trade and climate policy, which may set the broader context for national and local measures.

1.1 Why do we need to mainstream EGS in international policies?

Managing ecosystems to strengthen their delivery of goods and services for human well-being is mainly a local task (MA, 2005a; CBD, 2006; UNEP, 2007). In this report, we take the perspective that EGS are most directly affected by local practices, which are, in turn, influenced by regional, national, or, more indirectly, international factors.

Global assessments underscore not only the recent and accelerating decline in biodiversity and the associated EGS, but also the limited extent to which these trends can be mitigated by environmental policies alone (MA, 2005a; CBD 2006; UNEP, 2007; IAASTD, 2009). There are a number of reasons for exploring the links between EGS and international policies from a broader, yet practical perspective:

- The integrity or continuity of many ecosystems across national political boundaries means that securing EGS requires international cooperation.
- The quantity and quality of ecosystem services are determined by macroeconomic and trade policies to a greater extent than by environmental policies per se, and successful responses require coordinated action across different sectors and policy domains, as well as across different levels of government (Millennium Ecosystem Assessment 2005a).
- Both donor countries and developing countries have embraced measurable targets for poverty reduction through the Millennium Development Goals, but meeting these targets becomes more difficult as EGS degrade.
- The relative influence of foreign aid has declined with reduced and redirected official development assistance away from EGS-relevant sectors, over the last several decades, while the impact of private capital in development decision-making has increased in parallel with international policy agreements on trade and investment, broadening the scope of development policy influence from its traditional roots (Parks *et al.,* 2008).
- The predominance of the 'Washington consensus' on macroeconomic and development policies has led to liberalisation and structural adjustment reforms in many countries, over the last two decades. These international policies contributed to a reduction in state service delivery, such as health or extended services that provide support and security for farmers to implement EGS-related innovative practices (IAASTD, 2009; Pardey *et al*., 2006).
- The maintenance of EGS benefits interacts with related international policy areas; for example, about 30 per cent of greenhouse gas (GHG) emissions come from deforestation and land use change, undermining climate change mitigation objectives; the same ecosystems may also provide many other EGS, from water purification to new pharmaceuticals extracted from wild species.
- The negative regional and global security implications of degrading EGS are increasingly evident in several areas, particularly in Africa. Ecosystem degradation reduces the surplus of harvested resources and often exacerbates conflicts (Buckles, 1999).

International policies[1] can either reinforce or undermine incentives for local sustainable ecosystem management practices. Considering the increasing role of international commerce and foreign direct investment flows in many national economies, market mechanisms may either weaken or enhance ecological benefit-sharing. A positive example of market influence would be product certification schemes linked to ecosystem protection. Environmental conditionalities attached to loans provided by International Financial Institutions (IFIs) also play a potential role in constraining local decision-making. Moreover, there is also growing interest in particular types of ecosystem services at the global level (e.g. carbon sequestration, maintaining global water and nutrient cycles and plant genetic resources for agricultural or pharmaceutical uses), where policies need to be negotiated in a manner consistent with the desired local effect.

A growing body of work has started to highlight the importance of employing coherent policy levers for EGS delivery on the ground, beyond the reach of environmental policies. Lessons can also be learned from the case of foreign policy implications of climate change (Drexhage *et al.*, 2007; Kok and De Coninck, 2007; Kok *et al.*, 2008). International policies can play an important role in EGS functioning – for better or for worse. This requires integration (or mainstreaming[2]) of EGS concerns into other policy domains, such as development assistance, trade, investment, or in sectoral policies on various levels of policy-making.

This has also been well recognised in international nature and biodiversity conservation policies. The Global Biodiversity Outlook 2, for example, states that it is imperative that significant progress will be made to increase policy coherence with other international instruments (particularly under the trade regime) and to integrate biodiversity concerns into sectors outside the convention. The United Nations Convention on Biological Diversity (CBD), underwritten by 192 governments, has a specific article on integration of biodiversity concerns and sustainable use into relevant sectoral and cross-sectoral plans and policies (Article 6b of the CBD). The European Union and the Dutch Government, among others, have also called for strengthening the effectiveness of international governance for biodiversity and EGS, in part through minimising the impacts of international trade on the provisioning of EGS and through making international production chains and policies more sustainable (Dutch Ministry of LNV, 2008). The Strategic Plan adopted by the Conference of the Parties of the CBD in 2002, set goals to promote international cooperation in support of the Convention, and to achieve a better understanding of the importance of biodiversity and the Convention, leading to broader engagement, across society, in implementation of biodiversity policies. Moreover, it is expected that the new strategic plan of the CBD, due in 2010, will further emphasise this point.

Despite these intentions, the integration of EGS issues into international policy processes has not been a serious enough consideration beyond the environmental domain, and there is only scant evidence for its proactive use in international policies (Malayang III *et al*., 2005; Ranganathan *et al*., 2008a; Swiderska *et al*., 2008). We believe this may be partly due to the novelty of the concepts, but also partly to the lack of understanding of the complex mechanisms linking local ecosystems to international policy levers. Positive examples

1 We use the term 'international policy' here to include a wide array of inter-governmental policies and policies of international organisations, as well as national policies of which the main focus goes beyond country borders.

2 Integration is also referred to as 'mainstreaming'. We use both terms interchangeably.

of international policy initiatives that target EGS include Millennium Development Goal 7 on Ensuring Environmental Sustainability, the REDD programme, in climate policies. The study into The Economics of Ecosystems and Biodiversity (TEEB, 2009), the Poverty and Environment initiative of UNDP and UNEP, and several international private sector initiatives, such as those trying to come to agreement on common standards, criteria and indicators for the sustainable production of agricultural products (ISEAL Alliance), forest products (Montreal Process, Forest Stewardship Council), or the management of fisheries (Marine Stewardship Council) have started to directly or indirectly address EGS. With this study, we want to provide policymakers with a broader perspective on the opportunities for mainstreaming EGS in various international policy domains.

1.2 Objectives of this study

The goal of this study is to increase understanding of the conceptual and practical links between local delivery of EGS and the levers available in international policy processes to contribute to sustainable management of natural resources. The intent is to find ways to contribute to sustainable poverty reduction and reduce the pressure on ecosystems, by better aligning policies that are currently contradictory, addressing trade-offs explicitly, and finding opportunities for synergistic results. Our research:

- Explores the two-way relationship between international policy domains and selected EGS, to show the possible contribution of various international policy domains for advancing the sustainable management of EGS on the local level.
- Identifies options and conditions for a mainstreaming strategy for EGS in these policy domains.

The results are intended to raise awareness about the relevance of considering EGS in various international policy domains, to inform the agenda-setting process about opportunities for mainstreaming EGS, and to provide an overview of possible tools that can be used for further implementation. This exploration is guided by a fundamental concern for human well-being, reflected in the commitments made by the international community in the Millennium Development Goals. We consider the mainstreaming strategy as a potentially important element of natural resources and biodiversity policies.

We examined the following international policy domains, which have been flagged already as priority issues on the MDG agenda, or by the CBD in the Global Biodiversity Outlook 2:

- *Development assistance:* because of the possible contribution of sustainable EGS delivery to poverty reduction and development, we look especially at national development frameworks, capacity building for implementation, agriculture and food security, tenure of and access to natural resources.
- *Climate policy:* given the important role EGS can play for both mitigating and adapting to climate change, we especially look at forestry (REDD), conservation agriculture and climate change adaptation in the context of the United Nations Convention on Climate Change (UNFCCC).
- *Trade and investment:* because of the importance of EGS delivery for sustained trade in ecosystem goods (like food commodities, or timber), and the close connections of EGS to other kinds of economic activity (e.g. water supply), this chapter will look at the ways that trade policy decisions can undermine EGS, while regional trade agreements, certification and private standards and subsidies can help to reduce the negative consequences for EGS delivery.
- *Role of the International Financial Institutions*: because of the important role of IFIs in development assistance, we look at their country assistance programmes, specific measures such as payments for ecosystem services, recognition of the value of EGS through a reform of the national system of accounts and ultimately the GDP-based measurement of progress.

1.3 The Ecosystem Goods and Services approach and International Policies

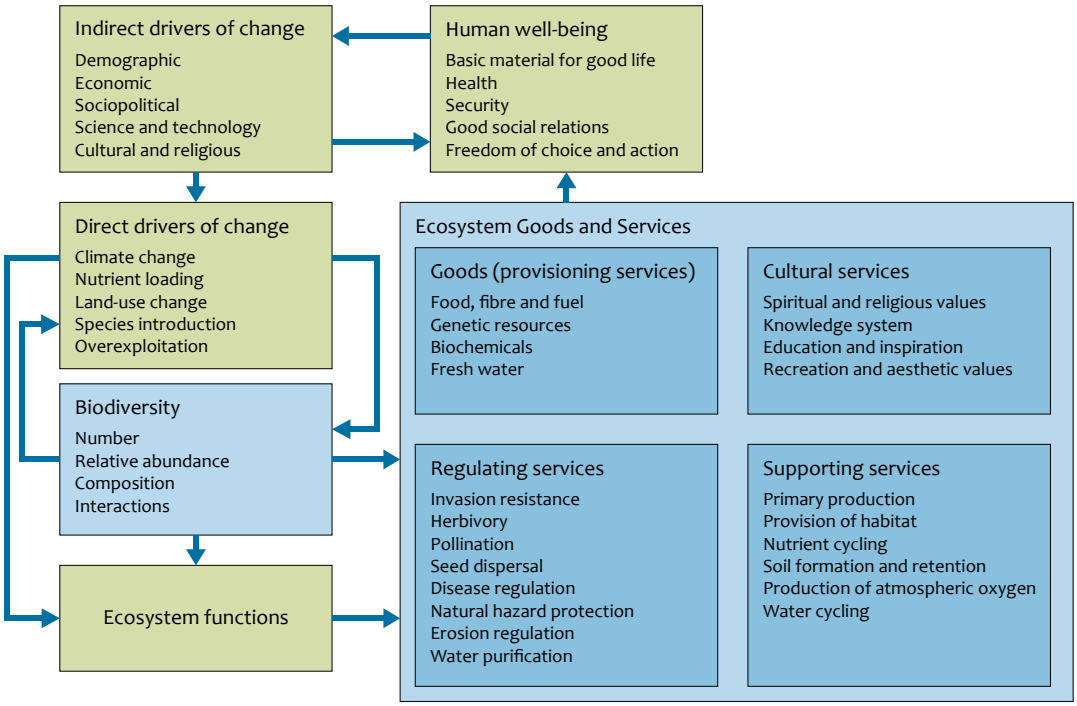
To understand the concept of EGS, this report uses the ecosystem framework developed by Costanza *et al*. (1997) and Daily (1997). This framework has been adopted by several global assessments, including the Millennium Ecosystem Assessment, the Global Biodiversity Outlook 2 and the Global Environment Outlook 4 (see Text box 1.1). The framework helps to communicate the logic of maintaining intact ecosystems, illustrating national economic values attributable to specific EGS, and underlining the importance of EGS in meeting basic human needs. From a policy point of view, the relationship between EGS and the poverty alleviation objectives of the MDGs have particular relevance.

Text box 1.1 Ecosystem Goods and Services

Ecosystem goods and services are the benefits people obtain from ecosystems. We follow the classification of that in the Millennium Ecosystem Assessment. Provisioning services are the goods people obtain from ecosystems, such as food, fibre, wood, fresh water and genetic resources. Regulating services are the benefits people obtain from the regulation of ecosystem processes, including air quality maintenance, climate regulation, erosion control, regulation of (human) diseases and water purification. Cultural services are the non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and experiencing aesthetic quality. Supporting services are those that are necessary for the production of all other ecosystem services, such as primary production, production of oxygen, and soil formation.

Millennium Ecosystem Assessment, 2005b. Ecosystems and Human Well-being. Current State and trends.

Linkages between Ecosystem Goods and Services and biodiversity **Figure 1.1**



Conceptual framework to analyse links between biodiversity and EGS (CBD, 2006).

The conceptual framework presented in Figure 1.1 illustrates the link between EGS and biodiversity, but also the linkages with both direct and, ultimately, indirect drivers of ecosystem change (see also Text box 1.2). The figure also illustrates downstream effects on human health and well-being. International policy may directly affect biodiversity and ecosystems and their ability to provide EGS, for example, through negotiation of the content, terms and national implementation of multilateral environment agreements (MEAs). It may also influence direct or indirect drivers of change on multiple scales. While the influence of MEAs is more transparent and easily recognised, the more powerful pressures for ecosystem change are often local behavioural factors linked to policies that are not focused on environmental issues at all. These drivers of ecosystem change may be unintended, indirect, or second-order effects of policies designed to achieve completely different kinds of objectives.

Addressing these unintended effects requires engagement with diverse economic actors to build wider awareness of EGS issues, modification of the institutional context and incentive structure for decision-making, the strengthening of transparency and accountability, and reduction or mitigation of negative impacts. The Global Biodiversity Outlook 2 states that 'this transformation represents the essence of mainstreaming biodiversity across economic sectors' (CBD, 2006, p.64).

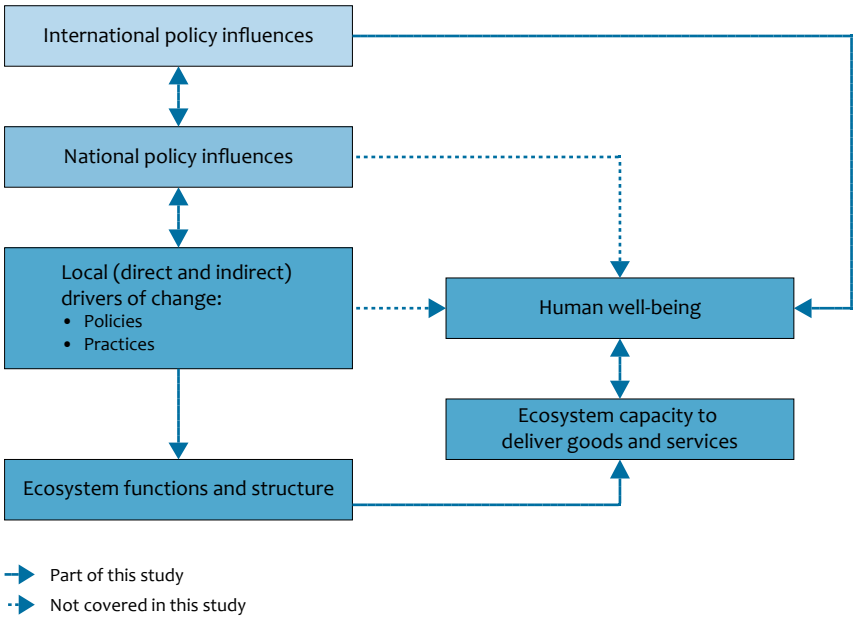
There are also trade-offs between the different kinds of EGS that may be obtained from any given ecosystem. While many opportunities exist for win-win solutions, in the end, from an EGS perspective, choices between protection and sustainable use will often also need to be made. For example, it would be possible to modify an ecosystem through management interventions to optimise either provisioning or

Text box 1.2 Relationship between Ecosystem Goods and Services and Biodiversity

Although there is little dispute about the scientific facts of biodiversity loss and the degradation of goods and services delivered by ecosystems, the relation between these two is still a matter of scientific debate. The ability of the EGS approach to protect biodiversity is also not certain.

Biodiversity is an important indicator of the capacity of most ecosystems to deliver EGS, although causal mechanisms are poorly understood and can be positively or negatively correlated, depending on circumstances. In terms of positive correlation, endemic biodiversity can be essential for the proper functioning and resilience of ecosystems. In terms of negative correlation, the introduction of invasive species can lead to an ecosystem restructuring that reduces or at least changes the ability to deliver EGS. The relationship between ecosystem functions and biodiversity is profound, and includes both quantitative and qualitative aspects.

Influences of international policies on local Ecosystem Goods and Services and human well-being **Figure 1.2**



Framework to analyse international policy influences related to local EGS delivery and human well-being.

regulating services on a sustainable basis, but probably not simultaneously.

The concept of EGS is descriptive but not normative; understanding the service provided does not tell you how much of that particular service is needed relative to others. These value decisions have to be made in light of the local context, keeping human well-being in mind, or, when made on an international level (i.e. regarding carbon), be linked to the situation at the local level. Evaluating trade-offs is typically the purview of economics, but assigning reasonable values to many ecosystem goods and services has posed major conceptual and practical challenges. This is not only because of the absence of market prices, but also of even the underlying monitoring data. The most serious problem, however, is not when some ecosystem goods and services are increasing at the expense of others, but when almost all of them seem to be degrading in the longer term.

Sustainable delivery of EGS is directly linked to achieving the MDGs, because most of the approximately two billion people targeted by the MDGs are farmers and subsist on immediately available ecosystem services. Local ecosystems supply a portfolio of different services; therefore, interventions should be aimed to improve the integrity of whole ecosystems rather than specific services, such as cash crop production (Millennium Ecosystem Assessment, 2005b). This philosophy, known as the ecosystem approach, is embedded in the CBD.

Interventions to strengthen delivery of EGS, although always implemented locally, require multi-scale collaboration among local, government and, in some cases, international agencies. The success of these interventions is influenced by processes of engagement, communication, learning and networking. Crucial ecosystem outcomes from these interventions are shown in Textbox 1.3. To achieve these outcomes will require enabling not only international and national policies but also supportive local institutions. The next chapter further explores these local dynamics.

Building on the EGS framework, elaborated in the previous section, we turned to the analytical framework and took different steps to explore the interface between EGS and international policy. We intended to identify plausible

Text box 1.3 Selected examples of positive EGS outcomes

- Sustainable food production, including, for example, higher value certified products. Production levels may grow or be reduced, depending on context.
- Wild food and medicines (especially from forests) are protected from commercial over-harvesting or habitat loss.
- Total fish catch is reduced to levels below maximum sustainable yield (MSY) to allow for stock and/or habitat recovery.
- Aquaculture production has increased, with attention to keeping environmental impacts within manageable limits.
- Fibre and fuel-wood production in forests is reduced and restructured more towards local rather than export markets.

(Millennium Ecosystem Assessment, 2005b)

evidence of the pathways through which priority EGS issues are or could be influenced by international policy measures and vice versa. Figure 1.2, while reflecting the overall structure from Figure 1.1, highlights the focus of this study: international policy influences on local policies and practices as local drivers of change. This framework enabled us to connect and bridge human well-being, local ecosystem functions and structures, relevant policies and practices, and policies at different levels.

1.4 How to read this report?

This report addresses various audiences. Depending on the policy area you are working or interested in you may wish to focus your reading on that specific chapter to see what an EGS perspective has to offer for your policy area. Biodiversity policy makers may be most interested in the chapter that relates EGS on the ground to various international policy making domains and learn more about where and how mainstreaming EGS in these various policy domains can take place. If you are interested to learn about different tools that can support mainstreaming there is a chapter on that at the end of the report.

More specific, the report is organized as follows:
First, the status and trends for key ecosystem services are reviewed at a global level (Chapter 2). This chapter also presents evidence of the local drivers behind these global trends, with a focus on three biomes of particular interest: drylands, tropical forests and coastal wetlands. The mechanisms for EGS degradation or recovery are described using examples documented from the literature. The local practices that positively and negatively affect EGS are illustrated, as well as the linkages to national and international policies.

Next, the focus is on current international policy issues and trends in each of the policy domains mentioned in Section 1.2. We examined the opportunities for mainstreaming EGS into these domains (see Chapters 3 to 6). These chapters start by showing the relevance of mainstreaming EGS for contributing to the realisation of the goals in these specific policy domains. Relevant policy measures to link to EGS in that specific policy domain are recognized. Subsequently, relevant decision-making tracks are identified, together with practical windows of opportunity for interjecting appropriate consideration of EGS. This step is intended to take the analysis to a more practical and strategic level of international policy-making with specific actors, interests and agendas for decision-making. In each of the policy domains, some priority issues are identified and analysed in more detail. Where available we used the results from integrated modelling and geospatial analysis to assess and illustrate how the impacts of international policy can filter down to produce actual changes on the ground. The chapters 3-6 end with elaborating mainstreaming tools that can be applied in these specific policy domains, together with the link to CBD, as this is a major policy domain concerned with the integrating of ecosystem services and the strengthening of their delivery.

Last, the two concluding chapters bring the analysis together; Chapter 7 evaluates the tool box available for mainstreaming, and, finally, Chapter 8 concludes this report.

2

Ecosystem Goods and Services: Status, global trends and local drivers

- Ecosystem goods and services provide the foundations for human well-being and are essential to the achievement of development goals. However, there are clear threats to ecosystem integrity and to the quality of services they can deliver. Increasing demand for provisioning services in coming decades may lead to trade-offs that weaken other key services, such as regulating or cultural services.

- The dynamics of ecosystem degradation is the result of complex socio-ecological interactions at multiple levels, as expressed locally. In drylands, degradation is fostered by policies favouring agricultural development in high-risk areas, land-use conflicts, and inappropriate agricultural practices. These may be exacerbated by trade liberalisation and export-oriented development projects if these do not provide technical and extension support for sustainable practices.

- Degradation of tropical forests is most often a direct result of agricultural colonisation, mostly linked to road construction or to commercial forestry. These processes can be aided by national policies subsidising infrastructure, credit and land conversion. Export-oriented production creates incentives for both farmers and governments for land conversion. Incentives to align the value of forest EGS with economic returns to local users can be frustrated by the complexities of resource tenure and the lack of supportive institutions for collective management.

- In coastal wetland areas, land-use change is a major threat to ecosystem goods and service delivery, including the conversion to urban or industrial uses, or intensive aquaculture. Better assessment of the economic value of the ecosystem services would be helpful, as would support for appropriate local intensification measures (either aquaculture or agriculture). Rehabilitation of wetlands is very difficult, once they have been developed for another purpose, so protective strategies are preferred.

- Common features of degradation include the role of trade driving land-use conversion locally, and the failure of conventional policies on resource tenure in creating suitable ecosystem management incentives. Solutions have typically involved decentralised and community-based innovations, plus access to improved production technology and extension services. These practices can be supported by consistent international policy measures.

2.1 Global pressures on EGS and their contribution to human well-being

EGS delivery has direct links to human well-being. Provisioning goods link especially to health and to providing basic materials for people's quality of life. Regulating services also have links to health and security (MA, 2005b).

Several of the provisioning and regulating ecosystem services play an important role in reaching the Millennium Development Goals (MDGs): food provisioning for eradicating hunger, water retention and purification to ameliorate access to fresh water. Delivery of these EGS must increase to meet basic development goals. But to reach the MDG target for a sustainable environment, the delivery of EGS should be balanced between provisioning, regulating, supporting and cultural services from these ecosystems (MA, 2005b). Throughout this chapter, as well as in the rest of the report we especially look at three biomes that are of special interest from a developmental and EGS perspective: from forest, aquatic and agro-ecosystems.

Over the last 40 years global food production has more than doubled. However, it must double again in the coming decades to fulfil the demands of an increasing and more affluent population (OECD, 2008; IAASTD, 2009). The challenge is to increase food production while also protecting other ecosystem services.

The expansion of irrigation has increased the share of global water use for agriculture to 70% of total withdrawals. Population growth and expansion of industry and manufacturing activities also require more water for consumption and production processes, although there is considerable scope in all sectors for efficiency gains in water use.

Soil fertility is essential for the provision of food, timber, fibre and biomass fuels. Soil provides a wide range of ecosystem services, including mineral nutrients for plants, organic matter essential for maintaining soil texture and moisture, and soil biota that help recycle organic and other wastes. In most intensively managed agricultural systems, fertility cannot be maintained without input of fertiliser. But access to chemical fertilisers is unequally distributed over the globe. Lack of nutrients eventually results in degraded soils that can no longer sustain agriculture. However, excessive application of nutrients affects the environment and other provisioning services, such as water quality and biodiversity.

Forests annually provide 3.3 billion cubic metres of wood (including 1.8 billion cubic metres of fuel wood and charcoal). Eighty per cent of the wood harvested in developing countries is used for fuel. Demand for wood is projected to increase in the coming decades, primarily due to an increasing population and continued economic growth, and energy policies increasingly encourage the use of biomass for energy. However, since forests also play an important role in the global carbon cycle and biodiversity, more and more forest areas will be excluded from wood production due to conservation policies and carbon sequestration (FAO, 2009a).

More than three quarters of the world's accessible freshwater supply comes from forested catchments. Water quality declines when forest areas in these catchments are reduced, and the impacts of extreme weather events, such as floods, landslides and erosion are increased. Forests can also play a significant local micro-climate moderating role, reducing surface temperature and increasing humidity, including in urban areas. Soil erosion can increase substantially on areas cleared of forest (MA, 2005b).

Forests are also extremely important for terrestrial biodiversity conservation (MA, 2005b). Tropical forests contain between 50 and 90% of all terrestrial species (WRI *et al.*, 1992). In the last three centuries, global forest area has been reduced by approximately 40%. Moreover, degradation and fragmentation of many remaining forests is further reducing biodiversity.

2.2 Expected global trends in EGS delivery toward 2050

For expected trends in EGS delivery, we use the baseline scenario from the Environmental Outlook of the OECD[1] (OECD, 2008; Netherlands Environmental Assessment Agency and OECD, 2008). This baseline scenario assumes a moderate increase in agricultural productivity, no new policies in response to environmental pressures – as well as no new agricultural policies (e.g. subsidies in production or tariffs in trade). Without policy response, pressures on the environment will experience an increase of disconcerting magnitude.

The OECD baseline scenario shows a population growth and increases in GDP per capita toward 2050 (blue line in Figure 2.1). Although trends in GDP per capita are highly uncertain toward 2050, an overall increase has been expected in all of the recent global scenario studies (Figure 2.1; IAASTD, 2009; UNEP, 2007; IPCC, 2007). Directly related to population growth and affluence is the increasing demand for food, wood, energy and fresh water (Figure 2.2). It is expected that food preferences will shift toward more meat consumption at higher incomes, which in turn will increase demand for feed and require more land and water per Kcal of food consumed. Increasing global energy use makes it more difficult to switch away from fossil fuels and exacerbates climate change.

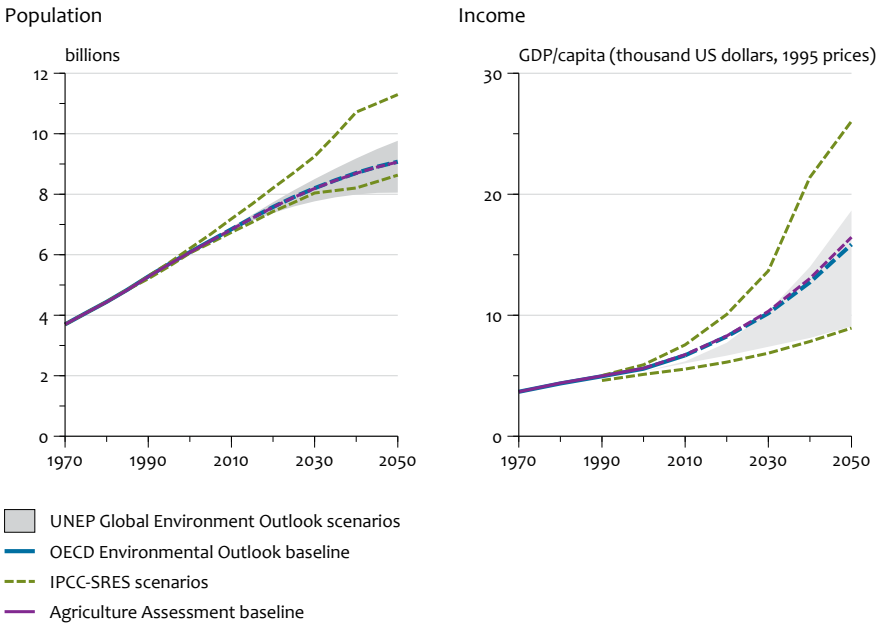
The increasing demand for provisioning services has an impact on related supporting, regulating and cultural services. Increasing production intensity increases the risk of degradation of underlying systems, such as soils, water, or watersheds unless improved, more sustainable production techniques are implemented. Converting more land for agricultural use will reduce natural habitat. Within regions with ample land area for agriculture, conversion of natural areas, including forests, for agricultural use is probable (e.g. Brazil or Africa). In land-scarce regions, where the demand for food and feed grains is strong (e.g. in China), the pressure will be to increase production intensity either within the country or in export-oriented production elsewhere. Besides the geographical characteristics of a region, other factors, such as trade policies and transport possibilities, will define the approach to increasing agricultural production.

Wood consumption is expected to grow rapidly (Figure 2.2). Current trends in energy policies encourage the consumption of woody biomass for commercial energy production. In Europe, use of wood energy by 2030 is projected to be three times the production of 2005. In developing regions, such as Africa, Asia and the Pacific, traditional biomass use will increase more slowly, but will be outweighed by increased production in the forestry industry or by renewable energy targets in individual countries, for example, in China.

1 The environmental outlook of the OECD uses several economic and biophysical models to analyse the impact of policy options. *Environmental linkages* and *LEITAP* have been used to evaluate economic change in each sector. The *IMAGE* framework has been used to analyse the impact on the environment (air quality, climate, landcover and biodiversity) (Netherlands Environmental Assessment Agency and OECD, 2008).

Trends in global scenarios

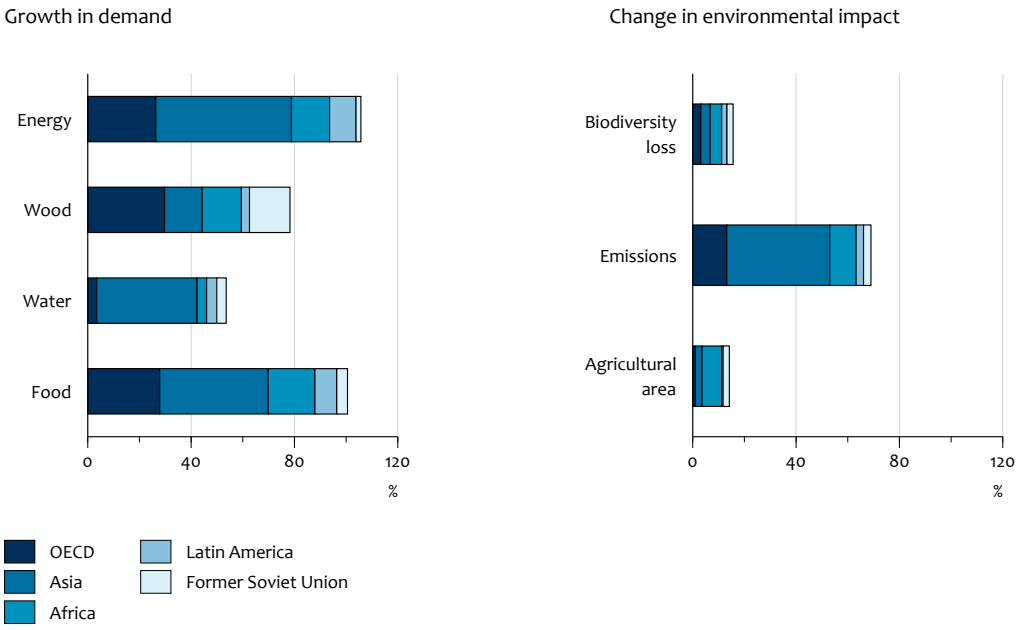
Figure 2.1



Trends in population and income in global scenarios (IAASTD, 2009; UNEP, 2007; IPCC, 2007 and OECD, 2008).

Provisioning Ecosystem Goods and Services and environmental impact, 2000 – 2030 OECD baseline scenario

Figure 2.2

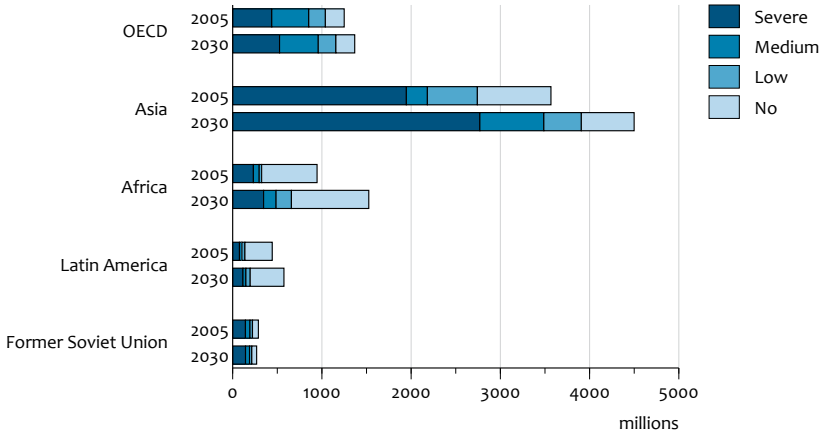


Growth in demand for ecosystem provisioning services and the impact on agricultural land use, biodiversity and GHG emissions from 2000 to 2030, according to the OECD baseline scenario as used in the Environmental Outlook of OECD (OECD, 2008).

Increased agricultural production per hectare will mean more external inputs, such as commercial fertiliser, irrigation water or pesticides. The way these inputs are managed and applied will define their impact on EGS. The baseline scenario of the OECD Environmental Outlook shows a growth in nitrogen application. Although nitrogen efficiency rates are expected to increase, the effects will probably be cancelled out by the increase in fertiliser use.

Excessive nutrient loading has emerged as one of the most important drivers of ecosystem change in terrestrial, freshwater and marine ecosystems over the past four decades. Coastal systems are already heavily disturbed by nitrogen exports via rivers. These are projected to increase, particularly in South and East Asia, where they are already high.

Number of people suffering from water stress, OECD baseline scenario **Figure 2.3**



Change in the number of people experiencing different levels of water stress (severe, medium and low) in the OECD baseline scenario (Netherlands Environmental Assessment Agency and OECD, 2008).

According to the OECD baseline scenario, the irrigated area for agriculture will not expand much further. The most suitable areas have been brought under irrigation already, and expansion will be much more costly (Molden, 2007). Water extraction in the power and manufacturing sectors increases considerably in the OECD baseline scenario, driven by economic growth. The increase in total water demand has been projected at 26%. This, together with the projected growth in population in affected areas, will increase the number of people living under water stress, especially in Southeast Asia and China (Figure 2.3). In Northern Africa and the Middle East, the total numbers are lower, but the share of the population under water stress in these region will be almost 100% (Netherlands Environmental Assessment Agency and OECD, 2008).

Converting dense forest or open woodland ecosystems to agricultural uses could affect hydrological cycles, especially the buffering capacity of forests. Compared to forests, annual crops have a diminished capacity to intercept and mitigate the effects of heavy rainfall, and are also less able to extract water from deeper soil layers during periods of drought. After forest clearing soils exhibit decreased infiltration due to exposure and crusting, the compaction of the topsoil due to heavy machinery or overgrazing, the gradual disappearance of soil faunal activity and the increases in impervious surfaces, such as roads and settlements. With lower infiltration, the dry season outflow of water from the soil diminishes, too (Bruijnzeel, 2004).

According to the Environmental Outlook (Netherlands Environmental Assessment Agency and OECD, 2008), biodiversity toward 2030 is still projected to decline (in terms of Mean Species Abundance. The Mean Species Abundance (MSA) expresses the state of biodiversity related to the pristine state of the biome, e.g. areas in the original state have a MSA of 100, whereas agricultural areas in Western Europe have a MSA of 10 (Alkemade et al., 2009). The increasing demand for provisioning services of ecosystems, such as food, feed and wood, is an important driver of habitat loss and biodiversity pressure. The increasing demand for provisioning services is especially driven by population growth and economic developments. Infrastructure development and climate change are also driving biodiversity loss (Figure 2.4).

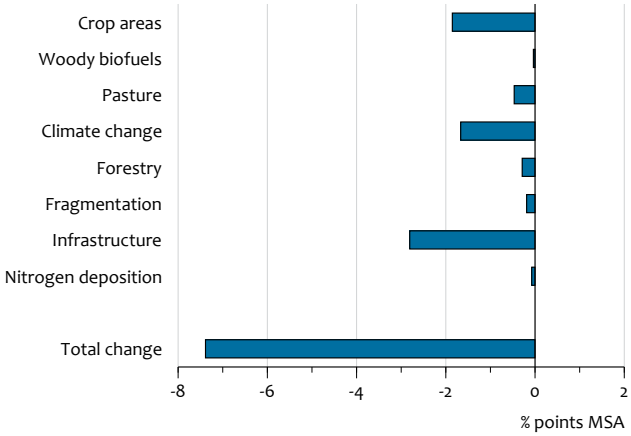
Exploring the impact of liberalisation on a few Ecosystem Goods and Services

Besides the exploration of a business as usual scenario, which assumes no changes in policy (for example trade policies), we can explore a scenario where for example all market distorting trade policy has been abandoned. In this case we will have a look at the impact of such agricultural liberalization on a few EGS (based on Verburg *et al.*, 2008. Changes in trade policies do have an impact on EGS in different world regions, because it induces changes in the location of the production of marketable goods.

We use two global models: LEITAP, a global economic model, in combination with the biophysical model IMAGE. These global models do not take into account all national or local policies, because they are regional or global in scope (i.e. blocks of countries or in some cases individual countries) impacts of global policies, such as of the WTO or climate policies. Therefore, this analysis shows the changing pressure on certain (global) regions if trade policies are changed. Excluded are national or local options that respond to these pressures, for example, extended forest protection (compared to current protected areas), or those that enhance trade opportunities, for example, infrastructure development. This analysis only shows the impact on three, out of the broad range of EGS.

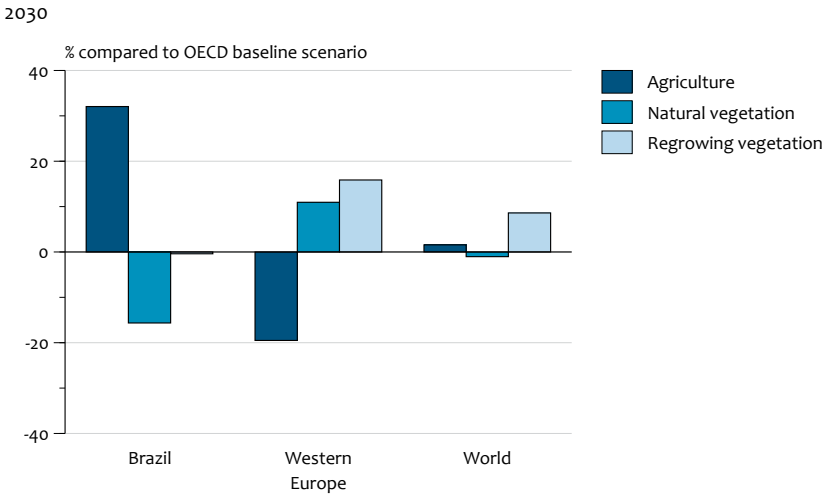
Two scenarios have been explored: the baseline scenario in which no new policies have been implemented (EGS trends as described above). The other scenario explored is an agricultural liberalisation scenario. All protectionist trade measures, such as factor price subsidies, trade barriers and quotas, will be fully phased out, worldwide, by 2015.

Global change in biodiversity per pressure factor, 2000 – 2030 OECD baseline scenario **Figure 2.4**



Global biodiversity loss in the OECD baseline (in loss of Mean Species Abundance).

Land use in liberalisation scenario compared to OECD baseline scenario **Figure 2.5**



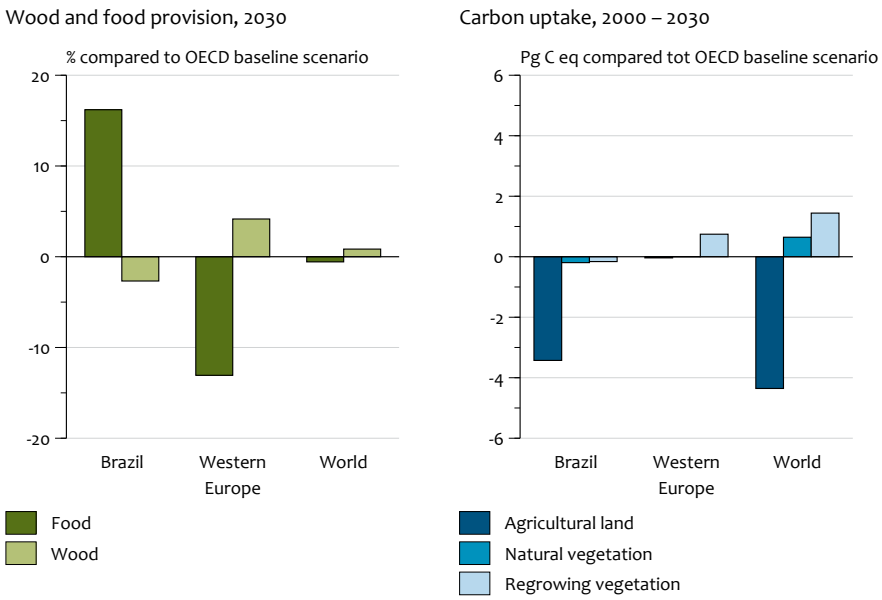
Increase in agricultural area in Brazil, Western Europe and worldwide (Netherlands Environmental Assessment Agency and OECD, 2008; own calculations).

The abolishment of protectionist agricultural policies, which are currently dominant does have an impact on the localisation of agricultural production. South America and especially Brazil are regions where agricultural production is increasing, whereas agricultural production in, for example, western Europe or the United States, is decreasing when trade policies have been phased out. The agriculture production is shifted to world regions where production of commodities is the most profitable, given all circumstances, such as those of labour cost and availability, land availability and suitability.

Changes in agricultural production in a specific region changes regional land-use patterns, as well as global land use. Since the relation between agricultural products and land is not linear, changes in trade policies and, therefore, shifts in production locations, do change land use in different ways. To produce more agricultural commodities in a region, more land is needed or a higher production per hectare should be attained. Labour, capital and land are used as factor inputs for agriculture. To a certain extent, land can be substituted by capital or labour and vice versa, keeping the same amount of production. Within the economic model, choices of substitution will be made based on prices of these factors (i.e. land, labour and capital). In addition, the potential productivity differs per location and per crop (e.g. rice in the tropics will yield more per hectare than rice in a Germany).

Abolishment of presently dominant trade policies increase agricultural production in, for example, Brazil, and decrease the production in regions with highly protected agricultural markets, such as those of western Europe. The impact on agricultural area and forest is shown in Figure 2.5 for a few regions. In Brazil the impact is huge. The agricultural area expands 30% more in a liberalised world than the expansion in the baseline scenario. In, for example, western Europe, the opposite takes place; the agricultural area decreases by

Ecosystem Goods and Services in liberalisation scenario compared to OECD baseline scenario **Figure 2.6**



Potential impact of liberalisation on certain provisioning and regulating ecosystem services.

almost 20%. Globally, land-use patterns change only slightly: 1 % more agricultural area and 2% less forested area by 2030, in the liberalisation scenario, compared to the baseline scenario.

The change in land cover driven by trade policies drives changes in EGS. The combination of the economic and biophysical models shows the provisioning service of food and wood and the supporting service of net carbon uptake of the total vegetation from 2000 to 2030 (e.g. the carbon uptake by natural and human induced vegetation compared to the emissions from deforestation). Figure 2.6 shows the trade offs between EGS compared to the situation in the baseline scenario, which is set at 100. In Brazil, food production has been increased, compared to the baseline scenario. However, the carbon uptake of the biophysical system is not even enough to compensate the emissions from deforestation in Brazil, let alone those from industry or energy production. This means the carbon stock is decreasing in this region. In western Europe, the decrease in food provisioning increases the possibility for wood production, as well as the carbon uptake by vegetational re-growth. Globally, the amount of provisioning services hardly changes because of liberalisation. However, the ability of global vegetation to sequester excess carbon from deforestation decreases by more than 20%.

This analysis shows how developments in trade policies can influence the delivery of different EGS in different regions in various ways. To enhance delivery of EGS, trade policy measures can make a contribution. The ways to go there have been elaborated in Chapter 5.

2.3 Local drivers of current EGS degradation: examples from different biomes

The dynamics of combined ecological and socio-economic factors driving the degradation of EGS in the trends described above are expressed uniquely in each local area (MA, 2005b). There has been substantial study of these proximal causes of ecosystem degradation, and many attempts to reverse the ecological problems have been created, for example, through restoration or biodiversity conservation. There has also been substantial investment to improve the ecological sustainability of production systems in poor countries.

But restoring services provided by natural systems is challenging. Human actors respond mainly to economic incentives, while crucial ecosystem services either are not priced, are undervalued in markets or have characteristics of public goods. Institutions for resource tenure and management, whether mainly public or private, have generally proven inadequate for this task, and there is limited consensus on which solutions to prescribe in varying conditions (Acheson, 2006).

This section diagnoses the degradation of EGS in dryland, tropical forest and coastal wetland biomes in developing countries, and provides illustrative examples of both positive and negative EGS outcomes. The diagnosis and the examples offer insight into the role of local practices and the effects of national and international policy in influencing such practices. They point to confounding or supporting roles that policies can play in local decision-making. We selected three biomes to focus on in this analysis: drylands, tropical forests and coastal wetlands. These biomes are currently under threat from active degradation and land-use change, but provide crucial ecosystem services for development in poor countries.

2.3.1 Drylands

Drylands are generally under-recognised as sources of globally valuable EGS. They comprise roughly 40% of the planet's land surface and serve as home to approximately 2 billion people. Many of these people are among the poorest in the world, due in part to the severe constraints and

variability of dryland ecosystems. The largest area of drylands is in Africa, totalling 13 million km². Of the global total, 28% of dryland area is grassland, 11% is cultivated, and 4% is forest area (White *et al.*, 2002).

Dryland ecosystems provide the following principal goods and services:

- Fodder and livestock;
- Food crops (especially cereals);
- Fibre from industrial crops (especially cotton);
- Fresh water (despite low annual rainfall, dryland ecosystems serve to replenish and restore important sources of surface and groundwater, particularly valuable for large urban populations in some regions (e.g. the United States, the Middle East, China, India);
- Fuel wood and charcoal;
- Carbon sequestration (particularly in undisturbed rangelands);
- Drylands serve as the source of genetic materials for some of the most important food grain crops (e.g. wheat, millet, sorghum).

On a practical basis, it is difficult to distinguish long-term degradation from the 'normal' responses of land and vegetation to natural variability in these highly variable ecosystems. For example, there was broad concern about deforestation, overgrazing, soil erosion and loss of ecosystem services in the Sahel during severe droughts in the 1970s and 1980s, but as rainfall returned there has been little evidence of widespread and persistent land degradation in the region (Benjaminsen, 1997; Tiffen and Mortimore, 2002; Reij and Steeds, 2003; Sorbo, 2003; Olsson et al., 2005).

Understanding EGS degradation in drylands

Land degradation generally results from a combination of management and use practices, mediated by institutions and policies, together with climatic variability and population pressure. Land degradation can occur in connection with either grazing or agricultural activities, but the mechanisms and interventions obviously differ. With population growth and better communications and infrastructure, there is increasing economic pressure to produce commodities for local or export markets (e.g. cotton, meat products, grains). But poor pastoralists and farmers typically do not have access to inputs that could enhance production, and may become trapped in a downward spiral of decreasing productivity, due to practices that degrade the ecosystem and further undermine livelihoods.

In regions of marginal and least-reliable precipitation, cultivated agriculture is a very risky proposition and can lead to loss of biodiversity, soil erosion by wind and surface run-off, and crusting of surface soil, preventing infiltration. In addition to fostering soil degradation, expansion of cultivated agriculture reduces the area available for pastoralists, who need a high degree of flexibility and mobility in order to respond to variable precipitation (Benjaminsen, 1997; Oygard et al., 1999; Thébaud and Batterbury, 2001; Sorbo, 2003). These risks often combine with other factors, such as drought, macroeconomic policy failures or civil conflict, resulting in further pressure on the ecosystems supporting both agriculture and pastoralism.

Climatic variability, particularly lack of seasonal rains, is a major stressor on rangeland management, but traditional pastoral practices in most regions are well adapted to such events. Such adaptations, however, have been complicated by the imposition of formal systems of resource tenure by many countries. Underlying these institutional issues is the social and ethnic marginalisation of pastoralists, who are often ethnic minorities regarded with suspicion by post-colonial governments intent on securing national boundaries, and building nationalist loyalties over those of clan and tribe (Thébaud and Batterbury, 2001; Sorbo, 2003). The combination of political and cultural animosity, together with persistent official biases against traditional resource management practices, tends to result in discrimination against pastoralists. In the absence of permanent settlement, pastoralists' territorial use claims are also difficult to validate and enforce by the typical representational or legal mechanisms available to the state, making conflicts more likely. All of these factors are exacerbated by drought, contributing to localised resource conflict and overexploitation.

Illustrations of drylands degradation and rehabilitation

Resource tenure conflicts can exacerbate degradation issues by reducing incentives for long-term sustainable management practices. In the absence of strong institutions for collective tenure and management, the degradation of communal areas through over-exploitation of forest resources, conversion to cultivated agriculture (enclosure) and unregulated access, can have negative effects on many dryland ecosystem goods and services (Struif Bontkes *et al.*, 2005). Neoliberal prescriptions suggest clearly delineated private property rights as a solution, but there is mounting evidence that while private tenure is sensible for farmers and in richly endowed agricultural biomes, many ecosystems cannot be effectively managed through private rights alone. In particular, pastoralists need more flexible and overlapping rights, intersecting with social and ecological functions in times of stress (Mwangi and Dohrn, 2008). This means that sustainable ecosystem management should include greater attention to collective and customary forms of negotiated tenure, rather than demarcated rangeland properties. Pastoral tenure rules should focus on processes, rather than specific pre-determined territory or property, to encourage necessary flexibility and adaptation, and must incorporate conflict management in light of specific local resource degradation threats (Mwangi and Dohrn, 2008).

This is not to dismiss the role of private forms of dryland resource tenure under appropriate conditions. In the Sahel, 25 years ago, woodlands were regarded as the property of the state and were widely over-exploited. But when trees on the edge of cultivated fields could be treated as their property, farmers selected, planted and managed economically valuable trees enthusiastically. In many villages of the Sahel today, there are more trees than 30 years ago (Reij and Steeds, 2003; Reij, 2006). They not only convey EGS benefits of additional fuel wood and fodder, but also soil conditioning and erosion protection.

Decentralisation of resource management to lower levels of government was undertaken in the 1990s, in many countries

across the Sahel, partly to improve local consultation in management decision-making and help address tenure conflicts. However, the results have tended to favour farmers whose cultivated lands fall exclusively within a local jurisdiction and who elect local government officials. Pastoralists frequently use land and resources across a much larger area at different times of the year, but may rely on access to local water or pastures at crucial points in the dry season or during migrations. The problem is not only that local authorities fail to recognise and support such claims, but also that different social and political groups at various scales have conflicting or contradictory claims. These can no longer be mediated locally through traditional social mechanisms, but neither do they fall within the purview or political interest of elected local governments (Benjaminsen, 1997; Thébaud and Batterbury, 2001; Sorbo, 2003; Roncoli *et al*., 2007).

Traditional pastoral tenure arrangements and claims can be easily eroded when a more powerful group converts areas of common pasture to more profitable private crops or fruit trees. For example, in the remote Arsaal valley of Lebanon, local elites effectively privatised the most productive pasture areas and converted them to fruit tree production over a period of one or two decades. The ongoing national political crisis and civil war meant that government was unable to regulate these processes. Negotiated solutions could only be found through new processes of sharing information on ecosystem degradation, exposing the hidden impacts of this degradation and developing 'win-win' technical options for both the orchardists and the pastoralists (Hamadeh *et al*., 2006).

The pressure for agricultural expansion is a response, partly to growing population and national policies of resettlement, but also to national subsidies for opening new agricultural land (Oygard, 1999; Rubin, 2007). There are examples of successful agricultural intensification in vulnerable dryland areas of Africa, often relying on the innovation and initiative of local farmers themselves (Zaal and Oostendorp, 2002; Reij and Steeds, 2003; Drechsel *et al*., 2005). Such experiences suggest that successful intensification of dryland agriculture requires factors such as:

- good infrastructure and proximity to high-value markets;
- high social capital in communities, to foster collaboration and learning;
- technology packages for sustainable and profitable production practices readily available and affordable;
- improved security of tenure or land inheritance rights, especially for women farmers;
- reduced exposure to risk associated with innovation, through insurance or initial subsidies;
- improved extension information for decision-making (costs, inputs, technologies).

Successful drylands rehabilitation measures have been strongly driven by local communities. Most of them require some kind of collective action, such as to establish rules for use or protection of rangelands and water holes; to construct and manage soil or water conservation structures that are of benefit to multiple farmers; or to share benefits, resolve conflicts, and promote effective innovations. All of these local processes must take place within the constraints of locally recognised authority, power differentials between social groups and social marginalisation (such as of women or ethnic minorities) in decision-making. For all these reasons, effective local processes for engaging people in resource management decision-making are crucial determinants of outcomes that reduce poverty and strengthen EGS (Thébaud and Batterbury, 2001; Blay, 2004; Nedessa *et al*., 2005; Tyler, 2006a).

Role of national and international policies

This overview of dryland EGS degradation processes shows the important role played by policies outside the environment sector in affecting local management practices and EGS degradation. National trade policies and economic liberalisation policies are often structured to create incentives for the production of industrial crops or export-oriented agricultural products in dryland areas. These policies support conversion of land to agriculture, but may not support the research and extension services and inputs necessary for sustainable agricultural practices (see also Chapter 4, on agriculture and global climate policy, or Chapter 5, on Brazil's incentives for soy cultivation). Agriculture is also favoured politically, because a sedentary farming population is easier to govern than a nomadic, pastoral one, and ethnic or social marginalisation typically undermines the local and national political negotiating power of pastoralists in these resource allocation conflicts.

Policies on land and resource tenure can also contribute to EGS degradation. Pastoral tenure systems cannot be easily standardised or privatised because of the need for flexible and contingent access to resources in times of ecosystem stress. Instead, policies must be structured to ensure fair processes for negotiating local access rights under widely varying conditions to avoid resource degradation.

International policies tie into the factors that drive local EGS degradation in dryland areas, but there has only been limited analysis of specific linkages and causal roles in individual cases. These linkages can be inferred from the factors identified at the local and national levels. For example, international trade agreements that reduce tariffs on agricultural products or subsidies on domestic production would increase the returns to farmers in developing countries. Higher returns would enable investments in sustainable agricultural techniques, if farmers are well informed about the advantages and the technical options, and where relevant inputs are easily available. Standards or certification procedures provide additional incentive for sustainable production practices, but will be difficult to negotiate fairly in order to assure they are not used as non-tariff trade barriers.

Similarly, official development assistance (ODA) policies are not always consistent with strengthening EGS (see Chapter 3, on Development assistance and agriculture and local rights). Sectoral development strategies, whether in agriculture, forestry, governance decentralisation or even integrated rural development, tend to be insensitive to unique local socio-ecological dynamics. Easily replicable formulaic interventions or standardised policy support are unlikely to be widely successful in supporting dryland EGS. Large-scale

infrastructure development projects may improve access to markets and inputs, but whether this leads to restoration or further degradation of EGS depends very much on the intensification strategies adopted by producers (see also Chapter 6, on the role of International Financial Institutions). Assuring greater market access (through trade policy) will increase returns, but unless incentives are created for sustainable practices, this could simply lead to short-term profitability gains and attract outside investors, displacing the local poor.

2.3.2 Tropical Forests

Tropical forests are the most biologically diverse terrestrial ecosystems, accounting for well over half of all known terrestrial plant and animal species (MA, 2005b). They provide a wide range of services, including:

- Provision of timber, fibre and other high-value industrial products;
- Provision of food and medicines, including fruit, nuts, fish and wildlife;
- Pollination services for adjacent agricultural or plantation activities;
- Fuel wood and charcoal;
- Biological diversity;
- Regulation of water resources and climate;
- Carbon sequestration;
- Important cultural and spiritual values.

Despite limited and contradictory information about forest status, it is generally accepted that tropical forest was lost at a rate of approximately 15 million ha / yr throughout the 1990s (MA, 2005b). While some of this loss was compensated by secondary re-growth or by replacement with industrial plantation tree crops, these provide nowhere close to the range of ecosystem services provided by natural climax forest. Forest dwellers are typically very poor, despite the high value of the resource, and have few options for livelihoods when forests are lost. Globally, 70 million people – many indigenous – live in the most remote regions of tropical forests. Another 735 million people worldwide live in or near tropical forests and forested savannah, and rely on trees for fuel, food and income (Chomitz, 2007).

The loss of biodiversity is the most prominent feature of tropical deforestation. Knowledge of forest biodiversity is still quite limited, and estimates of the risks vary, but the IUCN estimates that 87 per cent of the world's species of reptiles, 75 per cent of mammalian species and 57 per cent of amphibians are threatened by declining natural forest habitat (MA, 2005b). The main response to this threat is the creation of protected areas.

The carbon sequestration role of tropical forests, and the massive amount of global GHG emissions caused by land-use change from forestry to agriculture, are attracting special attention because of their potential to exert global influence on climate change mitigation (see Chapter 4 below).

Understanding EGS degradation in tropical forest

The causes of forest degradation are multiple and vary regionally. The evidence from case studies of deforestation suggests that the causes can be described as proximate (immediate and direct) and underlying factors. Among the proximate causes, conversion to agriculture and cattle ranching are common, often in combination with either or both logging and road construction activity (Geist and Lambin, 2001). The most important proximate factor for tropical deforestation was found to be road construction, which in all regions led to subsequent agricultural colonisation or logging and forest losses. Rather than the frequently maligned 'slash-and-burn' practices of traditional forest dwellers, the main agents of forest conversion were found to be migrant farmers, creating permanent agricultural holdings.

Underlying factors that led to these changes were also diverse, and include economic factors, such as growth in domestic and international market demand for timber or agricultural products, market failures that generate inappropriate incentives for forest clearing, government policies favouring agricultural colonisation, technological change in agriculture and forestry, and demographic change. Regional patterns are distinctive: while road-building and cattle ranching are crucial factors in the humid forests of Latin America, they are less important in Asia, where commercial logging (sometimes illegal), population growth and agricultural intensification play a more prominent role in lowland deforestation (Geist and Lambin, 2001).

In many of these forest areas, while agricultural colonisation is the visible face of land-use conversion, the underlying pressure may be voluntary migration of the poor, or industrial investment in plantation agriculture (e.g. oil palm, coffee), or government-subsidised migration and settlement schemes (e.g. cattle ranching). While the ecosystem degradation outcomes are similar, the policy prescriptions to address the problems obviously differ widely.

Chomitz *et al.* (2007) identifies three general types of forest cover, each with a characteristic environmental and governance challenge (note that as deforestation proceeds, any particular territory may shift from one category to another):

- Interior forests, beyond the accessible agricultural frontier, with few and mostly indigenous inhabitants, where the deforestation pressure is relatively low and driven generally by high value timber.
- Frontier and disputed forests, characterised by insecure and conflict-driven tenure, where deforestation and degradation are greater.
- Forest-agriculture mosaic lands, where land tenure is usually well-defined, but natural forest management for fuel, food and fibre cannot compete with agriculture or plantation forestry. Deforestation rates are generally highest here, and unique pockets of biodiversity are threatened.

Institutions of resource tenure play an important role in forest loss. Because of the value of forest resources, the traditional rights of forest dwellers to access and control the resources have historically been contested and only recently recognised by governments. In the Brazilian Amazon, overdue recognition of these rights has led to 20 per cent of the forested area being identified as indigenous territory. In

most tropical countries, forest land is controlled by the state, and rights are assigned preferentially to industrial firms for timber extraction. The tenure situation varies widely between different countries. Changes in tenure (e.g. assignment of commercial logging concessions; or occupation by agricultural colonists) frequently lead to conflicts between different user groups.

Illustrations of EGS degradation and rehabilitation

Cambodia provides a good example of rapid deforestation in Asia. In the period between 1990 and 2005, FAO estimates that forest cover decreased from 71.5 per cent to less than 58 per cent of the country's land area (cited in Heov *et al*., 2006). In the province of Ratanakiri, during the 5 years between 1996 and 2002, the area of evergreen forest declined by 138,000 ha, or more than 10 per cent of the total forested area of the province. The government had issued logging concessions for most of the province's forests in the mid-1990s, based in part on the premise that the forests were largely uninhabited and unused. But this assumption failed to recognise the traditional tenure and management systems of the ethnic minority inhabitants in the upland forests of the province (John and Phalla, 2006).

Conflicts ensued as local shifting cultivators found their fields and forests occupied by commercial logging and industrial forest plantation operators. Local activists and researchers were able to demonstrate the strong traditional management regimes of the local people as a first step to convincing, first the provincial government, and then national authorities, of the need to recognise collective and traditional forms of tenure as legitimate and legally. The creation of a form of collective tenure in new national legislation, together with processes for local resource planning, helped to boost the relative power of the local communities in their dealings with concession holders. The pressure on the forests was not eliminated by the improvements in tenure and planning procedures. However, these provided a more solid foundation for locally-driven development, and for legitimate management of forest resources by local people (John and Phalla, 2006).

Decentralisation by itself is not necessarily consistent with positive forest outcomes. For example, a study in East Kalimantan demonstrated that local people place very high value on the ecosystem services delivered by intact tropical forests (Lynam *et al*., 2006). Local governments in this area of Indonesia now have authority to issue concessions for logging and mineral activity. But the outcome of this decentralisation is ambiguous: in some areas villagers are organised to establish stronger controls over local resources, but in other areas the high value of these resources leads to conflict within and between villages over who should benefit from their exploitation. The combination of increased road access and a more pliable local permitting regime meant that the local indigenous people, who are moving towards a market economy, would lose substantial benefits from their traditional access to EGS, such as non-timber products and cultural use. The limited awareness of these trade-offs meant that the value of these ecosystem services was not considered in decision-making (Lynam *et al*., 2006).

One of the key questions for international programmes aimed at compensating forest users to preserve forests as carbon sinks, is whether such programs can be effective. Assessments of forest conservation in Noel Kempff Mercado National Park in Bolivia demonstrated that a climate mitigation project providing funds to compensate concessionaires was successful in reducing carbon emissions from logging operations (Brown *et al.*, 2000). However, the process of establishing the reserve did not involve sufficient consultation with local communities who were also negatively affected by this management change. These poor communities have borne a significant economic burden as a result of the climate project, and are resentful of the way the project was approved. Researchers concluded there was a high risk that reduced emissions from forest conservation would not be sustainable (Asquith *et al*., 2002).

Role of national and international policies

The story of tropical forest degradation is well-known, but the causes are often mis-attributed. Government policies have played a major role in forest loss, because in many countries, governments are directly responsible for managing the resource and have treated it as an important source of revenue and a contributor to national development. Road construction, settlement and migration policies, combined with commercial logging and supported by population growth all increase the pressure on tropical forests. Government incentives for expansion of agricultural area, or for expansion of plantation crop production, may include tax incentives, subsidies, or price supports. Frequently, the policies that encourage deforestation have nothing to do with the forest sector, but are aimed narrowly at other sectors (e.g. infrastructure support; commodity exports; or, as in the case of Brazil, soybean exports, see Chapter 5 below).

While the pressures on forests are mainly economic, and can arise from both large-scale commercial interests and opportunistic small farmers, deforestation has also generated a great deal of international policy effort in response. Conservation programmes and large-scale investment by international organisations have helped to increase the number and size of protected tropical forest areas. ODA has provided support for Integrated Conservation and Development projects to build local economic incentives for conservation.

There is increasing experimentation with a range of payment for ecosystem services (PES) approaches to forest conservation (see Chapter 5, on the role of forests in the international climate regime, and Chapters 3 and 6 on the role development assistance and IFIs can play in stimulating PES). It is intended that PES should go to the land owner / manager in order to encourage appropriate ecosystem conserving practices. However, in many forest areas of the world, deforestation actions are often taken by illegal or quasi-legal actors (sometimes even with the approval of governments). As a result, these actions would be unaffected by PES because there are no formal land owners to compensate. The conditions of agricultural colonisation, especially in Latin America, tend to foster a high degree of lawlessness on the agricultural frontier, a condition incompatible with

the transparency and accountability needed to enforce PES transactions.

Logging and forest land conversion have often sparked corruption and special interest politics in developing countries, where the value of the resource means substantial profits for those who control its exploitation. It is generally accepted that long-term forest sustainability relies on securing livelihoods of local people and assuring inclusive and accountable forest governance (Forests Dialogue, 2008). While these factors are mainly in the purview of national governments, international policies related to development assistance or climate mitigation can make these kinds of governance changes prerequisites to sectoral investments or REDD payments (Chapters 3 and 5).

2.3.3 Coastal Wetland Ecosystems

Coastal wetlands (following the definition of the RAMSAR convention and Millennium Ecosystem Assessment) include river estuaries, marshes, lagoons, and near-shore marine waters to a depth of 6 metres below low tide. The extent of these areas is proportional to coastline length, but the most productive and sensitive ecosystems are found in shallow lagoons, coral reefs, and estuaries where fresh water and salt water mix, creating high levels of biodiversity. These ecosystems are particularly important to archipelagic or island nations and in densely-populated river delta regions, such as in Egypt, Bangladesh, Southeast Asia, China, West Africa and the Caribbean. Coastal wetlands comprise the largest share of the estimated total area of 13 million km² of wetlands, globally (MA, 2005d).

Coastal wetlands provide many key provisioning, regulating and cultural uses for human benefit:

- highly productive fisheries habitat, especially valuable for poor fishers lacking access to open sea;
- physical protection from coastal erosion and storms (e.g. mangroves and related species; coral reefs);
- nutrient and waste processing;
- timber and fuel wood from mangroves and coastal forests;
- other non-timber products and aquatic foods (e.g. molluscs, reeds);
- sink for greenhouse gases;
- high recreational and tourism values (beaches, coral reefs, estuaries);
- high biodiversity (especially in estuaries and coral reefs).

Coastal wetland ecosystems are among the most vulnerable because they tend to be highly populated, and are subject to cumulative pressures from development and physical habitat loss, as well as concentrations of point-source and non-point-source pollutants (both toxins and nutrients) transported and accumulated along the length of river basins. In addition, these ecosystems are highly vulnerable to climate change, through sea level rise, rising ocean surface temperatures and more severe or intensive storm activity. These systems are highly productive and biologically diverse in their natural state, but are being degraded in most parts of the world by both local and global processes.

Understanding EGS degradation in coastal wetlands

The most important driver of degradation for coastal wetlands, including mangroves, saline marshes, estuaries and even coral reefs, is land-use change. Approximately 100 million people live at an elevation of less than 1 metre above sea level, and 21 of the world's 33 megacities are located along coasts, most of these in developing countries (Zou and Thomalla, 2008). Many ecologically important estuarine zones are highly urbanised, because of the historical transportation links formed by the joining of major rivers and tidal ports. The growth of coastal cities is driven by population growth, rural-urban migration, investment and trade – the latter factors strengthened by forces of globalisation and liberal economic policies.

Urban and industrial expansion consumes large amounts of land, surrounding estuaries and coastal deltas. Near urban areas, land values are high, so the poor are often forced to encroach on less desirable, and vulnerable wetlands areas. When demand for land is high enough, these may also be filled or drained for formal development, or dredged and cleared to expand port facilities. This pattern of development not only diminishes ecosystems' capacity to deliver provisioning services (fisheries, mangrove wood, other products), but also to regulate waste processing. Invasive species are often introduced into coastal wetlands through the water ballast of commercial shipping traffic. Receipt of polluted sediments from upstream river basins makes coastal ecosystems the most chemically changed of all global ecosystems (MA, 2005d).

In more remote coastal areas, especially in the tropics, aquaculture is a major factor contributing to degradation. Of the global mangrove resource that has been monitored over the past two decades, 35% has been lost to aquaculture, deforestation and freshwater diversion (MA, 2005d). Shrimp aquaculture is driven by the high value of this product in export markets. The market is quite competitive, so producers are sensitive to increases in cost caused by more stringent environmental standards or more intensive production techniques, and must compete with wild harvested shrimp from other parts of the world (Lebel *et al.,* 2002). A large share of international shrimp aquaculture is in South and Southeast Asia, where it has expanded rapidly in many countries over the past three decades. The expansion of shrimp aquaculture has been directly related to the destruction of mangrove and other coastal areas, and has led to water quality degradation, biodiversity losses and displacement of local farmers and mangrove users (Flaherty and Karnjanakesorn, 1995; Lebel *et al.,* 2002; MA, 2005d).

Mangroves are also exploited for their value as sources of wood for construction and fuel, including processing as charcoal for urban markets. In Bangladesh, over 50 per cent of mangroves outside the protected Sundarbans have disappeared. Thailand, Indonesia, Vietnam and the Philippines all show similar rates of degradation (UNEP, 2007). The overexploitation and conversion of mangroves typically occurs despite the recognised value of these areas to local users and to aquatic ecosystems, as a source of not only food and fuel, but also as key nursery for valuable marine fish. Part of the reason for this lies in resource tenure

issues. Mangroves cannot be sustainably managed under private tenure because of the multiple resource nature of the ecosystems, their seasonal variability, and the interactive effects of factors that cannot be easily controlled on any single site, such as water quality, vegetation distribution and nutrient flows. But neither state ownership or protection have been successful. Traditional or customary arrangements for mangrove use and stewardship, which relied on patterns of limited use by a closed group under social rules that constrained type and location of extractive activities, has largely broken down with increased population, migration, commercial pressure and ease of access to the resource (Adger and Luttrell, 2000; Marschke and Nong, 2003).

The loss of mangrove and estuarine shoreline to either urbanisation or aquaculture development is frequently irreversible. This is an important factor contributing to undermining marine and offshore fisheries, because of the key habitat role played by these highly productive coastal ecosystems in the life cycle of commercially valuable species (MA, 2005d).

Upstream freshwater withdrawals and major dam impoundments impact sediment loads and river water flows, altering depositional patterns in river deltas and shorelines near river mouths. This typically leads to habitat loss and can dramatically change the seasonal pattern of water quality cycles (e.g. changes in salinity, temperature, minerals) needed to support juvenile fish in various stages of their life cycle or migrations. Loss of river sediment can increase erosion in delta and shoreline areas, threatening physical infrastructure, as well as productive shoreline habitat (UNEP, 2007).

On a global scale, the world's seas are changing as a result of climate forcing and atmospheric chemistry. Unusually high sea-surface temperatures and CO_2 concentrations have already had an impact on coral reef ecosystems in tropical countries, exacerbating the effects of overfishing, destructive fishing practices (such as cyanide or dynamite fishing in reefs) and physical damage caused by fishing gear and boat traffic (UNEP, 2007; MA, 2005).

Illustrations of EGS degradation and rehabilitation

The high returns from shrimp aquaculture make it very difficult to prevent such land conversion. Aquaculture can be hugely profitable for local investors, farmer/ operators and for industrial firms who market both inputs (feed, antibiotics, shrimp fry) and products. Because products are exported and contribute directly to foreign exchange earnings, governments often encourage shrimp aquaculture through subsidies for land conversion (Tuyen *et al.,* 2006). However, shrimp aquaculture is also risky, so most of the production in Southeast Asia is from small-scale producers who may be powerful local elites or business investors. Successful operators must be experienced and capable, in order to successfully grow shrimp and avoid disease and water-quality problems. Once water-quality problems set in, often as a result of increased density of shrimp pond aquaculture in the area, farmers are obliged to use more chemicals to control disease outbreaks, leading to a negative spiral of declining water quality and additional chemical use (a process which is highly profitable to input suppliers). Frequently, shrimp ponds in Southeast Asia must be abandoned after 3 to 5 years due to accumulation of toxins or pathogens (Lebel *et al.,* 2002).

The experience with mangrove restoration has been mixed. If forest cover remains substantial, or if soil moisture can be maintained through high freshwater and brackish water levels, mangroves can often recover with limited management intervention, although this obviously must include physical protection of seedlings and growing trees. One example comes from a protected area in Koh Kong, Cambodia, where migrants displaced by civil conflict were over-exploiting mangroves in a wildlife sanctuary for purposes of commercial charcoal production. Because the population had grown very rapidly, with no external support for the development of more sustainable livelihoods, this opportunistic income provided high returns (with some risk that products or profits could be confiscated by government authorities). It required considerable persistence for government and research groups to persuade the residents, who were accustomed only to unsympathetic police actions, to recognise the benefits of healthy mangrove ecosystems. After several years of community-mandated and enforced protection, mangrove reforestation, and support for mollusc culture, sustainable fisheries practices and ecotourism, the communities involved recognised the evidence of more abundant fish, improved water quality, and sustainable mangrove products (Marschke and Nong, 2003).

Mangrove restoration, in this case, was successful in part because of the survival of large areas of adjacent intact mangrove forests. But this success required negotiation of a community /government co-management regime within and on the margins of the protected area, and the organisation of community decision-making processes, to ensure high levels of compliance. It also required collaboration between various government agencies, at the central and provincial level, to agree on management processes and dispute resolution, and strong communications processes within and in collaboration with the local communities. This process was driven by shared learning among the community members, government staff, and researchers; and by support from international and regional agencies (Nong and Marschke, 2006).

In Thailand, restoration experience in a mangrove area decimated by multiple activities (mining, aquaculture, deforestation) also showed that, after less than a decade, considerable recovery was possible. However, in this area, there was substantial variation in the biodiversity outcomes among the areas that had been subject to different types of impact. Extensive subsurface disturbance (such as caused by tin mining) made it difficult for the mangrove seedlings to survive by reducing the soil moisture and organic content in the inter-tidal zone (McIntosh *et al.,* 2002).

Similar issues have arisen in Andhra Pradesh, India, where a mistaken belief that large mangrove areas could naturally regenerate led to state forest officials authorising clear-cutting large areas of forest. The result was exposure and drying of the soils, preventing natural regeneration or seedling survival due to low seasonal soil moisture. A successful solution required the construction of artificial canals to increase tidal flows in the replanted area. In this

case, as well, the collaboration of community members in contributing to restoration and protection required negotiation of special access rights with the state forestry officials (Selvam *et al*., 2003).

In the large Tam Giang lagoon system in central Vietnam, the conversion of open lagoon areas to fish pens and aquaculture enclosures effectively privatised what had been an open access resource. This *de facto* change in tenure status was largely unregulated, and was encouraged by governments seeking higher resource rents and export earnings from high value commercial products. The cost of establishing the physical structures needed (mostly posts, fine mesh nets and other small structures in the shallow lagoon waters) meant that only the wealthier local fishers or farmers could implement this strategy. But uncontrolled expansion soon created water quality problems and prevented boat navigation and access across the lagoon surface. As conflicts mounted, researchers worked with communities to develop a shared understanding of the problems and to jointly plan allocation of lagoon space and assured access for poor fishers. The solutions developed by community based management committees were sanctioned and adopted by government authorities, effectively creating a new institutional model for co-management that, with government support, has expanded in the past four years from a single village site to over 1000 ha of densely used lagoon area (Tuyen *et al.,* 2006; Tuyen pers comm. Sept 19, 2009).

In the Diawling delta, in southern Mauritania and Senegal, IUCN worked with local partners through the 1990s, to restore a wetland damaged by drought and construction of an upstream dam. The damage had led to destruction of local livelihoods and significant out-migration of affected people. By restoring natural flood cycles and bringing back saltwater inflows over an area of 50,000 ha, the diverse delta ecosystem was improved over a period of 7 years. Fisheries and wildlife returned, and the value of local economic activity gained through the restoration was estimated at more than one million USD/year (UNEP, 2007).

Role of national and international policies

Where it has been possible to restore degraded coastal wetlands, the cases above demonstrate that such successes have generally required a combination of government sanctions (creation and enforcement of protected areas) together with local organisation, development of new institutional models for co-management involving local resource users, local and national governments that secure local rights to both resources and decision-making, and active development of alternative livelihoods.

A frequent issue in coastal ecosystems is that the problems, the required planning and interventions cross multiple sectors and jurisdictions. They are not well addressed by separate sectoral government departments. The lack of effective mechanisms for interagency planning, collaboration and regulatory action has frequently drawn attention in studies of these issues (e.g. Flaherty and Karnjanakesorn, 1995). This requires special policies for integrated coastal zone planning and management to incorporate better assessment of environmental risks and focus development in more appropriate areas (see further Chapter 3, on policy coherence for development). Recognition of this need is growing, but there are few good examples of effective mechanisms to address it in developing countries.

National and international policies to liberalise and promote trade have undoubtedly played an important role in stimulating the growth of the commercial aquaculture business in many parts of the world. At the same time, national policy subsidies for land conversion (e.g. to shrimp production or for urban development) have a distorting effect on decision-making by reducing the costs of wetland destruction. This is a good example of how the costs of local ecosystem loss are generally borne by local users, but the benefits (increased provisioning services or conversion to high value urban land, for example) are captured by investors, traders and consumers far away from where the wetland conversion takes place.

In the case of shrimp production, there has been increasing recognition of some of the issues of unsustainable production systems, as well as growing concerns in key markets with phytosanitary standards. The food safety and traceability requirements under WTO and EU standards make it easier to identify the sources and practices of producers, but are not designed to ensure sustainable production practices (see Chapter 5, on trade and labelling). However, concerns in the consumer marketplace about food origins and safety, as well as sustainability, make it more likely that systems for linking aquatic products to origin and production practices might be developed, for example, as part of a certification programme. This approach is complicated by a supply chain that is relatively long and complex, production systems that vary widely, and a high proportion of shrimp (and other aquatic products) that does not come from aquaculture, at all (Lebel *et al.*, 2002).

The example of *tra* catfish in the Mekong Delta shows that rapid growth in commercial aquaculture is possible without degrading other ecosystem values. Production by small farmers in local riverbank ponds increased by a factor of over 40, in the decade of 1997 to 2007, to a total of 1.2 million tonnes. Stocking density is very high, and productivity boosted by artificial feeding. Organic wastes are a limiting factor, but ponds are naturally flushed by the annual flooding of the river. Key factors in the expansion of this system included government support for applied research and extension services, favourable terms for credit, farmer familiarity with the species and with fish culture, concerted effort to develop export markets, and the rapid growth of private investment in hatcheries, feed supply and product processing (Phuong and Oanh, 2009).

While coastal wetlands, so far, have not played a significant role in climate policies, there is significant potential for these areas to become important for both mitigation (international) and adaptation (national level) programmes of action. Wetland and mangrove restoration offers crucial buffering capacity to extreme climatic events, such as storms or floods, in densely populated coastal areas that are vulnerable to climate change. The use of coastal wetlands as strategic

zones to help plan and manage coastal retreat with sea level rise is an important option for longer term adaptation. At the same time, preservation of the carbon sequestering functions of organic marshes and coastal forests offers important mitigation potential, analogous to REDD principles (see Chapter 6).

2.4 Lessons for mainstreaming EGS into international policy

The success of measures to reduce ecosystem degradation can be measured locally, through land-use and ecosystem changes and through changes in livelihood and well-being of the local population. Successes have typically required combinations of technical innovations (new or improved production techniques); policy reforms (modifying incentives and cost structures to reward sustainable practices); and building new institutions (multi-scale processes and governance mechanisms to reinforce local ecosystem-based management). Cases of successful intervention have several features in common (Tyler 2006a; Irwin and Ranganathan, 2007):

- They build on local knowledge and social relations, but introduce new information about ecosystem services.
- They invest in collective action to develop or strengthen institutions for shared ecosystem management.
- They strengthen local tenure (both private and collective) and resource control, and secure local benefits from long-term sustainability.
- They provide mechanisms for monitoring and shared learning.
- They strengthen accountability and transparency in governance processes.
- They align national and international policy and market incentives with key local enabling factors and with sustainable outcomes.

The most replicable policy tool to strengthen EGS is likely to involve the promotion of consistent institutional processes relating to resource management and tenure for local benefit. ODA support (see Chapter 3) to building local capacity for ongoing adaptive, ecosystem-based management would be complementary to both MDG and EGS goals, but the techniques required are diverse and experiential, so do not lend themselves to standardised (training) approaches (Armitage *et al.*, 2008; Tyler, 2008).

Climate policies offer a new international platform for supporting and leveraging sustainable agricultural practices (explored in Chapter 4). By creating market incentives for improved agricultural practices through transferable GHG emission reductions or carbon sequestration, the liberalisation of agricultural trade can be better aligned with best management practices at a local level. In the case of drylands, this would help create market incentives for the preservation of natural rangelands, for example, as carbon sinks. The challenge, as always, is to ensure that new market values created through international policy agreements in this domain reach the poorest local producers. If they do not, the result is likely to simply be displacement of degradation into other sites, as the poor are forced out by investors seeking to capitalise on higher returns.

International trade policy is intended to reduce the distorting effects of subsidies and tariffs on commercial exchange. Agricultural trade barriers have damaging effects on EGS in most developing countries, because they reduce the returns to local producers and constrain market access. This discourages investment in better management practices at the farm level, and increases exposure of agro-ecosystems to degradation. But trade liberalisation, on its own, is not a sufficient response: it must be combined with better product information and certification to ensure consumers in importing countries can likewise choose to support these better management practices (see Chapter 5). With market access and better consumer information to align production incentives, farmers are more likely to demand the local research and extension services to support better management practices, so that they can deliver products to high-value markets.

Land conversion processes are frequently driven by economic development activities or large investment projects where there has been limited assessment of the environmental impacts or the potential alternatives. These types of projects in developing countries are often financed in whole or in part by development banks on preferential terms. Better assessment of EGS losses, both in terms of magnitude and incidence, is needed prior to project financing and development decisions (see Chapter 6), for example, in road construction. More careful monitoring of on-site and remote costs, and incorporation in future project analysis and implementation, will be important to avoid repeating past mistakes.

Despite the well-documented problems and the emerging evidence of linkages between EGS and various international policies, the treatment of EGS issues in international policy mechanisms is still ad hoc at best. Reasons for this include the relative novelty of the concept and the difficulty of bridging practices across scales from the global to the local. The problems are further hampered by the lack of a well-articulated and practical conceptual framework and clear examples of operational mechanisms linking these different scales of endeavour, as well as supporting information that can be monitored transparently. A final barrier is that the accrued benefits from ecosystem exploitation are enjoyed by a different group of people than those who are bearing the costs of EGS degradation. Often these differences cross national and generational boundaries. Different actors and countries have different motivations for taking policy action, and strong international consensus is rare.

3 EGS and Development Assistance

- EGS provide important assets for the rural poor, whereas a lack of natural resources and sustainable EGS delivery increases their vulnerability. Investment in conserving and strengthening ecosystem service delivery can contribute to poverty reduction for the rural poor. Development assistance can play a key role in this. The potential contribution of EGS to poverty reduction and development is increasingly recognised in development assistance, but implementation is still in its initial phase.
- The implementation of the Millennium Development Goals, various forms of financial and technical development assistance and increasing efforts to enhance 'policy coherence for development' all provide opportunities to include EGS in international efforts to support poverty reduction and development.
- Development assistance can help to mainstream EGS delivery in national development polices, like the poverty reduction strategies. Development assistance could focus on raising the profile of EGS in national development mechanisms, contribute to building capacity for implementing EGS concerns in financial and planning ministries, scaling up investments in food security and agriculture and improving tenure and access to natural resources for local people.
- Several tools for mainstreaming EGS to identify appropriate improvements in relevant development policy frameworks and implementation processes are becoming available. These include country assessments, public expenditure reviews and strategic environmental assessments. However, these efforts need to be strengthened and replicated on a large scale.

3.1 Why are EGS important for development assistance?

The deterioration of natural resource productivity constrains the efforts of people in agriculture, fisheries, and forestry, in the poorest parts of the world. These changes are manifested by desertification, loss of biodiversity, soil erosion, and deteriorating water quality, among other symptoms. As a result, there are a number of reasons to consider the role of EGS in poverty reduction and development policies. *First*, it is important to highlight that the benefits that the rural poor obtain from ecosystems underpin the basis for their livelihoods, health and security. *Second*, when ecosystems are degraded or lost, the poor are disproportionately impacted. *Third*, hundreds of millions of people rely on natural resources to meet their basic needs, which are often provided by the areas also richest in biodiversity. In case of ecosystem degradation, the poor risk losing their livelihood security and falling deeper into poverty. Subsistence farmers, the rural poor and traditional societies are most vulnerable as they are the first to face the consequences of degradation.

The 2005 Millennium Ecosystem Assessment concluded that the degradation of EGS is a significant barrier to achieving the MDGs and that this factor could worsen considerably over the next 50 years (MA, 2005a; see Text box 3.1 and Chapter 2). It is not surprising that many of the regions facing the greatest challenges in achieving the MDG targets coincide with regions facing the greatest problems of ecosystem degradation (Wall *et al.*, 2005).

Investment in conserving and strengthening ecosystem service delivery, therefore, needs to be an integral part of policies, programmes and strategies to support the poor and prevent further impoverishment. Tackling root causes of EGS loss and poverty can lead to complementary positive outcomes, as many of the critical factors causing ecosystem changes are also central drivers for under-development. From a development cooperation perspective, addressing EGS can improve the efficiency and effectiveness of poverty reduction efforts (EuropeAid, 2007; IUCN, 2008; OECD/DAC, 2008; Vina, 2008; WRI, 2005; Sachs *et al.*, 2009; Tekelenburg *et al.*, 2009; CBD secretariat, 2009a; TEEB, 2009).

3.2 Linking EGS and development assistance policy measures

The main international mechanism for poverty reduction and development policy is official development assistance (ODA). This chapter focuses on development assistance or cooperation in the narrow sense of ODA, that is, grants or loans to developing countries to promote economic development and improving quality of life, including also technical co-operation. ODA is channelled through multi-lateral organisations (UN, WB, EU; see also Chapter 6, on the role of International Financial Institutions), bilateral assistance from donor country to recipient country and through support of civil society. ODA can be provided in support of improving the environmental situation and EGS delivery, be neutral to it or have adverse effects. This needs to be taken into account in further exploring opportunities for mainstreaming EGS.

Before turning to the main policy measures in international development policy, we first look at the entry-points for mainstreaming EGS (following Persson, 2009) on macro, meso and micro levels. On the macro level, donor countries influence recipient countries through ODA priority setting and the level of budgets made available. On the meso level, the main choice is about the means through which ODA is provided; either through budget support or funding specific programmatic/project frameworks. On the micro level, the choice is about design of actual projects and activities. For mainstreaming EGS in ODA, on all levels, the question of conditionality of aid and ownership of development strategies is a critical issue. It also needs to be taken into account that the 'donor landscape' is rapidly evolving; new donor countries come up, such as China, India and Brazil, that have their own way of providing aid and are not a member of the OECD/DAC and do not feel bound by its rules on aid delivery. Also new private foundations like the Gates Foundation are becoming increasingly important.

Budget and sector support is increasingly replacing project funding over the last years. Budget support for public spending is channelled through to ministries of finance or equivalent government departments in the recipient country. Budget support is replacing project support to strengthen ownership for the development process and to avoid the problems caused by development assistance which often comes from multiple, and often fragmented projects of various donor countries. Budget support comes as general budget support or support for specific sectors, such as agriculture, energy and health. With budget-support, mainstreaming EGS needs to happen at a high political level, by influencing priority setting. For example, budget support for rural development plans in drylands can be developed from an agricultural production perspective only, or it can take into account various opportunities and trade offs for the delivery of various EGS.

Poverty Reduction Strategy Papers (PRSPs) often form the basis for such budget support. PRSPs were introduced in 1999 by the World Bank and the IMF, as a framework to enhance domestic accountability for poverty reduction reform efforts. They were also designed to enhance the coordination of development assistance between governments and development partners, and have been used as a precondition of, or access to, debt relief and concessional financing from both institutions' Highly Indebted Poor Countries (HIPC) Initiative (see also Chapter 6). Beyond PRSPs, donor programmes use a wide set of policy frameworks that intend to enhance national development policies. These include, for example, the UN wide support for implementing MDG-based national development strategies, including the UN Development Assistance Framework and the EU Country Strategies and Country Environmental Profiles that both guide development assistance in recipient countries. These frameworks also play an important role in coordinating and prioritising bilateral donor programming, as most bilateral donor programmes are also based largely on the priorities established by the PRSPs.

Text box 3.1: Examples of consequences of EGS loss for the poor

Impacts for the poor are significant but not reflected in global GDP

A striking aspect of the consequences of the loss of ecosystem services is their disproportionate but unrecognised impact on the poor. For instance, if climate change resulted in a drought that halved the income of the poorest of the 28 million Ethiopians, this would barely register on the global balance sheet as it is calculated today. Global GDP would fall by less than 0.003% (Djoghlaf, 2010). Yet the humanitarian costs as measured by direct indicators of well-being would be staggering.

Possibilities for ecosystem based policies to reduce vulnerability

An often cited example to illustrate the link between managing ecosystem goods and services and reducing poverty comes from Haiti and the Dominican Republic (UNEP, 2007, TEEB, 2008). In recent years, forest degradation in Haiti has increased vulnerability to hurricanes and jeopardised water availability and agricultural productivity. By contrast, the neighbouring Dominican Republic has larger areas of intact forest left in place, resulting in much better conditions to meet basic human needs.

Disproportionate implications for women

The loss of forest biodiversity, often not very visible, has serious implications for the well-being and socio-economic status of women. In the tribal regions of Orissa and Chattisgarh, states in India which were once heavily forested, deforestation has resulted in the loss of access to medicinal plants, fuel wood and other forest products traditionally collected and managed by women. Women there now face not only diminished income and nutritional state, but also must devote more time and effort to collecting lower quality resources for the household. This also leads to a diminishment of their social roles in contributing to household well-being (saxena, nd).

Support for programmes and projects. In the case of programme or project support, development assistance funds are used to implement specific activities, with donor countries retaining control of project financing and management. Taking into account EGS delivery in designing programmes and projects, will make a large difference to the final outcomes. Systems of payments for ecosystem services (PES), for example, can be implemented as development projects.

Other policy domains, such as trade and security, basically taking an international cooperation perspective, are also important for realising development objectives. This is covered, for this report, by looking at 'policy coherence for development', as one of the policy tracks for mainstreaming (see the next section and the next three chapters). From an international cooperation perspective, as reflected in MDG8 on the Global Partnership for Development, ODA and relevant other policy domains will need to develop a coherent approach to realise development and EGS objectives within countries.

3.3 Policy tracks and gaps

Within the policy domain of development cooperation, there are a number of policy-making tracks that are especially relevant to the integration of EGS into poverty reduction policies. For example, the UN Millennium Development Goals have set internationally agreed overall goals and targets for 2015 that guide national and international implementation. National implementation is supported through various forms of (financial and technical) development assistance, in which EGS can be mainstreamed. As development outcomes are influenced by various (inter)national policy domains, and as ODA alone cannot realise the MDGs, policy coherence for development is increasingly receiving attention, for example within OECD/DAC and the EU and within donor countries.

The UN Millennium Development Goals (MDGs)

The MDGs represent the internationally agreed overarching policy framework for development cooperation, endorsed by governments at the UN Millennium Summit in September 2000. The goals and targets, mostly to be achieved by 2015, commit governments to improve human well-being by setting agreed targets for reducing poverty, hunger, and child and maternal mortality; providing education for all; controlling and managing diseases; tackling gender disparity; ensuring environmentally sustainable development; and pursuing global partnerships. Progress toward the targets is measured by specific indicators.

The MDGs serve as a common set of goals for many of the actors involved in poverty reduction and development. They provide a framework and guidance for domestic, bilateral and multi-lateral processes. The CBD target 'to achieve by 2010 a significant reduction of the current rate of biodiversity loss … as a contribution to poverty alleviation and to the benefit of all life on Earth' was incorporated in the MDGs in 2007. It is important to realise that EGS are relevant in almost all MDGs, not just in MDG7 related to environmental sustainability (Munasinghe, 2008).

The Annual Ministerial Review of the UN Economic and Social Council is mandated to assess progress with MDG implementation and to identify measures for scaling up and accelerating implementation. This was agreed to by the heads of state and government at the 2005 World Summit. Their Annual Ministerial Review session consists of three main elements: (1) a global review of the United Nations development agenda; (2) a thematic review, and (3) a series of national voluntary presentations of both developing and developed countries on MDG implementation progress.

The 2008 Annual Ministerial Review (UN Economic and Social Council, 2008; UN, 2009a) focused specifically on the role of the MDGs in regard to sustainable development, with a particular focus on the role of ecosystem goods and services. It recognised the important but poorly understood role of EGS for poverty reduction, and that implementation is lacking. In 2010, the MDG+10 Review Summit, called for by the Secretary-General and the President of the UN General Assembly, will evaluate overall progress on implementation. It is expected that, at this summit, long-term perspectives for the development agenda will be put on the international agenda. This obviously provides an opportunity to address the role of ecosystem goods and services in sustainable poverty reduction and development (PBL, 2009).

Official development assistance

Being one of the main international policy mechanisms for implementing the development agenda, development assistance is also an important policy track for mainstreaming EGS. Although there is an increasing attention for environmental issues in ODA projects, there is ample room for further improvement – especially from an EGS perspective (see European Commission, 2009a, for a critical evaluation of environmental integration in development; Hicks *et al.*, 2008; TEEB, 2009).

Analysing aid patterns in the 1980s and 1990s, Hicks *et al.* (2008; PLAID database) show that bilateral environmental aid almost doubled in that period, by contrast ODA with neutral or negative environmental impact, in 1999, was still seven and two times higher, respectively, then environmental ODA. In the 2002-2007 period, about 1 to 2% of all (bilateral and multilateral) ODA disbursed was earmarked by donor countries themselves to be used for 'general environmental protection' (Persson, 2009; OECD Creditor Reporting Database). Environmental issues that can be considered as global public goods started to receive bigger shares of development assistance in this period. Most projects now address (global) concerns of donor countries and (local) needs in partner countries. A specific focus on EGS, however, was not possible to distinguish in light of the novelty of the concept, as well as with the way projects are registered.

An important forum for creating guidance for mainstreaming EGS in development cooperation polices is the Development Assistance Committee of the Organisation for Economic Co-operation and Development (OECD/DAC). Through the DAC, donor countries coordinate and report their efforts and develop guidelines for making developing assistance more effective. Efforts to integrate environmental aspects in development assistance, are conducted primarily by the

Network on Environment and Development Co-operation (ENVIRONET). ENVIRONET works to enhance the coherence of OECD country policies in the areas of environment and development cooperation.

Two main activities in the ENVIRONET work programme are especially relevant for mainstreaming EGS. The first is the Joint Development-Environment Task Team on Governance and Capacity Development for Natural Resources and Environmental Management (established in 2006). It provides guidance for carrying out the work on strengthening the capacities of environmental institutions and on integrating natural resource and environmental management into development policies and plans. An analysis has been made of the possible contribution sustainable natural resource management can make to pro-poor growth; this is very much based on an EGS approach. It identifies development cooperation to play an important role in promoting political change to support natural resource management for pro-poor growth (see OECD/DAC, 2008).

The second relevant ENVIRONET activity is the work on Strategic Environmental Assessment (SEA), which provides a forum for sharing experiences and monitoring the implementation of the SEA Policy Guidance for development. Here, EGS are identified as one of three priorities for SEA for development planning. Currently, through this network, various donor countries are starting to apply SEA for EGS. First reviews of experience and progress are expected in 2010. Early analysis of experiences highlights the role of SEA in assessing the consequences of adverse and beneficial impacts on ecosystems, in terms of the effects on vulnerable groups in society, and raise considerations about when to give attention to impacts on ecosystem services in SEA of development policies, plans and programmes; whom to involve in this type of SEA and how to assess impacts on ecosystem services (OECD/DAC, 2006; 2008 and follow up guidance on EGS).

Policy coherence for development

The promotion of policy coherence for development (PCD) and the pursuit of development objectives through the systematic promotion of mutually reinforcing policy actions on the part of both donor countries and partner countries, provides an important opportunity to mainstream EGS. The issue of 'policy coherence for development' is high on the agenda within the OECD/DAC and EU Development Assistance.

There are a number of reasons for this increased attention to PCD. First, globalisation and liberalisation of markets raise the possible gains from interdependence and integration, which require coherent policies. Second, aid alone cannot reduce poverty. PCD, therefore, is an essential mechanism to achieve the Millennium Development Goals. And third, incoherence has an economic cost – to the poor in the developing world and to taxpayers in developed countries. The aim of the PCD agenda (as laid down in the 2005 Paris declaration on aid effectiveness; the OECD/DAC PCD declaration, 2008; and the Communication from the European Commission, 2009b) is to exploit the potential for synergies between different international policies, and to avoid that developed country policies undermine development objectives.

Several dimensions of coherence can be distinguished: internal coherence within development co-operation policies (to avoid overlaps and contradictions between donor countries). This report is concerned with inter-donor-country coherence, that is, the consistency of aid and non-aid policies of various donor countries and the consistency in policies in donor countries and developing countries. As an example of that in the latter, this can include support for special policies, such as integrated coastal zone planning, low-carbon development, rural development or integrated conservation and development projects and management to incorporate better assessment of environmental risks (including EGS concerns), and focus development in more appropriate areas.

Within OECD, the PCD focus is on member countries' policies in trade, investment, migration, agriculture, health and the environment. In its recent communication, the European Commission (2009b) proposes that the EU needs to focus on a few PCD priorities and to pro-actively take account of development objectives in formulating its selected initiatives. Proposals for priority issues that are relevant from an EGS perspective include ensuring the developmental component of EU policies to combat climate change (both climate-friendly and climate-safe development) and ensuring global food security (European Commission, 2009b). Some of the tools provided within the EU for realising the PCD agenda include consultation mechanisms, impact assessments, and Commission Country and Regional Strategy Papers. Furthermore, the European External Action Service that will be established under the Lisbon Treaty can be expected to also play a role.

Gaps

Importance of EGS for realisation MDGs is not widely understood

In development policies, the need for sustainable poverty reduction is increasingly recognised, although integration of environmental concerns in actual implementation remains a challenge. The importance of EGS for the realisation of development goals however, is less widely understood. The MDG agreement and its Annual Ministerial Review, by themselves, do not offer hard mechanisms to influence development practice and policy from an EGS perspective. The MDG agenda is a form of soft policy-making that helps coordination and building awareness, but requires additional implementation measures and resources to achieve any traction. Translating these concerns into action at all levels remains a key challenge.

This, for example, has to happen through development assistance. Donor countries have, in principle, agreed to allocate at least 0.7% of their total GDP for development assistance, but very few have actually achieved this target. Several analyses have also shown the gaps that exist in integrating environmental concerns and EGS in poverty reduction policies (UN Millennium Project, 2005; UNDP & UNEP, 2009, European Commission, 2009a). It appears that there is an insufficient focus on national implementation mechanisms and coordination across sectors, and a lack

of operational objectives and prioritisation. The lessons of both failure and success in pro-poor rural development and ecosystem management, as reviewed in Chapter 2, seem not to have gained widespread recognition at the level of national economic planning, nor among development cooperation specialists in donor countries.

There are a number of reasons for this. Environmental sustainability goals are seen as being distinct from, and often in conflict with, development goals. In the face of pressing needs for economic growth and poverty reduction, and given the scarcity of public funds, the environment tends to remain a low priority in public investment and policy formulation. Environmental managers face a continuing problem in 'selling' their sector to macroeconomic and sectoral decision makers. Traditional conservation arguments have rarely proved sufficient to make a compelling case that environmental sustainability has an important bearing on pro-poor growth. While these arguments relate to environment in general, these might be even more pressing for EGS delivery, which is perceived to be a new concept with little practical value.

Need for contextual solutions from EGS perspective
Another challenge is that the conditions for a large scale incorporation of EGS into rural poverty reduction are difficult to operationalise at the local scale. Donor countries favour development 'models' that can be widely and easily replicated to produce a broad impact with low project overhead costs. The practical lessons (see Chapter 2) suggest that, while methods, tools and processes are replicable, formulaic interventions are not. Successful management of ecosystems to improve human well-being tends to be highly contextual.

Analysis of the Poverty Reduction Strategy Papers, for example, examining in particular the impact that they had in the realisation of MDG objective 7 (environmental sustainability), shows that a major effort is needed to raise the level of attention to MDG7 in the PRSPs. The majority of PRSPs fail to account for the role of resource access and environmental management in the lives of the poor, and their potential contribution to poverty reduction programmes. Experiences in a number of countries show that coverage of environmental issues can be improved considerably through revisions from interim to full PRSPs. Despite progress with respect to integration of immediate environmental concerns, most PRSPs still lack attention to long-term environmental sustainability (Böjo and Reddy, 2003; Böjo *et al*., 2004; Hugé and Hens, 2007, 2009; UNDP, 2005).

Effective utilisation of available data can enhance the alignment of PRSPs with MDG7. In the absence of proper valuation mechanisms, returns on conservation investments only tell a partial story, which makes these investments relatively less attractive. For example, Country Environmental Analyses from the World Bank represent an attempt to give more weight to environmental issues, including possibly EGS. The relative weight that is given to these findings, in contrast with other country economic information, is the key issue and still a problem (see also Chapter 6).

While EGS issues are only starting to receive attention as part of the PCD agenda in the EU (in the context of climate change adaptation and mitigation, in relation to food security), the OECD is having a broader PCD agenda with respect to governance and capacity development for EGS and natural resources. This also still has to find its way down to local levels. Within OECD, the current focus, therefore, is on ensuring that development cooperation contributes to strengthened environmental management, in the context of new aid modalities, notably the shift towards general, non-earmarked, budget support. This includes, in particular, *i)* identifying ways to demonstrate the economic value of environmental management, using techniques applicable to developing country context; *ii)* identifying the challenges associated with integrating environmental programmes into medium-term budgetary processes/frameworks; and *iii)* developing approaches for assessing government's institutional capacities to manage the environment (European Commission, 2009b; OECD, 2009).

3.4 Priority Issues and opportunities

This section examines a number of priority issues where international development assistance policies can become particularly relevant for the delivery of EGS within countries. These include:

- Raising the profile of EGS in national development planning mechanisms;
- Contributing to building capacity for implementation;
- Scaling up investments in food security and agriculture;
- Improving tenure and access to natural resources.

National development mechanisms

International development frameworks, such as PRSPs, MDG strategies, the UN Development Assistance Framework, EU Country Strategies, and budgetary review processes in support of national development policies, provide an important opportunity to mainstream EGS delivery. This can contribute to aligning dominant governance processes in a specific country with EGS concerns. This requires the use of institutional measures, such as sector working groups, stakeholder engagement and donor country coordination – leading to identifying appropriate improvements from an EGS perspective to the resulting mainstream planning framework and process. The UNDP, for example, is aiming to do this for dryland issues. Priority sectors from the perspective of EGS delivery include agriculture, forestry, energy, infrastructure and water (UNDP, 2008).

Policymakers must address a number of challenges to be able to better use national development planning mechanisms for the delivery of EGS (Shackleton *et al*., 2008, Hicks *et al*., 2008; Huge and Hens, 2009; UNDP and UNEP, 2009; UN Millennium Project, 2005; WRI, 2005).

An important starting point for mainstreaming EGS in poverty reduction involves fostering a deeper understanding of their linkages with, and importance to, pro-poor development. This involves identifying the key poverty-environment linkages, as well as the relevant governance and institutional factors that affect policy, planning, and decision-making (see Chapter 2 for examples in various biomes). Finding the right entry point is crucial to improving environmental mainstreaming. In most

cases, this will include processes related to PRSP reviews, the formation of a new PRSP or MDG based national (sustainable) development strategy, or the start of the budget allocation process. Typical national policy domains to flag for attention include resource tenure and land management policies, and support to civil society intermediary organisations to work with marginalised communities, as part of a more decentralised resource management approach (see Chapter 2).

Particular focus must be directed to engagement with the finance and planning agencies responsible for economic development policy, 'making the economic case' on the basis of the contribution of natural resources to poverty reduction and development, and bringing the environment agency into the national development policy-making process. Commitment of the central planning or finance team is essential, and mainstreaming efforts need to be focused on the agency responsible for the PRSP or MDG strategy, or on the ministry responsible for the budgeting process, both in terms of influencing the planning process and the sectoral and local-level implementation processes that follow.

Furthermore, it is crucial to generate empirical evidence regarding the economic case for environmental mainstreaming, notably the contribution of EGS to economic development, reducing vulnerability to climate change, and pro-poor growth in a manner relevant to the key goals and priorities of a development strategy in a specific country. Better analysis, case studies, and examples of economic costs of EGS degradation would be helpful, next to models of standards, good practices, and examples from a range of sectors that demonstrate how to implement economic development strategies that complement and strengthen EGS. Inadequate baseline data and environmental monitoring in most developing countries is a key constraint to understanding the importance of healthy ecosystems in reaching the MDGs, pointing at the need of building capacity for implementation.

Building capacity for implementation

Countries will need to build implementation capacity within their governments and among civil society actors, to follow through from successfully influencing national planning frameworks to implementation. Development cooperation can support this. The implementation options include budget decision-making, launching sectoral strategies and programmes, building intermediaries and local-level implementation initiatives.

A mainstreaming process has high transaction costs, because it is about introducing a new topic to the development agenda, seeking to change government priorities, and involving all relevant ministries. Building capacity for mainstreaming needs to include support for ensuring that environmental investments in support of poverty reduction can be financed through domestic resource mobilisation; managing ecosystem services and understanding how national budgets should be reallocated for infrastructure development and ecosystem management functions; developing integrated, ecosystem-based implementation plans for, for example, PRSPs and MDGs at a national level; and developing community resource appraisal, including the analytical capacity needed for that (UNDP, 2005; WRI, 2005; UNDP and UNEP, 2009).

Several initiatives have been launched to build capacity, including the UNDP-UNEP Poverty–Environment Initiative and the Poverty and Environment Partnership. The Poverty–Environment Initiative is a joint programme to provide financial and technical support to countries to build capacity for mainstreaming poverty–environment linkages into national development planning processes. Established in 2001, the Poverty and Environment Partnership is an informal network of practitioners from development agencies, international environmental non-government organisations, and others working on poverty reduction and the environment. The Poverty and Environment Partnership shares knowledge and operational experience in addressing poverty and the environment, and seeks to improve coordination and collaboration among partners, while promoting ongoing and future joint activities.

Various multilateral agencies are also in a good position to coordinate capacity development related to assessment and reporting. For example, based on its Global Environment Outlook process and methods, the UNEP leads a global capacity development programme, focused on integrated environmental assessment, although this does not explicitly address EGS, yet.[1] While the capacity development programme is based on a common global assessment methodology, its primary targets include regional, national, sub-national and ecosystem-based organisations. The UNEP's presence and profile in all regions of the world and its ability to convene governmental and non-governmental actors in global assessment processes puts it in a good position to systematically promote assessment methodologies that cover EGS trends and interactions with human well-being. The capacities developed strengthen the ability of sub-global players to track their progress toward MDGs with direct or indirect connection with the environment.

A major challenge in increasing the sustainable use of ecosystem services will be the capacity building and education of farmers, researchers and policymakers, at the sub-national and local level. Women are often ignored in this, although they play an essential role in achieving food and water security. Efforts by women account for 60 to 80% of the food production in many developing countries, they produce more than 50% of the world's food and own 1% of the land (MA, 2005c). Increasing access to education for marginal groups, such as adjusting school hours for pastoralist children who have to watch over the cattle during the day, helps to build knowledge, skills and capacity. Entrepreneurial and self-employment skills, as well as agro-ecosystem knowledge, are of high importance to the reduction of poverty in rural areas. Last but not least, agricultural education needs to be prioritised and made more accessible to women (FAO, 2009b; IAASTD, 2009). The role of non-governmental intermediaries, such as farmer cooperatives, community organisations, educational and service delivery organisations, is crucial in building the local institutions to support these innovations

1 http://www.unep.org/ieacp/iea/

and facilitating transactions with senior governments and donor countries.

Scaling up investments in ecosystem services: agriculture and food security

Scaling up investment in managing and securing ecosystem services is key to reaching the MDGs, but these efforts must be a central part of broader poverty eradication efforts. Special attention must be paid to the critical area development, agriculture and food security. This is especially important given the increasing number of competing claims on productive lands (see also Text box 3.2 that illustrates this from an developmental and EGS perspective for biofuels).

As shown in Chapter 2, land-use change for agriculture is one of the main processes that changes delivery of EGS. Investments in ecosystem services are essential to keep agricultural production in pace with projected demand for food while buffering climate change. Resilient agro-ecosystems can enhance productivity, especially in regions where resource management is currently poor. In this way, investments in ecosystem services can add to food security.

Appropriate use of ecosystem services can also diminish capital needed to purchase artificial fertiliser or pesticides. Integrated pest management, for example, uses regulation services of ecosystems to diminish the pressure of pests and diseases. If a farmer expects a considerable loss of yield, chemicals are applied. In this way, the amount of pesticides needed diminishes, and natural equilibriums remain in place as long as possible.

Ecosystem services can also benefit water management. Retention of water ensures enough water in case of dry spells, while forest ecosystems or agro-forestry systems are essential in avoiding floods and soil erosion. Good soil management increases the infiltration and water storage capacity of the soil. Good soil management can also diminish the need for artificial fertiliser inputs. Application of fertilisers only in the amount necessary, and at the moment the crop needs it, increases nutrient efficiency and reduces the risk of environmental harm.

Reducing degradation and restoring ecosystem services in relation to agriculture will require effective scientific and site-specific local knowledge, which may have to be generated or adapted locally. Interventions are often innovative, meaning that poor farmers need to apply backstop technology to reduce the risks of failure. They also require investment, and usually alternative livelihoods, at least for an interim period, to reduce the pressure on degrading resources. All of these factors suggest the need for local organisation, facilitation by intermediary groups, external support, and access to markets, credit and extension services in agriculture. Yet in many countries, systematic disinvestment in rural development services has undermined precisely the package of skills and services required to both combat poverty reduction and meet EGS needs (IAASTD, 2009).

Improving tenure and access to natural resources

An important opportunity to strengthen EGS is the promotion of consistent institutional processes relating to resource management and tenure for local benefit. ODA support to building local capacity for ongoing adaptive, ecosystem-based management would be complementary to both MDG and EGS goals, but the ways to do this are diverse and experiential, and do not lend themselves to standardised or uniform approaches (see also Chapter 2).

Weak governance (e.g. political marginalisation and corruption) is a key underlying driver of both biodiversity loss and poverty (Swiderska, 2008). The key to both poverty reduction and protection of ecosystem goods and services in poor, resource-dependent rural communities lies in strengthening institutions for resource access and management at the local level. Policies on pastoral land-use tenure in drylands, for example, cannot be easily standardised, because of the need for flexible and contingent access to resources in times of stress. Policies, therefore, must ensure fair processes for negotiating local access rights under widely varying conditions, to avoid resource degradation (see Chapter 2). Development assistance can play an important role in enhancing such reforms.

Environmental governance reforms, therefore, are essential to support poor communities in improving their quality of life through sustainable resource use. These reforms would need to strengthen the rights of the local poor to access, use and manage ecosystem services and address issues related to lack of legal tenure and access to resources that generate key ecosystem services. Reforms, furthermore, need to create opportunities for the poor to engage in those decisions that affect how these ecosystems are managed, ensure access to information about ecosystem services and to align economic and financial incentives with ecosystem stewardship (through national policies).

Because the poorest resource users are typically marginalised, politically, as well as socially, even within their own communities, it is difficult to ensure that the benefits of resource management reforms are not reaped by local elites (WRI, 2008). Measures to ensure representation of marginalised social groups on decision-making bodies though well-intentioned, often fail because of systemic and deep-seated social biases. To ensure that the poorest benefit from improved ecosystem services, careful monitoring and targeting of interventions is essential, as well as high level policy support to ensure that local officials understand and are accountable for poverty reduction and EGS outcomes (Tyler, 2006b).

3.5 Tools for Mainstreaming

This section identifies a number of tools that are available to mainstream EGS in development policy. Some of them explicitly focus on EGS, while others are more generically looking at environment, but provide a basis for mainstreaming EGS.

A number of *generic guidelines* are becoming available that provide technical advice on mainstreaming the environment in poverty reduction and development policies. These include, for example, the 'Mainstreaming Poverty-Environment

Text box 3.2 Opportunities and risks of increased biofuel production inform and developmental and EGS perspective

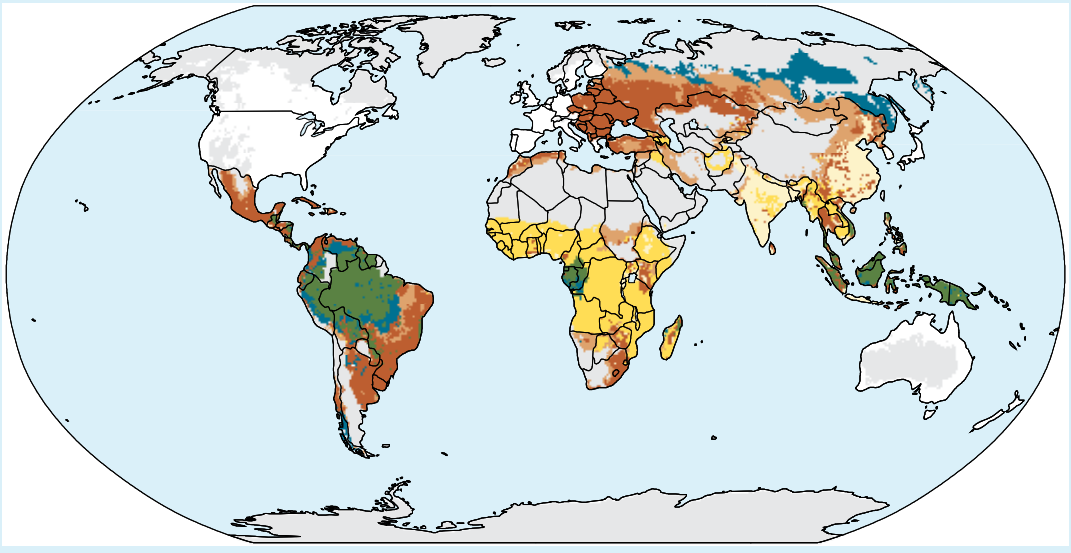
Biofuels are one of the provisioning services ecosystems deliver. The increasing demand for biofuels over the last couple of years, has been perceived differently by various parties. Producing biofuels does strongly compete with other provisioning services, such as food and water. This text box illustrates some of the opportunities and trade offs in the production of first-generation biofuels from a developmental and EGS perspective, especially looking at food security risk. Figure 3.1 shows the global distribution of the different ways in which rural livelihoods may become vulnerable to an increase in biofuel production, due to competition with food crop production.

Six clusters are shown. In the clusters of most severe food security risk and strongest land-use competition, human well-being is low, at the moment. People in the first cluster are most vulnerable to high food and energy prices and, therefore, competition between food and biofuels can have large impacts on their well-being. The strongest land-use competition cluster includes very densely populated areas, such as in China and India. The pressure on land and water is already enormous without biofuel production, and these areas are dependent on food and energy imports. Diverting from food production towards biofuels implies an even higher dependency on food imports. Two other clusters point to regions where natural systems are suitable to produce biofuels and people are less vulnerable to increasing food prices than in the first two clusters: high risks of biodiversity loss and competition over land and water, but trade offs exist with natural resources. The last two clusters, pockets of land-use competition and high water availability, uncultivated land, show the areas where land is less suitable for growing first-generation biofuels.

The production of biofuels has a trade off to other provisioning services, such as food and water and, therefore, in some of the clusters has an impact on human well-being. To become useful for development, biofuel production requires local institutions and sustainable access to natural resources claimed for food production and biofuels. In the high productive areas which have sufficient connection with the market, competition between biofuels and food seems to have less impact. However, the risk is that of using the regulating or supporting services in unsustainable ways. Besides, indigenous local people can be dependent on other provisioning services from these areas.

Global distribution of vulnerability profiles of rural livelihoods, 2000 **Figure 3.1**

Due to competition for land for food and biofuels



Global distribution of vulnerability profiles of rural livelihoods due to competition for land over food and biofuels (PBL, 2009).

Linkages into Development Planning: a Handbook for Practitioners' (UNDP and UNEP, 2009) designed to serve as a guide for practitioners engaged in the task of mainstreaming poverty–environment linkages. Within the European Commission an 'Environmental Integration Handbook for EC Development Cooperation' (EuropeAid, 2007) is used to mainstream environment throughout the different forms of European development assistance. As a follow up to the Millennium Ecosystem Assessment, a number of organisations have developed a guide for public sector policymakers on mainstreaming EGS (Ranganathan et al., 2008b). This will complement an initiative led by the World Conservation Monitoring Centre, that provides more technical guidance on ecosystem service assessment methodologies. The OECD Development Assistance Committee provides guidance for natural resource use and pro-poor growth (OECD/DAC, 2008).

Country specific ecosystem assessments can be used to examine the overall contribution of ecosystems to social and economic well-being, to understand how and why economic actors use ecosystems as they do, and to assess the relative impact of alternative actions in order to guide decision-making.

Country-specific economic analyses quantify the contribution of natural resources and the environment to the country's economy through revenues, job creation, and the direct use of resources by the population. By demonstrating the multiple values of the environment, expressed in monetary and broader non-market terms, economic analyses provide evidence to persuade key decision makers that environmentally sustainable management of natural resources will help them achieve key development goals.

Pro-poorpayment for ecosystem services is an instrument that can be used to create positive incentives to motivate communities in control of major natural ecosystems to restore damaged ecosystems and sustain the supply of ecosystem services. The concept has been promoted in the context of areas, such as agriculture, deforestation and watershed services, and can be taken up further as part of development cooperation. A key issue here is that these payments reach poor resource users and are not intercepted by middle men or intermediaries (see also Chapter 4 on REDD)

Public expenditure reviews analyse the state of public expenditure, particularly their adequacy and appropriateness to the national governments larger economic and social goals. In many cases, they are carried out jointly by national government and the World Bank and regional development banks. Increasingly, they are used to ensure the priority for funding of environmental management measures with potential to deliver poverty reduction and growth.

Strategic environmental assessments can be used as part of ex-ante evaluation of development assistance projects. Efforts are underway to strengthen the biodiversity and EGS perspective in these processes (see also Text box 3.2). Increasing awareness of the needs for mainstreaming EGS can also be created by *portfolio screening* (ex-post evaluation) of the current project portfolio of donor countries, from an EGS perspective for (missed) opportunities and trade-offs.

Several of the mainstreaming tools described are already used at the pilot level. International organisations are well positioned to facilitate their broader introduction and most importantly used by providing sustained capacity development assistance that covers not only the analysis of EGS and poverty linkages, but also the use of such information in actual decision-making. The administrative burden associated with such methodologies can be very significant, even for the public agencies of a developed country, so the major capacity challenges of the poor countries that perhaps most need these tools must be kept in mind in development cooperation.

3.6 The role of CBD and other MEAs

It is exactly through the concept of 'ecosystem goods and services' that biodiversity considerations are linked with poverty eradication and development aspirations, with reference to all benefits people obtain from ecosystems. The CBD has acknowledged the interlinkages between EGS, biodiversity, development and poverty reduction, although specific work on this topic has only recently intensified as a result of the Millennium Ecosystem Assessment and through the launch of the Biodiversity for Development Initiative.

The Biodiversity for Development Initiative was officially launched in 2008, during the CBD 9th Conference of the Parties, aiming to improve the integration of the three CBD objectives of protection, sustainable use and access, and benefit sharing into the development processes. The initiative works in close partnership with the UNDP to ensure that biodiversity conservation, sustainable use and benefit sharing are integral element of national and regional economic and social development policies, legal frameworks, development plans and implementation systems. It has developed a number of information documents focusing on the role biodiversity can play in poverty alleviation and development,[2] and work is expected to intensify through 2010, the international year of biodiversity. The theme of the 2010 International Biodiversity Day is 'Biodiversity for Development and Poverty Alleviation'.

Work on mainstreaming biodiversity into different sectors and development processes has been undertaken for several years by the Secretariat, governments and international organisations on the basis of CBD Article 6(b), which states that '… each Contracting Party shall, in accordance with its particular conditions and capabilities, integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes or policies…'. Mainstreaming EGS could build on this and also be further supported through development and implementation of national biodiversity strategies and action plans.

2 See http://www.cbd.int/development/implementation/tools.shtml?tab=0

The CBD Conference of the Parties develops regular guidance on strategy and action plan development.[3] Regional and sub-regional capacity-building workshops on implementation strategy and action plans and mainstreaming biodiversity, organised by the CBD Secretariat, further facilitate implementation.[4] However, challenges remain, as implementation of the plans requires enactment of national legislation, and biodiversity mainstreaming requires application of tools tailored to national conditions and resources. The recently adopted resource mobilisation strategy clearly states that the loss of biological diversity and associated ecosystem services poses a significant barrier to achieving sustainable development and the MDGs. But while the CBD is the foremost international legal instrument to address biodiversity loss and ensure attendant ecosystem services, the lack of financial resources for biodiversity policies is a major impediment to achieve its three objectives (UNEP, 2008).

Various tools developed under the Convention could be used for the purpose of achieving policy coherence (see Text box 3.3), especially the ecosystem approach, the Addis Ababa principles and guidelines for sustainable use, the Bonn Guidelines on access and benefit-sharing, and the voluntary guidelines on biodiversity-inclusive impact assessment (CBD secretariat, 2009a: 2, 9).

In the dryland context, the UN Convention to Combat Desertification, in its objectives, refers specifically to the achievement of sustainable development (Article 2). Obligations of country Parties include: adopting an integrated approach addressing the physical, biological and socio-economic aspects of desertification and drought, and integrating strategies for poverty eradication into efforts to combat desertification. Convention implementation is facilitated through the development of national action programmes, which should specify the practical steps and measures to be taken, through a participatory approach involving the local communities.

The UN Convention to Combat Desertification 10-year strategic plan and framework 2008-2018 (Decision 3.COP.8) underlines the importance of the Convention's efficient implementation as an instrument both to prevent desertification and land degradation and to contribute to poverty reduction and promote sustainable development. Strategic objective 2 refers to improving the condition of affected ecosystems. Expected impacts are that land productivity and other EGS will be enhanced in a sustainable manner, contributing to improved livelihoods, and the vulnerability of affected ecosystems to climate change, climate variability and drought will be reduced.

3.7 Key findings and recommendations

The importance of EGS for poverty reduction and development is increasingly recognised. EGS provide important assets for the poor, whereas a lack of natural resources and sustainable EGS delivery make the poor more vulnerable. Investment in conserving and strengthening ecosystem service delivery, therefore, needs to be an essential part of policy strategies to support the poor. Development assistance can play a key role in this.

3 The latest guidance is included in COP Decision IX/8, available at: http://www.cbd.int/doc/decisions/cop-09/cop-09-dec-08-en.pdf.

4 See http://www.cbd.int/nbsap/workshops.shtml.

Text box 3.3 CBD tools of relevance to EGS mainstreaming into development processes

Addis Ababa principles and guidelines for sustainable use

The Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity, building on the ecosystem approach, consist of fourteen interdependent practical principles, operational guidelines and a few instruments for their implementation that govern the uses of components of biodiversity to ensure sustainability and contribute to poverty alleviation. The principles provide a framework to assist governments, resource managers, indigenous and local communities, the private sector and other stakeholders in ensuring that their use of biodiversity components will not lead to long-term decline of those resources. (Source: CBD COP Decision VII/12)

Access and benefit-sharing

Biodiversity offers the potential to place unique products on the market and to generate income for local communities. Many of these products are very valuable, yet their sale seldom benefits the people who protect and harvest them. Fair and equitable benefit-sharing is the third CBD objective, and developing countries have particularly highlighted its potential for poverty alleviation and development. Although its operationalisation is generally lacking in comparison with the other two CBD objectives (conservation and sustainable use), in Bonn in 2002, the CBD adopted the Bonn Guidelines on access and benefit-sharing. Negotiations are currently underway for the development of an international regime. Potential future provisions regarding recognition of biodiversity-related traditional knowledge and fair return of benefits to local communities, could assist in creating win-win situations for EGS conservation and sustainable development.

Voluntary guidelines on biodiversity-inclusive impact assessment

The voluntary guidelines on biodiversity-inclusive impact assessment (CBD COP Decision VIII/28) provide detailed guidance on whether, when and how to consider biodiversity in both project-level and strategic-level impact assessments. They are an elaboration and refinement of guidelines previously adopted by the CBD (Decision VI/7-A), the Ramsar Convention on Wetlands (Resolution VIII.9) and the Convention on Migratory Species (Resolution 7.2) (Source: CBD: http://www.cbd.int/impact/guidelines.shtml).

Developing countries are only starting to recognise the opportunity to tie EGS to development funding and broad sectoral support programmes through the MDGs. At the international level, multilateral and bilateral donor countries have not yet begun to fully recognise the need to link EGS to country or sectoral support.

Increasing attention for policy coherence for development between donor countries provides an opportunity to mainstream EGS in various mechanisms for development cooperation and poverty reduction. International development policies, such as PRSP, MDG strategies, UN Development Assistance Framework, EU Country Strategies and budgetary review processes, can help to mainstream EGS delivery in national development policy. This can help to align domestic governance processes with EGS concerns – leading to identifying appropriate improvements from an EGS perspective to the resulting policy frameworks and processes.

Priority issues for mainstreaming EGS delivery in development assistance include raising the profile of EGS in national development planning mechanisms by making the economic case for mainstreaming EGS; building capacity for implementation; scaling up of investments in food security and agriculture and improving tenure and access to natural resources

Although opportunities for mainstreaming EGS are recognised in theory and in high-level policy statements,actual implementation is in its initial phase. Efforts are underway by the CBD to improve this situation by developing and providing tools and applying them in concrete situations, but such efforts need to be strengthened and replicated on a larger scale. Meanwhile, in order to operationalise the EGS concept in development practice, more attention needs to be paid to the tools, processes and institutions that enable local-level, small-scale successes.

Based on the analysis in this chapter, a number of recommendations can be made to the international development assistance community to mainstream EGS in their work, including:

- Raise awareness in donor countries and recipients of the importance of integrating EGS concerns into development assistance and poverty reduction efforts. Screen current project portfolios of development agencies to examine the integration of EGS concerns.
- Examine the necessary investments needed to ensure that EGS are duly integrated in the realisation of MDGs. Report on country-specific conditions and trends of EGS relevant to various MDG objectives.
- Improve mainstreaming EGS in development assistance mechanisms and scale up current efforts and use current development assistance mechanisms, such as PRSPs and MDG planning. Systematically apply mainstreaming tools that have become available, such as SEAs, integrated environmental assessment and valuation.
- Facilitate the broader introduction and, most importantly, the use of mainstreaming tools, by providing sustained capacity development assistance that covers not only the analysis of EGS and poverty linkages, but also the use of such information in actual decision-making. Address the major capacity challenges of the poor countries that will most need these tools.
- Propose specific measures and demonstrate how these will help achieve MDGs. Consider trade-offs in critical areas, such as in infrastructure development and agriculture.
- Strengthen institutions for resource access and management, at the local level, which is key to both poverty reduction and protection of ecosystem goods and services in poor, resource-dependent rural communities. Because the poorest resource users, typically, are marginalised, it is necessary that resource management reforms deal with marginalisation.

4 EGS and Climate Policy

- Strengthening EGS in the forestry and agriculture sectors is consistent with emissions mitigation and supportive of ecosystem-based adaptation, both important potential elements of international climate policy. These connections have not been widely appreciated in climate policy development. EGS options for delivering climate policy objectives are important because they are relatively low cost and could deliver very large emission reductions.

- The best opportunity for integrating EGS in climate policy is through the proposed UNFCCC programme for Reduced Emissions from Deforestation and Forest Degradation (REDD). This programme offers, for the first time, a market-based mechanism that could create economic values for standing forests that rival the value of alternative uses of forest lands. However, there are methodological and institutional issues that need to be resolved in order to assure effective implementation. Particularly, the question is how to avoid "leakage" by ensuring benefits are captured locally and agricultural colonization is not simply displaced. Other opportunities for incorporating EGS in climate policy include Nationally Appropriate Mitigation Actions (NAMA) and adaptation policy frameworks and finance related to the UNFCCC.

- In order to improve forest and agricultural EGS through climate policy, institutions and incentives for ecosystem conservation need to better counter the complex drivers of deforestation, which can vary significantly by context. An important element of this puzzle is a restored emphasis on agriculture as both an instrument of ecosystem management and of climate policy, as well as sustainable food production. This requires greater investment and incentives for sustainable agricultural systems, including agricultural intensification.

- Governance and institutional systems for forest management need to be strengthened to ensure local benefit and long-term effectiveness of the REDD incentives. REDD implementation will be determined by the UNFCCC process, which needs to devote more attention to developing implementation tools, measures and standards that take into account the local EGS perspective. More attention is needed to sharing basic knowledge about equitable forest management mechanisms and effective carbon management in agriculture.

4.1 Why are EGS important to climate policy?

The goals of international climate policy are to reduce atmospheric concentrations of greenhouse gases, and to better enable adjustment to unavoidable climate changes. Both of these functions are services delivered by ecosystems, but the broader role of ecosystems in supporting both mitigation and adaptation has not been widely recognised in international climate policies.

For mitigation, the land-use activities most relevant to climate change are forestry and agriculture. The IPCC Fourth Assessment Report identifies agriculture and forestry practices, including land-use change, as contributing over 30% to global GHG emissions. Significant scope for achieving climate mitigation objectives comes from modifying practices in both these sectors in ways that strengthen ecosystem services. In other words, strengthening EGS could potentially deliver major climate policy benefits.

Among the forestry and agricultural sectors, there has been even less attention to the GHG implications of agricultural practices than to those of forestry. Agriculture contributes 14% to global GHG emissions – when combined with deforestation (for which agriculture is a major driver), their fraction of global GHG emissions rises to more than one third. Agricultural emissions in developing countries rose by 32% between 1990 and 2005 and can be expected to continue to rise, as food production increases to meet the needs of an expanding population. Of the total global technical potential

for mitigation of agricultural GHG emissions, 74% is located in developing countries.

Practices focused on maintaining and strengthening ecosystem services delivery in both forestry and agriculture provide an entry point for greater ecological productivity, conserving primary forests and reducing deforestation. Moreover, they are one of the most cost-effective GHG emissions mitigation options available – if well-designed to avoid leakage risk.

Agro-ecosystems are imperilled by practices that degrade soils, add chemical nutrients and intensify production beyond ecological limits. Many of these practices also increase GHG emissions. By addressing these practices and restoring the ecological function of agricultural systems, farmers can greatly reduce GHG emissions. Similarly, by focusing attention on healthy forest ecosystems delivering a range of services besides carbon sequestration, policymakers allow opportunities for sustainable forest-based livelihoods that do not require massive land-use changes.

Ecosystem-based Adaptation (or EbA) is the use of natural resources and ecosystem services as part of an overall adaptation strategy to help people adapt to the adverse effects of climate change (IUCN, 2009). Investments in maintaining or strengthening the delivery of EGS, through conservation, restoration and sustainable use of ecosystems, can strengthen the climate buffering capacity of these ecosystems (e.g. coastal mangrove systems to resist storms and erosion; wetlands to absorb flooding and manage drought; and afforestation to reduce impacts of higher temperatures).

But many practical complications pose barriers to achieving successful outcomes at a climate policy level, and a narrow focus on carbon management can distract attention from complementary EGS factors that would enhance the possibilities for implementation of global climate policies in developing countries. We emphasise two issues here: one is the relative lack of technical attention to agriculture, relative to forestry, in terms of GHG emissions; and the other is the lack of political support from key developing countries for the global mitigation agenda. By focusing on local EGS, and their development co-benefits, both of these issues are likely to align with global climate policy objectives.

4.2 Linking EGS and climate policy measures under the UNFCCC

Climate policy measures of particular relevance from an EGS perspective revolve mainly around climate change mitigation, particularly provisions under the UN Framework Convention on Climate Change (UNFCCC) to recognise and support the mitigation potential of forestry, agriculture and related land-use change. This includes, in particular, various proposals to introduce financial incentives for carbon sequestration through forest conservation and land-use practices. The explicit recognition of the need for cooperative action and investment in adaptation measures since COP 13, in Bali, provides another window of opportunity for the application of EGS.

Despite the widespread technical consensus that forestry, agriculture, and related land-use change offer large and low-cost potential for effective climate mitigation under the UNFCCC, these measures so far have played only a very minor role in international policy agreements on mitigation. The main reasons are methodological and political. It is technically difficult to measure GHG emission reductions or sequestration from improved ecosystem management practices, it is difficult to ensure that gains are not reversed or that losses are not simply transferred to other sites, and long-term compliance cannot be easily assured. On the political side, there is little interest in emission reductions in developing countries, because the industrialised countries, historically, are the largest contributors to the problem, and restrictions might limit their own economic growth and poverty reduction.

*Forestry and agriculture-based mitigation options and carbon offset*credits are important both in their cost-effectiveness and their magnitude. The IPCC has suggested that tropical forestry can provide greenhouse gas emissions mitigation at costs well below other mitigation options, with estimates for abatement costs through forestry under 10 USD/tCO_2 eq in developing countries (IPCC, 2001). The Stern Review on the Economics of Climate Change pointed out that if mitigation through avoided deforestation, reforestation and afforestation are not achieved, particularly in developing countries, global mitigation costs will be much higher than 1% of global GDP (Stern 2006). Similarly, reports from McKinsey & Co. and Vattenfall conclude that in order to keep the global costs of GHG mitigation below 40 euros (64 USD) per tonne, with a total cost of 500 billion euros (790 billion USD), policymakers should adopt policies 'ensuring that the potential in forestry and agriculture is addressed effectively, primarily in developing countries' (Vattenfall, 2007) The IPCC estimated that at GHG mitigations costs of 50 USD/tonne, forestry and agriculture could contribute 32% to the total global mitigation potential. If the price rises to 100 USD/tonne, the potential contribution from these sectors rises to 45% (IPCC, 2007).

In addition to the generally weak treatment within climate policy of EGS as a way to achieve mitigation measures, mainstream climate policy has also overlooked the climate adaptation co-benefits of EGS. *Ecosystem based Adaptation* is best implemented as part of a broader adaptation programme, but can be applied at multiple scales, from the farm or plot level, to the level of a community, landscape or region (see Chapters 2 and 3 for more examples and links to development policy). Healthy ecosystems not only provide climate adaptation buffers, but also many other ecosystem goods and services, such as provisioning, cultural and recreational benefits. Often they also provide mitigation benefits, as in reforestation or soil carbon management on cropland or pasture. Conversely, ecosystems that are already weakened and only deliver limited services are more likely to collapse or transform under the additional stress of climate change, leading to reduced buffering and a greater need for investment in substitute adaptation measures. EbA is

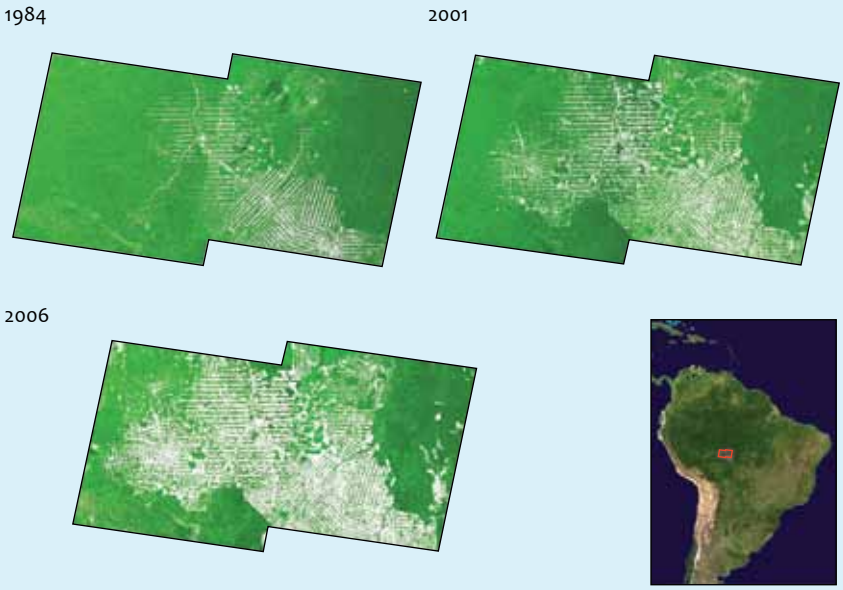
Text box 4.1. Impacts of international policy influences to deforestation and EGS: the Brazilian beef and soybean trade

A combination of domestic and international policies over the past few decades have contributed directly to the expansion of the Brazilian agricultural sector, and consequently to deforestation of the Amazon rainforest. Making clear links to the actual impacts of trade policies on deforestation and resulting loss of EGS benefits, however, is challenging, because of the multitude of factors affecting the agricultural sector.

During the 1990s, economic policy reforms in Brazil helped to stabilise the country's economy, and created a policy regime more favourable to agricultural investments, production, and exports (Schnepf et al., 2001). With liberalised trade and strengthened market signals, imports and use of equipment technology and agricultural inputs, such as fertiliser and herbicides, increased, in Brazil, throughout the 1990s. This led the way for the soybean industry in Brazil to expand. Strong world commodity prices and increased demand, especially from the EU and China, since 2000, have fuelled the strong expansion of the soy and beef industries in Brazil, and consequently increased the rate of deforestation.

Global markets have been identified as some of the key drivers of deforestation in the Amazon rainforest. Increased rates of deforestation after 2000, coincide with the expanding Brazilian beef and soy industries and the associated increase in agricultural exports, as a result of strong world commodity prices and foreign demand. While only a small portion of agricultural cultivation occurs in the Amazon rainforest, production in neighbouring areas, such as the Cerrado grasslands, further drives deforestation by displacing small-scale farmers and cattle producers, who then move deeper into the rainforest. Many suggest that Brazilians should profit from the EGS benefits that the Amazon currently provides for free, meaning carbon storage, reduction of carbon dioxide emissions, and water cycling, paying them for the EGS benefits their land provides, rather than clearing the land for unsustainable agricultural production. However, this solution overlooks the difficulty of getting compensation into the hands of those who could actually protect forests, when much of the deforestation is driven by migrants who do not hold land rights in the first place (see discussion in Chapter 2). International policies that promote a percentage of land to be set aside for protection, or requirements for 'rainforest-friendly' certified commodities, could also provide incentives to prevent deforestation.

Rondonia – deforistation of Amazon rainforest, 1984 – 2006 **Figure 4.1**



Deforestation in an area of Rondonia, Brazil. The classic fishbone pattern of forest clearing can be seen expanding further away from developed areas into the Amazon rainforest.

particularly helpful for developing countries, where it can reduce the vulnerability, especially of the poorest residents.

The development benefits of pro-poor climate investments greatly improve the political appeal among developing countries for mitigation actions. Broader opportunities for mitigation financing to support improved agricultural and forestry practices through international policy agreements will mean more investment to reduce rural poverty in developing countries. Marginal agricultural and forest boundary areas are typically some of the poorest in these countries, and have been neglected by agricultural investment and national policies, in favour of more productive agricultural zones. Similarly, investments in ecosystem-based adaptation can strengthen livelihoods and prevent losses among poor, resource-dependent communities.

International climate policy has embraced the concept of investment in Reduced Emissions from Deforestation and Forest Degradation (REDD), as part of a broader portfolio of climate change mitigation instruments. The principle is that ecosystem protection at the local scale, by maintaining intact forests, produces a valuable global ecosystem service –climate regulation.

Under the Kyoto Protocol, industrialised countries can contribute to their own greenhouse gas emission reduction commitments by investing in projects that reduce emissions in developing countries. Offset credits can be generated through projects that absorb or sequester atmospheric carbon through forestry, agriculture or other land-use activities. This class of activities is generally referred to as Land Use, Land-Use Change and Forestry (LULUCF) or 'carbon sinks'. LULUCF or 'sink' projects are generally deliberate attempts to increase biomass production on a clearly defined parcel of land.

Critics of forest carbon offset credits say they allow polluters to buy their way out of making real emission reductions. From an economic perspective, the point is instead that they can select the most cost-effective carbon offset investments at a global scale. A more serious technical concern is that it is difficult to calculate and then secure long-term carbon sequestration through forestry. The issues here are complex, involving resource tenure and security, the prospect of non-timber income streams, and the provision of long-term incentives for forest protection (Cowie *et al.,* 2007; Kindermann *et al.,* 2008; Benndorf *et al.,* 2007; Hohne *et al.*, 2007). Several barriers currently constrain the adoption of REDD, such as the perception that transaction costs will be high and governance issues difficult, perhaps the fundamental issues are accounting and permanence – the 'leakage' question.

In order to be credible, a GHG offset must deliver permanent (or at least very long-term) net reductions in deforestation. Forest protection at one site or region must not simply displace deforestation pressure to a neighbouring region. Complex methodologies have been proposed to calculate baseline levels of GHG emissions in the absence of REDD investments and to monitor all proximal lands vulnerable to deforestation pressure (e.g. the Global Observation of Forest and Land Cover Dynamics). Although it is generally agreed that any future international climate change policy framework should aim to reduce all anthropogenic emissions from the land-use sector through a combination of LULUCF and REDD type investments, it is not yet clear if this will be achieved.

4.3 Policy tracks and gaps

The realisation of the large potential for EGS co-benefits from climate policy will require collaborative policy development in developed and developing countries. The first policy priority is establishing a high-level consensus in the UNFCCC among national governments that terrestrial ecosystem management provides an opportunity for relatively low-cost, high-value carbon credits. A second policy priority is recognition among national governments that a forest-only terrestrial carbon policy will not suffice on technical grounds because of leakage risks, and ignores the many rural sustainable development benefits of a linked forestry-agriculture approach. A third priority is the recognition of the potential of EGS approaches to deliver real benefits in the delivery of climate change adaptation policies.

At the time of writing, negotiating positions for COP15 were scattered; proposals to include forestry and agriculture in a post-2012 regime include an expanded Clean Development Mechanism that includes LULUCF, such as agro-forestry and soil carbon management, or a REDD-plus mechanism which would include agricultural enhancement in later phases. The two proposals differ in the scope of their accountability requirements – an expanded Clean Development Mechanism generally favours developing countries, whereas REDD-plus is supported by developed countries and some developing countries.

LULUCF in CDM

The prospects for increasing the range of land-based carbon credits under the CDM did improve at COP-15 – if only marginally. A LULUCF decision is contained in the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) to the *Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol* (COP/MOP) in a decision designated as FCCC/KP/AWG/2009/L.15.

The draft decision requests the *Subsidiary Body for Scientific and Technological Advice* (SBSTA) of the UNFCCC to initiate a work programme that: "explores moving towards a land-based approach; considers procedures for additional LULUCF activities under the CDM; considers the role of non-permanence; revises reporting guidelines; and revises supplementary methodologies." (ENB, 2009). Thus no strong decisions have been taken, but a placeholder for the concept of broad ecosystem-based carbon crediting within the current CDM persists.

REDD

REDD integration into global climate policy has taken an important step forward as a result of decisions reached during COP15 in Copenhagen. The UNFCCC Executive Secretary declared at the outset of the conference that an

agreement on emissisions reduction from deforestation and forest degradation should be a core objective. Although the resulting "Copenhagen Accord" text is vague, aspirational and carries no legal weight, REDD issues are prominent, which many observers regard a relative success. The Copenhagen text refers to "REDD-plus", [1] and states that:

> "We recognize the crucial role of reducing emission from deforestation and forest degradation and the need to enhance removals of greenhouse gas emission by forests and agree on the need to provide positive incentives to such actions through the immediate establishment of a mechanism including REDD-plus, to enable the mobilization of financial resources from developed countries."

The Copenhagen text goes on to address funding issues:

> "Scaled up, new and additional, predictable and adequate funding as well as improved access shall be provided to developing countries, in accordance with the relevant provisions of the Convention, to enable and support enhanced action on mitigation, including substantial finance to reduce emissions from deforestation and forest degradation (REDD-plus), adaptation, technology development and transfer and capacity-building, for enhanced implementation of the Convention (UNFCCC, 2009).

Critics of the Copenhagen Accord point out the key details related to how the financial provisions will be operationalized are entirely unclear, however it is clear that REDD issues are firmly embedded in the negotiations going forward under the Bali Action Plan track.

This outcome demonstrates increased international commitment to the principles and financial support needed, but in the absence of agreed implementation rules, also creates additional speculative pressure on forest lands. While REDD is gathering momentum, there are increasing risks that the commercial benefits will be captured by global level investors and large scale corporate interests. At the same time, governments are more aware of the potential to use forests as bargaining chips in international environmental negotiations. Meanwhile, poor local users and indigenous peoples may have little influence on decision-making or access to the intended benefits, in which case they are likely to simply be displaced and further impoverished, with negative consequences on ecosystems in their new location.

Nationally Appropriate Mitigation Action (NAMA)

A yet untested programme option for REDD, that maintains the possibility of strongly linking forestry and agriculture *and* is palatable to most developing negotiating parties, is the Nationally Appropriate Mitigation Action (NAMA) concept. Under NAMA, developing countries would not take on binding emission reduction obligations; they would instead undertake GHG mitigation activity in selected sectors with strong sustainable development and capacity-building benefits. Activities can be undertaken independent of GHG credit markets, or with developed country financing. The EGS agenda would be well-served within the NAMA concept if developing countries designated both forestry and agriculture as project sectors, recognising the strong linkages between the sectors – and with the explicit goal of climate-friendly agricultural investments that would increase the security of forest GHG investments.

The NAMA approach is particularly appropriate from an EGS perspective, as it is compatible with the significant rural institutional capacity-building investment that will be required to fully realise EGS benefits in climate policy. Linking agriculture and forestry into a holistic terrestrial ecosystem carbon management approach at the national level also provides a practical focus for the ODA that will be necessary to correct the systemic disinvestment in the sector since the 1970s. Developed country ODA can be channelled into rural institutional capacity (for example, agricultural research, agricultural extension and rural credit programmes) for food security, EGS, and sustainable livelihood objectives, while facilitating GHG-specific investments.[2]

Adaptation

The concept of Ecosystem-based Adaptation is not described in the text of the Copenhagen Accord. Many questions remain as to how the financial pledges will be operationalized. The near-term commitment of an additional increment is described as "approaching 30 billion USD for the period 2010 - 2012 with balanced allocation between adaptation and mitigation" The concept of using biological carbon/ EGS investments such as REDD-plus to leverage adaptation co-benefits is not excluded but the Copenhagen text is too brief to explore these more subtle poverty alleviation and sustainable development opportunities.

Gaps

The primary policy opportunity for linking climate to local EGS is through the adoption of significant financial support to forest-based mitigation measures through REDD. Although the potential for REDD instruments to produce low-cost GHG offsets with significant local EGS and livelihood co-benefits is well understood, policy measures have not yet been put into place, because of four main factors:

- Climate policy instruments to implement REDD investments remain largely undeveloped, because of conflicted priorities of negotiating parties and methodological uncertainty.
- The complexity of forest dynamics, from both ecological and socio-economic perspectives, means that deforestation drivers are still poorly understood.
- Systemic disinvestment in rural development and agriculture, on the part of governments and development

1 The COP-13 Bali Action Plan described REDD-plus as, "policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries".

2 The scope of instutional capacity building includes developing country and regions specific parameterisation of GHG benefits attributable to specific agricultural and forest practices, policy and extension programming to incentivize such practices, and extension and credit support to farmers for practice uptake.

agencies, has reduced options for poor farmers and exacerbates deforestation pressure at the forest margin.
- Weak governance systems and inadequate institutions for ensuring local decision-making and benefit sharing mean that poor forest dwellers and indigenous peoples lack assurance that they can benefit from these schemes (see discussion in Chapter 2).

Addressing these systemic gaps will start to overcome fundamental negotiating obstacles, particularly the widely-held opposition among developing countries to mitigation actions, as they could constrain economic development and poverty reduction. Furthermore, addressing these systemic gaps and pursuing well-designed REDD mitigation policies also creates synergies with adaptation. In addition to the generally weak treatment within climate policy of EGS as a co-benefit of mitigation measures, mainstream climate policy has also overlooked the converse; the climate adaptation co-benefit of EGS. Below, these key gap elements are analysed in greater detail.

Climate policy instruments for REDD investments are nascent
Strengthening the nascent market for forest carbon credits has the potential to radically alter the current system of market incentives for EGS degradation through deforestation (Ebeling and Yasué, 2008). However, the experience with forest carbon credit instruments is quite limited.

Currently, only afforestation and reforestation LULUCF projects are eligible for credits under Kyoto's Clean Development Mechanism. Even these credits, however, are not recognised in the European Union Emission Trading System. The exclusion of LULUCF credits from the European System has sharply limited project development, and only eight LULUCF projects have been approved under current CDM methodologies, at the time of writing.[3]

The agreed LULUCF carbon accounting framework is likely to be made more rigorous. However, most of these activities are likely to remain voluntary, as mandatory carbon accounting across all forest and agricultural ecosystems appears neither politically nor technically feasible.

Despite the increasing levels of interest and activity in REDD, a great deal of confusion still surrounds the concept. Stakeholders across the spectrum have differing levels of comprehension about REDD, and differing ideas about what REDD could and should be. This confusion is beginning to lead to unrealistic expectations about both positive and negative impacts of REDD, opportunistic land speculation by investors, and simplistic assumptions about REDD implementation – an issue that is explored further in the next section.

Deforestation dynamics are context-specific and typically linked to agriculture
Deforestation is frequently blamed on poor farmers nibbling at forest margins or on massive commercial logging concessions. But the factors driving deforestation are highly diverse and depend on geographical, socio-economic and political context (see Chapter 2). In forest-agriculture mosaic landscapes, where deforestation rates and biodiversity values are both high, Chomitz argues that the key poverty and environmental challenges are interwoven – namely managing landscapes for agricultural production and EGS simultaneously (Chomitz, 2007). The governance challenge, in turn, lies in establishing and enforcing secure local (and particularly collective) tenure over land, trees and, crucially, ecosystem services.

In terms of market pressures alone, carbon finance could dramatically change the picture of forest conversion. Converted forest land often has low value for agriculture anyway, either because of limited productivity or inaccessibility, but deforestation may release as much as 500 tonnes of CO_2/ hectare. Tomich *et al*. (2005) analysed data from Cameroon, Brazil and Indonesia, and observed that a carbon price of 3 USD/tonne would provide better returns than agriculture, for a large range of typical land-use systems on deforested land. However, this simple market analysis ignores the complications of government subsidies for agricultural colonisation (as in some parts of Brazil or Indonesia), or of tax and investment credit distortions, and also assumes that efficient mechanisms could be developed to ensure that smallholder farmers or forest dwellers actually received the bulk of the market value for avoided deforestation, rather than having these amounts skimmed off by middlemen, governments or large property owners.

But it may be difficult for REDD incentives to alter the behaviour of quasi-legal forest migrants who simply occupy, log and farm forest lands. Because their land-use rights are not registered or formalised until the forest is gone, and their claims often conflict with those of other forest users, there is no simple way in which they can capture the benefits from payments for forest preservation. Hence, this important group of users, in particular, has little chance of benefiting from forest conservation. In summary, successful REDD policies require careful attention to local socio-economic and institutional context, and to the ways that these factors create incentives for deforestation (see also discussion in Chapter 2).

Systemic disinvestment in rural development and agriculture
Agriculture has received limited attention in development and global environmental policy for decades, but there are signs this may be changing. In 2008, for the first time in 25 years, the topic of the World Bank's annual World Development Report (WDR) was agriculture. The report documented the precipitous decline in official development assistance to agriculture and rural development since 1980, 'all the more striking because it happened in the face of rising rural poverty' (World Bank, 2007a, p42). ODA directed to agriculture declined from 18% of total ODA in 1980 to 3.5% in 2004, and declined by more than 50% in absolute terms. The WDR offered a number of reasons for the drop in agricultural and rural development assistance: falling international commodity prices that undermined agricultural profitability, increased competition for limited ODA from social sectors, large emergency response commitments to numerous humanitarian crises, opposition from agri-business

3 http://beta.worldbank.org/climatechange/news/uganda-registers-first-forestry-project-africa-reduce-global-warming-emissions. Accessed September 2009.

in donor countries to strengthening the competitive position of developing country producers in export markets, and opposition from some environmental groups who perceived agriculture as an environmental villain.

The WDR also cited widespread, 'agro-scepticism' among donor countries which had funded large-scale integrated rural development schemes in the 1970s, with little success. The result has been a steady erosion of investment in agricultural research, extension and rural services to support agriculture in most developing countries (IAASTD, 2009).

Since 2001, however, the World Bank has tracked increased policy interest (if not funding commitments) to agriculture, attributable to higher commodity prices, a higher priority to agriculture asserted by developing countries, and greater success with agricultural development models based on decentralisation, participation, and public-private partnerships. This growing policy interest peaked with the High Level Conference on World Food Security held in Rome, in June 2008. This multilateral meeting identified several urgent measures needed to strengthen the agricultural sector, including a people-centred poverty reduction policy framework oriented to investment in agriculture and rural livelihoods; building resilience of food production systems to climate change, in part through maintaining biodiversity; and efforts by governments to ensure that poor smallholders, fishers and indigenous people can benefit from international investments in climate mitigation and adaptation (IISD, 2008).

Institutions and governance mechanisms to ensure local benefits
Forest peoples' organizations and rights groups have pointed out that benefits from REDD are likely to be captured by intermediaries or large land owners, further impoverishing marginalized forest dwellers, unless stronger institutions for tenure and access rights are put in place (The Forest Dialogue, 2008; Griffiths, 2009). While it is promising that REDD offers an alternative market value for intact forest ecosystems, this value can only be secured over the long term if economic benefits are realized by forest dwellers and indigenous peoples. If REDD cannot generate income for poor forest dwellers, they will still be forced to log or cut forests for their livelihood, threatening the viability of the concept. There is also a risk that increasing the commercial value of standing forests, without securing the tenure rights of marginalized local people, will lead to their eviction from their traditional forest lands so that corporate interests can profit from REDD transactions. As explained in Chapter 2, these outcomes weaken local management mechanisms, would compromise both the intent and the effectiveness of REDD, and limit its ability to deliver EGS.

4.4 Priority issues and opportunities

To better integrate EGS into climate policy, there are three main opportunities:

- Recognition of the role of agricultural practices and land-use management more broadly in climate mitigation policies;
- Recognition of the linkages between agriculture and forest carbon sequestration in REDD;
- Integrating Ecosystem-based Adaptation into climate policies and adaptation planning and finance.

These three areas are closely linked, and because of their synergies with local livelihoods and poverty reduction in poor rural areas, they can be addressed in a way that also strengthens benefits for developing countries.

Recognition of the role of agricultural practices and land-use management

Scherr and Sthapit (2009) argue that greatly increased agricultural investments are not only essential for resolving food insecurity, but also for climate policy. They claim that only through land-use management can we achieve the potential for large-scale removal of GHGs by photosynthesis. The most important climate-friendly agricultural strategies are enriching soil carbon, farming with perennial crops, improved animal husbandry and manure management, natural habitat protection, and degraded watershed and rangeland restoration. Essentially, these are strategies for strengthening EGS.

Practices that increase the carbon content in the soil will increase fertility. This can lead to better water retention and decreased erosion, which leads to higher yields and better drought resilience (UNCTAD-WTO). Besides the provision of food, agricultural mitigation practices enhance other EGS by improving water quality, reducing water consumption, improving air quality, improving biodiversity, conserving energy, as well as preserving the landscape's aesthetic value (Smith *et al.,* 2007). These additional benefits will be realised on farms through more efficient operation, but also at a regional level.

The agricultural practices necessary to support climate policy are also entirely consistent with the agro-ecological intensification needed to reduce REDD project leakage risk:

> Climate-friendly farming and land use that involve carbon sequestration do not significantly increase farmer's costs of production. Investing in agroforestry practices in settled farming systems is far more likely to take land-clearing and harvesting pressures off of any nearby natural forests. Enhancing soil carbon in agricultural fields will typically increase crop yields and farm income, enabling farmers to use less land for the same production and to avoid land-clearing (Scherr and Sthapit, 2009, p28).

The IPCC Fourth Assessment Report largely reached the same conclusions, and noted that well-designed agriculture and forestry projects had a high potential to contribute to sustainable development and poverty alleviation, increase EGS stocks and flows, and simultaneously help adaptation to the impacts of climate change (IPCC-WGIII-SPM, 2007, p21). Unfortunately, the perception that forestry and agriculture are stagnant sectors with weak institutions undermines the potential to reap these complementary benefits – a situation exacerbated by the decades-long disinterest and disinvestment of official development agencies (see discussion above).

Scherr and Sthapit argue that the required institutional capacity largely already exists in rural development agencies, farmers' organisations, NGOs, and private agricultural service providers. Tapping into these heterogeneous systems will be challenging but essential for climate policy to benefit from the hard-won lessons of the last 50 years of rural development practice: decentralised, participatory projects, scaled-up horizontally, have the greatest prospects for durability and success. Engaging these diverse groups in strengthening agro-ecosystems through climate policy also expands the range of organisations, countries and individuals with an active stake in climate mitigation.

Benefits for rural development in poor countries help to build political support for these climate mitigation investments among countries that otherwise have little direct interest in mitigation. The high potential for synergistic effects provides an argument for prioritising carbon investments in areas where poverty reduction and productivity gains can be realised.

Recognition of the linkages between agriculture and forest carbon sequestration

There are similar co-benefits from forest carbon programmes. Many argue that the carbon market, in many cases, can 'tip' the balance of economics in favour of forest conservation. An effective market-based regime for REDD could also mobilise significant resources for the rural poor to help lift them out of poverty and into sustainable livelihoods. At the same time, it would enable least-developed countries to capture an important market opportunity from the global carbon trade while helping Europe and other industrialised countries lower compliance costs (Butler, 2008). As explained in previous sections, REDD thus offers simultaneous opportunities to strengthen EGS, development and global carbon sequestration, if it can be implemented effectively.

One crucial co-requisite to carbon financing for forest protection is intensified production of food and timber on degraded lands or currently cultivated lands, to reduce leakage risk. The climate policy discourse describes this issue as a methodological concern around comprehensive carbon stock accounting. But to poor farmers, the leakage concern reflects a major and increasingly urgent development challenge. How can improved technologies, extension and financial support be mobilised to help farmers build sustainable agro-forestry systems to increase returns and to deliver food, fuel, and fibre without damaging protected forests? Essentially, low cost carbon forestry offsets are technically feasible to meet global EGS / carbon needs, but are unlikely to be realised in practice without a concurrent investment in strengthening local agro-ecosystems and their related rural services (IAASTD, 2009). In order to harvest the 'low-hanging fruits' for climate mitigation from forest ecosystems through REDD, investment is also needed in agricultural EGS.

The Convention on Biological Diversity's *ad hoc* technical expert group (AHTEG) on climate change and biodiversity arrived at similar conclusions. The AHTEG final report was made available to the UNFCCC COP-15 in Copenhagen, and is an attempt to influence negotiations towards more ecosystem-based climate solutions (CBD Secretariat, 2009b). The report's main messages, based on extensive research, point to actions which could result in synergistic positive effects both for climate change at the global level and for ecosystems and livelihoods at the local level. The report emphasises the importance of conserving primary forest, for both carbon and biodiversity benefits, and suggests ways to restore forest cover and improve land management in areas already deforested.

The generally low profile of agriculture and its ecological and sustainable development co-benefits within the climate policy discourse is belatedly being addressed. The FAO has alerted UNFCCC negotiating parties that a crucial opportunity may be lost to link the large technical potential of agricultural mitigation with increased food productivity, food security, resilience and adaptation co-benefits, if the terrestrial EGS (both of agriculture and forestry) are not included in a post-2012 climate regime.[4] In addition to the FAO, other major organisations with REDD-Agriculture initiatives are the ASB Partnership for the Tropical Forest Margins, which operates as a system-wide programme of the Consultative Group for International Agriculture Research (CGIAR),[5]

4 http://www.fao.org/forestry/foris/data/nrc/policy_brief_sbstabonn.pdf
5 http://www.asb.cgiar.org/blog/?p=1077

Text box 4.2 Six principles for tapping the potential of land-use mitigation

1. *Include the full range of terrestrial emission reduction, storage and sequestration options in climate policy and investment.*
2. *Incorporate farming and land-use investments in cap-and-trade systems.*
3. *Link terrestrial climate mitigation with adaptation, rural development, and conservation strategies.*
4. *Encourage large, area-based programmes that are integrated across sectors. Using landscape or watershed frameworks for planning can better ensure ecosystem management links to development, territorial management, agriculture and energy strategies.*
5. *Encourage voluntary markets for greenhouse gas emission offsets from agriculture and land use, and monitor outcomes.*
6. *Mobilise a worldwide, networked movement for climate-friendly food, forest, and other land-based production and their products. This can build support and market pressure for reforms from both the production and consumption end of the value chain.*

From: Scherr, S. and S. Sthapit. (2009). Mitigating Climate Change through Food and Land Use. Washington, D.C., Worldwatch Institute. Report 179.

and Ecoagriculture Partners, an NGO partnership pursuing conjoint biodiversity, productivity, and rural livelihood benefits in agricultural watersheds.[6]

In addition, the backdrop of COP15 negotiations served to highlight the announcement of a new Global Research Alliance on Agricultural Greenhouse Gases, or GRA, involving strengthened collaboration on research, development and extension including 20 countries and estimates of hundreds of millions of research dollars so far. Most of the founding members are OECD countries, but developing country members include India, Chile, Ghana, Colombia, Uruguay and Vietnam (USDA 2009).

> *The GRA will focus on research, development, and extension of technologies and practices to grow more food (and more climate-resilient food systems) without growing greenhouse gas emissions. This will be accomplished through partnerships among researchers in participating countries with the purpose of developing new knowledge and technologies that can be transferred to farmers and other land and resource managers around the globe. Anticipated products of the worldwide scientific collaboration include cost-effective and accurate ways of measuring greenhouse gas emissions and carbon stored in soil; new farming practices that reduce emissions and increase carbon storage in farmland in different countries; and farming methods that sustain yields while helping to mitigate climate change.* (USDA 2009)

The GRA announcement signifies the higher profile of agriculture generally at the Copenhagen negotiations. An agriculture-specific negotiating text was developed by the negotiating group on sectoral approaches, which emphasizes climate change and food security issues, as well as the significance of traditional knowledge. Nonetheless, the expert community expressed dismay, "at the immensely unequal attention that forestry and agriculture have received in the UNFCCC context, dealing both as they do, with similar issues related to land use, carbon sequestration functions and emissions" (ICTSD, 2009).

Integrating Ecosystem-based Adaptation

Ecosystem-based Adaptation provides another opportunity for strengthening climate policy and local livelihoods by strengthening EGS. While adaptation commitments were formally placed on the UNFCCC agenda, in Bali, during COP 13, there have been few agreements for implementing adaptation actions and financial support.

The connections between local EGS, poverty reduction and climate policy provide opportunities to build greater political support for global climate action among developing countries. However, in order to develop practical mechanisms for implementation of this more inclusive climate policy framework, local resource users and ecosystem managers need to be more involved. Just as successful climate change mitigation is very unlikely without forestry, solutions to deforestation or adaptation are very unlikely without the support of local resource users. For example, establishing and enforcing legitimate tenure rights to forestland, and negotiating the respective rights and responsibilities of tenure holders, communities and loggers, is key to effective deforestation prevention strategies (Parker, 2008).

From a developed-country perspective, EGS-positive climate policy is a combination of ODA targeting rural institutional capacity development for sustainable agriculture, agro-forestry and sustainable forestry coupled with a commitment for commercial purchase of the verified carbon credits created by this style of rural development programming. The distinction between ODA institutional support and carbon project finance is important, because a long-standing principle in international carbon finance is that ODA not be used to finance carbon credit purchases. Civil society must consistently communicate to governments in the North and South about the logic and the specific tools needed to realise the EGS opportunity in climate policy.

Other Opportunities for incorporating EGS in climate policy initiatives

The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD) is a collaborative initiative between the FAO, the UNDP and the UNEP, to support the implementation of the REDD programme in developing countries. A multi-donor trust fund was established in July 2008 that allows donor countries to pool resources and provides funding to support a variety of UN-REDD activities, especially assessment of deforestation drivers and the needs of local and indigenous peoples. The UN-REDD programme also assists in the development of rigorous forest conservation verification systems, and payment options (UN Department of Public Information, 2008).

The World Bank Forest Carbon Partnership Facility (FCPF) was established in September 2007 to assist developing countries and to jump-start a practical forest carbon market that provides incentives for conserving forests (World Bank, 2007b). The facility consists of two components: A 100 million USD Readiness Fund will provide grants to help developing countries to build technical, regulatory and sustainable forestry capacity to reduce emissions from deforestation and degradation, especially in terms of setting up systems and processes to monitor and govern their forests. Several countries will also be able to sell emission reductions to a special 200 million USD Carbon Fund supported by industrialised countries and private sector organisations.

4.5 Tools for mainstreaming

The mainstreaming tools for increasing EGS benefits through climate policy are a function of the specific LULUCF and AFOLU mechanism, negotiated for the post-2012 period, however, several general observations are clear.

Shared knowledge building. The IPCC could play a leading role, establishing the EGS co-benefit of linking forestry and agricultural from a terrestrial ecosystem management perspective. The IPCC has produced technical papers and special reports on Land Use, Land-Use Change and Forestry

6 http://www.ecoagriculture.org/index.php

(Watson *et al*., 2000), Biodiversity (Gitay *et al*., 2002), and Water (Bates *et al*., 2008). An authoritative IPCC special report that would focus on EGS co-benefits, such as mitigation-adaptation synergies, rural development, poverty alleviation and the empirical analysis of successful policy measures, would be an invaluable contribution to the discourse.

Various *mapping tools* are being developed to support site selection for REDD projects by identifying areas that are rich in both carbon and biodiversity (Trumper *et al*.; UNEP-WCMC, 2008). The UNEP World Conservation Monitoring Centre's *Carbon and Biodiversity* Demonstration Atlas, for instance, includes regional and national maps for six tropical countries, showing where areas of high carbon storage coincide with biodiversity hotspots. Such tools can assist the development of projects that could achieve both climate and local ecosystem benefits.

Development of common standards and measures. A crucial problem in both the REDD programme and agriculture offsets is with the development of standards and measures that are widely accepted and verifiable to ensure carbon markets will function efficiently. Foundational work can build on the Voluntary Carbon Standard (VCS), released by a collaborative private-sector group including the World Business Council for Sustainable Development, in November 2007[7].

The VCS Programme provides a global standard for approval of credible voluntary offsets. VCS offsets must be real (have happened), additional (beyond business-as-usual activities), measurable, permanent (not temporarily displaced emissions), independently verified and unique (not counted more than once to offset emissions). The VCS includes Agriculture, Forestry and Other Land Uses (AFOLU) in the list of eligible project activities and provides standards to manage non-permanence risks. Eligible activities include:

- Afforestation, Reforestation and Revegetation (ARR);
- Agricultural Land Management (ALM);
- Improved Forest Management (IFM);
- Reducing Emissions from Deforestation and Degradation (REDD).[8]

The Climate, Community and Biodiversity Alliance, a partnership among research institutions, corporations and non-governmental organisations, has also developed standards for evaluating land-based carbon projects. The CCB Standards identify land-based climate change mitigation projects that simultaneously generate climate, biodiversity and sustainable development benefits. They include criteria that address local community and poverty reduction objectives, as well as biodiversity, while encouraging innovative project design. The standards have been field-tested on a range of projects in numerous countries, and applied to more than 16 funded projects (CCBA 2008).

7 http://www.v-c-s.org/about.html

8 http://www.v-c-s.org/afl.html

4.6 Key findings and recommendations

Despite the scope of issues that remain to be resolved, the growing willingness of parties to acknowledge the important role played by forests and other ecosystems is a very important development for climate mitigation, and for EGS more generally (Prickett, 2008). Against this backdrop, we highlight several key conclusions for better integrating EGS considerations into these climate policy developments.

Carbon market-based funding is a critical source of financing forest ecosystem conservation. Given the enormous size of the carbon market relative to continually dwindling public finances, a REDD regime, for the first time, offers a market-based tool that could create economic values for standing forests that rival the existing market alternatives, that is, timber, plantation forests and agriculture (Davis, 2008). An effective REDD regime, therefore, is a potential, international key policy tool for strengthening forest ecosystem services. A caveat on this potential is that implementation would need to incorporate stronger forest governance and local management institutions to assure benefits to forest dwellers.

REDD policy development has paid insufficient attention to the agricultural sector. In order to successfully reduce or avoid deforestation, agricultural production in the forest marginal areas, or in forest mosaic landscapes, will have to be significantly improved. Agricultural intensification based on more sustainable production systems will help boost productivity for farmers, reducing the need for additional forest clearing and preventing REDD leakage. There is significant potential here for building adaptation co-benefits through strengthening both forest and agricultural ecosystems.

Ecosystem-based Adaptation could play a significant role in climate adaptation policies. Strengthening ecosystem goods and services at the local level can help buffer climate change impacts, such as floods, droughts, storms, temperature increases and increased climate variability.

Based on these key conclusions and the discussions and examples presented in this chapter, we suggest some preliminary recommendations for better integrating EGS into climate policy.

- Clean Development Mechanism rules for afforestation and reforestation should be reformed in the post-2012 regime, to build synergies between climate mitigation and EGS. By strengthening local institutions, certification and national oversight to support long-term forest EGS, mitigation benefits can be more secure. Similarly, there are opportunities for increasing forest cover in Annex-1 countries that cannot be achieved under current restrictions.
- Enhance REDD capacity at the national level. Developing countries which have the greatest potential to contribute to global REDD activities, currently have limited capacity to monitor compliance in terms of deforestation rates and emissions. Creating the infrastructure to support REDD programmes and address the rights and roles of all relevant stakeholders impacted by REDD programmes,

will require sustained support, as well as building shared knowledge and experience. At the same time, participating countries should commit through sustained political will to address issues of collective tenure and co-management to ensure that local people benefit and are able to incorporate REDD activities into long-term forest planning.

- Develop capacities, processes and institutions to support the application of ecosystem-strengthening practices that can be funded by climate change policy mechanisms. The approval of international policies that support ecosystem-based mitigation and adaptation is not sufficient for these to be implemented effectively. In general, four areas of institutional capacity development are necessary, involving the engagement of civil society, governments and other stakeholders in the development of new technical innovations and engagement processes. Firstly, development agencies should provide major investment in rural development capacity to enable EGS in support of climate policy. Second, mitigation projects in the forestry and agricultural sectors must focus on sustainable agriculture and forest management practices. Thirdly, carbon-market or voluntary portfolio standards need to ensure that sustainable agricultural credits are valued appropriately. Finally, all parties need simple and transparent monitoring mechanisms that show not only carbon and ecosystem outcomes, but also institutional processes and social impacts on the ground. Carbon market benefits need to be shown to flow through to impoverished resource users as a direct incentive for changing resource use practices.

5 EGS and international trade policies

- The impact of trade policy measures, including tariffs and non-tariff measures like intellectual property rights and standards, on ecosystem goods and services will depend on how and in which context the measures are applied. International trade policy plays an important role in setting the framework for their application, and, thereby, influencing the resulting EGS impacts.
- Opportunities for mainstreaming EGS considerations into international trade policy exist in the context of the WTO (for example subsidy reform for agriculture and fisheries or Trade Related Intelectual Property Rights in relation to CBD), bilateral and regional free trade agreements and multilateral environmental agreements. While some progress has been made in these fora, environmental considerations remain an add-on rather than an integral part of trade policy-making.
- The EGS approach can be useful in mobilising political interest in mainstreaming environmental considerations in trade policy, by helping to strengthen the economic argument for environmental protection and allay fears among developing countries over Northern protectionism.
- Promising tools for mainstreaming EGS considerations into trade policy include sustainability impact assessments (provided the findings are indeed implemented), EGS markets (such as carbon credits or tradable pollution allowances) and improved coordination mechanisms between multilateral trade and environment fora.

5.1 Why are EGS important to the trade policy domain?

Policies that seek to stimulate or regulate trade, where they lead to increases in, or changes to, the nature and location of economic activity, will almost inevitably impact the delivery of EGS. In theory, trade liberalisation should shift production to locations where it is most efficient. In practice, market distortions, such as the failure to internalise environmental costs (e.g. arising from air and water pollution) in the cost of production, might lead to production being located where direct costs, but not necessarily broad economic and social costs, are the lowest. Trade policy measures contribute to these distortions by shaping the location, volume and type of production and trade (see also 2.2 for expected trends in changes in EGS as a consequence of trade liberalisation).

Interactions between trade policy measures and EGS are complex and context-specific. Impacts can occur at all stages of the life cycle of production, including raw material extraction and cultivation, manufacture, distribution, use and disposal. At the most basic level, trade liberalisation is likely to change the structure of economic activity with consequent impacts on EGS delivery. Increased wealth generated by trade can lead to positive environmental outcomes, by freeing financial resources and increasing demand for environmental protection. At the same time, associated increases in consumption levels can cause negative impacts, such as increases in resource use and environmental impacts of moving goods around

As elaborated below, specific trade policy measures can have both positive and negative impacts on EGS delivery. The application of some trade measures can lead to unsustainable production, such as subsidies that result in overfishing. Other trade measures, such as incentives or certification, can be used to encourage EGS-supportive production and behaviour. EGS management can also provide new trade and business opportunities, such as the development of new technologies or the creation of new markets for EGS (e.g. carbon trading). Moreover, trade can serve as an adaptation mechanism as EGS change or shift (e.g. due to climate change) often faster than the economy can adjust.[1]

1 One example of this is the use of trade to deal with water scarcity, such as water-scarce countries importing water-intensive agricultural goods.

Just as trade policies can impact EGS delivery, changes in EGS can have significant economic and trade implications. Indeed, trade in many commodities depends on EGS functions. Unsustainable use of natural resources encouraged by trade liberalisation, such as fisheries or timber, for instance, can undermine the long-term sustainability of related industries. Competition for energy and water can weaken other areas of economic activity, while increased pollution can have negative effects on workers' health and, consequently, on productivity. On the positive side, EGS management can provide new trade and business opportunities, such as the development of new technologies or the creation of new markets for EGS (e.g. carbon trading).

5.2 Linking EGS and trade policy measures

The trade policy tools of particular interest in the EGS context include tariffs, non-tariff measures and subsidies. A full appreciation of the impacts of these measures on EGS delivery will require assessing impacts along the entire supply chain, including the 'winners' and 'losers' at different stages of the chain, and for the chain as a whole (for example, increased pollution from transporting goods may be outweighed by EGS gains at the production level, but those being affected by the pollution may not be the ones receiving the benefits of the production gains). In addition, the impacts of an individual trade measure on changes in production/trade patterns and EGS cannot be assessed in isolation. For instance, while tariff reductions, in theory, may stimulate production of a certain good, producers may not be able to take advantage of market opportunities if they cannot meet export market standards or compete with subsidised products.

Moreover, in most cases, EGS impacts will be side effects of trade policies rather than the explicit aim, making it challenging to establish causality between such policies and EGS delivery. Besides, multilateral trade policies generally regulate the use of domestic trade policy measures, rather than prescribing them, which adds another layer of complexity when assessing the linkages between international policy and EGS delivery in the trade context (trade measures adopted under MEAs are a notable exception – see below).

Bearing these caveats in mind, some general observations can be made.

Tariffs can influence production location, types and volumes (Text box 5.1). Low tariffs on certain fish products, for instance, might lead to an increase in fishing effort and trade, which, in turn, will impact the availability of fish as food in both exporting and importing countries. Increased aquaculture production for exports in response to low tariffs might result in loss of mangrove forest and consequent impacts on flood control and nutrient cycling. Note that trade policies permitting market access do not determine the EGS impacts of the production process. The example of Mekong catfish production, which has exploded on the basis of market access, demonstrates that rapid export growth can be sustained up to a high level with suitable inputs and production practices (Phuong and Oanh, 2009; see Chapter 2). Low import tariffs on inputs (e.g. cotton for garment manufacturing) might stimulate an expansion of processing activities with associated changes in water and energy consumption as well as air and water pollution. Tariff escalation[2] for processed timber products in export markets might encourage exports of logs and, thereby, put pressure on forest resources, due to the low value received for the exports.

Non-tariff measures (NTM), such as food safety standards, rules of origin requirements or import licenses, will also impact EGS delivery, in both the exporting and importing countries. Documentation requirements at the border, for instance, can be used to ensure the legality and/or sustainability of imports. For example, exporters of endangered species regulated under the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) are required to submit a permit at the border to show that the specimen was legally obtained and that the export will not be detrimental to the survival of the species. Similarly, under the EU regulation to combat illegal, unreported and unregulated fishing, anyone wishing to import fish into the EU has to submit a catch certificate to show that the fish was caught legally.

NTMs can also be used to address global EGS. Border tax adjustments, for instance, have been proposed in the climate-change context. Imported goods would be taxed at the border to reflect the cost of the emission trading in the country of import, thereby levelling the playing field between domestic producers (who are required to pay for their greenhouse gas emissions) and their foreign competitors (if they are not). Under the Montreal Protocol, restrictions on trade in ozone-depleting substances (ODS) and products that contain or are made with ODS were adopted as part of the international effort to halt the depletion of the ozone layer.

Using mandatory NTMs, which aim to address environmental impacts outside a country's jurisdiction, have proven controversial at the WTO, in particular, where they are not implemented in the context of a multilateral initiative, such as an MEA. More commonly, these standards are voluntary and, thus, EGS impacts occur where countries choose to comply with them. For instance, national organic standards in the EU will impact production methods used by farmers wishing to label their agricultural exports to the EU as 'organic'. Such voluntary standards are increasingly being set by retailers and processors, as well as private certifiers, through various labelling schemes.

In addition, standards are used to address human, animal and plant health in the importing country with consequent impacts on EGS. Requirements to fumigate wood packaging before entering a country, for instance, aim to prevent the introduction of alien invasive species that may harm local ecosystems. Import restrictions on animals from certain countries or regions that may carry infectious diseases are meant to protect domestic livestock and wildlife. While such measures are generally implemented at the national level,

2 Higher tariffs on processed goods than on the raw materials from which they are produced.

they are often based on internationally agreed standards negotiated under the auspices of the international standard-setting bodies.

Intellectual property rights (IPR) are another NTM that can affect EGS delivery in a number of ways. IPR will influence the development, diffusion and use of technologies that may harm or support EGS delivery. Their actual role in this context is contentious. Some have argued that strong IPR are needed to stimulate innovation and technology transfer. Critics contend that IPR can hinder the diffusion and adaptation of technologies, including those that may improve EGS delivery. In the agricultural context, IPR have also been blamed for stimulating the development and expansion of large-scale monoculture crops, thereby eroding agricultural biodiversity and other related EGS.

Text box 5.1: Deforestation in Brazil – Tariffs, subsidies and soy

Rapid soy expansion has been one of the key drivers of deforestation in Brazil. A number of trade-related policies implemented by Brazil and its trading partners have contributed to this expansion. Establishing the actual impacts of trade policies on EGS is inherently challenging, given the many other factors that have influenced the extent and nature of soy expansion in Brazil. Understanding these interactions, however, is crucial to adjust trade measures and design supporting policies for forest and agricultural management in Brazil that can help to promote positive EGS outcomes.

Soy production in Brazil has grown at a remarkable speed, expanding from just 640 ha in 1941 to 21 million ha in 2007. The global and domestic feed industries are the main markets for Brazilian soy. Brazil is a major supplier of feed to the global market, as the second largest producer and exporter of soybeans and soybean products, after the United States. A growing share of soybean meal and oil production is going towards domestic use, including the expanding pork and poultry industries. Brazil itself is a major meat producer, and, since 2004, has overtaken the United States as the world's largest exporter. Some of the key export markets include the EU, Japan, Russia and Hong Kong.

The expansion of soybean cultivation has had significant impacts on EGS in Brazil. It has contributed to deforestation, both directly where farmers have cleared land to farm soy, and indirectly by pushing cattle pastures further into the forest. In the south, soy is grown mainly in areas formerly covered with Atlantic Forest, and the crop is also expanding into the Cerrados, and more recently the Amazon. Deforestation and land clearance for large-scale agriculture, in turn, have led to habitat and biodiversity loss, soil erosion, and pollution from pesticides.

As the world's largest importer of feed ingredients, the EU is an important market for Brazilian soy. Protein supplements are in high demand from Europe's industrial meat producers, in particular, since the BSE crisis which saw producers search for alternatives to bone meal for feed. Because of natural conditions, the EU does not have the capacity to produce sufficient amounts of protein feeds and, therefore, relies on imports to meet this demand. Brazil and Argentina have become the main sources of soy for the EU, accounting for close to 90 per cent in 2006.

European trade policies have been cited as some of the drivers for soy expansion in Brazil. To promote its domestic meat industry, the EU applies a zero per cent import tariff on soybeans and 4.5 per cent on soybean meal. At the same time, the domestic cereal and meat producers are protected by tariff-rate quotas and comparatively high import duties. This tariff structure is thought to have contributed to encouraging production and export of soybeans from Brazil while limiting exports of higher-value processed soybean and meat products.*

Moreover, several economic policies in Brazil have helped to promote export-oriented soybean expansion. The Brazilian Government has been supporting soy production since the 1960s – both directly and indirectly – as a means of generating foreign exchange earnings, for example, through financial support and infrastructure development. Moreover, the Brazilian Kandir Law (1996), which grants tax exemptions for exports of raw materials, provides an incentive for exporting raw soybeans, thereby discouraging producers from increasing returns through value-addition rather than production expansion.

US subsidies for corn-based ethanol have also been blamed for driving deforestation in Brazil. By encouraging US soy farmers to switch to corn, the subsidies have reduced soy supplies, thereby, pushing up soy prices, which, in turn, has stimulated cultivation expansion in Brazil to fill supply gaps and profit from the high prices. At the same time, substantial subsidies granted to US soy producers have depressed global prices (until recently, at least) which, in turn, may have slowed down soy expansion in Brazil (while driving soy expansion in the United States, with consequent impacts on EGS).

Much of the needed analysis and policy changes will have to happen at the national level. International policy processes, notably the WTO negotiations, can support this process by providing a forum for reducing tariffs in line with sustainable development objectives, including tariff escalation, and tackling agricultural subsidies at the multilateral level, which may not be politically feasible through bilateral negotiations. The WTO dispute settlement system also has proven useful in addressing subsidies. Brazil has already successfully challenged certain US cotton and EU sugar subsidies at the WTO, and, together with Canada, has initiated a dispute against other US agricultural subsidies, including those of energy (ethanol) and soy.

** Tariffs on cereals have been suspended since 2007 in response to high feed prices (at least until June 2009).*

Sources: Dros (2004), Goldsmith & Hirsch (2006), Laurance (2007), WTO (2009) and FAO Stat (accessed 20 May 2008).

Subsidies may have both positive and negative impacts on EGS delivery. For instance, financial support that increases the capacity of fishing fleets (in the absence of an effective management system) can lead to overfishing, reduce the availability of fish for food and affect ecosystem health. Coastal wetland ecosystems are also vulnerable to conversion to aquaculture when the high initial costs are subsidised through government credit programmes (see Chapter 2). Certain agricultural subsidies may encourage large-scale land conversion and displace low-input small-scale farmers who are unable to compete with their subsidised competitors. At the same time, subsidies can be used to promote environmentally friendly practices, such as subsidies for certain types of fishing gear that reduce by-catch levels.

Taken together, these measures will shape not only the production but also the movement of goods which, in itself, will impact on EGS delivery, such as pollution from transportation, habitat loss to make way for transport infrastructure, or the unintended introduction of invasive species through trade routes.

5.3 Policy tracks and gaps

The use of trade measures is regulated internationally through agreements adopted by the World Trade Organization (WTO) and international standard-setting bodies, as well as in bilateral and regional free-trade agreements. While EGS specifically have not been widely discussed in these processes, many of the environment-related issues that are slowly making their way into trade debates will have a bearing on EGS delivery. Trade measures are also used to promote MEA objectives which are often (though not always explicitly) linked to EGS.

WTO agreements and negotiations

At multilateral level, the WTO is the main forum for regulating trade policy measures. Initially it was known as the General Agreement on Tariffs and Trade (started in1947). Negotiations in the early decades focused on liberalising trade through tariff reductions. Environmental considerations were included in the GATT by providing countries with the flexibility to adopt measures that contravene WTO rules if they are necessary to protect human, animal and plant life, or health, or to conserve exhaustible natural resources, provided that they are non-discriminatory and do not present disguised barriers to trade.[3]

Since the Uruguay Round of trade talks that culminated in the establishment of the WTO in 1994, the scope of multilateral trade rules has broadened increasingly to include other aspects of international trade, such as the use of standards, border measures, trade-related intellectual property rights and subsidies. The Agreement Establishing the WTO 1994 for the first time includes references to sustainable development, stating that trade liberalisation should allow for the 'optimal use of the world's resources in accordance with the objective of sustainable development'. A number of WTO agreements regulate the use of tariffs, subsidies and non-tariff measures:

As part of the Uruguay Round, countries have bound (i.e. fixed the maximum level of) many of their tariffs for agricultural and industrial goods. The tariff levels and number of bound tariff lines varies between countries. Countries are free to apply lower tariffs than bound rates and often do so.

The WTO agreements cover both agricultural and industrial subsidies, although under different agreements[4]. The Agreement on Subsidies and Countervailing Measures disciplines the use of subsidies and regulates the actions countries can take to counter the effects of subsidies. The Agreement originally exempted certain environmentally motivated subsidies, but this exemption has now lapsed. The Agreement on Agriculture sets out special rules for agricultural subsidies. It permits so-called 'green box' subsidies, these are, subsidies that do not, or only minimally, distort trade, including support for environmental protection.

Several WTO agreements regulate the use of non-tariff measures, including those that may be motivated by environmental reasons. The Agreement on Technical Barriers to Trade deals with technical regulations and standards, including for environmental objectives, while the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) regulates the use of non-tariff measures to protect human, animal and plant health. The agreements generally recognise that countries have the right to implement such measures, pursuant to certain conditions to minimise trade disruptions and avoid protectionism.

Also, as a result of Uruguay Round, the international standard-setting bodies have gained in importance as an international policy process that can impact EGS delivery. The SPS Agreement states that any domestic SPS measure that is based on standards adopted by the international standard-setting bodies[5] is presumed to be consistent with WTO rules. This provision has given a quasi-legal status to otherwise voluntary international standards, which has led to a shift of some of the environment-related discussions from the trade to the standard-setting fora, and has led to a greater politicisation of the standard-setting process.

The most recent WTO round of negotiations was launched in Doha, in 2001 (commonly referred to as the 'Doha Development Round'). Environmental considerations feature in various parts of the negotiating mandate. Sustainable development is the stated aim of the negotiations, and the WTO committees on development and environment have

3 Under Article XX of the General Agreement on Tariffs and Trade.

4 Which agreement applies to which subsidy is not always clear-cut, as can be shown with the example of biofuel subsidies. In the WTO context, bio-diesel is categorised as an industrial good. However, given that subsidies can have direct and indirect impacts at various stages in the supply chain (including feed production, processing and consumption), support for rapeseed oil production could be an agricultural subsidy, but could also result in a downstream subsidy for bio-diesel production (an industrial good).

5 The international standard-setting bodies explicitly mentioned in the SPS Agreement are the Codex Alimentarius Commission (food safety), the International Plant Protection Convention (ICCP, plant health) and the World Animal Health Organization (OIE; animal health).

been tasked with monitoring progress towards this end. A number of negotiating items deal with environmental issues:[6]

- the relationship between WTO rules and trade measures set out in MEAs;
- procedures for information exchange between MEA Secretariats and the WTO;
- criteria for granting observer status (including for MEAs);
- liberalisation of trade in environmental goods and services (Text box 5.2);
- rules to discipline fisheries subsidies;
- revision of rules on permitted agricultural subsidies (including those provided for environmental purposes);
- the relationship between the WTO Agreement on Trade-related Intellectual Property Rights and the CBD;
- revision of the criteria for 'green box' subsidies (including environmental subsidies) permitted under the Agreement on Agriculture.

Despite the inclusion of some environment-related negotiating mandates, environmental considerations are yet to be mainstreamed throughout the negotiating agenda, and there has been no attempt to explicitly link the negotiations to EGS. However, as noted above, outcomes in all areas can be expected to have EGS impacts. In the industrial goods negotiations, for instance, countries are considering fast-tracking trade liberalisation for forestry and fisheries products, which could have implications for natural resource use. In the agriculture negotiations, new rules on subsidies might change production patterns and trade flows with consequent impacts on EGS.

Also noteworthy in the WTO context are the rulings of the dispute settlement body, which provide guidance on the application of WTO provisions. One of the most contentious issues has been whether a country can distinguish between products based on the process and production methods (PPMs) used outside its jurisdiction, in particular if the PPMs have a negligible impact on the final product (e.g. timber from sustainably managed forests versus timber from forests that are not managed sustainably).

A number of disputes have examined how WTO rules apply to PPM-based trade measures that are informed by EGS criteria. Among the most prominent are the *tuna-dolphin* and *shrimp-turtle* cases which assessed the legality of US import bans on tuna and shrimp caught in a manner harmful to dolphins and turtles. In particular, the ruling in the *shrimp-turtle* case acknowledges that countries are free to apply measures that serve an environmental objective, even outside their jurisdiction, provided such measures are not discriminatory or unnecessarily trade restrictive. The Dispute Settlement Body rulings also suggest that voluntary requirements, as well as requirements agreed under MEAs, might be more likely to withstand a WTO challenge. It is not yet clear whether this might lead to potential trade actions against producing countries that consistently flaunt the provisions of MEAs[7]

Bilateral and regional trade agreements

While – and partly because – the WTO negotiations have been moving along at a snail's pace, the number of bilateral and regional free-trade agreements (FTAs) has grown considerably over the last decade, and, today, most trade is taking place under such agreements rather than against the tariffs agreed to by the WTO. The proliferation of trade agreements and the resulting overlaps in legal provisions are posing further challenges to assessing and addressing EGS impacts.

6 As set out in the Ministerial Declaration adopted at the IV WTO Ministerial Conference in Doha, in 2001

7 A hypothetical example might be dryland agricultural production that undermines the practices and guidelines recommended under the Convention to Combat Desertification (see issues elaborated in Chapter 2).

Text box 5.2: 'Ecosystem' versus 'environmental' good and services

The reduction in tariffs and non-tariff measures for environmental goods and services (commonly abbreviated as 'EGS' in the WTO context) is being discussed as part of the 'trade and environment' mandate in the current round of WTO talks. How to define environmental goods and services remains contentious among WTO members, but it has become clear that 'environmental' and 'ecosystem' goods and services differ considerably in their scope:

Environmental goods: Some countries, in particular, industrialised ones, favour a narrow scope (based on the definition developed by the OECD) which would focus on industrial environmental goods used for environmental remediation, such as air and water pollution control technologies and engineering consulting. Others have argued for the inclusion of so-called 'environmentally preferable products' (EPP), that is, products that cause significantly less 'environmental harm' at some stage of their life cycle than alternative products that serve the same purpose. One example of such products could be ethanol, which Brazil, in particular, is keen to see included in the trade liberalisation discussions.

Environmental services: The WTO Services Sectoral Classification outlines different types of 'environmental services', with a focus on sewage, refuse disposal, sanitation and other services. Some countries, notably those of the EU, have argued that this classification is no longer consistent with commercial reality of the environmental industry. They would like to see a shift away from services that focus on traditional end-of-pipe pollution control and remediation towards integrated pollution prevention and control, cleaner technology, and resources and risk management.

Thus, under any of the proposed definitions, liberalising trade in environmental goods and services could potentially help to promote EGS delivery (to varying degrees), for example, by facilitating access to pollution abatement technologies or environmentally friendly products.

The extent to which environmental considerations have been taken into account differs between agreements[8]. Many of the EU, US and Canadian agreements include references to sustainable development as the goal of the agreements. The United States has pushed for the inclusion of environmental side agreements and provisions in its FTAs, starting with the North American Free Trade Agreement (NAFTA) with Canada and Mexico. Some South-South agreements also include environmental language, although only to a limited extent. The Treaty of Establishment of Mercosur[9], for instance, asserts that its development goals must be achieved while preserving the environment.

FTAs, especially regional ones, may provide a useful mechanism for addressing and cooperating on EGS issues of common interest to the signatories (see also below). The agreements might also provide a forum for advancing issues that are bogged down at the international level. One such issue is the relationship between WTO rules and MEAs, which continues to be a bone of contention in the current round of WTO negotiations. Under NAFTA, the United States, Canada and Mexico agreed that MEAs shall prevail, provided that the least trade-restrictive measure available is chosen to comply with those obligations.

The flipside of this is that FTAs have provided an avenue for countries to push their interests, in particular, where the power balance is uneven, to the detriment of weaker negotiating partners and, potentially, of EGS. The link between intellectual property rights and biodiversity has been particularly controversial in this regard. The United States has been promoting TRIPS+ provisions in some of its FTAs, by requiring that plant varieties are protected by patents, and/or by committing countries to accede to the International Convention for the Protection of New Varieties of Plants, although the TRIPS Agreement does not prescribe either. As noted above, critics have raised concerns that these intellectual property systems would encourage agricultural systems that negatively impact agricultural biodiversity and associated EGS (Baumüller and Tansey, 2008).

The lack of transparency of many FTA negotiations, challenges in tracking the numerous negotiations underway at any one time, and limited opportunities for input from other stakeholders, have made it difficult to integrate EGS considerations into the negotiations. Some agreements have been assessed for their potential environmental impacts, notably those of the United States, Canada and the EU (with varying scope – see below). The EIAs have proven useful in shaping subsequent capacity building efforts based on the needs identified in the assessment. To date, the assessments have not linked the negotiations and agreements specifically to EGS delivery. South-South agreements generally do not undergo environmental impact assessments, even in countries that have gained some experience with undertaking such assessment during negotiations with the EU, Canada or the United States.

8 This section draws on: Cosbey (2007).

9 A regional trade agreement covering Argentina, Brazil, Paraguay and Uruguay.

Multilateral environmental agreements

A number of MEAs have used trade measures to promote their environmental objectives. In general, any trade-related negotiations in MEAs have proven to be highly controversial and often involve the Parties' trade ministries, with a tendency to prioritise economic over environmental interests. Nevertheless, a few examples exist where trade and environmental measures have been combined successfully, such as the permit system under CITES, restrictions on trade in environmentally harmful substances (e.g. hazardous wastes, chemicals and pesticides, and persistent organic pollutants) and documentation requirements for shipments of living modified organisms.

As noted above, trade measures adopted under MEAs, even where they aim to address environmental issues outside national borders, are likely to be accepted as legitimate by the WTO dispute settlement mechanism (with some conditions). Thus, it would be advisable for countries wishing to use trade measures for EGS purposes to include them in an MEA. However, the dispute settlement body, so far, has shied away from a systemic judgement on the relationship between WTO rules and MEAs. This issue is currently under negotiation in the Committee on Trade and Environment[10], although the mandate's scope is somewhat narrow in that it only covers trade measures in MEAs that WTO Members are Parties to[11]. Conflicts, however, should they arise, are more likely to be initiated by non-Parties.

Countries have also used MEA negotiations to push their trade agenda, which, at times, has stalled progress on other issues under discussion. The CBD is a good example of this trend. For instance, divisions among Parties on whether and how to address 'incentives' to promote the conservation and sustainable use of biodiversity have mirrored disagreements over the use of agricultural subsidies for environmental purposes (promoted in particular by the EC and opposed by the agricultural trade liberalisers, such as the United States, Brazil and Argentina). Another example is the Cartagena Protocol of Biosafety where the negotiating positions of biotech exporters were motivated by their desire to keep trade barriers (such as documentation requirements for biotech shipments) to a minimum.

The overlaps and tensions between multilateral environmental and trade regimes have come to the fore, particularly, in the context of discussions on regulating access and benefit-sharing (ABS) related to genetic resources. Negotiations are underway at the CBD to adopt an international agreement on ABS. At the same time, several developing countries (led by Brazil and India) are pushing for related negotiations at the WTO to bring the TRIPS

10 Para. 31(i) of the Doha Ministerial Declaration

11 It is still open which MEAs [MDGs?](and provisions within them) will be covered by the negotiated outcome. At a minimum, it is likely that they will cover CITES, the Basel Convention on Transboundary Movement of Hazardous Waste, the Montreal Protocol on Ozone-depleting Substances, the Stockholm Convention on Persistent Organic Pollutants, the Rotterdam Convention, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, and the Cartagena Protocol on Biosafety.

Agreement in line with the CBD objectives by introducing requirements to declare the origin of genetic material and evidence of prior informed consent and benefit sharing in patent applications. Yet others would like to see these discussion take place in the World Intellectual Property Organisation. Such 'forum shopping' has greatly hampered progress on the most contentious issues.

Gaps

Environmental considerations are add-ons rather than an integral part of policy-making. In most of the trade policy processes outlined above, environmental considerations tend to remain an add-on rather than an integral part of the negotiations. The focus has been on environmental impacts (often in the context of sustainable development) rather than referring specifically to EGS. Some countries have started to assess environmental impacts of trade policy-making, both in the WTO and for the FTAs they are engaged in. The EU has been a leader in this regard with a broad scope that examines both environmental and social impacts within and beyond its borders (although not on EGS specifically). For the most part, however, negotiating positions are being formulated and trade agreements entered into without a good understanding of the environmental impacts.

Lack of coordination. The lack of coordination between environment and trade ministries along with knowledge and capacity gaps regarding trade and environment issues (let alone trade and EGS) also continue to pose major constraints for coherent policy-making. Interaction at the international level has been improving, but is mainly limited to information exchange. Negotiations in the Doha Development Round aim to improve such exchanges between the WTO and MEA Secretariat, possibly also by granting observer status to the Secretariats in the WTO negotiations. However, the outcome is unlikely to lead to fundamental changes in inter-agency interaction. Some civil society groups and researchers are working to bridge the gap and have made good progress, but their levels of engagement in the negotiations still differ widely between countries and processes.

Reluctance to include environmental measure due to the protectionist connotation. Concerns that environmental measures may be used for protectionist purposes have further contributed to reluctance among trade negotiators to seriously engage in environmental issues. This is the case, in particular, in developing countries that would like to see environmental considerations to be embedded in a broader debate on sustainable development that also takes into account other social and developmental issues. Indeed, non-tariff measures continue to be one of the main obstacles for developing country exports. International standards aim to find a commonly acceptable basis, but, in actual practice, they are often skewed towards industrialised countries' interests, partly due to difficulties for developing countries to engage in the negotiations. Efforts are being made to provide technical assistance to meet environmental (and other) standards.

Even with the progress that has been made, to date, to bring environmental considerations into trade debates and use trade measures to promote environmental objectives, the political reality remains that trade and economic interests often take precedence over environmental ones. At times, this can even be observed in the MEA context, such as during discussions on economic incentives for biodiversity conservation in the CBD, which have stalled due to concerns among advocates of agricultural trade liberalisations that such incentive could be used to justify agricultural subsidies. This applies to both developed and developing countries. The EGS approach can be useful in this regard, by highlighting the socio-economic dimension of environmental change and addressing developing countries' concerns over Northern protectionism.

5.4 Priority issues and opportunities

This section highlights a number of priority issues where the use of trade policy processes and measures might be of particular relevance to EGS delivery:

- Regional FTAs and cooperation on EGS;
- Certification and private standards;
- Subsidies.

Regional FTAs and cooperation on EGS. Regional FTAs may provide a useful forum for countries to cooperate on environmental issues of regional concern. NAFTA, for instance, was the first agreement to include an environmental side agreement which has (to some extent) helped foster cooperation on transboundary environmental issues, such as migratory species, persistent organic pollutants and waste management. Another notable feature of NAFTA is that it established a mechanism for citizens to lodge a complaint if a NAFTA member fails to enforce its environmental laws, providing an interesting example of using a trade agreement to address environmental issues outside a country's territory (although no real penalties are being imposed). Capacity building is also a common feature in many of the North-South agreements, notably in the EU and Canada, and increasingly also the United States.

Some developing country regions have also used regional economic integration as a venue for environmental cooperation. Mercosur has adopted an Environmental Framework Agreement to address regional environmental issues, such as the harmonisation of environmental management systems and increased co-operation on shared ecosystems (Leichner Reynal *et al.,* 2002). Similarly, cooperation among members of the Association of Southeast Asian Nations (ASEAN) is promoted through the annual meetings of the ASEAN Senior Officials on the Environment (supported by a number of working groups) and its subsidiary bodies, the Meeting of the ASEAN Environment Ministers and the ASEAN Secretariat. Environmental issues discussed go beyond those related to trade, such as haze pollution. It is unlikely that these mechanisms will lead to binding agreements, but nevertheless provide an opportunity to raise and assess the interlinkages between trade policies and regional EGS issues (e.g. related to regional watersheds, shared forests and fish stocks, transboundary air and water pollution, and illegal trade in timber, fish or wildlife).

Certification and private standards. Certification schemes provide a potential avenue for promoting EGS-friendly

production. Many of these schemes are privately developed, either by independent certification bodies or the companies themselves. Examples include the Forest Stewardship Council and Marine Stewardship Council certification for sustainable forest and fisheries management, and the ISO 14000 series of environmental management standards. Numerous organic agriculture standards have been developed with guidance from national or regional government standards on what qualifies as 'organic'. It is hoped that these certification schemes (and associated labels) will provide incentives for producers to improve the environmental performance of production in order to expand their market and/or receive price premiums for their products.

Certification and private standards still face challenges. Numerous different schemes exist, each with different criteria, and producers have to decide which one to comply with. Developing country producers, in particular, find it difficult to meet certification requirements. Thus, even though the schemes are often voluntary, some producers could effectively be shut out of the market or see their market share drop if retailers and consumers give preference to certified products. Also, to have a significant impact on EGS globally, the reach of such schemes would need to be scaled up and mainstreamed into the processing and retailing sector. Moreover, for the purpose of this paper, international policy processes, other than the international standard-setting bodies, have limited influence on the development of environmental certification and private standards.

Subsidies. Subsidies can have substantial negative impacts on EGS where they stimulate unsustainable production that would otherwise not have been economically viable (let alone environmentally viable). Assessing and addressing the impacts of subsidies is crucial for successful EGS management. However, the political stakes are high, given that the subsidised producers are often important lobbyists, campaign supporters and voters in the respective countries. Subsidy reduction is more likely to be achieved through international policy processes, such as the WTO, where non-subsidising countries have more political clout and bargaining power than they might have in FTAs. International agreements also provide an opportunity for domestic governments to push through unpopular reforms at home.

Environmentally beneficial subsidies, however, could help promote environmental objectives. Multilateral trade rules already allow for such subsidies, notably in the Agreement on Agriculture under the 'green box' which permits the use of agricultural subsidies that are minimally trade-distorting (including those provided for environmental purposes). Negotiations currently underway to revise the green-box criteria could provide an opportunity to integrate an EGS perspective in the agriculture negotiations. Countries also broadly agree that environmentally beneficial fisheries subsidies, for example, for fisheries management, should be permitted in the fisheries subsidies disciplines currently being negotiated (Text box 5.3).

5.5 Tools for mainstreaming

A number of tools are available (and have to some extent been used) to mainstream environmental considerations into trade policy-making. While these tools do not necessarily take an EGS perspective, they could easily be adapted.

Impact Assessments. Several approaches have been used to assess the impacts of trade liberalisation and agreements on the environment with the aim of informing trade policy-making. The approaches vary in geographical scope and types of impacts assessed (WTO, n.d.):

Sustainability impact assessments in the EU to identify the potential economic, social and environmental impacts of any given trade agreement in the EU and in the countries or regions with which the EU is conducting negotiations (carried out by external consultants)

Environmental assessments in Canada focus on the impacts of bilateral, regional and WTO negotiations on the Canadian environment (carried out by representatives from relevant federal government departments)

Environmental reviews in the United States identify potential environmental impacts of bilateral and regional trade agreements, with a focus on the United States, but also considering global and transboundary impacts (coordinated by the US Trade Representative in collaboration with US federal agencies).

Environmental impact assessments have also been conducted by international and non-governmental organisations. They are commonly based on ex-post case studies to look at the impacts after the agreements have been implemented to then provide advice for future trade policy-making. UNEP's Integrated Assessment of Trade-related Policies, for instance, aims to evaluate the environmental, social and economic impacts of trade liberalisation and trade-related policies at national level (UNEP-ETB, n.d.). Another example is the Rapid Trade and Environment Assessment methodology developed by the International Institute for Sustainable Development which provides a relatively fast assessment to identify and prioritise those trade policies, negotiations and sectors that have potential to significantly impact the environment (both negatively and positively) (IISD, n.d.).

These assessments, however, can only become mainstreaming tools if their results are integrated into trade policy-making and recommended measures are effectively implemented. In practice, it is in the implementation that many of the assessments still fall short.

Another assessment tool that could potentially be relevant, in this context, is the *WTO's trade policy review* (TPR) mechanism. TPRs are regularly carried out for all WTO members. The frequency of the reviews varies between two and six years (and possibly longer in the case of least-developed countries) depending on a country's share in world trade. The focus is on trade policies and practices, trade policy-making institutions and the macro-economic situation of the WTO member country. While EGS issues (or environmental and

social ones, for that matter) have not been included in the review, the scope of the TPRs could feasibly be extended, drawing on inputs from external experts or organisations to complement the trade expertise of the WTO. Broadening the TPR could provide a practical avenue for including sustainable development considerations into trade policy. It could also help ensure that assessment findings are indeed implemented, given that implementation will be monitored on a regular basis through the TPR mechanism.

EGS markets are another possible mainstreaming tool. These markets aim to provide an incentive for EGS management by awarding monetary value to specific EGS. Emission trading, for instance, is used to control pollution by providing economic incentives for achieving reductions in the emission of pollutants. It does so by establishing a market for trading allowances to emit a particular pollutant while capping the total emissions/allowances at a maximum level. Reducing Emissions from Deforestation and Forest Degradation (REDD) mechanisms (see Chapter 4) is another example which uses market/financial incentives to reduce the emission of greenhouse gases from deforestation and forest degradation. The CBD Conferences of Parties have also discussed options for creating markets for biodiversity resources, such as indirect incentive measures for conservation and sustainable use of biodiversity.

As mentioned above, FTAs can provide opportunities for establishing cooperation mechanisms on trade and EGS. *Coordination mechanisms between multilateral trade and environment fora*could also provide opportunities for mainstreaming EGS considerations into multilateral trade policy. Negotiations are already ongoing to set up mechanisms for information exchange between MEA Secretariats and the WTO. With its broad scope, the CBD, in particular, can provide analytical input and policy options in a number of areas of relevance to multilateral trade policy, such as the use of economic incentives to promote biodiversity objectives, the impact of trade liberalisation on agricultural biological diversity, and the relationship between the TRIPS Agreement and the CBD.

Other mainstreaming tools, already mentioned above, include subsidies to promote environmentally friendly behaviour, and standards/certification to regulate and incentivise EGS as part of sustainable production.

Text box 5.3: EGS indicators in the WTO negotiations on fisheries subsidies

As part of the current round of trade talks, WTO members are mandated to 'clarify and improve WTO disciplines on fisheries subsidies, taking into account the importance of this sector to developing countries'[a]. Expanding on this mandate, WTO members at the Hong Kong Ministerial conference in 2005 further agreed to prohibit 'certain forms of fisheries subsidies that contribute to overcapacity and over-fishing'. They also reiterated the need to take into account the sector's importance to poverty reduction and concerns about livelihood and food security.

Much of the discussions have revolved around which subsidies should be prohibited, which should be permitted, and which may be allowed with certain conditions. While there is some agreement on which subsidies are clearly 'good' (e.g. for research or management) or 'bad' (e.g. for the construction of fishing vessels), countries standpoints differ widely with regard to subsidies that fall within the 'grey area'. A major challenge in the negotiations has been that the impacts of certain subsidies can vary depending on the context in which they are provided, such as the health of a fishery or the effectiveness of the management regime. Another contentious issue has been that of what environment-related conditions, if any, should be placed on developing countries when providing otherwise prohibited subsidies.

What makes these negotiations particularly interesting, from an EGS perspective, is that, depending on the final outcome, the new disciplines could make the use of trade measures subject to EGS-related indicators. For instance, one proposal would prohibit any subsidy that affects fish stocks which are in an 'unequivocally overfished condition'. Another proposal would make the provision of fisheries subsidies dependent on the presence of a fisheries management system that is based on 'internationally-recognised best practices' reflected in relevant international instruments, and include regular science-based stock assessments, as well as capacity and effort-management measures.

These proposals, however, have raised questions around how and by whom such possible EGS-related indicators would be defined and assessed. WTO members (and even the environmental community) would likely be wary of charging a trade body with making a judgement on the state of a particular fish stock or on the quality of a management regime. Assessments by external bodies, in particular, the UN Food and Agriculture Organization, are already available, but some may question whether the data and science are currently reliable enough to be used as a basis for judging the legitimacy of subsidies. Options could also be explored to request advice from international organisations or independent fisheries experts, on a case-by-case basis, as is already done in dispute settlement cases that deal with technical non-trade issues.

These negotiations will be an interesting case study regarding the political willingness for and practicalities of using EGS-related indicators and external expertise to decide on the use of trade measures. This approach could also be relevant in other EGS-related areas, such as energy and agricultural subsidies, tariff reductions for natural resource based goods (e.g. timber or fish products) or liberalising trade in environmental technologies.

a under paragraph 28 of the Doha Ministerial Declaration

5.6 Key findings and recommendations

The impact of trade policy measures on EGS delivery is neither positive nor negative, per se, but depends on how and in which context the measures are applied. International trade policy plays an important role in setting the framework for their application and, thereby, influencing the resulting EGS impacts.

*Some progress has been made to integrate environmental considerations (*which will have a bearing on EGS delivery) in international trade policy-making, including in WTO agreements, international standard-setting bodies, and bilateral and regional free-trade agreements. Some notable examples include WTO negotiations to reduce harmful fisheries subsidies and to liberalise trade in environmental technologies, as well as cooperation on environmental issues through bilateral and regional free-trade agreements.

Overall, however, environmental considerations remain an add-on rather than an integral part of trade policy-making. The political reality remains that trade and economic interests often take precedence over environmental ones. At time, trade concerns have even hindered progress in environment-related discussions, such as on access and benefit-sharing related to genetic resources and the use of economic incentives for biodiversity conservation.

The EGS approach can be useful in mobilising political interest in mainstreaming environmental considerations into trade policy by linking environmental change with socio-economic outcomes, thereby helping to strengthen the economic argument for environmental protection, and allay fears among developing countries over protectionist intent behind supposedly environmentally motivated trade measures.

Based on the above analysis, some general recommendations include:

Given that EGS degradation can cause trade-dependent economies to become more vulnerable, minimising these risks requires diversification and flexibility, even if this approach, at times, runs counter to the rationale for specialisation (comparative advantage) suggested by trade theory.

The reduction of environmentally harmful subsidies (notably in the fisheries and agricultural sectors) appears at present the most promising opportunity for promoting EGS in the WTO context, given that subsidies reductions are difficult to achieve bilaterally or regionally. At the same time, it will be necessary to preserve the policy space to provide environmentally beneficial subsidies.

The fisheries subsidies negotiations at the WTO will provide an important case study for introducing EGS criteria into trade policy decision-making by linking the use of certain fisheries subsidies to scientific and management conditions. A mechanism to engage external expertise, such as the FAO, the CBD and independent experts, will be needed to ensure that application of the criteria is scientifically sound.

Building on existing mechanisms, more attention could be focused on using regional and bilateral trade agreements, such as fora to promote cooperation on EGS issues that are of particular significance to the region and/or are difficult to resolve at the international level (such as regional watersheds, air and water pollution, illegal timber trade).

Where countries wish to use trade measures to promote EGS delivery, they should seek endorsement through MEAs, to gain international support and 'protect' the measures against a possible WTO dispute.

The feasibility of expanding the scope of the WTO's trade policy reviews to include EGS issues could be explored, including the involvement of external experts or institutions to provide expertise on the EGS-related dimensions of trade policies.

Sustainability impact assessments can provide a useful avenue for integrating an EGS perspective into trade policies, provided that the assessment outcomes are taken on board in policy-making. Such assessments can also help to promote better cooperation across areas and levels of policy-making through a participatory process that fosters cooperation between the different ministries/agencies and engages non-governmental stakeholders.

6

EGS in International Financial Institutions

- EGS are important for International Financial Institutions (IFIs) to consider, partly because through their lending practices and the attached conditions they provide incentives and/or disincentives that affect EGS, and partly because the status of its EGS is an important element of a country's overall risk profile.
- Dialogue on the reform of IFIs, initiated by the G20, provides an opportunity to raise the profile of EGS concerns. The process has gained momentum because of the need to support the global economic recovery. However, limited access by the broader international community and lack of binding commitments with regard to the environment lead to reduced expectations.
- A central issue is the need to recognise EGS and their economic value, in national accounts and the economic models that guide IFI policies and practices. Initiatives to complement current national account systems with environmental and social indicators can help shift attitudes.
- IFIs already have tools, such as strategic environmental assessments, the World Bank environmental safeguard policies, valuation and payments for EGS, country environment analyses, and portfolio screening. These and other tools would need to be systematically used by both public and private sector lending arms of IFIs.

6.1 Why are EGS important to global economic development and recovery?

The goods and services that ecosystems generate have been estimated to contribute trillions of euros to the global economy and to gross world product, despite the fact that these are not systematically reflected in the current system of national accounts (TEEB, 2009; World Bank, 2009c). The first systematic EGS valuation efforts undertaken in the late 1997 produced estimates of EGS annual values of over 22 trillion euros annually, almost twice the global gross national product, which was 18 trillion USD in that same year (The Katoomba Group´s International Marketplace, 2009).

Just as economic development depends on healthy ecosystems and the goods and services they provide, so does the global economic recovery process. As the global economy recovers from the financial crisis of recent years, it will be important to avoid another crisis founded on the widespread collapse of ecosystems and the economic values they deliver. This will require a shift in attitudes and policies to recognise EGS as the foundation of a qualitatively different, sustained economic growth. Investment in EGS not only can support improving livelihoods and eradicate poverty, but also support economic activity in all sectors (United Nations Economic and Social Council 2009).

Under the ambit of the G20, a new process has been initiated to reform the international financial architecture, to prevent future economic crises and to stimulate global economic recovery. An important focus has been directed to improving the governance of international financial institutions, such as the World Bank and the International Monetary Fund (IMF).

However, despite the even greater crises of climate change and ecosystem loss, which threaten the economic recovery process and the long-term prosperity of both developing and developed countries, surprisingly little attention has been directed to the role and impact that the international financial institutions (IFIs) and their policies have had on drawing down nature's line of credit[1] that through EGS provides a crucial lifeline to many of the countries IFIs serve.

1 This means that, similar to the line of credit you get from your bank, there is (a) a limit on how much you can withdraw; (b) you have to return what you borrowed and (c) inability to return what you borrowed has serious consequences. The credit language has been quite extensively used to highlight the similarities of the economic and ecological crises.

If the IFIs are to play a constructive role in making sure the global economic recovery process does not further aggravate global poverty and the environmental sustainability situation, their reform must: (i) recognise the importance of ecosystem goods and services to global economic recovery, to poverty eradication and to meeting the basic needs of many countries; and (ii) address the impact that IFI lending and financing decisions have on the sustainable supply of EGS.

Despite their key role in the global economic recovery process, IFIs are currently inadequately equipped to ensure that global economic growth is grounded in a model that properly values and protects EGS. This chapter explores how the policy tools and levers available to IFIs affect EGS and how the IFIs could proactively embed EGS into their policies, in response to the global financial crisis and beyond (Stiglitz *et al*. 2009).

6.2 Linking EGS and the process to reform IFIs

IFIs have a broad range of policy measures at their disposal, most of them related to maintaining a country's macroeconomic stability and capacity to meet debt service obligations. Impacts on EGS are typically indirect and a result of domestic policy initiatives designed to meet conditionalities attached to loan agreements. IFIs may also have the power to initiate wide-ranging structural adjustment programmes.

Conditionalities are often defined to keep government budget parameters, such as deficits, within defined limits. In order to meet these goals, a government may need to adjust its monetary policy and/or fiscal policy, both on the revenue and spending side. These adjustments may be very wide ranging, and many may have implications for EGS. For example, cutbacks may reduce not only environmentally destructive subsidies, but also subsidies that support stakeholders and practices that contribute to EGS maintenance (e.g., forest conservation, agricultural extension services). On the revenue side, governments may be required to loosen restrictions on the development of their natural resource sectors in order to boost direct foreign investment and export revenues. The implications may not be explicitly realised when the measures are designed and introduced, with macroeconomic balance and debt servicing goals primarily or exclusively in mind.

IFIs are often in a position to directly require national governments to undertake specific policy actions. This is either because when governments turn to IFIs they are facing a crisis and have very limited negotiating space, or because their ability to borrow from commercial sources is very limited. They may rely on IFIs either as a lender of last resort or as a co-signer required by commercial banks as a risk mitigation measure, so again this limits their flexibility. The ability of national governments to maintain flexibility with regard to conditionalities is pertinent, because EGS are often locally defined and may have sensitivities that are completely missed by IFI analysts and their macro-economic models, while more visible to national governments.

There are several large IFIs, but because of their global reach, the International Monetary Fund and the World Bank stand out. While the IMF addresses balance of payments issues, the World Bank's primary focus is on supporting developing countries in the achievement of the Millennium Development Goals (MDGs). Other relevant IFIs have a regional focus and may have impacts on government policy and, thus, EGS, in their region that is similar in terms of size and scope as global IFIs. The Bank of International Settlements (BIS) is also relevant, but it plays a special role as the 'bank of central banks'. In order to keep the analysis focused, this report will concentrate mainly on the IMF and the World Bank.

As for the IMF, its mandate is to assure global financial and economic stability through the following activities:

- Monitoring economic performance and providing technical assistance to member countries to improve the management of their economies;
- Providing policy advice and financing to members facing balance-of-payment difficulties;
- Helping developing nations to achieve macroeconomic stability through concessional and other types of loans (International Monetary Fund n.d.).

Text box 6.1: Examples of linking IFI policies to EGS at the World Bank

The following examples are of recent efforts by the World Bank to mainstream EGS in their policies and lending practices:

- *The World Bank has adopted a set of ten environmental and social safeguards, which establish standards and procedures for World Bank financed projects. Of particular interest is the natural habitats standard, which places limits on World Bank financed projects that may impact on areas of important biodiversity.*
- *Moreover, the World Bank has been financing efforts by a number of developing countries to develop the valuation of EGS, which are not normally accounted for on national balance sheets.*
- *PRSPs provide a general framework through which both the World Bank and the IMF could potentially enhance valuation and protection of EGS, as they are the main tools through which the IMF and the World Bank determine the amount of debt financing and concessional lending they will make available to low-income countries. Introduced in the World Bank's 2001 Environment Strategy, Country Environmental Assessment (CEA) reports could also contribute helpful analysis and data to mainstream efforts, as they are used as the key diagnostic tool to evaluate environmental priorities, their policy implications, and capacity needed to address priorities (World Bank, 2009a).*

In recent years, in return for IMF support and loans for member states with balance-of-payment difficulties, the IMF has imposed a wide range of structural adjustment programmes (SAPs) to control severe budget deficits, inflation, price controls, or over-valued or under-valued currencies, all of which tend to contribute to balance-of-payment crises. The IMF (together with the World Bank) also launched the Poverty Reduction Strategy Initiative that requires developing countries to develop Poverty Reduction Strategy Papers (PRSPs). While PRSPs were intended to take social and environmental issues more systematically into account, their implementation has resulted in similar policies to the earlier SAPs, with insufficient attention, among other things, to environmental sustainability (International Monetary Fund 2002; see also Chapter 3).

With the recent G20 pledge of 750 billion USD to the IMF, political leaders have strengthened its role in redressing the impacts of the global financial crisis. Equipped with ever-more resources, the key challenge will be to ensure that IMF interventions will be designed and executed in ways that support EGS (G20, 2009).

As for the World Bank and the other multilateral development banks, they too are positioned to play a key role in supporting developing countries in meeting poverty eradication and economic growth objectives, notably through the provision of concessional loans and grants, as well as technical assistance. Comprised of two development institutions owned by member countries, the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA) provide low-interest loans and interest-free credits and grants to developing countries for investments in education, health, public administration, infrastructure, financial and private sector development, agriculture, and environmental and natural resource management (World Bank, n.d.).

6.3 Policy tracks and gaps

Calls for the reform of IFIs and to consider the interests of the environment and poverty in that reform are not new. The issues have been kept on the agenda mainly by governments that had negative experience with IFI interventions in domestic policy, and by the part of the NGO community that was critical of how IFI policies and practices, through domestic intermediaries, affected the state of the environment. While there have been explicit calls for considering EGS perspectives in the reforming process, making the link is not difficult.

The global economic crisis, coupled with other global crises more directly related to EGS, such as the food crisis, climate change and biodiversity, lead to increased political willingness to address IFI reform-related policy that previously received only marginal attention. In their current form, these policies treat the environment as a somewhat marginal issue or do not explicitly address it at all. Given the linkages between EGS and IFI policies and practices as outlined before, this is a clear gap but also an opportunity to mainstream EGS considerations into any new IFI architecture.

Bretton Woods II Process

Bretton Woods II refers to the process initiated by the leaders of the G20, in November 2008, to review the global financial system, including major bodies, such as the World Bank and the International Monetary Fund that were established under the original Bretton Woods Agreement in 1944. Notwithstanding NGO criticism (described below) of the G20's resistance to undertake fundamental reform, the G20 have at least signalled their commitment to undertake several governance reform measures (US Department of State, 2009).

The closest the latest round of IFI reform efforts comes to addressing EGS is reflected in the Pittsburgh G20 Communiqué, calling for the World Bank and the regional development banks to play a leading role in responding to global problems that require globally coordinated action, such as climate change and food security. Specifically, the Communiqué calls on the World Bank to enhance its focus on food security by improving agricultural productivity and access to food, and to increase its green economy investments, especially in sustainable clean energy generation and use, energy efficiency and climate resilience (US Department of State, 2009).

UN Conference on the World Financial and Economic Crisis

The UN Conference on the World Financial and Economic Crisis was held in New York on 24-26 June 2009. Its objectives were to provide an assessment of the current economic crisis, to establish short- and long-term responses in order to diminish the impact of the crisis and to spark off a debate on the reform of the whole international financial architecture, and, thus, to prevent further crises.

This was the first major conference on the financial and economic crisis that involved the international community, however, as described below, it concluded with rich countries blocking the substantive IFI reforms demanded by developing countries. The conference's outcome document did manage to highlight at least the need for genuine policy space for developing countries and emphasised the links between the financial crisis, global inequality, 'increased food insecurity, volatile energy and commodity prices, and climate change'.

The most important substantive input to the Conference was the report produced by the Stiglitz Commission, which called for major reforms of IFI governance and policy approaches. While the G77 expressed their clear support for these measures, the final Outcome Document was stripped of most of the concrete proposals for change by industrialised countries. The final text does however include language on many of the critical issues raised by developing countries, and establishes a follow up process that could expand the UN's role in this area.

There are new opportunities for elevating the EGS agenda in the IFI reform process through the new open-ended working group of the General Assembly that has been mandated with the task of following up on the outcome document. The success of the working group depends on its level and the degree of support it gets from member countries, civil society and others. Since many other concrete proposals for

follow-up mechanisms were stripped from the final outcome document, this ad-hoc working group, albeit in a sub-optimal process, is the central vehicle through which EGS-related IFI governance reform could be promoted within the UN system.

The UN Economic and Social Council was also called upon to consider the 'possible establishment of an ad-hoc panel of experts on the world economic crisis and its impact on development'. If successfully established, this committee would be an important way of promoting the importance of EGS in the IFI reform process (Bretton Woods Project, 2009a).

Gaps

Shortcomings in the mandate, policies, resources and governance of the international financial institutions with regard to the environment and sustainable development are well-documented. Inadequate attention to the environmental and social impacts of IFI-supported development projects has not only led to significant ecological degradation and social hardship, but in many cases also has directly undermined the effectiveness of IFI lending (Bank Information Center, n.d.).

It has become clear that a fundamental problem with IFIs is that the economic models and theories at the heart of their operations, are problematic. While they promote macroeconomic stability and growth, the models are almost blind to the role that EGS play in long-term economic stability.

The goal of the reform of the international system must be the better functioning of the world economic system, for the public good, which entails simultaneously pursuing long-term objectives, 'such as sustainable and equitable growth, the creation of employment in accordance with the "decent work" concept, the responsible use of natural resources, and reduction of greenhouse gas emissions, as well as more immediate concerns, including addressing the challenges posed by the food and financial crises'(Stiglitz et al., 2009). In order to take these issues simultaneously into account, they must be properly integrated into the mainstream decision-support models used by IFIs in their lending practices.

IFIs will have to place much greater emphasis on making explicit the negative and positive external costs, such as the impact on EGS. Global ecosystems goods and services continue to be seriously at risk from an economic recovery that, without structural changes, may ignore their value and importance. A global economic recovery process that also does not directly address the importance of EGS will have little chance of achieving a durable success.

Text box 6.2 Recommendations of the Stiglitz Commission

The Stiglitz Commission's EGS-related observations and recommendations were taken up in the Chair's draft Outcome Document, but were the subject of acrimonious debate among Member States. They include the following (Bretton Woods Project, 2009a):

- *The current crisis not only affects the financial and economic sectors, but also has a human dimension. This means that policy responses should also address other key sectors, such as environmental protection, energy, health and education.*
- *Access to new financial facilities and mechanisms should not be based solely on GDP, which is a poor indicator of economic sustainability.*
- *Additional resources for social protection, food security and human development should be made available through the World Bank's Vulnerability Financing Framework.*
- *Inclusive governance approaches are necessary for ensuring legitimacy of the future international financial system and institutions.*

Text box 6.3: Examples of IFI interventions contributing to environmental degradation

- *PRSPs often continue the trajectory of failed structural adjustment policies, do not adequately mainstream environmental issues, and do not take into account the role of resource access and management in the lives of the poor, and their contribution to poverty eradication (see Chapter 3).*
- *Oil and gas projects and coal-fired power plants continue to play a dominant role in the World Bank's energy sector portfolio. About 50 per cent of all World Bank loans within the energy sector are granted without any attention to mitigating greenhouse gas emissions (GHGs) or to reducing climate risks. In relation to the World Bank`s role in carbon finance, only 10 per cent of the financing has actually focused on sustainable development priorities (Ballesteros and Munilla, 2009).*
- *IMF credits and policies led to a significant increase in deforestation in biodiversity-rich Latin America, Asia and Africa. The IMF strategy of promoting export-led growth forced governments to reduce environmental spending, which, in turn, accelerated deforestation (Bretton Woods Project, 2008). For example, the IMF forced Cameroon – one of the countries with the greatest biological diversity in Africa – to devalue its currency and reduce taxes on exports of forest products. As a result, over 75 per cent of the country's forests have been logged, or will be logged in the near future (Zogbi, 2005).*

A narrow economic model continues to underpin the IFIs
The G20 BWI reform process has been consistently silent on the need for a different economic model to underpin the IFIs, notably an economic system that is clearly based on achieving sustainable development. The current market allocation system that underpins the IFIs excludes most non-marketed natural and social capital assets and services, which are huge contributors to human well-being.

A new EGS sensitive economic model would measure and include the contributions of natural and social capital. New indicators for measuring economic, social and environmental dimensions of sustainable development are an essential part of this shift and have been called for by the Brundtland Commission and the 1992 UN Conference on Environment and Development (World Commission on Environment and Development 1987; United Nations 1993). Recently, UNEP has recommended the introduction of a genuine progress indicator (GPI), to replace GDP for tracking economic health. It would account for the importance of ecological sustainability, social fairness and real economic efficiency, and would emphasise the finiteness of natural and social capital and the real Earth System limits to the expansion of the market economy (UNEP, 2009).

Addressing these gaps cannot happen overnight and will require significant, coordinated effort on the part of political forces and agencies in charge of the calculation of national accounts. The European Commission's *Beyond GDP* and the OECD's *Measuring the Progress of Societies* initiatives indicate growing momentum, complemented by a process, led by UN Department of Economic and Social Affairs and UNStat, to introduce a more robust framework for national environmental accounts. Some of the IFIs are involved in these processes, for instance, the World Bank, the Inter-American Development Bank, and the African Development Bank, are among OECD's partners in Measuring the Progress of Societies.

BWI greening efforts need to be scaled up
Despite the G20 call for removal of perverse subsidies, especially in the energy sector, the World Bank still provides loans for environmentally and socially harmful projects, such as those involving oil, gas, and mining. Furthermore, the IMF and World Bank structural adjustment loans continue to promote export-led growth. While some structural adjustment initiatives are accompanied by consideration of environment and, potentially, EGS, for example, through the use of strategic environmental assessments (SEAs) or environmental impact assessments (EIAs), these are marginal and generally weaker than would be needed to achieve fundamental changes in the direction of lending practices.

6.4 Priority issues and opportunities

This section highlights a number of priority issues where the use of the processes and measures of the international financial institutions might be of particular relevance to EGS delivery:

- Integrating EGS into World Bank environmental safeguard policies;
- Financing for renewable energy projects;
- IFI governance;
- Measuring, valuing and modelling what matters.

Integrating EGS into World Bank environmental safeguard policies. The World Bank operates a set of ten key environmental and social policies that establish standards and procedures which the borrower and the bank both must follow, in the lead up to and during World Bank-financed projects. Among these ten standards, two relate to EGS. The environmental assessment standard calls on parties to identify potential social and environmental impacts and to propose mitigation measures. The natural habitats standard places limits on World Bank-financed projects that may impact on areas of important biodiversity. Both of these should be examined to ensure that they contain sufficient EGS criteria.

Financing for renewable energy projects. Important gains in renewable energy and energy efficiency, of recent years, still do not compensate for the highly imbalanced financing in favour of fossil-fuel development (Bank Information Center, 2009).

Since World Bank fossil-fuel lending is on the rise, especially for coal, an important shift in direction is needed to ensure that World Bank energy project financing and lending for renewable energy is increased by far more than the 11 per cent increase for renewables that was allocated during the World Bank's 2008 fiscal year. The World Bank's ongoing energy sector strategy review must send a strong message that both the bank and the International Finance Corporation must greatly decrease fossil fuel financing (increased by over 100 per cent in 2008) and significantly increase the number of renewable energy projects that it finances (Bretton Woods Project, 2009b). The World Bank must provide genuine leadership in convincing member countries of the merit of investing in carbon-free energy. In the revision of the World Bank's energy sector strategy, the bank should be more proactive in leading countries towards the carbon-free environmentally friendly and socially responsible path of economic development.

IFI governance. Broader participation in IFI governance would be important, because, without it, the voice of borrowing countries whose environment and EGS are most at risk as a result of IFI lending and conditionalities, has very limited influence. The World Bank publicly acknowledges the importance of participation in its own governance reform. However, it does not have any required procedures nor minimum standards for soliciting public input into its lending operations (Ebrahim, 2009). Formalising broader and substantive participation of borrowing countries that rely heavily on EGS, and ensuring that they have real opportunities to address concerns with regard to policies that present a risk to EGS, would be important, but can happen only in the context of broader IFI governance reform.

However, as described earlier, the G20's Bretton Woods II process is not generating sufficient interest in reforming the governance of the IFIs. As an alternative, the Stiglitz Commission recommends the formation of a Global Economic Co-ordination Council equivalent to the Security Council

or the Human Rights Council. As opposed to the G20, the Council would be better placed to provide credible political direction in the global economic recovery process (Stiglitz *et al.*, 2009). If the Council would get sufficient political traction and would have a strong license to address macroeconomic policy coordination, the case would be strong for making sure its scope of work also extends to EGS with clearly defined economic value.

Measuring, valuing and modelling what matters. Integrating EGS perspectives into the IFIs decision-making process requires a serious review of their mainstream macroeconomic models, and expanding them to include interactions between the economy, the environment and the value of the environment's goods and services - EGS - for human well-being. While this would have to represent a significant change, the work could build on the increasingly rich tradition of integrated modelling with the addition of an explicit economic valuation element. Making the move from narrow macroeconomic models would need to be a long-term and well-calculated transition, and would require progress in other related areas, mainly with regards to the establishment of much better measurement and valuation of EGS.

In order to help countries take the real value of EGS into account, IFIs can help develop or strengthen accounting mechanisms as part of public sector reform and capacity building. To place a proper value on EGS in decision-making and in decision-support models that run in the background, there is a need, first, for better physical indicators and, second, for mechanisms for establishing economic values of EGS, informed by these indicators and their value to society. This can help create incentives for more sustainable use and conservation of EGS that currently do not appear on balance sheets.

The international agenda on measurement reform is advancing, illustrated by efforts, such as the European Commission's Beyond the GDP programme and the OECD's Measuring the Progress of Societies initiative in the development of new environmental and social indicators to complement GDP and national accounts. The European Commission's work is focused on complementing GDP and national accounts, which present production, income and expenditure in the economy – with environmental and social accounts (European Communities, 2007). Once developed, these accounts will also help underpin the development of more robust and credible EGS valuation schemes.

6.5 Tools for mainstreaming

IFIs have a wide range of tools at their disposal to mainstream EGS into their own practices and that of their clients' countries. In fact, several of the tools have already been applied by IFIs, but neither systematically, nor sustainably. Some of the tools have already been discussed, such as impact assessments, environmental and natural resource accounts and valuation schemes. Additional tools are mentioned below.

World Bank environmental and social safeguard policies. In 1998, the World Bank grouped ten of its key environmental and social policies into a set of 'safeguard policies' designed to provide protection for the environment and vulnerable populations from the negative effects of World Bank-financed operations. Below are the ten environmental safeguard policies applied by the bank in their public sector lending practices:

- Environmental Assessment
- Natural Habitats
- Pest Management
- Indigenous Peoples
- Involuntary Resettlement
- Forestry
- Safety of Dams
- Projects on International Waterways
- Projects in Disputed Areas
- Cultural Property

Among the ten standards, the environmental assessment standard is regarded as the 'umbrella policy', through which potential social and environmental impacts are identified and mitigation measures proposed. In theory, at least, the World Bank is not allowed to finance projects that contravene legislation or obligations of the receiving country under relevant international environmental treaties and agreements. Moreover, for potentially high-risk projects, the borrower must retain independent experts not affiliated with the project to carry out the environmental impact assessment or strategic environmental assessment.

The World Bank's private-lending institution, the International Finance Corporation (IFC) also employs environmental and social safeguard policies. However, NGOs have been far more critical about the way in which the IFC has implemented the safeguards. In order to strengthen the use of the safeguards to benefit EGS, the IFC would need to use them more systematically, clarify specific details such as 'adverse impacts' or 'critical natural habitats', and place the needs

Text box 6.4: Examples of World Bank-funded payments for environmental services systems.

A few municipalities downstream of El Imposible National Park in El Salvador have agreed to make a financial contribution to park management as payment for watershed services.

In Colombia, many groups of water users pay for watershed services and in some cases, they have bought entire watersheds.

Also in Colombia, power companies, are required by law to pay a percentage of their revenues to regional corporations responsible for watershed management. (TEEB, 2008).

and the environment of the communities above the interests of the client. The IFC should also be open to introducing an independent monitoring of its clients.

The World Bank has been working with several of its client countries on the design and implementation of systems of *payments for environmental services*. These mechanisms are designed to improve the provision and protection of environmental services by ensuring that those who provide the environmental services are paid for doing so, and that those who benefit from environmental services pay for their provision.

Phase II of *The Economics of Ecosystems and Biodiversity* (TEEB) assessment will produce a range of *new instruments and tools* for policymakers to take into account the value of ecosystems in policy-making. The tools will include subsidies and incentives, environmental liability, new market infrastructure, national income accounting, cost-benefit analysis, cost-effectiveness analysis, and methods for implementing Payment for Ecosystem Services and Access and Benefits Sharing (TEEB, 2008).

6.6 Key findings and recommendations

As the global economy recovers from the financial crisis of recent years, it is essential that efforts are undertaken at all scales of governance to shift attitudes and policies to recognise the value of natural resources as the foundation of sustained economic growth.

The international financial institutions that are directly responsible for the global economic recovery process, in fact, are the least-equipped to ensure that global economic growth is grounded in a model that properly values and protects EGS.

It has become clear that a fundamental problem with IFIs is that the economic models and theories, at the heart of their operations, are problematic. They promote the pursuit of macroeconomic stability and growth, but the models that are grounded therein seem to be blind to the role that EGS play in their long-term success.

It has become increasingly clear that insufficient attention has been directed to the failure of the IFIs to systematically address EGS, or, more broadly, environmental considerations, in their policies and lending practices, despite the IFI reform process that has been initiated by the G20.

If the IFIs are to play a meaningful role in the green global economic recovery process, *fundamental reform of the international financial architecture will be necessary* to ensure that the IFIs: (i) affirm the importance of ecosystem goods and services to global economic recovery and poverty eradication; and (ii) address the impact that IFI lending and financing decisions have on the well-being of EGS.

7 Tools for mainstreaming EGS in the national and international policy process

- While there is significant literature on the tools and processes for mainstreaming the environment in general, there is much less experience with the tools for mainstreaming EGS. Nevertheless, the experience concerning mainstreaming tools for the environment can serve as a starting point for integrating EGS into international policy.
- Policy tools for mainstreaming EGS are available for any stage of the policy cycle, whether in planning, implementation or policy review, and also for all of the studied policy domains. Selection of tools must be part of a mainstreaming process that often unfolds over several years and consists of several different stages.
- Policy tools for integrating EGS into international policy need to highlight costs and opportunities associated with EGS, in ways that explicitly show the implications for human well-being and development. This may involve, but does not always require, economic valuation.
- Context is important – different mainstreaming tools may fit different policy domains, and in some cases, established non-EGS or even non-environmental policy tools can serve as a vehicle and be modified to integrate EGS perspectives.
- Given the inherent complexity and uncertainties of the management of various EGS, the selection and application of various policy tools should follow an adaptive learning approach, with scope for modifications in case the selected policy tool would not produce expected EGS outcomes.

7.1 Tools for mainstreaming ecosystem goods and services

The previous chapters have discussed the rationale and opportunities for integrating EGS into several international policy domains. Relating EGS to these domains requires policy tools that have relevance for both the given policy domain and the EGS concerned; these have also been identified. The principal challenge is to find tools that help catalyse a shift towards a view in which investing in EGS is seen as essential for supporting long-term development (UNDP and UNEP, 2007). This requires:

- Understanding that natural resources are productive natural capital, and there are trade-offs between investing in sustaining this natural capital and converting it to other uses;
- Emphasising the economic returns from environmental investment. Sustainable management of environmental assets generate a flow of economically valuable goods and services;
- Understanding the outcomes for human and economic well-being. Ecosystem goods and services are part of the key indicators that are used to measure progress in economic growth, development and poverty reduction.

The loss of ecosystems' abilities to supply services may be an irreversible process that involves risk and costs. These risks and costs can be severe and lasting to the economy, human well-being and social stability, particularly if they involve crossing critical thresholds. Mainstreaming tools can be used to identify these risks and give them the required attention in decision-making and implementation.

The applicability of the identified policy tools varies; some are broadly applicable to a wide range of EGS and a wider range of policy areas. For example, impact assessment and capacity

Main categories of mainstreaming tools for EGS discussed in this report and the phase in the policy cycle they relate to Table 7.1

Tools	Planning	Implementation	Review	Examples of uses in specific policy domains
Generic guidelines	X	X		Development planning
Public expenditure reviews			X	As part of PRSP process
Portfolio screening			X	In investment, in development assistance
Payments for EGS		X		REDD, water management
Country-specific assessments and strategies	X		X	For example, Poverty Reduction Strategy Paper (PRSPs), Country Environmental Assessments (CEAs).
Certification and private standards		X		In trade, in combination with development assistance
CBD-related frameworks and action plans	X	X		

development may apply, with different foci, more broadly to all EGS and policy areas. However, there are tools that have less history and, in this stage at least, their applicability is less universal. For instance, valuation of and payments for ecosystem services is becoming better developed for EGS, such as carbon sequestration, but in other cases the application is more challenging, for example, in assigning economic value to the provision of habitats for wild species. Differences need to be carefully weighed, when considering the potential applicability of mainstreaming tools in specific policy areas.

Following some of the distinctions made already (UNEP and UNDP, 2007; Dalal-Clayton and Bass, 2009), we emphasise that the selection of tools must be part of a mainstreaming process that often unfolds over several years and consists of several different stages. Most of the previous literature focuses on mainstreaming the *environment* rather than mainstreaming *EGS*, but at least they provide a good starting point for discussing the mainstreaming of EGS tools.

While little is written about mainstreaming EGS, the literature on mainstreaming the environment is already well-developed. What is important, from the EGS perspective, is building on existing mainstreaming experience, while also highlighting the specific risks and opportunities that arise from the perspective of the EGS approach. From this perspective, valuable tools are those that help highlight the positive or negative implications of environmental change (goods and services) for human development and economic conditions, in either monetary or non-monetary ways, from a nevertheless quite explicitly utilitarian perspective.

Dalal-Clayton and Bass (2002 and 2009) situate mainstreaming the environment in an institutional context of continuous improvement, and point out that mainstreaming is a process that involves several stages and may take several years. They emphasise the importance of having a framework and indicators in place, to consider capacity aspects, to work towards a systematic approach, paying attention to clear communication, and finally building from and working with a platform of engaged allies and committed decision-makers. We consider capacity development and capacity building to be modalities that may be part of the mainstreaming approach for any of the identified tools, therefore, not being tools themselves. We also accept the broad interpretation of capacity, which includes not only tools, but also the social aspects, material and resource dimensions of this capacity (UNDG, 2002).

While the institutional process and strategy are important, selecting the *right* tools is also essential. Dalal-Clayton and Bass point to several selection criteria that should be considered, and they also identify several different approaches and tools for environmental mainstreaming, in general – again, loosely structured around the policy cycle: tools related to information, planning and organisation, deliberation and engagement, management, voluntary, indigenous and other approaches. Table 7.1 shows the mainstreaming tools discussed in this report and the phase of the policy cycle that they fit in.

Considering the focus of this report, we are particularly interested in identifying tools that help mainstream EGS into international policy areas. Most of the tools discussed in this chapter, already have been discussed in earlier chapters, in the context of specific policy areas, but here we point to other options for their direct or indirect applicability to EGS. We understand direct applicability to mean that the policy instrument can be applied by organisations leading or involved in policy setting and implementation at the international level. Others are more applicable at a lower – national or local – scale, but international organisations may be able to successfully promote them through, for example, capacity development, demonstration projects, awareness raising, or through other means.

This chapter will review the following policy tools that, based on our review of policy areas, hold promise for mainstreaming EGS. While the list is not definitive and, thus, cannot be relied on as a full menu, it can serve as a starting point and inspiration for a critical discussion on selecting policy tools.

7.2 Making the Case for EGS in Public Finance: Expenditure Reviews

Government spending is a key tool for influencing the behaviour of all members of society, with implications for EGS. Public finances can be a double-edged sword. For example, subsidies to industries whose activities lead to irreversible changes in local ecosystems can be a major source

of problems. Subsidies to the fossil-fuel sector and industrial agriculture, and subsidies to the fisheries industry that contributes to overcapitalisation, overfishing and ultimately the collapse of fisheries, are some examples that have shown to cause massive damage to the environment, at an equally high cost to social well-being (GSI, 2009; Koplow, 2006). Alternatively, budgetary incentives such as for conservation agriculture, renewable energy or water conservation, may result in EGS pay-offs.

Public expenditure decisions are mainly taken on national and other levels of government, but they may be subject to review by international organisations. They can play an important role in overall accountability mechanisms. Public expenditure reviews (PERs) represent a good entry point for mainstreaming EGS considerations into poverty eradication efforts. As formal initiatives, in many cases, they are jointly carried out by the national government and IFIs, such as the IMF, the World Bank or regional development banks. They analyse the state of public expenditures, particularly their adequacy and appropriateness for key economic and social goals of national government. Expenditure reviews are often focused, as a priority, on the ability of government to meet macroeconomic objectives, but on occasion they are also subject to reviews from perspectives of human development and environmental outcomes (World Bank, 2009a).

The analysis of subsidies either as part of expenditure reviews or as stand-alone initiatives, is important. Subsidies are often among the largest items in government budgets, yet they can be a double-edged sword, from the perspective of the environment, as highlighted by several recent studies and initiatives (Myers, 2001). If awarded to industries and for products that cause direct damage to EGS, subsidies may be a truly wasteful investment of public assets: they not only divert resources from other, more constructive purposes, but also cause damage to the environment, which should also appear on society's balance sheet as an additional cost. Detailed analyses may point out the direct and indirect environmental effects of subsidies, but by focusing on EGS impacts, they may also show the impact on society's overall balance sheet in full cost terms.

Such analyses can be *ex ante* or *ex post,* and may build on an already rich and growing body of literature and practice of green budget reform. Ex-ante reviews, for some purposes regularly prepared by civil society groups, such as Canada's Green Budget Coalition (2009), can indicate specific areas to which government spending could or should be targeted, and at which scale, to meet specific environmental objectives, including those on EGS.

Among the international policy areas covered in this report, those associated with the reform of the Bretton Woods Institutions are the ones where expenditure reviews have the greatest potential. IFIs already carry out expenditure reviews based on established criteria that significantly influence debtor country behaviour, while also informing on World Bank lending practices. Advancing the criteria for these expenditure reviews, already under way in some cases, to include EGS perspectives as a priority *on par* with macroeconomic criteria, would provide a stronger incentive to national governments to factor EGS into spending decisions. A particularly important step in this direction would involve integrating the economic value of some of the previously unaccounted for EGS into national balance sheets. Making some of the key EGS costs and benefits visible, next to other, traditionally calculated costs and benefits, may lead to adjusted subtotals which, over time, influence budget allocations and government policy.

7.3 Awareness raising: Portfolio Screening

Portfolio screening is becoming an important tool for organisations to assess the degree to which their activities reflect broader or specific social concerns. Portfolio screening may be applied by a wide range of organisations, typically *ex post.*. Portfolio screening is most often mentioned in the context of individual or institutional investors analysing the environmental and social performance associated with investments in specific corporations and sectors. Portfolio screening helps raise awareness and may result in investment or divestment in particular firms based on their performance or certain types of activities.

However, portfolio screening also has been used, for example, by development agencies to assess the extent to which their programmes in recipient countries take certain concerns into account. For instance, several development agencies have carried out portfolio screening of their programmes, to assess the attention they are paying to mainstreaming adaptation to climate change (Klein *et al.* 2007). In the same way that these organisations analyse their portfolios, from the perspective of climate change adaptation, similar assessments could focus on either the entire set or specific types of EGS.

At the heart of portfolio screening are criteria for analysing the activities and impacts of an organisation, a company or an investment fund. Funds can distinguish themselves based on the set of criteria they use to screen their investments and the degree of rigour with which screening is taking place. EGS can be built into portfolio screening through these criteria.

International actors most likely to be interested include rating agencies and large socially responsible funds. Among international organisations, UNEP's Financial Initiative has taken an active interest and works on investment criteria by working with private sector partners to define environmental, social and governance factors that can help inform investment analysis and decision processes (UNEP and Mercer, 2007). While these factors, in principle, incorporate EGS, a review of key words used in screening responsible investment in the same report, makes no mention of even the term. This may simply be a result of EGS being a relatively new concept as far as mainstream applications by the investment community is concerned. However, capturing the main EGS through their quantitative indicators or qualitative attributes may turn out to be a good proxy for the quality of a fund's management or for measuring its ability to produce long-term returns, as noted by the same report. Incorporating an EGS lens into investment portfolio screening would not magically do away with data and analytic challenges, but it may help

to define, more closely, those environmental implications of investment that have direct economic value in a particular context.

7.4 Valuation: Payment for Ecosystem Services

Payment for ecosystem services is a tool that can be used as a positive incentive to motivate behaviour to restore damaged ecosystems and sustain the supply of ecosystem services. The concept has been promoted by a variety of institutions, at the international level, including UNEP, the World Bank and FAO, in the context of issue areas, such as agriculture, avoided deforestation and watershed services.

Payments for EGS are intended to assign greater and more tangible value to those environmental factors that are crucially important for human well-being. However, being public goods, EGS do not have, or have only limited markets and, thus, no readily available market prices (e.g. Farber *et al.*, 2002). While the absence of economic value does not preclude the possibility of taking the environment in general, or EGS in particular, into account, in the absence of the economic incentives that payment schemes may provide, such considerations are much less likely.

Although various methodological options exist, establishing values for EGS that can then serve as a basis for payments presents considerable challenges (e.g. Mishra, 2003). Part of the challenge is that economic value needs to have some relationship with a physical condition or quantity of the service provided, but very often this information is inadequate or missing and, thus, it can ill inform those undertaking the valuation exercise. Another challenge associated with EGS payment schemes is related to their distributional effects on society. A key aspect of maintaining the sustainability of EGS is that people who rely on these services should have options to meet their basic needs in ways that do not deplete ecosystems and EGS beyond carrying capacity. If allocated, in an equitable way, to those in society who rely most directly on EGS, typically the poor in resource-based communities, payments for ecosystem services may provide these options.

Although not perfect, payment for ecosystem services can be an effective ecosystem management implementation tool. While EGS payment schemes may be defined in a local context where the exchange of both services and payments takes place in a small regional (e.g. watershed) setting, there are EGS issues that clearly matter in the broader international or global context: conservation of genetic resources and particularly carbon sequestration, are examples where this broader transboundary value has been recognised with a clear role for international organisations and mechanisms. Payments under the CDM and REDD programmes are examples of specific mechanisms that recognise EGS values, and where institutional mechanisms already exist, to both monitor, report and verify ecosystem resources and services traded and to process payments.

Considering the real potential of payment schemes for EGS, this method is still in its infancy, even though the number of schemes is growing. While the estimates on the economic value of global ecosystem services vary by a wide margin, early estimates by far surpass the value recognised in current transactions, even without taking issues such as irreversible loss into account (e.g., Costanza *et al.*, 1989; Peterson and Lubchenco, 1997). In order to close this gap, and to move payment schemes from the research or marginal operational stage to that of the mainstream, further methodologies, capacity and, eventually, institutions need to be developed, and international organisations clearly can play a more significant role than they do today.

7.5 Supporting Implementation: Country-specific Assessments

Country-specific assessment can specifically target the environment or a policy area, such as trade related to the environment. Finding a place for EGS in an environmental assessment is not difficult, but it is not always effective. Integrating the environment into non-environmental assessments is more challenging, but it may have significant potential. As discussed earlier, the WTO's Trade Policy Review may serve as a useful vehicle for addressing EGS issues from the perspective of trade, even though, to date, no precedent has been set.

With regard to more direct environmental assessments, integrated environmental or ecosystem assessments (IEA) are or could be used to examine the overall contribution from ecosystems to social and economic well-being, to understand how and why economic actors use ecosystems as they do, and to assess the relative impact of alternative actions in order to guide decision-making. Currently, a wide range of environmental assessments is being used, including strategic environmental assessments, impact assessments, and sustainability assessments. The CBD has developed a guideline for biodiversity-inclusive impact assessments, to ensure EGS concerns are included.

IEAs can combine the analysis of the physical environment and human well-being, including the impact from economic activities in a place-based context, whether 'place' is an ecosystem, a political jurisdiction or a combination of both. The analysis could integrate retrospective analysis, that is, past trends of human activities as driving forces and pressures, their impacts on EGS, and their interactions with a projection of expected EGS trends based on current dynamics and realistic policy options. The analysis may also assess ecosystems for their resilience, in light of their current dynamics and critical thresholds, where such thresholds are known.

In order to ensure EGS concerns receive sufficient policy traction, IEAs could be a major instrument for building an ecosystem and human well-being case for EGS. This requires making use of economic valuation results for EGS, as discussed earlier, and presenting these results in parallel with physical EGS status indicators.

As described earlier in this report, there is a growing tradition of country-specific 'place-based' assessment, often with the

involvement and support of international organisations, such as UNEP, WWF, or IUCN. IEAs based on a UNEP approach have been published by a growing number of countries, and could serve as a useful vehicle for more explicitly addressing EGS issues. Country Environmental Analyses by the World Bank, EU or national donors could also explicitly target EGS. CEAs are prepared with the World Bank's assistance in poor developing countries, and could be particularly useful in expressing EGS concerns in economic terms for non-environmental interests.

7.6 Strengthening Accountability: Standards and Certification Schemes

Certification can be used to confirm whether a product meets certain standards or characteristics. Usually (although not always) certification is provided through an external assessment. Certification schemes may include labels that are then displayed on the final product or in accompanying documentation to be shown at country borders or to retailers or manufacturers. In the EGS context, certification could be used to attest the environmental sustainability of a product.

Some existing certification schemes focus on the entire life cycle of the product (such as the German certification scheme 'Blue Angel'), while others target certain aspects. *Production*-related certification schemes are most widely used. Examples include the Forest Stewardship Council and Marine Stewardship Council certification for timber and fish from well-managed sources. Certification can also be used to denote that the traded product has been obtained legally, for instance, under CITES in the case of endangered wildlife. Another example is certification of agricultural goods produced with organic farming methods.

Environmental certification schemes are often voluntary and led by the private sector (including producers, processors and retailers) or NGOs. From a business perspective, producers hope to gain a price premium for certified products or increase their market share vis-à-vis their uncertified competitors. Among the government-led schemes, some are mandated by international agreements, such as documentation requirements for international trade in living modified organisms under the Cartagena Protocol on Biosafety. Others may be bilaterally agreed, such as under the Voluntary Partnership Agreements between the European Union and timber supplying countries, which require timber exports to be certified as being legally sourced (FLEGT). Unilateral certification schemes may also be used, such as a new requirement in the EU that any fish product entering the European market needs to be certified as legally obtained. Governments can also encourage the use of certified products through their public procurement policies. Mandatory government-driven schemes, however, are less commonly used than voluntary private schemes, because of concerns that they may be contested under WTO rules.

Among the challenges posed by such certification schemes is their diversity, given that countries – and supermarkets and manufacturers within them – often subscribe to different schemes. International cooperation between governments and industries can help to promote greater coherence between the schemes, for instance, in the context of MEAs (e.g. CITES, the Cartagena Protocol or the UNFCCC), international standard-setting bodies (such as the International Standards Organisation) or umbrella certification schemes (such as the Programme for the Endorsement of Forest Certification, which supports the assessment of and mutual recognition of national forest certification schemes). Compliance with certification requirements will also be facilitated by ensuring transparency and participation of stakeholder groups in the development of the schemes' criteria and approval procedures.

There are three aspects of standards that are particularly important, from the perspective of international policy tracks. In principle, all three can be applied on the international level, but given that standards often cut across national borders, they are well suited for international coordination and action.

First, there is a need to ensure that standards and certification schemes explicitly incorporate EGS perspectives. The process requires careful consideration of the EGS implications of production in a given sector, while allowing for sufficient flexibility to make sure ESG issues associated with production in different types of ecosystems can be covered.

Second, the impacts associated with production practices that fall under the auspices of particular standards need to be monitored and verified, both to ensure that the standard indeed delivers on the criteria and to help compare it with the effects of non-certified production.

Third, at some point, standards may need to be harmonised, to assure comparability and to prevent confusion on the part of all market actors. Efforts are already under way in some cases to develop common protocols, for example, those by the ISEAL Alliance in the food industry (Liseed Consulting 2008). Because of the complexity of the science and vested interests in already introduced practices, this is a complicated process, but – when and wherever this takes place – it will be particularly important to ensure EGS perspectives are regarded.

The international actors most directly affected include the standard-setting bodies themselves and those providing audit services for them. International organisations involved in or affected by policies under fair trade, organic production and other types of schemes (e.g. FAO, WTO) would be in a good position to review these mechanisms from the EGS perspective and provide guidance.

7.7 Supporting Implementation: CBD-related frameworks

The CBD has been active in trying to mainstream EGS in various policy domains. Mechanisms under the CBD have the advantage that given the CBD's mandate and biodiversity's essential role in influencing EGS, they can most directly target EGS delivery. Their weakness is that the CBD has a weak or no mandate in the context of influencing those economic development-related factors that are some of

the most important determinants of EGS. The mechanisms available under the CBD most often fall under the authority of environment ministries that have limited influence when compared with other departments with significant EGS impact, such as agriculture, forestry, finance or trade. The point is not to argue that tools and mechanisms under the CBD are inadequate or ineffective, but to highlight the importance of keeping their expected influence in perspective.

Biodiversity mainstreaming in international policy processes and at the national/local level has been a key obligation for CBD parties since the Convention's entry into force. A number of initiatives aim at enhanced cooperation among different international processes to improve policy coherence, and a number of tools have been, or are being developed, to that regard. CBD implementation at the national level is to be achieved mainly through development of NBSAPs and then by national legislation, with cross-sectoral biodiversity mainstreaming specifically provided for in the text of the Convention itself (Article 6(b))[1]. However, both tasks are inherently complex and a variety of challenges remain.

At the international level, a number of initiatives have been successful in achieving improved cooperation between multilateral environmental agreements, in particular the CBD, UNFCCC and UNCCD, but also other biodiversity-related Conventions, such as CITES, the International Treaty on Plant Genetic Resources for Food and Agriculture and the Ramsar Convention on Wetlands. Such initiatives include establishment of the Joint Liaison Group between the three Rio Conventions and the Liaison Group of Biodiversity-related Conventions, two informal fora for exchanging information, exploring opportunities for synergistic activities and increasing coordination, mainly at the Secretariat level. They provide a useful example of inter-agency cooperation and collaboration, although it has to be said that, with all their members being multilateral environmental agreements, they are not faced with resolving inherent tensions between different subject matters. It is clear that in cases where such tensions arise, collaboration is lacking. Already in the case of UNFCCC, the CBD has found it challenging to get its message across, that biodiversity through the EGS it provides makes an important contribution to both mitigation and adaptation to climate change. This is despite its recent substantive involvement in the UNFCCC process, mainly through provision of scientific and technical advice on the integration of biodiversity concerns into climate change-related activities.

Integration of biodiversity concerns into other sectors, including development or trade processes, has been even less successful, so far. The fact that environmental protection is still considered an impediment to the achievement of development or trade goals, a lack of understanding of the importance of EGS for achieving such goals, and the weak political clout of the CBD and environmental institutions, in general, compared to those for trade and development, are some of the reasons for such failure. Furthermore, the CBD lacks in active involvement in such processes, which could potentially assist in rectifying the situation: in several WTO Committees for instance, the CBD Secretariat has not been granted observer status despite its repeated applications.

Implementation of the CBD at the national level and particularly cross-sectoral biodiversity mainstreaming remains a major challenge. Unlike older MEAs, such as CITES, which includes very specific requirements and trade restrictions related to specific lists of species, the CBD includes only general provisions as a means for achieving its three objectives. And although the Convention is legally binding, it provides a significant degree of flexibility to national governments for implementation in light of domestic circumstances. Such flexibility is further increased by qualifiers in its provisions, such as 'as far as appropriate' or 'subject to national legislation'. Implementation is then dependent on available financial resources, technologies and know-how, putting biodiversity-rich developing countries in a disadvantaged position. Finally, lack of a compliance mechanism results in the CBD having less 'teeth' compared to other international processes, such as the WTO with its non-compliance and dispute settlement mechanism; and makes national implementation a matter of political commitment, which may be lacking.

Putting such challenges aside, years of deliberations and policy-making in the CBD and MEAs, in general, have resulted in a set of tools, best practices, guidelines and regulations that could be used as a model for mainstreaming EGS into policy processes from the international to the local level.

The Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity, developed in the CBD framework, are of relevance not only to biodiversity-related conventions but also to other sectors, sustainable use being a concept linking environment and development considerations. They consist of fourteen interdependent practical principles, operational guidelines and a few instruments for their implementation that govern the uses of components of biodiversity to ensure sustainability and contribute to poverty alleviation, thus providing a framework for action by governments, resource managers, indigenous and local communities, and the private sector.

Many of the principles highlighted above are also included in the ecosystem approach, the primary framework for action under the CBD. Of particular relevance to this report, the ecosystem approach focuses also on governance issues, calling for: ensuring intersectoral cooperation; management actions at the appropriate scale, with decentralisation to the lowest appropriate level; enhancing benefit-sharing; and use of adaptive management practices. An Ecosystem Approach Sourcebook is under development on the CBD website, created as a tool to help practitioners implement the ecosystem approach and share experiences. Currently including a case study database, the sourcebook will

1 Article 6(b) states that each Contracting Party shall, in accordance with its particular conditions and capabilities, integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes or policies.

eventually also include various tools and techniques that can be used to implement it.[2]

The ecosystem approach is a valuable tool for integration of EGS concerns into national planning processes; however, knowledge on its application remains limited and capacity building is still required. An effective legal framework is also a necessary condition for its application.

National biodiversity strategies and action plans (NBSAPs) are the basic tool for CBD implementation at the national/local level, including biodiversity mainstreaming. NBSAPs should provide for integration of biodiversity considerations into all relevant economic sectors, in particular through tools, such as the environmental impact assessment and the strategic environmental assessment. Enactment of biodiversity-related legislation would provide the administrative and procedural elements required for achieving the NBSAP targets. Cross-sectoral communication and use of the NBSAP is then necessary for integration of biodiversity considerations into the drafting of sectoral legislation with potential impact on EGS.

According to recent reviews of their effectiveness by the CBD Secretariat, however, NBSAPs are not used to their full potential, due to a variety of reasons, ranging from poor integration of the ecosystem approach and limited integration of biodiversity concerns into broader planning processes to lack of specific funding provisions and effective communication outside the environment sector. Lack of mainstreaming in particular has been identified as one of the major obstacles to NBSAP implementation.[3] Although achievement of the second and third CBD objectives

2 See http://www.cbd.int/ecosystem/sourcebook/.

3 See for instance 'Synthesis and Analysis of Obstacles to Implementation of National Biodiversity Strategies and Action Plans: Lessons Learned from the Review, Effectiveness of Policy Instruments and Strategic Priorities for Action' (UNEP/CBD/WG-RI/2/2/Add.1), discussed at the second

Text box 7.1 Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity

Practical principle 1: Supportive policies, laws and institutions are in place at all levels of governance, and there are effective linkages between these levels.

Practical principle 2: Recognising the need for a governing framework consistent with international/national laws, local users of biodiversity components should be sufficiently empowered and supported by rights to be responsible and accountable for use of the resources concerned.

Practical principle 3: International and national policies, laws and regulations that distort markets which contribute to habitat degradation or otherwise generate perverse incentives that undermine conservation and sustainable use of biodiversity, should be identified and removed or mitigated.

Practical principle 4: Adaptive management should be practiced, based on: science and traditional and local knowledge; iterative, timely and transparent feedback derived from monitoring the use, environmental, socio-economic impacts, and the status of the resource being used; and adjusting management based on timely feedback from the monitoring procedures.

Practical principle 5: Sustainable use management goals and practices should avoid or minimise adverse impacts on ecosystem services, structure and functions as well as other components of ecosystems.

Practical principle 6: Interdisciplinary research into all aspects of the use and conservation of biological diversity should be promoted and supported.

Practical principle 7: The spatial and temporal scale of management should be compatible with the ecological and socio-economic scales of the use and its impact.

Practical principle 8: There should be arrangements for international cooperation where multinational decision-making and coordination are needed.

Practical principle 9: An interdisciplinary, participatory approach should be applied at the appropriate levels of management and governance related to the use.

Practical principle 10: International and national policies should take into account: current and potential values derived from the use of biological diversity; intrinsic and other non-economic values of biological diversity; and market forces affecting the values and use.

Practical principle 11: Users of biodiversity components should seek to minimise waste and adverse environmental impact and optimise benefits from uses.

Practical principle 12: The needs of indigenous and local communities who live with and are affected by the use and conservation of biological diversity, along with their contributions to its conservation and sustainable use, should be reflected in the equitable distribution of the benefits from the use of those resources.

Practical principle 13: The costs of management and conservation of biological diversity should be internalised within the area of management and reflected in the distribution of the benefits from the use.

Practical principle 14: Education and public awareness programmes on conservation and sustainable use should be implemented and more effective methods of communications should be developed between and among stakeholders and managers.

Source: http://www.cbd.int/sustainable/addis-principles.shtml

(sustainable use of biological diversity, and fair and equitable sharing of benefits) makes mainstreaming imperative, the review of NBSAPs suggests that most governments use them as a planning framework for conservation activities. Integration is lacking because of a number of reasons, including the low profile of the NBSAP; priority of economic interests; inadequate coordination among agencies or lack of clear distribution of responsibilities; lack of human and financial resources; lack of legislation; and lack of awareness.

Finally, a tool under development which could strengthen cooperation at the international level and at the same time enhance MEA implementation at the national level is harmonised reporting (see UNEP-WCMC, 2009). Harmonised reporting could not only build on issues of relevance to several conventions, demonstrate compliance, including the enactment of appropriate legislation, and develop an overview of implementation, projects and financial matters at the national level, but it could also assist with development of a single, comprehensive product, easy to transmit to other than the environment sectors.

7.8 Key Findings and Recommendations

Mainstreaming EGS into international policy requires tools that can help positively influence the ability of the environment to deliver EGS and to contribute in measurable ways to human well-being. Identifying these tools can build on experience with tools and concepts that help mainstream the environment into decision-making in general, but these tools must be of particular benefit to improving the availability of specific tools and services.

Tools can be applied in different stages of the management cycle, whether planning, implementation or assessment. There are several tools available for each stage. Selecting new policy tools that promote EGS or adjusting existing ones, need to be based on a careful analysis of their impacts to avoid surprises. This may be particularly the case for non-environmental initiatives where environmental impacts may be more indirect and hidden, even if just as real. Rather than addressing EGS issues only in one stage of the policy cycle, introducing relevant tools is several stages of the cycle may help to develop and capitalise on synergies, as far as positive impact on EGS is concerned. Considering the multi-dimensional nature of many EGS problems, looking for synergies that can be achieved only through multiple interventions may be the only choice to achieve real change.

Tools can help articulate costs and opportunities or benefits, both in quantitative and qualitative ways. Portfolio screening by large institutional investors in industries that cause serious EGS damage could be a strong incentive for companies to take social and environmental responsibility more seriously into account. On the opportunities side, certification and standard schemes that factor in EGS elements may help not only to mitigate EGS related risk, but also to access higher value added 'green' markets.

Articulating the value of EGS for human well-being in economic terms is a growing area with significant potential, but with still continuing methodological challenges as far as the operational, routine use of up-to-date valuation data is concerned. Economic valuation of EGS and rolling these values up to ecosystem sales and higher totals is important, and could be complemented and verified by non-monetary EGS indicators.

An important criterion of using the reviewed tools successfully is the importance of adapting them to the specific context. One size does not fit all. For instance, assessment that takes EGS into account would need to be customised according to the existing institutional capacity and level of development of a country to ensure recommendations are realistic. Realistic in this sense means not only what measures are affordable in economic terms, but also what must happen in order to ensure no critical environmental thresholds are crossed.

Considering the inherent complexity of connections between international policies and local level EGS outcomes, it is reasonable to expect not only successes with tools and policies but also failures. While the risk of failure should certainly be minimised, particularly in cases where irreversible EGS impacts can be expected, it is equally important to have adaptive mechanisms in place, so that tools can be adjusted and modified as information about the effectiveness becomes available. This requires, among other things, a close monitoring of the results of their impacts on EGS delivery and the conditions of underlying ecosystems where impacts on EGS may appear earlier, and flexible policy mechanisms where change and learning is expected and embraced (Swanson and Bhadwal, 2009).

meeting of the CBD Working Group on Review of Implementation (July 2007, Paris, France); and COP Decision IX/8.

8 Conclusions

The goal of this study is to increase understanding of the importance of international policy mechanisms in sustainably delivering EGS for the benefit of human well-being. The report explored the linkages between local delivery of selected EGS and priority international policy domains, to show the potential for advancing their sustainable management through specific international policies. The main emphasis in the analysis is thus on identifying options and conditions for mainstreaming strategies for EGS in various international policy domains. While ecosystem services are more likely to be explicitly addressed in environmental and biodiversity policies, these policy domains often have only limited influence on the behaviour of economic actors. Therefore, we broadened the analysis of policy options beyond the domain of environmental and biodiversity policies, to also include development assistance, trade, investment, and climate policy that may set the broader context for national and local measures.

The main findings of the study can be summarised as follows:

This study shows that integrating EGS into various international policy domains conveys significant opportunities for improving EGS delivery at the local level. The study also shows the risks of not doing this. The basis for mainstreaming EGS can be found in many goals and policies already agreed upon by governments. This is clear, for instance, in MDG implementation and the REDD programme. The REDD debate provides clear evidence of the linkage between global policy objectives (carbon sequestration) and local ecosystem services (leakage, agriculture, forest ecosystem function).

This study shows that EGS can contribute to international policy objectives. Sustainable management of local EGS is for example very important to the achievement of global (climate) policy objectives. In this case, the realisation of the global objective is a direct result of local ecosystem function. Ecosystem goods and services are also important to trade and for poverty reduction and development as supported by ODA or IFI's; illustrating the need for a coherent international policy framework.

While most management decisions affecting ecosystem services are made at a local level, these local decisions are conditioned by national and international policies. Because the impact pathways of international policies are mediated by the national and local contexts, direct attribution of causation is challenging. The enabling policy conditions for local ecosystem management reforms, however, can be generalised to allow better targeting of higher-level policies. They include institutional reforms ensuring resource tenure and access, especially for common pool resources, ensuring fair returns to producers, and providing information and incentives for application of new knowledge in management decisions.

The concept of EGS is now well-entrenched in the scientific literature, but there is scant evidence for its proactive use in international policy design. Despite the well-documented problems and the emerging evidence of linkages between EGS and various international policies, the treatment of EGS in international policy mechanisms is still ad hoc, at best. Reasons for this include the relative novelty of the concept and the difficulty of bridging practices on a scale, ranging from local to global. The problems are further hampered by the lack of a well-articulated, practical and easy-to-communicate conceptual framework for EGS and clear examples of operational mechanisms linking these endeavours on the various scales, as well as by the lack of supporting information that can be monitored transparently. A final barrier is that the accrued benefits from ecosystem exploitation are enjoyed by a different group of people than those who are bearing the costs of EGS degradation. Often these differences cross national and generational boundaries. Different actors and countries have different motivations for taking policy action, and strong international consensus is (still) absent.

There are clear opportunities for mainstreaming EGS in international policy domains that can support poverty reduction through EGS delivery. These require however careful consideration, as many of the identified policy opportunities can act as a double-edged sword: depending on ecological, institutional, cultural, or economic policy context, they may have either positive or negative impacts on the poor and (sustainable) management of EGS. This study confirms the need for consistent policies across scales, based on assessment of local conditions. Local analysis is a crucial starting point because this is the level at which poverty reduction and sustainable ecosystem management need to be effective. This requires early and genuine engagement of local people in tracking EGS and the potential impact of policies. Policy coherence is also critical; while individual policies matter, a constellation of policies on every scale and policy domains will typically be needed for consistent positive impact. We have demonstrated several ways to incorporate

EGS in various policy domains, including those of poverty reduction, climate change, trade, and the role of international financial institutions.

Mainstreaming EGS is starting to happen. Some early initiatives are underway to identify options for guiding decision-making at different levels, to better attend to ecosystem goods and services. New opportunities are also emerging in the context of policy regimes such as the REDD programme, poverty reduction, and sustainable development strategies, as well as through certification schemes in trade, and new tools, such as full cost accounting and payments for ecosystem goods and services. Positive poverty reduction and EGS outcomes cannot be taken for granted and require careful policy design, monitoring and corrective measures.

Considering the inherent complexity of connections between international policies and local level EGS outcomes, it is reasonable to expect not only successes with tools and policies but also failures. While the risk of failure should certainly be minimised particularly in cases where irreversible EGS impacts are possible, it is equally important to have adaptive mechanisms in place, so that tools can be adjusted and modified as information about the effectiveness becomes available. This requires, among other things, a close monitoring of the results of their impacts on EGS delivery and the conditions of underlying ecosystems where impacts on EGS may appear earlier, and flexible policy mechanisms where change and learning is expected and embraced.

The arguments for mainstreaming, put forward in this report, could likely be extended to other policy domains, including those of public health, peace and security, migration and food security. With regard to public health, well-functioning ecosystems may provide not only nutrition, but also medicines. Securing access and benefit-sharing rights with regard to natural medicine can be an important mechanism for recognising the value of EGS maintenance for local communities. Monitoring and early warning of EGS crises may be important in averting conflict, just as capacity development for rebuilding EGS that directly meet basic human needs may be part of peace-building strategies. And recognising EGS as part of the multi-functionality of agro-ecosystems may increase their economic value, and the economic resilience of farmers. Several of the tools reviewed in the report provide additional opportunities for mainstreaming EGS into these additional policy domains.

The Convention on Biological Diversity (CBD) could play an important role in mainstreaming EGS, but its current mandate to influence other sectors is too weak to do so. The CBD has been actively trying to mainstream EGS into various policy domains, but with limited success. Given the CBD's mandate and biodiversity's essential role in influencing EGS, mechanisms under the CBD have the advantage of already having been agreed on by governments, and of being able to directly target EGS delivery. Their weakness, however, is that the CBD has limited influence on underlying economic factors that strongly affect EGS outcomes. The CBD Secretariat and Conference of the Parties have a role in providing further practical guidance to NBSAP development and implementation, as well as providing elevation of their status and focus on their potential for mainstreaming. The process for the revision of the Convention's Strategic Plan beyond 2010 provides a good opportunity in that regard.

CBD tools could support mainstreaming EGS in other policy domains. Biodiversity mainstreaming has been a key obligation for CBD parties since the Convention's entry into force, and a number of initiatives and tools have been developed with regard to both the international and the national/local level. Lessons learnt from their implementation, so far, indicate that an objective, such as mainstreaming of EGS, cannot be left to the constituency supporting conservation objectives alone. If key decisions affecting EGS are mainly taken by other bodies, there is an urgent need for emphasis on raising awareness, both for the general public and among decision makers in relevant policy domains. A mainstreaming and communication strategy should therefore be a vital component of National Biodiversity Strategies and Action Plans (NBSAP). Acknowledging that most countries still view environment and development as contradictory objectives, a focus on the economic value of biodiversity, and its relevance to human well-being through the provision of EGS, could generate broader political support for the NBSAP and, therefore, assist in integration. Furthermore, inter-sectoral participation in the NBSAP preparation should increase awareness of EGS issues outside the traditional environment agency and build support for implementation.

Methodological lessons and further research questions There are very few international policy mechanisms intended to have direct effects on local ecosystem services (the REDD programme is one of these). As a result, the methodology we have had to apply focuses mostly on *unintended* effects of policies, and on scales at which policy effects are normally not measured. It is not surprising that there is limited direct evidence of cause-effect linkages between scales, making attribution a challenge. This experience suggests that, for key policy domains where EGS are particularly important, it would be worthwhile investing in both better strategic assessment, and in developing relevant indicators at multiple scales of policy effects during implementation. Further *ex-post*, perhaps place-based, research can track impacts on all scales, and analyse policy coherence. *Ex-ante* analysis is necessary to identify the potential for simultaneous EGS and poverty reduction benefits in the context of specific policy regimes. A special issue of concern is the need to analyse the risks of leakage or impact displacement (poverty or EGS related) associated with specific policy regimes focused on a single EGS issue.

This report has shown that to secure the essential services provided by ecosystems, policy responsibilities must be equally broadly based. Most economic sectors and actors have a direct effect on local ecological integrity. Governments have already committed to much of this through the CBD. International policies dealing with these sectors need to consider these effects, and responsible agencies need to be made accountable for reducing their unintended impacts. But the necessary accountability and compliance mechanisms have not yet been put in place.

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Mainstreaming Ecosystem Goods and Services into international policies provides significant opportunities to contribute to reducing poverty

Degradation of ecosystems worldwide threatens local and regional supplies of food, forest products and fresh water, and also biodiversity. Although most decisions that directly affect ecosystem management are made locally, these decisions are influenced by national and international policies.

This study shows how local delivery of ecosystem goods and services (EGS) is closely linked to international policies on development cooperation, trade, climate change and reform of international financial institutions. Integrating or mainstreaming EGS considerations into these policies provides significant opportunities for reducing poverty while simultaneously improving the quality of local EGS. Furthermore, mainstreaming EGS in international policies can contribute significantly to achieving policy objectives on biodiversity and sustainable management of natural resources. However, mainstreaming EGS requires careful consideration because many of the opportunities identified can reduce poverty, but may have the opposite effect if poorly managed or implemented. A major challenge is, therefore, to ensure consistent policies across scales and policy domains based on analysis of the local situation. In order to support poverty reduction it matters how the mainstreaming is done and who benefits locally. Tools to mainstream EGS into non-environmental policy domains are available but there are few examples of their systematic application.

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