

The GLOBE Natural Capital Legislation Study

**A Review of Efforts towards Natural Capital Legislation
in Eight Countries**

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Abbreviations

BISE	Biodiversity Action Plan for Europe
CBD	Convention on Biological Diversity
CI	Conservation International
COP	Conference of the Parties
CRES	Compensation and Rewards for Ecosystem Services
EC	European Commission
EEA	European Environment Agency
EIA	Environmental Impact Assessment
ESV	Ecosystem Service Valuation
EU	European Union
GDP	Gross Domestic Product
GIS	Geographic Information System
GLOBE	Global Legislators Organisation
GNCI	GLOBE Natural Capital Initiative
HDI	Human Development Index
IAS	Institute of Advanced Studies
IFC	International Finance Corporation
IMF	International Monetary Fund
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IWI	Inclusive Wealth Index
IWMI	International Water Management Institute
IWR	Inclusive Wealth Report
MA	Millennium Ecosystem Assessment
MDG	Millennium Development Goal
NBSAP	National Biodiversity Strategy and Action Plan
NC	Natural Capital
NESS	National Environment Statistics System
NVI	Natural Value Initiative
OECD	Organisation for Economic Cooperation and Development
PEER	Partnership for European Environmental Research
PES	Payments for Ecosystems Services
SDG	Sustainable Development Goal
SEEA	System of Environmental-Economic Accounting
SNA	United Nations System of National Accounts
TEEB	The Economics of Ecosystems and Biodiversity
TNC	The Nature Conservancy
UNCEEA	United Nations Committee of Experts in Environmental-Economic Accounting
UNCSD	United Nations Conference on Sustainable Development, “Earth Summit”
UNDP	United Nations Development Program
UNEP	United Nations Environment Program

UNSC	United Nations Statistical Commission
UNSD	United Nations Statistical Division
UNU-IHDP	United Nations University – International Human Dimensions Programme
WAVES	Wealth Accounting and the Valuation of Ecosystem Services
WRI	World Resource Institute

Foreword

Natural capital is wealth.

“Nothing” is precisely the value that wealth accounting procedures have placed on Natural Capital. As a consequence, governments are still failing to take proper account of the threats and opportunities that natural capital represents to our countries’ economies. Any erosion of nature’s capacity to deliver ecosystem products and services has an immediate and damaging effect on our economic progress. A decline in forest cover can affect everything from food security to our flood protection; a decline in insect populations can affect the yield of our crops as we lose the pollination service they provide.

Were economists and governments to apply conventional economics to the loss of these services, they would amount to several percentage points of GDP. If we were to take account of their impact on the delivery of major public policy goals – such as job creation and economic growth, climate change mitigation and adaptation, energy security, and health and wellbeing – the urgency with which we should be acting to reduce such losses would become all too clear.

The Economics of Ecosystems and Biodiversity (TEEB) recently estimated that the costs of cumulative losses of ecosystem services in the 50-year period to 2050 will be equivalent to 7% of GDP. It is clear therefore that the protection and enhancement of nature can no longer remain the preoccupation of environment ministries. The state of natural capital must be of utmost importance to finance ministers as well.

As the recently published *Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda* has highlighted, natural capital must also be at the heart of the post-2015 development agenda. The Post-2015 Development Goals and Sustainable Development Goals should clearly articulate the importance of natural capital to prosperity and poverty reduction. This will help ensure that the use of natural resources in the pursuit of economic development does not lead to perverse outcomes that undermine the human economic well-being we are striving to create.

At the 1st World Summit of Legislators held in Rio de Janeiro in 2012, 300 legislators from 86 countries adopted the GLOBE Natural Capital Action Plan, which outlined a number of practical steps that legislators can follow to ensure that the value of ecosystem services is integrated into policy-making procedures across all government departments. Importantly, the Action Plan recognised the crucial role that legislators can play in creating the sustainable structures necessary to support natural capital accounting, as well as ensuring that the information produced is integrated into decision-making processes.

One of the advantages of the natural capital approach is that each country can develop their own national system without the need for complex international negotiations or financial transfers. Over time, it will be important to develop common approaches and standards for the valuation of ecosystem services. This is an agenda that can be controlled nationally through policy and legislation appropriate to the circumstances of each country. This is why legislators are uniquely placed to advance it.

The concept of accounting for nature has been around for decades. However, as we can see from this 1st GLOBE Natural Capital Legislation study, progress with implementation is slow. While the technical and academic understanding of how to value the natural world continues to improve, the political and economic structures necessary for integrating these values into national accounting and policy-making processes remain weak although improving in the study countries.

The missing link is political leadership. That is why we have planned the publication of this study to coincide with the launch of an important new policy process – the GLOBE Natural Capital Initiative (GNCI). The first phase of the GNCI will work with legislators in a leadership group of 20 countries participating in the launch in Berlin, including the eight study countries of Botswana, Colombia, Costa Rica, Georgia, Germany, Peru, the Philippines and the United Kingdom, to support the integration of natural capital into national accounting and policy-making processes.

It will also provide a valuable platform for legislators to discuss the challenges and opportunities associated with integrating natural capital into national accounting and policy-making processes, and its implications for long-term economic growth. Through the GNCI legislators will have an opportunity to share ideas about how their legislative, oversight and budgetary functions can be used most effectively to advance the natural capital approach.

Incorporating the value of natural capital into the framework of national accounting will help governments identify, reduce and mitigate the real economic risks associated with the depletion of natural resources. It will help them identify opportunities for the protection and restoration of the natural environment that are crucial if present and future generations are to enjoy continued economic growth.

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Summary and conclusions

Over 20 years ago, at the 1992 Earth Summit in Rio de Janeiro, 178 governments adopted a programme of action for sustainable development.¹ Recognising the crucial role of the environment as a source of natural capital, governments agreed to establish systems of integrated environmental and economic accounting. Whereas for most of the last 20 years progress has been slow, this study shows that significant steps have been taken, both at the international and national level, during the last decade.

This study introduces natural capital as the basis for all economic activity. It summarises the benefits and methods of valuing natural assets in their crucial role of providing natural resource inputs and environmental services for economic production. This study reviews international efforts towards valuing ecosystem services, followed by an account of the measures taken by eight countries towards natural capital accounting. As the first such assessment of national approaches to natural capital accounting, the study provides legislators with a wealth of information about how governments around the world are responding to the challenge of natural resource depletion. Making use of its findings, legislators have a better opportunity than ever to mobilise national support for the implementation of natural capital accounting.

The concept of accounting for natural capital has been around for more than 30 years. However, progress in moving beyond conceptual thinking and experimentation toward implementation has been slow. The Millennium Ecosystem Assessment, a landmark study published in 2005, documented the largely declining state of global ecosystem services, noting their past benefits for people and current unsustainable use and degradation. The subsequent TEEB reports in 2009, which document the economic benefits of biodiversity and the cost of ecosystem degradation, along with the 2009 Stiglitz Report, the 2010 GLOBE Natural Capital Action Plan and the 2010 CBDs Aichi Targets, all urged governments to include the value of natural capital in national accounts.

¹ Agenda 21: A Programme for Action for Sustainable Development.

Natural capital is a critical asset, especially for low-income countries where it makes up a significant share (36%) of total wealth. It is important that legislators can explain natural capital accounting as a way of providing detailed information for better management of the economy. This needs to be done in a way that is coherent internationally but also resonates at home with a public concerned about seeing the more immediate benefits of economic growth.

Over the last three years international agencies have begun to respond to this challenge. The World Bank WAVES programme launched in 2010, the adoption in the EU of regulations on environmental-economic accounting in 2011, the approval of System of Environmental-Economic Accounting (SEEA) as an international standard, and the creation of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) in 2012 all point to a growing global commitment to better understand and value the benefits of nature to human well-being and economic development. This was reinforced by declarations on natural capital accounting by countries, legislators, financial institutions and NGOs in Rio and Gaborone in 2012.

The eight countries reviewed in this study have all made significant strides towards recognising the value of the natural environment in policy and economic decision-making. The history of payments for ecosystem services (PES) schemes in Colombia will provide a strong foundation for work that is underway to develop sets of satellite environmental accounts. Similarly, the government of Peru recently produced a first version of a guide to implementing satellite environmental accounts. Peru also require that all Environmental Impact Assessments (EIA) include ecosystem service valuations, which is a positive example of how to embed environmental value into the making of policy.

As one of the first countries to create natural resource accounts, Costa Rica is now planning to produce pilot natural capital accounts. The Costa Rican Government has also integrated its Ministry of Environment with water, forests and mining to ensure that formerly competitive departments co-operate better. As with Colombia and Peru, Costa Rica also has a number of successful PES projects.

During the 1990s and early 2000s, the Philippines were one of only a few countries working to develop environmental accounts. With little implementation over the last decade, the Philippine government is now working to strengthen the institutionalisation of economic-environmental and natural resource accounting, as well as developing ecosystem accounts for fisheries, coastal and marine ecosystems and minerals.

If projected growth rates of 4.8% in 2013 and 5.3% in 2014² are to be maintained, Africa will need to protect and enhance its natural resource base. Botswana is one of the continent's best examples of how to harness natural resources effectively. Since becoming one of the first countries to pilot national environmental and natural resource accounting in the 1990s and early 2000s, Botswana is now working on natural capital accounts in a number of priority sectors, including energy and minerals, water and land/ecosystems. This is also true in Georgia, where the environment and natural resources are part of the national accounting system.

The UK National Ecosystem Assessment is notable as one of the first national studies of the benefits that nature provides to society and economic prosperity. The subsequent Natural Capital White Paper includes a commitment to reform national accounts so that, by 2020, they also reflect the country's natural wealth. Germany is also recognised as an international leader, both through the EU and support for programmes and studies such as TEEB reports, and through the integration of ecosystem values into national sustainable development policy since 2002.

While it is clear that all eight countries assessed have made strong commitments towards natural capital accounting, no one country has as yet successfully integrated the true value of natural capital into national accounts and economic policy making. Having completed an assessment of national approaches to natural capital accounting, we have reached the following conclusions:

- All eight countries are moving beyond thinking and experimentation towards the proper integration of natural capital into national accounting and policy making process.
- None of the countries is advancing comprehensively on all the necessary fronts – wealth accounting, development of national ecosystem assessments, valuation of ecosystem services and institutional and legislative reform.
- The most comprehensive natural capital-specific policies are to be found in developed countries, although these are nonetheless failing to carry out a comprehensive overhaul of policies affecting natural capital. The unsuccessful “structural greening” of the EU Common Agricultural Policy is one such example.

² African Economic Outlook 2013.

- Substantive progress is taking place in emerging economies, which shows how natural capital accounting is increasingly understood as an indispensable instrument supporting decision-making towards sustainable and inclusive socioeconomic development. In particular, the popularity of payment per ecosystem services programmes in developing countries is a testament to the increased awareness of the linkages between environmental protection and sustainable economic development.

A thorough understanding of how current and potential policies impact on the environmental services upon which well-being and economic prosperity depend is essential for long-term sustainable growth. Natural capital accounting is a useful and globally recognised tool.

To this end, GLOBE makes the following recommendations based on the findings of the study:

- Legislatures should begin to develop natural capital accounting legislation;
- All government departments should prepare inventories of the natural capital and ecosystems that fall within their remit or are affected by their policy decisions;
- A ministerial position should be created within the Finance Ministry to work with the department of environment in assessing the value of natural capital in departmental inventories and regulating the use of the country's natural wealth;
- The national Finance Ministry should develop a set of Natural Capital Accounts that is accompanied by an annual report that outlines the status of biodiversity, ecosystem services and natural capital, as appropriate, and
- National audit offices should adopt the natural capital approach when examining the effectiveness and efficiency by which government departments use their resources and apply cost–benefit analyses.

Unquestionably, there is still a long way to go before natural capital is mainstreamed within our national accounting across the world. However, as this study shows, the direction of travel is clear and the eight countries covered in this study are helping to lead the way.

Table 1: Progress in Natural Capital Accounting

Key:



Significant Progress





Positive Progress






Limited Progress






Negative Progress

Country	National Ecosystem Assessment	Primary National Policies for Nature Conservation	Primary Method for Recognising the Value of Natural Capital in Policy Making	Commitment to Valuing Natural Capital in National Accounts	Existing Governance	Progress & Future Outlook
Botswana	One of 19 countries included in the Southern African Millennium Ecosystem Assessment.	Botswana Biodiversity Strategy and Action Plan (2007). Signatory of the Gaborone Declaration.	Sustainable Budget Index, which monitors mineral revenues. Payments for Ecosystem Services (PES) schemes.	WAVES Phase 2 (2012-2015) identified four priority sectors for natural accounting (energy and minerals, land/ecosystems, water and macroeconomic indicators).	Botswana Steering Committee for WAVES.	 Long recognised importance of natural resources to the economy. Currently working with WAVES to develop accounts for four priority sectors.
Colombia	Regional assessments only.	National Policy for the Integrated Management of Biodiversity and Ecosystem Services (2011). Natural Capital Strategy (2010).	Regional and local PES schemes. Working with the Natural Capital Project to Generate information on natural capital that will guide and inform decision making.	Piloted environmental accounts since 1992 Recently started the process of introducing satellite environmental accounts to the official statistics.	Green Accounting Committee, which was established by UNDP. However it meets infrequently.	 Long history of PES schemes. Currently developing satellite environmental accounts.

Country	National Ecosystem Assessment	Primary National Policies for Nature Conservation	Primary Method for Recognising the Value of Natural Capital in Policy Making	Commitment to Valuing Natural Capital in National Accounts	Existing Governance	Progress & Future Outlook
Costa Rica	No national ecosystem service assessment.	National Biodiversity Strategy and Action Plan.	PES schemes.	Working with WAVES to produce pilot natural capital accounts. Assets accounts will be produced for water, forests and marine resources.	WAVES pilots will be led by a Steering Committee, which includes the environment Ministry and the Central Bank of Costa Rica.	 <p>Long history of PES schemes. Currently developing pilot natural capital accounts.</p>
Georgia	TEEB scoping study of the value of ecosystems and biodiversity in Georgia will be published in 2013. Regional assessments have been completed for specific ecosystems.	National Biodiversity Strategy and Action Plan.	None.	Georgia's 2005 National Biodiversity Strategy and Action Plan recommends "mainstreaming nature's value in decision making".	Ministry of Environment and Natural Resources and the National Statistics Office have lead responsibility environmental accounting.	 <p>Should build from the TEEB scoping study by committing to integrate natural capital into national accounts and policy making.</p>

Country	National Ecosystem Assessment	Primary National Policies for Nature Conservation	Primary Method for Recognising the Value of Natural Capital in Policy Making	Commitment to Valuing Natural Capital in National Accounts	Existing Governance	Progress & Future Outlook
Germany	A National TEEB Assessment was launched in October 2012.	National Strategy on Biological Diversity (2007). Supported by National Programme on Biological Diversity (2011) and the National Programme on the re-connection of Habitats (2012)	Environmental-Economic Accounting data is used in policy appraisal. Since May 2009, ministries have had to carry out a sustainability check for each draft law or ordinance.	All EU Member States have committed to: mapping and assessing the state of ecosystems and their services by 2014; assessing the economic value of such services; and promoting the integration of these values into accounting and reporting systems at EU and national level by 2020.	The Natural Capital Germany - TEEB DE project is supported the Federal Agency for Nature Conservation.	 <p>Recently launched a national TEEB assessment. Committed to meeting the targets of the EU Biodiversity Strategy.</p>

Country	National Ecosystem Assessment	Primary National Policies for Nature Conservation	Primary Method for Recognising the Value of Natural Capital in Policy Making	Commitment to Valuing Natural Capital in National Accounts	Existing Governance	Progress & Future Outlook
Peru	<p>No national ecosystem service assessment.</p> <p>A sub-global Millennium Ecosystem Assessment was undertaken in the Vilcanota sub-region of the Peruvian Andes.</p>	<p>National Biodiversity Strategy.</p> <p>National Environment Policy (2009).</p>	<p>Since 2011 all environmental impact assessments have been legally required to include an ecosystem services valuation.</p> <p>PES schemes.</p>	<p>Recently published a first version of a guide to implementing Satellite Environmental Accounts.</p>	<p>The Vice Ministry for Strategic Management is responsible for developing the national strategy for the integrated management of natural resources and overseeing its implementation.</p>	 <p>Only country to have <i>ecosystem service valuation enshrined in law</i>. <i>Progress being made to develop Satellite Environmental Accounts.</i></p>
Philippines	<p>World Bank's Philippines Country Environmental Analysis 2009.</p>	<p>The Philippine Biodiversity and Action Priorities.</p>	<p>PES schemes.</p>	<p>Adopted the 2012 SESA.</p> <p>Working with WAVES to develop ecosystem accounts for fisheries, coastal and marine ecosystems and minerals.</p>	<p>Philippine Economic-Environmental and Natural Resources Accounting Steering Committee.</p>	 <p>Adopted the 2012 SESA. Developing a number of ecosystem accounts in priority areas.</p>

Country	National Ecosystem Assessment	Primary National Policies for Nature Conservation	Primary Method for Recognising the Value of Natural Capital in Policy Making	Commitment to Valuing Natural Capital in National Accounts	Existing Governance	Progress & Future Outlook
United Kingdom	UK National Ecosystem Assessment.	Natural Environment White Paper (2011). Biodiversity 2020: A Strategy for England's wildlife and ecosystem services (2011).	The Ecosystems Approach Action Plan includes a focus on ensuring that the value of ecosystems is reflected in policy appraisal. Launched a number of pilot projects for biodiversity offsetting. Launched a number of pilot PES schemes across England and Wales. A Best Practice Guide for PES is due to be published in 2013.	Committed to including natural capital in the UK Environmental Accounts by 2020, with early changes planned in 2013.	An independent Natural Capital Committee was established in 2012 to advise the Government on the state of natural capital. The Committee reports to the Chancellor of the Exchequer. The Office for National Statistics and the Environment Department (Defra) are developing pilot natural capital accounts. The Four Countries' Biodiversity Group is the lead governance body for the UK Biodiversity Framework.	 Committed to putting natural capital at the heart of Government accounting. Established an independent Natural Capital Committee to advise the Government. Early stage of implementation.

1 Introduction

The Global Legislators Organisation, known as GLOBE International, launched the GLOBE Natural Capital Initiative (GNCI) in September 2012 working with a group of legislators from seven countries to help promote the understanding and implementation of the Natural Capital concept by national governments and across government departments. This initiative was part of the implementation of the Legislators' Protocol agreed by the 1st World Summit of Legislators in Rio de Janeiro in 2010. The initiative also hopes to work towards establishing an international process for national legislators to support the development and implementation of natural capital accounting.

The first phase of the GNCI runs from September 2012 to June 2013, and includes the production of this study, the first GLOBE *Natural Capital Legislation Study*. It aims to outline baseline legislation and policy in eight countries and to identify policy gaps, highlight good practice and encourage peer-to-peer learning. The study was prepared by the GLOBE International Secretariat, in consultation with country partners, with the exception of the Georgia chapter which was prepared by in-country partners.

In order to maximise the synergies of this work, the GNCI will primarily engage with parliaments from countries participating in the World Bank's Wealth Accounting and the Valuation of Ecosystem Services (WAVES) Programme.¹ These countries include Botswana, Colombia, Costa Rica and the Philippines. Peru and Georgia will also be involved in the GNCI, along with the United Kingdom and Germany, two of the leading developed countries on this subject. These eight countries represent a wide range of geographies and development levels in order to highlight the global relevance of natural capital accounting and demonstrate the importance of early and effective engagement with legislators in order to improve the awareness about natural capital issues within national parliaments.

The failure to value the many benefits that ecosystems provide humans has been identified as a major contributing factor to the deterioration of global ecosystems and consequently their capacity to support human well-being and sustainable economic growth [1]. Natural capital accounting is a tool to help recognise and monitor the value of our ecosystems to humans, and to ensure that value is integrated into government decision making. To do this, three things are necessary:

¹ [Http://www.wavespartnership.org/waves/](http://www.wavespartnership.org/waves/).

- **Scientific information** regarding the status and trends of natural capital;
- Economic **valuation methodologies** to assign accurate values to natural capital;
- **Political leadership** to ensure the integration of this value into policy processes.

The GNCI focuses on the last part of this process. The first two parts, while not yet complete or perfect, are sufficiently developed to make preliminary assessments of the real value of natural capital, particularly given the recent adoption of the SEEA in 2012 as an international statistical standard. The onus is now on political leadership to take the crucial steps towards an economy which recognises and takes into account the role of ecosystem services.

2 Natural Capital Assessments, Accounting and Implementation

2.1. What Is Natural Capital?

Natural capital comprises Earth's natural assets (soil, air, flora and fauna), and the ecosystem services resulting from them, which make human life possible.¹

Natural capital can be defined as the stock of our natural physical assets (such as soil, forests, water and biodiversity) which provide value through flows of goods and services that benefit people. These goods and services are collectively known as **ecosystem services** and include material and non-material benefits such as crops, timber, water, climate regulation, natural hazard protection, soil function, mental health benefits from contact with nature, and biodiversity. Some ecosystem services can be valued economically, while others have a non-economic value. See Box 1 for more information on types of ecosystem services.

Box 1. Categorising ecosystems services

The Millennium Ecosystem Assessment (MA) in 2005 defined four categories of ecosystem service [1]:

- **Provisioning services** are the products obtained from ecosystems, such as food, water, timber and fibre.
- **Regulating services** that affect climate, floods, disease, wastes and water quality, such as climate regulation, water purification, air quality regulation, natural hazard protection, pollination and erosion regulation.
- **Cultural services** are non-material benefits that ecosystems provide to people through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences (e.g. landscapes and the mental health benefits of contact with nature).
- **Supporting services** are those necessary to maintain all other ecosystem services. They may not feature in accounts but information on these services will be needed in order to understand changes in the stock of ecosystem assets. Supporting services differ from other types of services because their impacts on humans are often indirect or occur over a very long time. They include soil formation, photosynthesis, primary production (the assimilation or accumulation of energy and nutrients by organisms), nutrient cycling and water cycling.

Some services such as soil erosion can be categorised as both a regulating and a supporting service, depending on the time scale of the impact on people.

¹ The Natural Capital Declaration, <http://www.naturalcapitaldeclaration.org>.

2.2. Why Account for Natural Capital?

Gross domestic product, the leading economic measurement, is outdated and misleading... It's like grading a corporation based on one day's cash flow and forgetting to depreciate assets and other costs.²

The MA detailed the degradation or unsustainable use of the majority of the earth's ecosystems and the consequent negative impacts on human well-being, identifying the failure to value ecosystem services as a major contributing factor [1] (see Box 2).

Box 2. Global value and status of ecosystems

The MA's findings are presented in five technical volumes [2-6] and six synthesis reports [1, 7-11] and show that: (1) Human activity over the last 50 years has had a significant impact on ecosystems, resulting in substantial and largely irreversible loss of biodiversity. (2) These changes have contributed to net gains in human well-being and economic development, but have also had a detrimental impact on many ecosystem services and have exacerbated poverty for some groups of people. Future generations are unlikely to receive similar benefits without substantial changes being made. (3) The first half of the 21st century could see significant further degradation of ecosystem services and this is a barrier to achieving the Millennium Development Goals (MDGs). (4) Reversing the degradation of ecosystem services while meeting increasing demands on those services can be partially achieved, but requires substantial changes in policy, institutions and practices that are not currently underway.

"Human use of all ecosystem services is growing rapidly. Approximately 60% (15 out of 24) of the ecosystem services evaluated in this assessment (including 70% of regulating and cultural services) are being degraded or used unsustainably".

2.2.1. A tool to help recognise the value of ecosystem services

Including natural capital in national accounts is a useful tool to help recognise and maintain the benefits of ecosystem services, and to avoid the cost of the loss of those services via a conservation and rehabilitation programme [12, 13]. For example, sustainable management of capture fisheries can increase economic returns, while restoration and improvement of watersheds and their associated forests can increase agricultural production as well as decrease flooding and increase resilience to drought (e.g. a watershed restoration programme in China's Loess plateau was associated with a near doubling of household incomes [14]).

² Joseph Stiglitz, Nobel Prize winner for Economic Sciences.

Understand the value of ecosystem services can also help to inform policy by illustrating the economic costs and benefits of their decisions. For example, decisions involving a trade-off between economic interests and natural assets are often difficult to assess, and natural capital accounting can help to illustrate the true cost of a particular policy. Understanding the true cost of policies may also help to reduce unsustainable policies, such as perverse subsidies. Global subsidies contributing to the overuse of natural capital have recently been estimated at \$1-1.2 trillion per year [15, 16], including \$455-485 billion for fossil fuel subsidies, \$200-300 billion in water subsidies, £10-30 billion in fisheries subsidies and \$370 billion in transfers to agriculture.³

2.2.2. Green growth

Better management and valuations of natural capital can help promote green growth [15]. In economic terminology, the flows of ecosystem services have been described as the “dividend” that society receives from natural capital. Including the value of the environment in wealth estimates and macroeconomic indicators helps governments to ensure that their development strategies deliver sustainable and inclusive growth.

2.2.3. Relevant to high-income and low-income countries

Accounting for natural capital is important for all countries. Low-income countries often rely heavily on natural capital, estimated as making up 30% of wealth in 2005 [17]. Within countries, degradation of ecosystem services is sometimes the principal factor causing poverty, with the poor disproportionately bearing the harmful effects of ecosystem deterioration [1], often because they are more likely to be reliant on nature (e.g. forests, fisheries, minerals and soil productivity) for their daily existence. For example, globally, over a billion people depend on fisheries for their principle source of animal protein, and over 600 million people depend (directly or indirectly) on fisheries for livelihoods, of which the vast majority are in developing countries [18].

Natural capital accounting is also relevant for wealthy countries. High-income countries still account for a disproportionate share of environmental degradation, and as the MA states “*Wealthy populations cannot be insulated from the degradation of ecosystem services*”. Economic and public health costs associated with

³ This figure is from the World Bank’s 2012 “Inclusive Green Growth: The Pathway to Sustainable Development” and includes OECD countries’ agricultural subsidies, some of which are decoupled from production and are not environmentally harmful. It does not include developing countries’ agricultural subsidies, estimated at \$200 billion.

damage to ecosystem services can be substantial. For example, over-fishing led to the collapse of the Newfoundland cod fishery in the 1990s, resulting in the loss of tens of thousands of jobs, and costing at least \$2 billion in income support and retraining.

Box 3. Wealth accounting, natural capital accounting and GDP

- **Gross Domestic Product (GDP)** is generally recognised as the international measure of economic growth. This measures gross output but does not capture the wealth or assets that underlie that output and the generation of income, and so is no indication of the sustainability of that income or growth (e.g. GDP does not capture the depreciation of manufactured capital such as factories and roads). In addition, GDP does not fully capture the value of natural capital – there is no measure of losses in the landscape’s ability to provide ecosystems services, the depletion of resources or future losses arising from anthropogenic impacts on the environment (e.g. from climate change or pollution).
- **Wealth Accounting**, a “national balance sheet”, measures all of the assets that support human well-being, including manufactured capital, human capital (e.g. education), social capital (e.g. entrepreneurship and innovation) and natural capital, and together with GDP provides a better measure of long-term growth prospects. Only a small number of countries currently compile wealth accounts, and even fewer include natural capital.
- **UN System of National Accounts (SNA)** is the internationally agreed standard set of recommendations on how to compile measures of economic activity, and has been adopted by most countries since the 1950s. It describes a set of macroeconomic accounts in the context of agreed concepts, definitions, classifications and accounting rules, for measuring national income, savings and some measures of wealth, including produced capital.⁴
- **System of Economic-Environmental Accounting (SEEA)** is the international statistical standard for natural capital accounts. These accounts are not intended to replace GDP, but as a set of satellite accounts to the SNA.

2.3. Natural Capital Accounting Systems

“A first step towards the integration of sustainability into economic management is the establishment of better measurement of the crucial role of the environment as a source of natural capital and as a sink of by-products generated during the production of man-made capital and other human activities”⁵

⁴ [Http://unstats.un.org/unsd/nationalaccount/sna.asp](http://unstats.un.org/unsd/nationalaccount/sna.asp).

⁵ Chapter 8 of Agenda 21, “Integrating Environment and Develop in Decision-Making”, UN Conference on Environment and Development, Rio de Janeiro, 1992.

The SEEA (see Box 3) and most other natural capital accounting systems consist of the following key elements:

- **Physical flow accounts:** Physical flows of materials and energy within the economy and between the economy and the environment. Physical information is linked to the economic accounts.
- **Asset accounts:** Stocks of environmental assets, and changes in these stocks. This includes the quantity and quality of natural resources such as land, water, fish, soils, forests, minerals and energy, and changes in these stocks within a given time period. Stocks are measured in physical units and in monetary units.
- **Monetary accounts:** economic activity and transactions related to the environment. This includes environmental taxes and subsidies, environmental protection expenditure and resource management expenditure.

The SEEA uses the same accounting conventions, concepts, rules and structures as the SNA. It aims to explain in a clear fashion the types of accounts and tables that are contained in the SEEA Central Framework and the basic principles of accounting for stocks and flows, the definition of economic units and the principles of recording and valuation.

Two sub-systems of the SEEA have also been developed, namely SEEA-Water and SEEA-Energy. These build on the concepts of the SEEA, while maintaining close links with the concepts and terminology of the specific subject areas. The SEEA-Water [19] was adopted by the UNSC in 2007, followed by the *International Recommendations for Water Statistics (IRWS)* [20] in 2010. SEEA-Energy is currently being finalised.

Ecosystem services have different types of values, namely direct use value, indirect use value, option value and non-use value. Assigning monetary values to all aspects of ecosystem services is complex and work is underway to continue to refine the methodologies (SEEA Volume 2, see Box 4 [overleaf]). However, the SEEA states that environmental accounts do not necessarily need a large amount of data,⁶ and indeed provides the structure necessary to bring all available data together to verify consistency and to improve understanding of the relationships between them. This aids with the identification of data gaps and in improving data quality, which in turn helps to avoid “paralysis by analysis” – a delay in the integration of natural capital values into policy frameworks due to the lack of data or methodologies.

⁶ SEEA Briefing Note, <http://unstats.un.org/unsd/envaccounting/Brochure.pdf>.

Box 4. Background on the System of Environmental-Economic Accounting (SEEA)

The 1987 report of the Brundtland Commission, *Our Common Future* [21] and the *Agenda 21: Programme of Action for Sustainable Development* [22] recommendations of the Rio Earth Summit in 1992 prompted the development of the SEEA by the United Nations Statistical Division (UNSD). The SEEA-1993 [23] “interim” version and SEEA-2003 [24] handbooks and SEEA 2000 manual [25] were released to provide increasingly detailed information to policy-makers on a common framework to measure the contribution of the environment to the economy and the impact of the economy on the environment. They aimed to provide policy-makers with indicators and descriptive statistics to monitor these interactions, tools for policy analysis and guidance in the implementation of SEEA and national programmes.

Since then, an extensive global revision process led by the UN Committee of Experts in Environmental-Economic Accounting (UNCEE) has taken into account measurement of new environmental issues and experiences in implementation from a wide range of countries, and resolved areas where more than one recommendation was presented in SEEA-2003. In addition, consultation with multiple international partners has taken place, including various UN agencies, World Bank, IMF, OECD, and the European Commission. The *SEEA Central Framework*, sometimes known as SEEA Volume 1, was approved by the UN Statistical Commission as an international statistical standard in 2012 and the white cover version of the *SEEA Central Framework* was published in May 2012 [26]. Work on additional portions of the SEEA, the *Experimental Ecosystem Accounts* (SEEA Volume 2) and *Applications and Extensions* (SEEA Volume 3), is ongoing and expected to be completed in 2013.

Box 5. Substitutability among different types of capital

Wealth accounting, including natural capital accounting, converts all forms of wealth into a single monetary measure. This assumes that different forms of capital are highly substitutable for one another, and doesn’t accurately reflect the limits to substitutability, impending thresholds for natural capital, or the possibility of irreversible and/or catastrophic events – all serious concerns given the poor state of many of the world’s ecosystems [1]. In addition, these comprehensive measures of wealth may disguise differences in human well-being due to factors that cannot be measured as economic values (e.g. cultural wealth).

Despite these limitations, comprehensive wealth is widely accepted as a valuable tool and useful indicator of economic performance [27]. As a recent TEEB report [13] put it “*There must be a clear understanding of the value of nature and how to take this value into account in public and private decisions... This is one of many ways of assessing the role and importance of nature. It is important to understand that identifying the value of nature does not suggest that it should have a cost or a price or be traded in the market and hence commoditised.*”

2.4. Implementing Natural Capital Accounting

There is now wide acceptance of the need to put natural capital accounting into action, and 24 countries currently compile at least one account on a regular basis [28]. The World Bank WAVES project has outlined several steps in the “road map” to implementing natural capital accounting [28]. Similarly, the first version of the *GLOBE Natural Capital Action Plan* (endorsed at the Nagoya Legislators Forum in October 2010) and the second version of the Action Plan (prepared as part of the GLOBE International Commission on Land Use Change and Ecosystems) [29] outline a number of steps for legislators to aid transition to a green economy by mainstreaming the valuation of natural capital (see the Annex to the present study for the GLOBE recommendations on Natural Capital).

The GLOBE recommendations, and to some extent the WAVES “road map”, include the following components:

- **Natural Capital Accounts:** Include natural capital in the country’s accounts – implement SEEA.
- **Reporting:** Include regular reporting on natural capital accounts, environmental implications of policy and departmental natural capital inventories. Results should be communicated to policy-makers, the private sector and civil society.
- **Policy Evaluation:** Include valuation of natural capital in policy and project appraisals. Policy proposals showing a depletion of natural capital should be costed and approved by treasury.
- **Institutions:** Establish institutional structure, with clear lines of responsibility across government departments. This may include:
 - **Natural Capital Committee:** An expert advisory group to advise the government on natural capital issues, to oversee technical incorporation of natural capital into accounting and policy and to report on policy impacts on the environment.
 - **Minister for Natural Capital** within the Finance Ministry to mainstream a natural capital approach to accounting and decision making.
- **Legislation:** Legislation on the above (namely, natural capital accounting, reporting, inclusion in policy evaluation and institutional responsibilities) will ensure long-term sustainability and political will.
- **Oversight and scrutiny:** Include natural capital in the budgetary process, in Parliamentary/Congressional Committees and in parliamentary debates and questions.

In addition, the WAVES road map suggests starting with sub-accounts that are most policy relevant, and technically feasible, and where natural capital accounting can make a relatively quick impact on development policy.

2.5. What Is a Natural Capital Law?

For the purposes of this study, we have defined natural capital law as:

Legislation, or policies and decrees with comparable status, that refer specifically to natural capital or that relate to valuing or accounting for natural capital, ecosystems services or environmental services.

This definition is fairly arbitrary, and has been applied with flexibility on a country-by-country basis. As a result, this study does not offer an exhaustive list of all natural capital-relevant legislation.

Due to the recent nature of natural capital accounting implementation schemes, not least because the SEEA approval as an international statistical standard only took place in 2012, we have included information on a range of efforts towards natural capital accounting and legislation. This includes bills under consideration (e.g. the Natural Environment White Paper in the UK). For the same reasons, we have included some information on progress on natural capital and ecosystem services assessments and valuations, capacity for natural capital assessments and accounting, progress towards governance on natural capital issues (e.g. the creation of institutions for natural capital governance, or mechanisms for embedding ecosystems values into policy appraisal) and current governmental or non-governmental initiatives based on ecosystems services (e.g. Payments for Ecosystems Services schemes), as well as policy and legislation on natural capital accounting.

3 Trends in Valuing Ecosystem Services

3.1. International Efforts Towards Natural Capital Accounting

Over the last decade, there has been increasing global momentum for valuing ecosystems and their services and for the inclusion of natural capital values into decision-making processes. A number of global or multi-lateral initiatives, reports and assessments have taken place, leading to a few key commitments by international bodies, most notably the Millennium Ecosystem Assessment in 2005, the adoption of the SEEA as an international statistical standard in 2012 and the CBD new Strategic Plan for Biodiversity 2011–2020 and Aichi Targets in 2010. Some of the key and relevant initiatives are listed below. This list is not exhaustive.

A summary of key international and multi-lateral efforts, commitments and initiatives is shown in Table 2, with details below.

Table 2: Summary of significant international efforts towards valuing ecosystems services over the last decade

Year		Decisions of international bodies (policy or legislation)	Voluntary multilateral - supported initiatives	Voluntary non-governmental initiatives	Government & multilateral research & reports
2005	The first Millennium Ecosystem Assessment reports released				x
2007	Potsdam Initiative for Biological Diversity	x			
2009	Stiglitz Report				x
2010	TEEB reports (2010–2012) – the first four volumes published				x

2010	Biodiversity Information System for Europe (BISE) web portal launched		x		
2010	CBD adopt new Strategic Plan for Biodiversity and Aichi Targets	x			
2010	WAVES programme launched by World Bank			x	
2011	EU regulation on environmental economic accounts & framework for ecosystem capital accounting	x			
2011	EU 2020 Biodiversity Strategy	x			
2012	IFC policy revisions requiring ecosystem services in impact assessments			x	
2012	SEEA approved as an international statistical standard	x			
2012	IPBES established			x	
2012	Rio+20, the Natural Capital Declaration, and the Sustainable Development Goals (SDGs)	x		x	

- Millennium Ecosystem Assessment, 2005

An international synthesis by over a thousand scientists initiated in 2001 analysing the state of the Earth's ecosystems, the consequences of ecosystem change for human well-being and the scientific basis for action to improve the conservation and sustainable use of those ecosystems [1]. See Box 1 (p. 3, above) for more details and Box 2 (p. 4, above) for main findings.

- Potsdam Initiative, and the inception of the TEEB, 2007

In March 2007, environment ministers from the G8+5 countries met in Potsdam, Germany. Inspired by the Stern Review on the economics of climate change [30], they agreed to initiate the process of an analysis of "the global economic benefit of biological diversity and the failure to take protective measures versus the costs of effective conservation", dubbed the Potsdam Initiative for Biological Diversity [31], which led directly to the TEEB.

- Stiglitz report, 2009

The "Stiglitz" report on *Measuring Economic Performance and Social Progress* called for a broader definition of wealth to include natural and human capital, in order to improve understanding of economic well-being.

- The Economics of Ecosystems and Biodiversity (TEEB) Reports, 2010
The four initial study TEEB reports were published in 2010, calling for governments to include natural capital values in national accounts. See Box 6 for details.

Box 6. The Economics of Ecosystems and Biodiversity (TEEB)

Following the Potsdam Initiative for Biological Diversity, the European Commission and the German Ministry for the Environment, with the support of an advisory board, initiated a global study, the results of which were named The Economics of Ecosystems and Biodiversity (TEEB). The findings of this first phase were presented at the Ninth Conference of the Parties to the Convention on Biological Diversity (CBD COP-9) in Bonn, Germany in May 2008 as the TEEB Interim Report [32].

The TEEB “phase 2” series of reports [33-36] was issued in 2010 and launched at the CBD COP-10. These reports highlight the public and private sector imperative to begin to consider ecological factors within national accounts, calling for national accounts to be upgraded to include the value of changes in natural capital stocks and ecosystem service flows, as outlined in the synthesis report [37].

Since then, the TEEB Implementation Phase, “phase 3”, has issued a number of studies to build on initial findings and provide a deeper analysis of specific sectors, including the cost of ecosystem degradation and a focus on integrating these findings into decision making [13, 38-41]. TEEB now supports countries to assess their ecosystems and biodiversity and to mainstream that information into policy.

- EU biodiversity baseline and BISE, 2010
The European Environment Agency (EEA) and the European Commission (EC) present the EU 2010 biodiversity baseline report, providing information on the state and trends of biodiversity and ecosystem components [42], including on Ecosystem Services. The EEA and EC also propose the development of the Biodiversity Information System for Europe (BISE),¹ a web portal centralising information about European biodiversity. This includes information on EU policy and legislation on the environment, the state of the EU environment and ecosystems and the threats they face, and research on biodiversity. It also serves to facilitate access to existing information.

¹ [Http://biodiversity.europa.eu/](http://biodiversity.europa.eu/).

- CBD new Strategic Plan for Biodiversity and the Aichi Targets, 2010
In October 2010, at the Convention on Biological Diversity tenth Conference of the Parties (CBD COP-10), in Nagoya, Japan, the 193 member states agreed to a new *Strategic Plan for Biodiversity 2011–2020* (decision X/2), which includes the Aichi Biodiversity Targets [43]. These targets include the need to incorporate the values of biodiversity into national accounting and reporting systems.²

- Nagoya Declaration on Parliamentarians and Biodiversity, 2010
At the same time, parliamentarians participating in the GLOBE & CBD Parliamentarians and Biodiversity Forum at the CBD COP-10 agreed to the Nagoya Declaration on Parliamentarians and Biodiversity,³ calling for a new global economy that integrates the true value of natural capital and makes recommendations on how to achieve that, as outlined in the *GLOBE Natural Capital Action Plan*.

- Wealth Accounting and the Valuation of Ecosystem Services (WAVES), 2010
Also at CBD 2010, the World Bank launched its *Wealth Accounting and the Valuation of Ecosystem Services* (WAVES) project, assisting a number of partner countries to implement natural capital accounting. See Box 7.

Box 7. WAVES project

The World Bank WAVES project aims to help countries implement natural capital accounting and incorporate natural capital accounts into policy analysis and development planning in five pilot countries: Botswana, Costa Rica, Colombia, Madagascar and the Philippines. In addition, WAVES helps to develop methodology for ecosystem accounting for the SEEA, and to promote global adoption of natural capital accounting beyond the pilot countries. Also engaged are Australia, Canada, France, Norway, Japan and the UK.

- European Union (EU) regulations and strategies, 2011
- In 2011, the EU issued a number of reports and initiatives on ecosystem services and valuations:
 - The European Environment Agency (EEA) issues “*An Experimental Framework for Ecosystem Capital Accounting in Europe*” presenting an

² Aichi Biodiversity Target 2: “By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems”.

³ <http://www.cbd.int/doc/meetings/biodiv/parli-nagoya/official/parli-nagoya-declaration-en.pdf>

experimental framework for ecosystem capital accounting, based on the need to implement simplified ecosystem capital accounts for Europe as part of a “fast-track” initiative launched in 2010 [44].

- The EU adopts a *Regulation No. 691/2011 on European Environmental Economic Accounts*⁴ requiring the 27 member countries to report regularly on environmental taxes, various resources and emissions to air, land and water. This will be revised every three years, with the opportunity to expand the scope of the areas covered by national accounts.
- The EU published its *2020 Biodiversity Strategy* which includes an initiative aimed at “no-net-loss of ecosystems and their services”.⁵

- IFC policy revisions, 2012

The International Finance Corporation (IFC) revised its *Policy and Performance Standards on Social and Environmental Sustainability* to require clients to maintain the “continuous benefits from ecosystem services”, presenting new methodology to help incorporate ecosystem services into impact assessment [45, 46].

- SEEA approved as international statistical standard, 2012

In February 2012, the UN Statistical Commission approved the revised SEEA as an international statistical standard like the SNA [26], providing an agreed methodology for producing internationally comparable environmental-economic statistics.

- Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), 2012

The IPBES was established in April 2012 as an independent intergovernmental body to assess the state of global biodiversity, ecosystems and ecosystem services.⁶ This followed five years of discussions, including those of the steering committee for the consultative process on an International Mechanism of Scientific Expertise on Biodiversity (IMoSEB) in 2007, and an intergovernmental and multi-stakeholder meeting in June 2010 where governments decided on the establishment of the IPBES and many of the principles of its operation as part of the Busan Outcome [47]. It provides a mechanism recognised by scientific and policy communities to synthesise, review, assess and critically evaluate relevant information.

⁴ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:192:0001:0016:EN:PDF>.

⁵ <http://ec.europa.eu/environment/nature/biodiversity/comm2006/2020.htm>.

⁶ <http://www.ipbes.net/>.

- Rio+20 Earth Summit, 2012

The United Nations Conference on Sustainable Development (UNCSD), “Rio+20 Earth Summit”, in June 2012 saw a great deal of support for natural capital accounting and the ecosystem approach, including the launch of a number of key reports and initiatives. This includes the following:

- 57 countries and the EU supported a communiqué that called on governments, the UN system, international financial institutions and other international organisations to strengthen the implementation of natural capital accounting into countries’ national accounting systems.⁷
- “The future we want” outcome document [48] adopted at Rio+20, reaffirming commitment to Agenda 21 and recognising the importance of ecosystem services for people⁸ and of achieving the Aichi Targets. In addition, the conference recognised the importance of valuing environmental factors and encouraged their use in decision making, and states the need for broader measures of progress to complement GDP.⁹
- The Natural Capital Declaration was launched by UNEP Finance Initiative, GCP and Brazilian business school FGV. By the end of 2012, 41 financial institutions and 23 NGOs had become signatories. This declaration makes a commitment to working out how natural capital accounting might be done.
- UN *Inclusive Wealth Report* (IWR 2012) [49] published by the UN International Human Dimensions Programme on Global Development Change (UNU-IHDP) and UNEP features a framework to measure broad measures of wealth based on estimates of their manufactured, human and natural capital, the Inclusive Wealth Index (IWI). The report uses this index to show changes in inclusive wealth for 20 countries from 1990 to 2008.

⁷ <http://www.worldbank.org/en/news/press-release/2012/06/20/massive-show-support-action-natural-capital-accounting-rio-summit>.

⁸ Paragraph 197. “We reaffirm the intrinsic value of biological diversity, as well as the ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its critical role in maintaining ecosystems that provide essential services, which are critical foundations for sustainable development and human well-being”.

⁹ Paragraph 38. “We recognise the need for broader measures of progress to complement GDP in order to better inform policy decisions, and in this regard, we request the UN Statistical Commission in consultation with relevant UN System entities and other relevant organisations to launch a programme of work in this area building on existing initiatives”.

- The World Bank report, *Inclusive Green Growth* [15], argues that better management and valuation of natural capital can lead to green growth.
 - *Moving beyond GDP – Factoring natural capital into economic decision making* [28], a report by WAVES, gives a synthesis of natural capital accounting, illustrating its use as a tool for policy-makers, and showing that 24 countries are already using natural capital accounting in their decision making.
 - The creation of *Sustainable Development Goals* (SDGs)¹⁰ is proposed by the governments of Colombia and Guatemala, which would build on the MDGs (which expire in 2015) in order to measure success in balancing socio-economic growth with the sustainable use of natural resources and conservation of ecosystem services.
- UN Convention on Biological Diversity, 11th Conference of the Parties (CBD COP11), October 2012

At the CBD COP11, in October 2012, commitments were made reinforcing the messages of Rio+20. These included a pledge by developed countries to double funding to developing countries in order to aim towards meeting the Aichi Biodiversity Targets by 2015. In addition, TEEB presented practical guides to governments for integrating the economic, social and cultural value of ecosystems into national biodiversity plans, including the *Implementation Guide for Aichi Target 2* [50] and a discussion paper, *Nature and its role in the transition to a green economy* [13], which outlines how natural capital contributes to the green economy both in terms of benefits to society of maintaining nature, and the losses avoided by conservation and rehabilitation measures.

3.1.1. Other efforts

In addition to the above, numerous efforts at a regional and international level have stressed the importance of an ecosystems approach and of valuing ecosystems services.

These include **research, reports and assessments of ecosystem services and valuations** such as (1) the UNU-IAS Ecosystem Services Assessment (ESA) Programme started in 2009,¹¹ the European Academies Science Advisory Council (EASAC) policy report, *“Ecosystem Services and Biodiversity in Europe”* [51] (2009); (2) the 2011 UNEP and the International Water Management Institute (IWMI)

¹⁰ <http://sustainabledevelopment.un.org/index.php?menu=1300>.

¹¹ http://www.ias.unu.edu/sub_page.aspx?catID=752&ddIID=753.

report “An Ecosystem Services Approach to Water and Food Security” [52]; (3) the 2011 Natural Value Initiative (NVI) report “Biodiversity and Ecosystem Services Risk and Opportunity Management within Extractive Industry” [53]; (4) the PEER Research on Ecosystem Services (PRESS) phase 1 [54] and phase 2 [55] reports, which look at how EU policies can help increase the benefits to humans from ecosystem services; (5) the 2012 ASEAN Centre for Biodiversity “TEEB Scoping Study”,¹² (6) the 2012 UN Global Compact report “A Framework for Corporate Action on Biodiversity and Ecosystem Services” [56]; (7) the 2012 “State of the Planet Declaration” [57] calling for regular global sustainability analyses; (8) the 2013 BSR report “Global Public Sector Trends in Ecosystem Services, 2009–2012” [58].

In addition, projects to help **implementation of an ecosystems approach** have increased, such as (1) the UNEP *Ecosystem Management Programme (2009)* [59] and publication of the UNEP Policy Series on Ecosystem Management¹³ from 2010; and (2) the 2011 European Commission *Voluntary Scheme for Biodiversity and Ecosystem Services in Territories of European Overseas (BEST)* for the sustainable use of ecosystem services in Outermost Regions and Overseas Countries and Territories.¹⁴

Finally, there have been many reports, projects, meetings and initiatives supporting or aiming to **integrate ecosystem services valuations** into public policy and/or private sector decision making, such as (1) the 2009 *Jakarta Charter on Business and Biodiversity*;¹⁵ (2) the 2012 TEEB for Business report; (3) the 2012 Global Environment Fund (GEF) sponsored *Project for Ecosystem Services (ProEcoServ)*; (4) the World Banks *50:50 Campaign*;¹⁶ and (5) the Gaborone Declaration by 10 African nations supporting green accounting.¹⁷

¹² [Http://www.teebweb.org/asean/](http://www.teebweb.org/asean/).

¹³ [Http://www.unep.org/ecosystemmanagement/](http://www.unep.org/ecosystemmanagement/).

¹⁴ [Http://europa.eu/rapid/press-release_IP-11-241_en.htm?locale=en](http://europa.eu/rapid/press-release_IP-11-241_en.htm?locale=en).

¹⁵ [Http://www.cbd.int/business3/](http://www.cbd.int/business3/).

¹⁶ [Http://www.wavespartnership.org/waves/building-support-natural-capital-accounting-%E2%80%93-what-can-governments-and-civil-society-do](http://www.wavespartnership.org/waves/building-support-natural-capital-accounting-%E2%80%93-what-can-governments-and-civil-society-do).

¹⁷ [Http://www.gov.bw/Global/OP%20Ministry/Gaborone%20Declaration.pdf](http://www.gov.bw/Global/OP%20Ministry/Gaborone%20Declaration.pdf).

4 Efforts towards Natural Capital Legislation in Eight Countries

4.1 Botswana



4.1.1. Fact Box

Total estimated value of natural resources to the economy	Natural capital: 31% of the wealth of Botswana (2005) (initial estimates) Produced wealth: 36% Human and social capital: 25% Net foreign assets: 8%
Natural Capital Growth: average annual growth rates, 1990–2008 (from the Inclusive Wealth Report [49])	Not currently available
Status of Ecosystem Services	Four (of seven) eco-regions identified as vulnerable. The remaining three are “stable/intact” or “relatively stable/intact” [60]. Of the three ecosystem services assessed by the SAfMA, freshwater, food and biodiversity are all issues for Southern Africa, but Botswana is not the worst in the region
Vulnerability to Climate Change and Anthropogenic action	Threats include land use change and degradation, overexploitation, fires, wind erosion, unsustainable use of water, wildlife conflicts, climate change and alien species [60]
National Ecosystem Assessment	Botswana included in the <i>Southern African Millennium Ecosystem Assessment</i> , 2005 [61, 62]
Key legislation or planned legislation	Not currently available
National Biodiversity Strategy and Action Plan	Botswana Biodiversity Strategy and Action Plan 2007 [63]

4.1.2. Abbreviations: Botswana

BBi	Biodiversity Intactness Index
BEAC	Business and Economic Advisory Council
DEA	Department of Environmental Affairs
DWA	Department of Water Affairs
MEWT	Ministry of Environment, Wildlife and Tourism
MFDP	Ministry of Finance and Development Policy
MFMP	Makgadikgadi Framework Management Plan
MMEWA	Ministry of Minerals, Energy and Water Resources
MoA	Ministry of Agriculture
NDP	National Development Plan
PEI	Poverty Environment Initiative
SAfMA	Southern African Millennium Development Assessment
WUC	Water Utilities Corporation

4.1.3. Background

Over the past four decades, Botswana has moved from being one of the poorest countries in the world to a being middle-income country, increasing its per capita wealth by 35% between 1995 and 2005. This is largely attributed to careful management of its natural resources (in particular, investing income from mining into the country's development), as well as strong governance and accountability structures. It has one of the most stable economies in Africa, and has been a leader in transparency in Africa.¹ Minerals, particularly diamond mining, account for more than one third of GDP, the majority of export earnings and roughly half of government revenue, but tourism,² financial services, farming and cattle raising are also important sectors, with natural capital making up more than a third of Botswana's total wealth. Natural capital also contributes to local food security, with households in Botswana consuming bushmeat in some areas [61].

Botswana also has significant biodiversity value, including ecosystems such as the Okavango Delta, in the process of being confirmed as a World Heritage Site, which form the basis of a valuable eco-tourism industry. Indeed, Botswana's 10th National Development Plan (NDP10) identifies tourism as a sector for growth and diversification. While less commercially important, agriculture provides livelihoods for a large number of the rural population.

¹ Transparency International recognise Botswana as consistently having the best ranking in Africa on its Corruption Perception Index, <http://www.transparency.org/>.

² No clear figures are available for the contribution of tourism to the economy, but two recent estimates give a range of 3-4% for direct contribution and roughly double that for total impact.

4.1.3.1. Status of national ecosystems and ecosystem services

The Southern African Millennium Ecosystem System Assessment (SAfMA) [61] includes Botswana, and focuses on three ecosystem services, namely fresh water, food and biodiversity, with additional assessments of wood fuel and other less tangible cultural services.

Fresh water

Low rainfall and high evaporation rates have made Botswana one of the most water-scarce countries in Southern Africa. Despite this, currently 95% of the population has access to improved water, the highest in the region [61]. However, an increasing population, climate change and economic expansion mean that pressures on water resources are increasing.

Food

Sub-Saharan Africa is considered the least food-secure region in the world, but within this Botswana's average daily calorific and protein needs are well above required amounts. However, the agricultural potential of land is generally low due to semi-arid conditions and low soil fertility, with commercially grown crops only possible with irrigation. Consequently, land is used mainly for livestock production while agricultural land, particularly in communal areas, is often underused due to lack of investments and low input production strategies. In addition, large areas of land have been subject to environmental degradation.

Biodiversity

Biodiversity was assessed as a measure of environmental capacity to support ecosystem services. One measure, the *Biodiversity Intactness Index* (BII), estimates that overall 84% of the original number of wild organisms (not species) persist in Southern Africa, with 89% in Botswana alone [61].

Efforts have been made to conserve biodiversity and ecosystem function, with 19% of Botswana's land area classified as protected areas designated for wildlife and biodiversity conservation and 17% as wildlife management areas for sustainable use and conservation. Water ecosystems, which cover only 4% of its area and provide important hydrological, ecological and climatic functions, have had a particular focus. The main water ecosystem, the Okavango delta, is a designated Ramsar site and is protected under the convention. In addition, the Global 200 project identified two Global priority areas, namely the Zambezi-flooded savannas and the Central and Eastern Miombo woodlands. There are also a number of sites that have been described as important to Botswana, some of which have been categorised as National Heritage sites and are protected by law.

4.1.3.2. Ecosystems vulnerability to climate change and anthropogenic action

Botswana is made up of seven distinct eco-regions, of which four are classified as vulnerable [60]. Many of the threats to ecosystems are water related – Botswana is susceptible to droughts, desertification and limited freshwater access, and the scarcity of water is expected to limit economic growth unless used efficiently. In addition, land use change and degradation (including deforestation), fires, unsustainable use (e.g. overgrazing, water extraction, habitat change and degradation and, to some extent, poaching), species competition due to elephant population figures, wind erosion and invasive alien species are significant threats.

Climate change is expected to exacerbate these problems, particularly water stress, and the consequent reduced land productivity. Climate change models predict that Southern Africa will be on average 2-5°C warmer and drier by 2050 compared to 1990, particularly in interior countries such as Botswana.

4.1.4. Assessing natural capital

4.1.4.1. Institutions and institutional capacity for environmental accounting

A number of government agencies are involved in developing natural capital accounts in Botswana. These include:

- Office of the President, Poverty-Environment Initiative (PEI)
- Ministry of Finance and Development Planning (MFDP), lead WAVES agency
 - Central Statistics Office
 - Environment Statistics Unit
- Ministry of Environment, Wildlife and Tourism (MEWT)
 - Department of Environmental Affairs (DEA)
- Ministry of Minerals, Energy and Water Resources (MMEWA)
 - Department of Water Affairs (DWA)
 - Water Utilities Corporation (WUC)
- Ministry of Agriculture (MoA)

The MFDP is currently the lead agency on natural capital, being the lead WAVES agency and chairing the WAVES Steering Committee. The Central Statistics Office within the MFDP is responsible for coordinating, monitoring and supervising the National Statistical System. This includes indicators for the MDGs and national development strategies such as Vision 2016.

Within the Central Statistics Office, the Environment Statistics Unit compiles data on the availability and quality of natural resources, human activities and natural events that impact those resources, and the responses to those impacts by government, non-government and other agencies. This includes information on climate, land, water, agriculture, wildlife and energy [64, 65].

4.1.4.2. Ecosystem and ecosystem services assessments

Botswana has not conducted a national ecosystem assessment. It has published the *Botswana Biodiversity Strategy and Action Plan 2007* [63] and the *Botswana Fourth National Report to the Convention of Biological Diversity, 2009* [60] both submitted to the CBD. The latter gives details of Botswana's biodiversity status and trends, and on the implementation of and progress towards the national strategic plan. In addition, Botswana was one of 19 countries included in the Southern African Millennium Ecosystem System Assessment (SAfMA) [61], a sub-global assessment linked to the MA.

4.1.4.3. Natural capital/environmental services accounts

Past natural capital accounts

Botswana was one of the first counties to pilot environmental and natural resource accounting in the 1990s and early 2000s. Pilot natural capital accounts were constructed for selected sectors, with monetary accounts constructed for minerals, and physical accounts only constructed for minerals, water and livestock [66]. Wealth accounts were also constructed for produced capital and net foreign financial assets (data were insufficient to construct human capital accounts).

In addition to national accounts, two regional ecosystem valuation studies have been completed for the Okavango Delta, the Makgadikgadi Pan and the Kgalagadi drylands. The *Economic Value of the Okavango Delta, Botswana, 2006* [67], uses both a Total Economic Valuation Framework (TEV) and a National Accounting framework to consider direct use values from tourism and natural resource use, indirect use values and non-use values (option and existence values). The 2010 *Makgadikgadi Framework Management Plan* (MFMP) [68] incorporates data previously collected [69, 70], and uses the TEV method to assess the economic value of goods and services provided by the MFMP area. This includes direct use, indirect use and option values for the area, as well as an analysis of current and potential tourism incomes. Similarly, the economic values of dryland goods and services in Kgalagadi were assessed in 2007 [71], including direct use, indirect use, and asset values. Market prices were used to derive direct use values, and benefits transfer methodologies to assess indirect use values, while at a national level, the social accounting matrix (SAM) model was used.

Pilot natural capital accounts

The WAVES Phase 2, 2012–2015 [72] work plan, as developed in collaboration with the PEI-WAVES Steering committee and other stakeholders, identified the following priority sectors for natural capital accounting:

- **Energy and minerals:**

Detailed accounts on Botswana's mineral resources are particularly important given its high contribution to GDP and the expected decline in diamond production over the next 15 to 20 years [73]. In addition, for the sustainable diversification of Botswana's mining industry (a stated aim in the NDP10), it will be necessary to understand properly the potential impacts and benefits of other mining sectors, such as coal mining and mineral mining, for example copper, nickel and gold.

- **Land/ecosystems and tourism:**

National and ecosystem based tourism accounts to inform ecotourism management are planned in four key ecosystems, Okavango, Chobe, Makgadikgadi Pans and Central Kalahari.

- **Water:**

Compiling water accounts, including how much water each sector of the economy is consuming will allow the government to identify any overuse of water, potentially create incentives for water efficiency and contribute to the national water tariff policy. Work on pilot water accounts, building on previous work, is currently underway.

- **Macroeconomic indicators:**

The work plan also includes the development of new macroeconomic indicators such as adjusted net savings, adjusted net national income and comprehensive wealth, which will allow for integration of natural resource values.

4.1.5. Governance

4.1.5.1. Governance bodies for natural capital

The Botswana Steering Committee for WAVES has been established, chaired by the Ministry of Finance and Development Policy (MFDP), Socio-Economic Policy Section. In Botswana, WAVES operates under a joint National Steering Committee with the UNDP-UNEP Poverty Environment Initiative (PEI), the PEI-WAVES Steering Committee.

4.1.5.2. Mechanisms integrating natural capital values into policy

The government reports environmental statistics regularly, including annual mineral revenues in publicly available documents, and there is open discussion on how to make best use of these revenues. In the 1990s, the Ministry of Finance and Development Planning introduced the Sustainable Budget Index to monitor the extent to which mineral revenues were being invested into the government budget.

4.1.6. Current initiatives based on ecosystem services

4.1.6.1. Ecosystem services valuations inform policy

Information from environmental valuations has been used to inform policy and management. Most notably, environmental accounting on the mining sector has long been used to inform rent collection, allowing a large share of the rents from mining to be recovered and invested into Botswana's long-term development. In addition, regional ecosystem services valuation studies [67-69, 71] have been used to inform management options in protected areas.

4.1.6.2. Payments for ecosystem services

Botswana has 20 years experience with community-based natural resource management (CBNRM), which is a form of PES; e.g. payment for wildlife management through use of tourism potential in community areas; also similar activities apply to the use of veldproducts (veld fruits, Morula, grapple etc., as well as phane worms).

Recent research on the feasibility of using PES as an incentive-based policy instrument in the Okavango Delta [74] has concluded that there is a potential to establish a PES market in Botswana, particularly harnessing tourist willingness to pay, but as yet no programmes are in action.

4.1.7. Legislation & Policy

4.1.7.1. Policy

Presidential Support and The Gaborone Declaration

There is a high level of political support for natural capital accounting in Botswana. In May 2012, Botswana and nine other African countries endorsed a plan to put natural capital at the centre of sustainable development – The Gaborone Declaration.³ This includes the following pledge:

³ http://www.conservation.org/conferences/africa_sustainability_summit/Documents/Gaborone-Declaration-HoS-endorsed_5-30-2012_Govt-of-Botswana_CI_Summit-for-Sustainability-in-Africa.pdf.

To ensure that the contributions of natural capital to sustainable economic growth, maintenance and improvement of social capital and human well-being are quantified and integrated into development and business practice.

An appended Communiqué on Natural Capital Accounting also recognises the “importance of natural capital as a tool for mainstreaming natural capital into informed economic decision making”. His Excellency Seretse Khama Ian Khama, the President of the Republic of Botswana and co-host of the summit, announced Botswana’s endorsement of The Gaborone Declaration and noted:

economic growth and human well-being in Africa will be threatened if we do not undertake concerted action to halt and reverse the degradation and loss of healthy ecosystems and biodiversity, and to enhance society’s ability to adapt to climate change and environmental risks and scarcities.

The National Office of the President has stated that Botswana is interested in accrual accounting (i.e. where revenues are recognised the moment that goods or services are provided, as opposed to cash accounting where revenues and expenses are taken into account only when hard cash has been received/paid). Botswana now wants to add accumulated value to the balance sheet.

Natural Capital and Development Policy

The government of Botswana has also recognised the importance of natural capital to achieving development objectives and of understanding the impacts of changes to natural resources. The long-term *Vision 2016*⁴ strategy states:

The natural resources of Botswana are one of its greatest assets. The strategy for protecting these resources must be based upon sound domestically based research. This should include the extent of mineral and water resources, the possible implications of increases in manufacturing, urbanisation, tourist volumes or long-term changes in climate, and the effect of the use of water resources both within Botswana and in neighbouring countries...

Vision 2016, together with the medium-term *NDP10*⁵ and the BEAC Strategy document [17] have targeted several natural capital based sectors for a role in economic diversification, including:

⁴ [Http://www.vision2016.co.bw/](http://www.vision2016.co.bw/).

⁵ [Http://www.finance.gov.bw/index.php?option=com_content1&parent_id=334&id=338](http://www.finance.gov.bw/index.php?option=com_content1&parent_id=334&id=338).

- new mining activities, particularly the development of Botswana's coal reserves
- expanded ecotourism, with greater participation by local communities
- expansion of commercial agriculture through irrigation
- more efficient use of water resources

The 11th National Development Plan is due to be developed from 2014 onwards, for implementation from 2016, and is likely to include evidence from natural capital accounting. The Keynote Policy Paper (KPP) for the MTR, and Mid Term Review (MTR) of NDP10 make specific mention of NCA. The MTR was endorsed by Parliament in May 2013 and is now an official document which guides the implementation of NDP10 during the remainder of the implementation period, i.e. 2013–March 2016.

Botswana's biodiversity policy also recognises the value of environmental valuations. The 2007 *Botswana Biodiversity Strategy and Action Plan* [63] includes a call for "Appropriate valuation/appreciation of biodiversity and raised public awareness on the role of biodiversity in sustainable development and public participation in biodiversity related activities and decision making".

4.1.7.2. Support and implementation of international objectives

Botswana is a signatory to the CDB, and as such submitted the *Botswana Fourth National Report to the Convention on Biological Diversity* in 2009 [60] and the *Botswana Biodiversity Strategy and Action Plan* [63]. The latter includes the need for economic valuation of certain actions, such as developing cost calculations for the restoration and rehabilitation of destroyed habitats to include in EIA cost-benefit analysis (Action 2.7.2).

4.1.7.3. Legislation (planned or in force)

While there are a large number of policies and legislation covering natural resource use (see *Botswana Environment Statistics* [65] or the *Makgadikgadi Framework Management Plan*, p. 104 [68] for a list), there is no current legislation specifically regarding natural capital accounting.

4.1.8. Case study: More complete measures of wealth to inform policy

In the 1990s, the DEA piloted wealth accounts, more complete measures of wealth which included natural capital values, in order to monitor recovery of resource rents, and the investment of those rents, particularly from minerals. This facilitated the explicit policy of reinvesting resource rents from minerals, widely thought to be one of the key attributing factors to Botswana's increased wealth. In 2004, a study compiled full asset accounts for available natural and produced capital to construct

new and updated per capita wealth accounts for Botswana and Namibia [8]. These were used to assess the contrasting development of the two countries, illustrating the increase in Botswana's per capita wealth as well as per capita GDP, with both roughly tripling between 1980 and 2000. In contrast, over the same two decades, Namibia had no explicit policy of reinvesting resource rents, and showed a decline in per capita wealth. However, from 1990, this decline in per capita wealth was not reflected in GDP: GDP per capita rose in Namibia from 1990–1994, and then stayed constant as Namibia effectively “liquidated” its natural capital, without reinvestment.

This illustrates how more complete measures of wealth can give a better picture of the potential for future development within a country, helping policy-makers to determine the levels of investment needed to maintain sustainable development, and guide long-term policy.

4.2 Colombia



4.2.1. Fact Box

Total estimated value of natural resources to the economy	Not currently available
Natural Capital Growth: average annual growth rates, 1990–2008 (from the Inclusive Wealth Report [49])	Natural Capital Growth (%): -0.39 Natural Capital per Capita (%): -2.09 IWI per Capita (%): -0.08
Status of Ecosystem Services	There is a high level of biodiversity, but natural resources are being depleted
Vulnerability to Climate Change and Anthropogenic action	Threats include deforestation, floods, droughts, pollution and climate change
National Ecosystem Assessment	Regional assessments only (e.g. [75])
Key legislation or planned legislation	Not currently available
National Biodiversity Strategy and Action Plan	2011 National Policy for the Integrated Management of Biodiversity and Ecosystem Services

4.2.2. Abbreviations: Colombia

BBI	Biodiversity Intactness Index
CGR	Comptroller General of the Republic, <i>Contraloría General de la República</i>
CSA	Environmental Accounts, <i>Cuenta Satélite Ambiental</i>
DANE	National Administrative Department of Statistics, <i>Departamento Administrativo Nacional de Estadística</i>
DNP	National Planning Department, <i>Departamento Nacional de Planeación</i>
IDEAM	Institute of Hydrology, Meteorology and Environmental Studies, <i>Instituto de Hidrología, Meteorología y Estudios Ambientales</i>
MADS	Ministry of Environment and Sustainable Development, <i>Ministerio de Ambiente y Desarrollo Sostenible</i>
MAVDT	Ministry of Environment, Housing and Territorial Development, <i>Ministerio de Ambiente, Vivienda y Desarrollo Territorial</i>
PND	National Development Plan, <i>Plan Nacional de Desarrollo</i>

4.2.3. Background

Colombia is classified as an upper middle income country, and has shown strong economic performance over the last decade. It relies heavily on oil exports, and is also the largest source of coal imports to the USA. Other key exports include coffee, emeralds, nickel and bananas. Forested areas still make up over half of the total land area, despite land conversion and deforestation. In addition to wealth from minerals, Colombia also relies on renewable ecosystem services. In particular, watershed areas, mostly forested, in the Colombian mountains are a key source of fish production, water supply and wood fuel, as well as being important for crops, livestock, flood regulation and erosion protection. A large network of reserves and national parks are also vital for urban water supply and biodiversity.

4.2.3.1. Status of national ecosystems and ecosystem services

Colombia is one of the world's mega-diverse countries, with almost 14% of the world's biodiversity, including 54,443 species recorded in 34 ecoregions. Of these, 1695 are birds (of which 94 are threatened), 359 are mammals (52 threatened) and 3.4% are endemic to Colombia [76]. Agricultural land makes up 37.3% of total land, while forested areas make up 53.1%. Total converted land is 45.4%, while protected areas make up 20.9% of total land area. However, if other conservation categories such as indigenous reserves, Afro-Colombian collective territories and forest reserves are included with protected areas, approximately 43% of Colombian territory is under some sort of conservation scheme [77].

However, studies have shown a decline in Colombia's natural capital. Balvanera *et al.* [76] calculate that natural resources are being depleted by 7.75% GNI. Similarly, the *Inclusive Wealth Report* (IWR) shows a decrease in Colombia's natural capital base, which together with a high population growth, has contributed to a negative

IWI growth rate. In contrast, Colombia shows positive growth rates for HDI and GDP per capita, demonstrating how GDP per capita focuses on income, while IWI reflects the stocks of assets and changes over time.

4.2.3.2. Ecosystems vulnerability to climate change and anthropogenic action

Land use conversion, deforestation and water, soil and air pollution are all noted threats to ecosystems in Colombia. A regional report on the Colombian Andean coffee-growing region showed that land use change was a principal “direct driver” of ecosystem change, with natural ecosystems decreasing from 33% of the study area in 1987, to 26% in 2000, including a 25% reduction in forest area [75]. Over the past two years, three quarters of Colombia has been affected by costly floods. Both flooding and Colombia’s periodic droughts are predicted to be made worse by climate change, and particularly its impacts on high Andean ecosystems. This is also likely to impact important exports such as coffee [78].

The MA sub-global assessment report for the Colombian Andean coffee-growing region also notes a number of indirect drivers of change, namely population growth, economic activity and the activities of environmental NGOs and other associations [75].

4.2.4. Assessing natural capital

4.2.4.1. Institutions and institutional capacity for environmental accounting

The National Administrative Department of Statistics (DANE) is responsible for Colombia’s official statistics program, including environmental accounts, the *Cuenta Satélite Ambiental* (CSA). The National Planning Department (DNP) supports DANE in managing the environmental accounts and evaluating policy, and is a cross-sectoral organisation.

The Ministry of Environment and Sustainable Development (MADS)¹ is responsible for establishing valuation methods, and for valuating the costs of environmental degradation and conservation, aided by the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM) and the Comptroller General of the Republic (CGR). In particular, the CGR quantifies the impact of the use and degradation of natural resources, and evaluates management of these resources.

¹ Formed in 2011, previously was the Ministry of Environment, Housing and Territorial Development.

In 2011, there were 47 permanent personnel equivalents working in governmental departments on environmental valuation [79]. Since then, the numbers have grown, not least due to the WAVES programme and personnel.

4.2.4.2. Ecosystem and ecosystem services assessments

There has been no national ecosystem service assessment, but ecosystem services in parts of Colombia have been mapped and assessed in a number of regional and international efforts. In 2009, the Natural Capital Project set up a scheme to map ecosystem services in the Northern Andes and Southern Central America (NASCA) region, spanning seven countries in Latin America, including much of Colombia.² This was done using InVEST³ (Integrated Valuation of Ecosystem Services and Tradeoffs), a software tool developed by the project to assess the current and potential status of ecosystem services under future scenarios in a spatially explicit way and to use that information to inform policy, including through PES schemes, permitting and mitigation strategies and climate adaptation strategies.⁴ Similarly, in 2008, The Nature Conservancy (TNC) quantified selected ecosystem services in Colombia and Ecuador for hydrological, carbon, tourism and pollination services using the same software, while WWF used InVEST in 2010 to assess ecosystem services in the Upper Putumayo Region, which included an analysis of carbon storage and sequestration, sediment retention, water purification (nutrient retention), biodiversity and water supply [80] as reported in [81]. Most recently, as part of seven pilot PES projects in five departments, MADS has begun quantifying hydrological services using the Soil and Water Assessment Tool (SWAT).⁵

Other assessments include the MA sub-global assessment [75] which focused on the Colombian Andean coffee-growing region, and assessed ecosystem services, particularly as related to the coffee industry. In addition, the World Bank's Integrated Silvopastoral Approaches to Ecosystem Management Project (2009) monitored multiple ecosystem services in Colombia, Costa Rica and Nicaragua [82] (see Box 9 [p. 47, below]).

² <http://www.naturalcapitalproject.org/nasca.html>.

³ <http://invest.ecoinformatics.org/>.

⁴ www.naturalcapitalproject.org/pubs/NatCap_InVEST_and_Case_Study_Summary_TEEB_2010.pdf.

⁵ See section "Current initiatives based on ecosystem services" for details of the PES pilot projects.

4.2.4.3. Natural capital/environmental services accounts

As early as 1992, a multi-institutional committee for environmental accounts, CICA (*Comité Interinstitucional de Cuentas Ambientales*), was set up to pilot environmental accounts in Colombia through the COLSCEA project (*Proyecto Piloto de Contabilidad Económico Ambiental Integrada para Colombia*), and included representatives from DANE, UN, Inderena, CGR and DNP. In 1995, DANE started producing physical accounts for energy (oil, coal and gas), followed by environmental protection spending and physical accounts for selected minerals in 2001 [83],⁶ and introduced an environmental quality index for air and water resources in 2007, the *Indices de Calidad Ambientales*. In addition, the UASPNN produced a valuation of the economic benefits of the National Parks in 2003, and the MAVDT-WB valued the costs of environmental degradation in Colombia in 2004. The latter was updated in 2012, and used to inform policy guidelines on the prevention and control of air pollution. In another environmental economic valuation, MADS supported studies to determine the cost of water pollution in Colombia [84], that were used in the development of the National Policy on Water Resource Management.

On a smaller scale, a number of non-governmental studies have valuation ecosystem services, including the importance of national parks for hydrological services [85, 86], recreation and tourism [87, 88], biodiversity [89], food provision [90] and climate and soil regulation [91]. See Ruiz-Agudelo *et al.* (2011) [92] for more examples. More recently, the Colombia Natural Capital Project designed a protocol for an economic valuation of the Natural Capital of the Colombian Andes, using a benefits transfer method [92].

The *Inclusive Wealth Report* [49] estimates the present value of Colombia's national carbon stocks in 2000 to be roughly between US\$942.1 billion and US\$947.5 billion. It also maps and quantifies the supply of nutrient retention for drinking water quality, and erosion regulation for drinking water quality and for reservoir maintenance.

⁶ Also see the DANE website for energy and mineral accounts including for oil, gas and nickel up to 2011, http://www.dane.gov.co/index.php?option=com_content&view=article&id=69&Itemid=87.

Pilot natural capital accounts

DANE, together with WAVES, has now started the process of introducing satellite environmental accounts to the official statistics. This will build on existing valuation work, bringing together all stakeholders, and work towards ecosystem accounting contributing to policy-making. Initial focus is on the following accounts:

- **Energy and mineral resources**, including stock accounts for oil, hard coal, natural gas, iron, copper and nickel
- Expense accounts for environmental protection
- **Renewable resource accounting**, including for water, forest and waste accounts
- **Environmental quality index** constructed for air and water resources

4.2.5. Governance**4.2.5.1. Governance bodies for natural capital**

A green accounting committee was established by UNDP about 5 years ago and meets irregularly. The DNP and CGR also have overseeing roles, respectively evaluating policy with respect to environmental accounts, and evaluating the management of natural resources.

4.2.5.2. Mechanisms integrating natural capital values into policy

The Natural Capital Project has a three-year agreement with the Ministry of Environment in Colombia to provide them with tools such as InVEST⁷ through the NASCA project to generate information on natural capital locations to guide and inform decision making.⁸

The Colombian National Development Plan (PND), 2010–2014, includes a “good governance pillar”, which calls for good environmental governance including improvements in environmental information. See Policy section for more details.

4.2.6. Current initiatives based on ecosystem services

There are a large number of regional and local PES, PES-like and CRES (see Box 8) schemes in Colombia, aiming to create incentives for better land management. Many of these focus on hydrological services, including irrigator payments for watershed protection in Colombia’s Cauca Valley [93], and other watershed

⁷ Integrated Valuation of Environmental Services and Tradeoffs, http://www.naturalcapitalproject.org/pubs/NatCap_InVEST_and_Case_Study_Summary_TEEB_2010.pdf.

⁸ [Http://www.naturalcapitalproject.org/nasca.html](http://www.naturalcapitalproject.org/nasca.html).

protection initiatives paid for by water consumers and hydropower suppliers [94] (and see Box 11 [p. 80, below]). Other PES schemes include payments for biodiversity, carbon sequestration and production services (paid for by carbon offsets) [76, 81, 95, 96].

Box 8. Payments for Ecosystem Services (PES)

PES schemes are a market-based approach to environmental management, enabling the value of ecosystem services to be recognised by users and stewards. Cash payments or other incentives are used to encourage ecosystem conservation and restoration. Land stewards are paid (via direct or indirect payments) by ecosystem service beneficiaries, either directly or via government or independent intermediaries.

Commonly described as a *“voluntary transaction whereby a well-defined ecosystem service or land use likely to secure that service is being bought by at least one buyer from at least one provider, if, and only if, the provider secures the provision of the service”* [97], they are often defined as having the following elements:

- A voluntary transaction
- For a well-defined environmental service (or land use likely to secure that service)
- Bought by at least one ecosystem service buyer
- From at least one ecosystem service provider
- On the condition that the provider continues to supply that service
- Although see [98] for arguments against the necessity of the intervention being voluntary at all levels.

A related concept, Compensation and Rewards for Ecosystem Services (CRES) schemes [99] have been described as contractual or negotiated arrangements between ecosystem stewards, environmental service beneficiaries and/or intermediaries, for the purpose of enhancing, maintaining, re-allocating and offsetting damage to environmental services.

It has been estimated that by the year 2030, 10-15 million low-income households in developing countries could benefit from markets for biodiversity conservation, 25–50 million from carbon markets, 80-100 million from watershed protection and 5–8 million from markets for landscape beauty and recreation [100].

Since 2009, MADS has supported the design and implementation of seven pilot PES projects in five departments: three projects in Boyacá (in the municipalities of Villa de Leyva, Chiquiza and Arcabuco), one in Tolima, and one in Santander. These projects are focused on payments for hydrological services, particularly water regulation and sediment control. MADS also supports other initiatives in the middle and lower basin of the Otún River, the department of Risaralda, which additionally include scenic beauty ecosystem services. Of the seven pilot projects, two are now being implemented.

One such scheme based in rural areas of Villa de Leyva, involves payments by rural water users through their water bills. This money is then used as an economic incentive to property owners in areas relevant to water regulation, to pay for the restoration and recovery of natural ecosystems in strategic areas important for providing hydrological services such as water regulation and sediment control. The identification of target areas important for water services is done using SWAT tools.

Some international projects involve Colombia, including the Guiana Shield program to protect biodiversity and carbon sequestration,⁹ which covers some forested areas of Colombia.

4.2.7. Legislation and Policy

4.2.7.1. Policy

National Development Plan, 2010–2014

The Colombian National Development Plan (PND) 2010–2014, “Prosperity for All”, includes environmental sustainability and risk prevention as one of five central pillars, acknowledging the contribution that natural resources have made to Colombia’s economic growth, and expressing concern over loss forest, biodiversity, water resources and the risks of climate change, pollution and other environmental hazards. Within the PND, the biodiversity strategy identifies as a key challenge the need to design and implement tools for the identification and valuation of ecosystem services and their impacts on human well-being,¹⁰ for inclusion during the decision-making process for sectoral and land-use planning. The PND also includes aims to harmonise the regulations for access to biodiversity and to promote Colombia as a megadiverse country as goals.

In order to strengthen the protection and restoration of biodiversity and ecosystem services, the PND identifies the following actions:

- Design a strategy to integrate environmental considerations into private decision-making on the location of industries and production activities.
- Adopt and implement the National Plan of Restoration, Ecosystem recovery and rehabilitation that will include, among other things, reforestation for protective purposes.

⁹ www.guianashield.org.

¹⁰ “diseñar e implementar instrumentos para la identificación y valoración de los servicios ecosistémicos y sus vínculos con el bienestar humano”.

- Arrange specific management strategies for protected areas with ethnic groups.
- Promote schemes to change domestic production adding the value of ecosystem services associated and recognize this factor as a comparative advantage in international markets.

The PND and others [101] recognise the importance of identifying and valuing ecosystem services and their links to human welfare and strengthening the sustainable use of biodiversity, in order to achieve competitiveness, and sustainable economic and social growth in Colombia.

Other relevant policy

In 2011, the National Policy for the Integrated Management of Biodiversity and Ecosystem Services was released as a revised and updated National Biodiversity Policy, and now acts as the main framework for all environmental policies, programmes, plans and strategies in Colombia.¹¹

The Colombia Natural Capital Strategy was developed in 2010 by Conservation International (CI) and the Fund for Environmental Action and Youth (FPAA), joined by the Colombian Presidency and the Office of the Comptroller General in 2011. The project aims to conserve the country's natural capital, to acknowledge the importance of ecosystem services in all economic and social sectors, and to develop mechanisms to integrate the value of Colombia's natural capital into decision making [102].

4.2.7.2. Legislative process

Colombia's 1991 Constitution establishes an obligation on the part of the State to protect the country's natural wealth through some 60 dispositions, which establish a linkage between environmental issues and development plans, and places environmental policies on the same footing as economic and social policies.

The Constitution grants certain legislative powers to Congress in general, divides other powers between the two Houses and apportions others between Congress and the President. Legislative authority is vested in the bicameral Congress, consisting of the Senate (*Senado*), with 114 members, and the House of Representatives (*Cámara*), with 199 members.

¹¹ [Http://www.cbd.int/nbsap/about/latest/](http://www.cbd.int/nbsap/about/latest/).

Both houses of Congress have joint responsibility for initiating, amending, interpreting and repealing legislation; inaugurating the President and selecting the presidential designate; selecting the membership of the Supreme Court; changing the boundaries of the territories, creating new departments, granting special powers to the departmental legislatures and moving the location of the national capital; supervising the civil service and creating new positions in it; and setting national revenues, providing for payment of the national debt and determining the nation's currency.

4.2.7.3. Legislation (planned or in force)

There is no current legislation specific to ecosystem services valuation. However, the following resolutions are relevant:

- 2003 MAVDT Resolution 1478 on valuation methods
- 2010 MAVDT Resolution 1503 adopting the environmental studies manual for projects under licence

Most recently, in May 2013, MADS officially issued Decree No. 953, which regulates article 111 of the 1993 Law No. 99. This regulates the land purchase, maintenance and the development of PES schemes, ensuring that municipalities and governments invest at least 1% of their current income to finance these actions in properties in areas of strategic importance for the supply of water for municipal water supply.

4.2.8. Case study

In Colombia's Cauca Valley, the East Cauca Valley Water Fund was set up as a long-term trust fund involving public–private partnership of water users who pay to maintain access to a clean, regular water supply¹² [103]. The money is invested into conservation schemes in watershed areas which have the highest potential for reducing sediment and maintaining water yield. Priority areas are identified using a mapping and modelling software tool, InVEST. This scheme is one of many water funds across the Andes [104].

¹² www.naturalcapitalproject.org/pubs/NatCap_InVEST_and_Case_Study_Summary_TEEB_2010.pdf.

4.3 Costa Rica



4.3.1. Fact Box

Total estimated value of natural resources to the economy	Not currently available
Natural Capital Growth: average annual growth rates, 1990–2008 (from the Inclusive Wealth Report [49])	Not currently available
Status of Ecosystem Services	High level of biodiversity, but ecosystem services are thought to be declining
Vulnerability to Climate Change and Anthropogenic action	Having reversed deforestation trends, pollution, soil erosion, urbanisation, increasing demands for energy, agricultural growth and climate change are all threats
National Ecosystem Assessment	There has been no official national ecosystem services assessment
Key legislation or planned legislation	The Forestry Law 7575 recognises four ecosystem services, but there is no law on ecosystem services accounting
National Biodiversity Strategy and Action Plan	Costa Rica <i>Estrategia Nacional de Biodiversidad</i> submitted the CBD in 2000 [105]

4.3.2. Abbreviations: Costa Rica

BCCR	Costa Rica's Central Bank, <i>Banco Central de Costa Rica</i>
CENIGA	National Geo-environmental Information Centre, <i>Centro Nacional de Información Geoambiental</i>
FBS	Sustainable Biodiversity Fund, <i>Fondo para la Biodiversidad Sostenible</i>
FONAFIFO	National Forestry Fund, <i>Fondo Nacional de Financiamiento Forestal</i>
INEC	National Statistics Agency, <i>Instituto Nacional de Estadística y Censos</i>
MINAE	Ministry of the Environment and Energy, <i>Ministerio de Ambiente, Energía</i>
MINAEM	Ministry of the Environment, Energy and Seas, <i>Ministerio de Ambiente, Energía y Mares</i>
MINAET	Ministry of the Environment, Energy and Telecommunications, <i>Ministerio de Ambiente, Energía y Telecomunicaciones</i>
MMBIEM	Mainstreaming Market Based Instruments for Environmental Management
NASCA	Northern Andes and Southern Central America
PSA	Payments for Ecosystem Services, <i>Pago por Servicios Ambientales</i>
SINIA	National Environmental Information System, <i>Sistema Nacional de Información Ambiental</i>

4.3.3. Background

Ecosystem services are a major source of income for Costa Rica, particularly through tourism, pharmaceutical prospecting and other services. 91% of power generation now comes from renewable sources, of which 73% is from hydropower. Over 20 years ago, Costa Rica had one of the highest deforestation rates in the world. Since then, Costa Rica has reversed the trend for environmental degradation¹ and is now recognised for its strong environmental protection policies and sustainable management of natural capital. In 1997, Costa Rica became one of the first countries to establish a national PES programme [76] and to sell carbon credits internationally [106], and more recently has committed to carbon neutrality² and pursuing green growth as reflected in the mining ban and a three-year moratorium on oil and gas explorations.

4.3.3.1. Status of national ecosystems and ecosystem services

Costa Rica is a small country with high biodiversity, with 13,680 species currently recorded in seven ecoregions, of which 850 are birds (19 currently threatened), 205 are mammals (9 threatened) and 7.6% are endemic to the country [76].³ Agricultural land makes up 35.2% of total land, while forested areas make up around 50%. Total converted land is 49.4%, while terrestrial protected areas make

¹ The deforestation rate decreased from 43,000 ha in 1983 and 13,000 in 1993, to an average of 5,000 ha in the last 5 years.

² [Http://www.uncsd2012.org/](http://www.uncsd2012.org/).

³ Figures given at www.cbd.org vary slightly from this.

up around 20% of total land area, including national parks (12% of the country), biological reserves, protected areas, forest reserves, wildlife refuges and wetlands. However, Balvanera *et al.* (2012) [76] calculate that natural resources are being depleted by 0.14% GNI and other sources report damage to ecosystems, particularly marine and coastal systems (see [107] and other articles from the same issue).

4.3.3.2. Ecosystems vulnerability to climate change and anthropogenic action

Population growth, urbanisation, increasing energy demand and agricultural developments are all putting pressure on Costa Rica's natural resources. Although deforestation is no longer the threat it once was, soil erosion and water pollution are now threatening ecosystems, particularly marine and coastal resources. The MA sub-global assessment in Costa Rica's Chirripó River basin identified logging, poaching, pollution and ecosystem fragmentation due to the unsustainable agricultural practices of non-indigenous people as current threats to the forested study area [108].

Climate change is predicted to have a negative impact on biodiversity and ecosystem services in Costa Rica. In particular, impacts to cloud forests may exacerbate risks of flooding and drought.⁴

4.3.4. Assessing natural capital

4.3.4.1. Institutions and institutional capacity for environmental accounting

The National Statistics Agency, INEC, and the Ministry of Environment and Energy (MINAE),⁵ are responsible for collating information on environmental statistics and indicators,⁶ which are put into the *Sistema Nacional de Información Ambiental* (SINIA) which acts as a base from which to determine the state of the environment and natural resources. SINIA was conceived to be a resource base for data and publications, coordinated between the National Geo-environmental Information Centre, *Centro Nacional de Información Geoambiental* (CENIGA), of MINAE and INEC.

⁴ <http://www.eeg-regionalcentrelac-undp.org/>.

⁵ Sometimes referred to simply as the Environment Ministry, MINAE was known as the Ministry of Environment, Energy and Telecommunications (MINAET) from 2006. It reverted back to MINAE on 1 February 2013 after the telecommunications portfolio was moved to the Ministry of Science and Technology (MICIT). A bill currently in the Legislature will change the name once more to the Ministry of Environment, Energy and Seas (MINAEM) as the ministry takes on the waters and seas portfolio. See <http://www.minae.go.cr/index.php/2012-06-08-20-19-22/quienes-somos>.

⁶ www.inec.go.cr.

The lead agencies for environmental accounting are MINAE and the Central Bank (BCCR). In addition, the National Statistics Agency (INEC), the Ministry of Finance and the Ministry of Planning are also involved.

4.3.4.2. Ecosystem and ecosystem services assessments

There has been no national ecosystem service assessment, but ecosystem services in Costa Rica have been mapped and assessed through a number of international efforts, at least in part. The Natural Capital Project set up in 2009 maps ecosystem services in the Northern Andes and Southern Central America (NASCA) region, spanning seven countries in Latin America, including much of Costa Rica,⁷ using InVEST software⁸ and other tools to generate information that can guide and inform decision making.

Numerous studies on ecosystems valuation from NGO and academia, including a Millennium Ecosystem Assessment sub-global report, assessed ecosystem services in parts of the Chirripó River basin [108].

4.3.4.3. Natural capital/environmental services accounts

Costa Rica was one of the first countries to create natural resource accounts, with the World Resource Institute (WRI) and government counterparts compiling accounts for forestry, soil erosion and fisheries as early as 1991 [109], reported in [110]. Since then, there have been examples of natural resource accounting (e.g. [111, 112]), but little is known about the value of tourist revenue generated by forests and protected areas, and the value of any benefits to local communities. Natural capital and ecosystem accounts are not currently incorporated into national accounts. However, INEC and MINAE together produce statistical reports on a range of subjects, including: air quality and emissions, hydrological resources, forest cover, biodiversity, climate, energy, sustainable development indicators and institutional management of the environment,⁹ which will aid in the development of natural capital accounts.

Pilot natural capital accounts

The Costa Rican government and WAVES project are now planning to produce pilot natural capital accounts. Asset accounts will be produced for priority areas, identified as water, forests and marine resources. In addition, there will be more

⁷ <http://www.naturalcapitalproject.org/nasca.html>.

⁸ Integrated Valuation of Environmental Services and Tradeoffs, http://www.naturalcapitalproject.org/pubs/NatCap_InVEST_and_Case_Study_Summary_TEEB_2010.pdf.

⁹ Available at <http://www.inec.go.cr>.

explicit consideration of ecosystem services in existing tourism satellite accounts. This will be a useful tool for policy-makers to help determine the effectiveness of alternative policies. In addition, an opportunity to incorporate natural capital accounts into the national system during the existing Costa Rica CAB Project (2012–2014), which will change the base year and update national accounts (2012–2014), was identified in a workshop in May 2012.

4.3.5. Governance

4.3.5.1. Governance bodies for natural capital

The WAVES pilot natural capital accounts will be led by a Steering Committee consisting of the MINAE and the Central Bank of Costa Rica (BCCR), together with the INEC. The committee provides overall leadership of the project, and together with the country coordinator, MINAE, will also monitor and report on policy dialogue and planning with non-governmental stakeholders.

4.3.6. Current initiatives based on ecosystem services

Costa Rica has a well-established system of PES schemes (see Box 8 [p. 37, above] for PES definitions) and has become known as a leader in developing innovative financing mechanisms for conservation. A recent study identified 28 PES projects of varying sizes currently in operation in Costa Rica [76]. These include national government paying protected area managers for hydrologic services, hydroelectric and water suppliers paying local communities or NGOs for biodiversity values, carbon sequestration projects to pay local landowners, carbon offset purchasers funding the maintenance of production services, and ecotourism operators and commercial bioprospectors paying for aesthetic qualities, many of these through the national PSA scheme (see below).

4.3.6.1. National PSA scheme

In 1997, Costa Rica became the first country to establish a national PES or *Pago por Servicios Ambientales* (PSA) scheme and to adopt the terminology of environmental services. In this scheme, landowners are compensated for activities identified as contributing to ecosystem services or a sustainable environment, such as reforestation, sustainable forest management, forest conservation and regeneration activities.¹⁰ Landowners are under contract to manage or protect their forests for 20 years and are obliged to follow a management plan that applies to all future purchasers of the land. Carbon offsets and watershed protection are then sold to domestic and international buyers, via the government, to compensate landowners.

¹⁰ [Http://www.fonafifo.com/paginas_english/environmental_services/servicios_ambientales](http://www.fonafifo.com/paginas_english/environmental_services/servicios_ambientales).

Since its inception, the scheme has been mainly (around 80%) financed by allocating the revenue from a 3.5% tax on fossil fuel sales (about US\$10 million per year in 2006) to FONAFIFO,¹¹ the semi-autonomous National Forestry Fund that administers the PSA programme. Additional funds supporting the project have also come from revenues from a forestry tax, a World Bank loan (through the Eco-markets Project, 2001–2006), grants from the GEF,¹² the German government (for forest protection) and the Norwegian government (for carbon sequestration), Conservation International (for agroforestry contracts and tree planting) and from 2007 through the World Bank Mainstreaming Market Based Instruments for Environmental Management (MMBIEM) project. In addition, GEF funds for the Costa Rica component of a silvopastoral scheme in three countries were also channelled through the PSA programme [113, 114] (see Box 9).

The Costa Rican PSA scheme built on previous initiatives, such as the incentives for timber plantations, mainly through tax rebates, in the 1970s, later broadened through the Forest Credit Certificate, CAF (*Certificado de Abono Forestal*) [115], in 1986 and the Forest Protection Certificate, CPB (*Certificado para la Protección del Bosque*), in 1995. These meant that when the PSA scheme began, there was already a system of payments for reforestation and forest management and the management institutions in place.

The PSA programme in Costa Rica is widely regarded as a success [116]. In its first five years, payments were made to over 4,400 people [117], and in the first 8 years of implementation, half a million hectares (a fifth of the country's forested area) was enrolled in the scheme. The significant decrease in deforestation is also largely attributed to the PSA scheme. In 1900, 85% of Costa Rica was forested, but by 1987 that had decreased to only 29%. Following significant changes in the 1990s, in 2008 forest cover had increased to 51% [118]. However, there are limits to what PES schemes can achieve. In Costa Rica, within the 1.4 million ha of biodiversity priority conservation areas outside of protected areas, carbon and water financing is a significant option for about 0.2 million ha and 0.3 million ha respectively. A Biodiversity Conservation Trust Fund (*Fondo para la Biodiversidad Sostenible*, FBS), set up to provide long-term conservation payments in this area, provides some funds for the remaining 0.9 million ha, but despite efforts the local tourism industry have so far avoided providing financing [112].

¹¹ [Http://www.fonafifo.com](http://www.fonafifo.com).

¹² Grants for PES schemes from International donors such as GEF are sometimes considered as payments from the global community for the biodiversity services provided by Costa Rica's forests.

Hydropower

FONAFIFO has now reached a number of agreements with water users for them to pay for the water services they receive. This started as a voluntary scheme with hydropower producers [119], but in 2005, Costa Rica introduced a compulsory water tariff, of which only a portion is channelled through the PSA programme, and the rest of which is allocated to the Ministry of Environment and to protected areas. Funds are used for national water management, specific conservation projects and for the conservation, maintenance and restoration of the basin ecosystem, including the purchase of land for groundwater protection and for protecting significant water sources [120]. See Box 11 (p. 80, below) for details of watershed funds.

Box 9. Silvopastoral Systems

In the past, the clearing of land to make way for permanent pasture was one of the main causes of primary forest deforestation in Central America [82]. In an effort to reduce pressure on primary forest from ranching-induced deforestation, the World Bank Silvopastoral Scheme¹³ was established to introduce payment incentives for farmers adopting integrated silvopastoral farming systems in degraded pasture lands in three countries, Costa Rica, Colombia and Nicaragua. The project developed technologies to help control livestock-induced deforestation, addressed socio-economic issues linked to livestock grazing and identified means to overcome barriers (e.g. financial, knowledge or policy) to the adaptation of silvopastoral systems.

The project was largely successful. The change to silvopastoral systems allowed farmers to increase productivity (i.e. local socioeconomic benefits) and reclaim degraded soils, and also provided improvements to ecosystem function and global conservation benefits. Between 2003 and 2008, the accumulated PES per farm was US\$2,500, US\$2,400 and US\$2,300 for Costa Rica, Nicaragua and Colombia, respectively, resulting in 12,262 hectares of improved biodiversity and carbon sequestration indices. In addition, the project demonstrated improvements to other ecosystem services, including better water infiltration, soil retention, soil productivity, reduction of fossil fuel dependence (e.g. substitution of inorganic fertiliser with nitrogen fixing plants), diversification of farm benefits, scenic beauty enhancement and land rehabilitation. One innovative element of the project was that payments varied depending on the degree of environmental service being provided. This eliminated inefficiencies and allowed farmers to decide the degree of conservation effort they were willing to make [121].¹⁴

¹³ <http://documents.worldbank.org/curated/en/2008/11/10054669/colombia-costa-rica-nicaragua-integrated-silvopastoral-approaches-ecosystem-management-project>.

¹⁴ Projects to scale up these schemes also include adjustments for farm location, as similar land use changes in different areas will provide different environmental services that should not be equally rewarded.

4.3.7. Legislation

4.3.7.1. Policy

Costa Rica has a stated “green growth strategy”. It has committed to carbon neutrality, increasing the share of hydropower, expanding eco-tourism and sustainable management of forest and marine resources.¹⁵ Mining activities are also banned and there is a three-year moratorium on oil and gas exploration.

The National Biodiversity Strategy and Action Plan aims to promote the conservation and fair and equitable use of the country’s biodiversity. One of its thirteen strategic points is the “internalisation of costs for environmental services and incentives”.¹⁶

4.3.7.2. Support and implementation of international objectives

Costa Rica is a signatory to the CDB, and as such submitted the *Costa Rica Fourth National Report to the Convention on Biological Diversity* in 2009 [122] and the National Biodiversity Strategy and Action Plan [104]. Costa Rica has also ratified international agreements such as the Convention on Biological Diversity and its Protocol on Biosafety, laws which are supported by a mandate stipulated in Article 50 of the Political Constitution of the Republic of Costa Rica [123].

4.3.7.3. Legislation (planned or in force)

1996 Forestry Law No. 7575

There is currently no law on natural capital accounting, but ecosystems have been recognised as providing critical services. In 1996, Costa Rica adopted Forestry Law No. 7575, legally recognising four critical services provided by forest ecosystems, namely (1) carbon sequestration, (2) hydrological services (including provision of water for human consumption, irrigation and energy production), (3) biodiversity protection and (4) scenic beauty for recreation and tourism [112]. This law also established a framework for payments to landowners for these ecosystem services, and established the National Fund for Forestry Financing, FONAFIFO,¹⁷ to manage the PSA. In addition, the Forestry Law also prohibits forest conversion and requires all working forests to be placed under an approved management plan.

Since then, a number of decrees have been introduced, adapting the forestry law and affecting the national PSA scheme. These include:

¹⁵ See National Development Strategies on energy, tourism, water, forest and marine resources.

¹⁶ [Http://www.cbd.int/countries/profile/default.shtml?country=cr#status](http://www.cbd.int/countries/profile/default.shtml?country=cr#status).

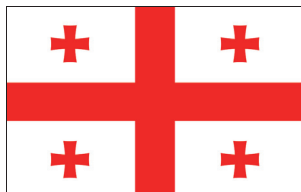
¹⁷ Article 46.

- **Fiscal Simplification and Efficiency Law No. 8114** (2001) fixing FONAFIFO's share of fuel tax revenues to 3.5%, guaranteed through the Ordinary National Budget¹⁸
- Fiscal Simplification and Efficiency Law No. 8114 (2002) introducing an agroforestry contract
- **Executive Decree No. 30762** (2002) giving FONAFIFO all management of PES, excluding the organisations budget, which must be approved by the ministry of finance.
- **Law No. 8058** regarding World Bank and GEF funding for PES
- **Law No. 8355** regarding PES funding from the German aid agency KfW, and from Conservation International
- **Presidential Decree No. 32868** (2005), inaugurating and regulating the Water Charging Scheme.
- **Biodiversity Law No. 7788 (1998)**, stipulating the protection and consolidation of protected wildlife areas, including provisions for PES schemes [123]

For details of forestry laws relevant to PES before 1996, see Bennett and Henninger (2009) [118].

¹⁸ Originally, article 69 of the Forestry Law 7575 assigned one-third of fossil fuel tax revenues to FONAFIFO.

4.4 Georgia



4.4.1. Fact Box

Total estimated value of natural resources to the economy	Not currently available
Natural Capital Growth: average annual growth rates, 1990–2008 (from the Inclusive Wealth Report [49])	Not currently available
Status of Ecosystem Services	High level of biodiversity, but ecosystem services are thought to be declining
Vulnerability to Climate Change and Anthropogenic action	Climate change is predicted to put severe stress on ecosystems. Deforestation, forest fragmentation, unsustainable exploitation and pollution are also threats to biodiversity
National Ecosystem Assessment	The International TEEB initiative is currently implementing a scoping valuation study of ecosystems and biodiversity in Georgia. This is aimed to help policy-makers, businesses and society to understand and recognise the value of biodiversity and the services provided by ecosystems
Key legislation or planned legislation	The aim of Forestry Law is to protect ecosystem services provided by forests, but there is no law on ecosystem services accounting
National Biodiversity Strategy and Action Plan	First NBSAP was adopted by Government of Georgia in 2005. An updated NBSAP, in accordance with the Aichi targets, has recently been finalised and is now under discussion by stakeholders

4.4.2. Abbreviations: Georgia

KNP	Kolkheti National Park
MoENR	Ministry of Environment and Natural Resources
NBSAP	National Biodiversity Strategy and Action Plan
NSO	National Statistical Office
TEV	Total Economic Valuation

4.4.3. Background

As part of the Caucasus Ecoregion, Georgia is considered one of the 25 globally significant “biodiversity hotspots”. Georgia relies significantly on ecosystem services for hydropower, industry, tourism, agriculture, mining, fuel wood, NTFPs and watershed services. Despite this, ecosystems are threatened by habitat destruction and degradation, unsustainable exploitation, pollution and climate change.

4.4.3.1. Status of national ecosystems and ecosystem services

Georgia is located on the southern slopes of the Great Caucasus Mountain Range and, as part of the Caucasus Ecoregion, is considered one of the 25 globally significant “biodiversity hotspots” based on the species richness and the significant level of species endemism. The Caucasus Region is registered as one of the WWF Global 200 Ecoregions.

4,100 species of vascular plants have been recorded in Georgia, of which 300 are endemic to the country and 600 to the Caucasus region. Georgia’s flora also includes 16 genera endemic or sub-endemic to the country. The diversity of faunal species is as follows: over 11,100 species of invertebrates, 84 species of freshwater fish, 12 species of amphibians, 52 species of reptiles, 300 species of birds and 109 species of mammals. Of these, 135 species and 4 subspecies are considered threatened.¹

Georgia has a diverse landscape with the following major biomes identified: forest, flood plane forest, semi-desert, steppe, arid light woodland and hemi-xerophytes scrub, sub-alpine, alpine zone, subnival, wetlands. Within these biomes, the diversity of habitat types is also remarkable. The Kolkheti forest refugium, as well as the limestone and high mountain vegetation complexes, are all ecologically and biogeographically distinct and noteworthy in terms of species composition.²

¹ Included on the IUCN Red List.

² <http://www.cbd.int/countries/profile/default.shtml?country=ge#status>.

4.4.3.2. Ecosystems vulnerability to climate change and anthropogenic action

The main threats to biodiversity in Georgia are the destruction and degradation of habitats and the extensive extraction of biological resources. The principal causes of habitat destruction are timber logging, degradation of water ecosystems, mining, pollution and overgrazing. Intensive grazing is problematic for subalpine forest ecosystems as well as in the semi-arid zones in the south-eastern parts of Georgia where, in both cases, large numbers of grazing livestock (especially sheep) result in soil erosion. Livestock is often grazed in forest ecosystems, which negatively impacts natural restoration cycles within forest stands [124].

The water ecosystems in Georgia have been intensively modified over the years as bogs have been drained and water levels in many lakes have been artificially regulated. The water quality of many rivers and reservoirs became critically low during the Soviet period. At present the main sources of water pollution are the utilities sector (67%), thermal power engineering (31%) and industry (2%). Additional sources of water pollution are agricultural run-off and domestic waste dumps on river banks [125].

Climate change is predicted to cause higher temperatures and decreased levels of precipitation in some parts of Georgia, which will put ecosystems – especially those which are at the margins of their natural range – under severe stress. The distributions of plant communities, and the animal populations that depend on them, will change and some may disappear from Georgia because they are not able to move or adapt to the changed climate.

4.4.3.3. Economic context

Currently classified as a lower middle income country,³ Georgia's economy grew by more than 10% in 2006–2007, based on strong inflows of foreign direct investment and robust government spending. GDP growth slowed following the August 2008 armed conflict with Russia and turned negative in 2009 in the wake of the global financial crisis. The economy rebounded in 2010–2012, with growth rates above 6% per year.

Industry is one of the largest economic sectors, at around 26% of GDP, from mineral mining (manganese, copper and gold), food processing, production of beverages (e.g. spring and mineral waters, wine and other alcoholic and non-alcoholic

³ [Http://data.worldbank.org/country/georgia](http://data.worldbank.org/country/georgia) In 2012, In 2012, Georgia's GDP was about US\$15.8 billion, with per capita GDP at US\$3520.

beverages), metals, machinery and chemicals. Hydropower production is also becoming an increasingly important industrial sector,⁴ with hydropower now providing most of Georgia's energy needs.

Agriculture is also important, making up 7.5% GDP,⁵ and includes the cultivation of grapes, citrus fruits and hazelnuts. Livestock breeding is an important agricultural subsector. The share of forestry and fishery in the country's economy is not high at present, but there is a good natural basis for developing these sectors: forests covers about 40% of the country's inland territory and the country is bounded by the Black Sea to the east and has a large river network with over 26,000 rivers and streams.

Tourism and nature-based tourism have grown significantly over the last years. The total output of tourism-related services increased by 73.5% in the period 2006–2011 and amounted to 7.1% of the country's total economic output.⁶

4.4.3. Contribution of natural capital to Georgia's economic development, people's livelihoods and poverty alleviation

Many of the sub-sectors important for Georgia's economy rely significantly on ecosystem services. Fresh water resources originating in the mountains of the Greater and Lesser Caucasus Range are indispensable for hydropower production, drinking water supply, irrigation and fishery; mineral and fresh water springs are key resources for mineral and bottled water industries; grasslands in the mountains and lowlands are important for livestock breeding; fertile soil, favourable climate and pollination services are essential for crop production, viticulture and fruit cultivation.

Ecosystem services are also critical for sustaining rural livelihoods, especially among the poor. Forests, wetlands, rivers, lakes, grassland and other natural habitats provide local people with a variety of goods and services and are a source of livelihoods for thousands of rural people. It is estimated that as many as one half of the naturally occurring vascular plants in Georgia have some value to the people of the country [125]. Natural products such as wild fruits, nuts, berries, mushrooms and edible greens, tubers, and other plant products provide an important source of sustenance and well-being for rural people, while other plants are used medicinally

⁴ <https://www.cia.gov/library/publications/the-world-factbook/geos/gg.html>.

⁵ Georgian National Statistical Service. www.geostat.ge.

⁶ Georgian National Statistical Service. www.geostat.ge.

in many villages. Fir tree seeds, in particular of *Abies nordmaniana*, are important sources of income for rural economies in the Racha region. Forests are also crucial sources of fuel wood, providing the primary source of energy for heating and cooking, for people in many rural areas and towns, with annual fuel wood consumption estimated at 2 million m³.

The natural pasture lands of Georgia provide fodder for domestic sheep, goats and cattle that are herded from one area to another over the course of the seasons. The rivers, streams, lakes and coastal areas of Georgia provide people with fish, crayfish, snails and other edible food items. Hunting of waterfowl and other birds provides sport and also supplemental food for many Georgian residents.

Forests ecosystems provide essential services to reduce the threat of natural disasters. Georgia is prone to natural hazards such as floods, flash floods, mudflows and avalanches which may entail high economic damage and the loss of human life. Forest ecosystems reduce the occurrence of flash floods in spring and autumn seasons, prevent soil erosion and landslides and prevent drying out of the rivers.

4.4.4. Assessing natural capital

4.4.4.1. Institutions and institutional capacity for environmental accounting

There are no institutions in Georgia formally assigned with the task of being engaged in economic valuation of ecosystem services, cost–benefits analysis or environmental-economic accounting. However, both the Ministry of Environment and Natural Resources⁷ (MoENR) and the National Statistics Office (NSO) act as lead agencies for environmental accounting.

Ministry of Environment and Natural Resources

The MoENRP is the body that leads various projects related to economic valuation of ecosystems and ecosystem services and cost–benefit analysis. However, capacity to undertake valuation studies or develop national environmental accounts in this institution is limited. There is no division or staff in the ministry working on environmental economics systematically. The ministry is also responsible for producing *State of the Environment Reports* every three years, in cooperation with other ministries and institutions. (More detailed information on these reports is provided in subsection 4.4.4.3.)

⁷ Sometimes referred to as the Ministry of Environment and Natural Resource Protection (MoENRP) or the Ministry of Environmental Protection and Natural Resources.

National Statistical Office and national accounting framework in Georgia

The National Statistics Office (NSO) of Georgia develops the national accounts in the country. The conceptual framework for Georgia's national accounts is the System of National Accounts 1993 (1993 SNA)⁸ which was adopted by the United Nations Statistical Commission (UNSC) in 1993 as the international standard for compilation of national accounts statistics and for the international reporting of comparable national accounting data.⁹ The 1993 SNA was updated in 2008 and *The System of National Accounts 2008* (2008 SNA) was adopted by the United Nations Statistical Commission (UNSC) which is the latest version of the international statistical standard for the national accounts. Georgia plans to switch gradually to the application of 2008 SNA for its national accounts.¹⁰

Environment and natural resources are part of the national accounting system of Georgia. There is a Department of Agriculture and Environment in the National Statistics Office staffed with 10 people. This department collects information on the state of the environment, environmental pollution and natural resources and their uses from various ministries, including Ministry of Environment and Natural Resources (MENR), Ministry of Agriculture, Ministry of Energy and so on.

The NSO produces the annual statistical publication *Natural Resources and Environment Protection in Georgia*, detailing information on land, forest, biodiversity, water resources and their uses. It also contains some data on the protected areas and on the animal and bird species in them. The publication also provides data on the extraction of some mineral resources and wastewater discharges. However, only physical environmental data are provided in the Georgian national accounts. There is no monetary valuation of the natural resources or their uses applied in the national accounts. There is also no information provided on, for example, natural resource use and management expenditures, revenues from environmental taxes, increase or decrease of the natural resource base (natural capital) of the economy and so on.

⁸ Geostat, http://geostat.ge/cms/site_images/_files/english/methodology/GDP%20Brief%20Methodology%20ENG.pdf.

⁹ United Nations Statistics Division, <http://unstats.un.org/unsd/nationalaccount/hist2008.asp>.

¹⁰ Geostat, http://geostat.ge/cms/site_images/_files/english/methodology/GDP%20Brief%20Methodology%20ENG.pdf.

Human resources to undertake environmental accounting are limited. There are only a few national environmental economics experts in the country. Those who have a certain expertise in economic valuation methodologies do not have the opportunity to work in this field systematically and to develop their skills. Most of the economic valuation studies in Georgia were undertaken by international experts in cooperation with limited number of national experts who are scattered across different international projects or institutions.

4.4.4.2. Ecosystem and ecosystem services assessments

Georgia has not yet undertaken a comprehensive ecosystem assessment at national level. However, acknowledging the value of biodiversity and its potential for creating incentives for conservation and sustainable use, Georgia offered to be a pilot country for an ecosystem valuation study, implemented under the international TEEB initiative. It is hoped that the study will help policy-makers, businesses and society to understand and recognise the value of biodiversity and the services provided by ecosystems. A TEEB Georgia scoping study was recently finalised,¹¹ taking stock of work that has been done thus far on biodiversity and ecosystem services assessments in Georgia. (More detailed information on the scoping reports is provided in subsection 4.4.4.3.)

At a regional level, a number of assessments have been undertaken for specific watersheds or ecosystems. These include, but are not limited to, the following:

- Kura-Aras River Basin Transboundary Diagnostic Analysis;¹²
- Detailed Assessment of Natural Resources of the Upper Alazani Pilot Watershed Area [126];
- Detailed Assessment of the Natural Resources of the Upper Rioni Pilot Watershed Area [127].

In addition, there are a number of studies conducted for the establishment of various protected areas which also provide information on specific ecosystems in Georgia. These studies provide mostly physical assessments of these ecosystems.

¹¹ Results of the scoping study were presented at the 6th Biodiversity in Europe conference organised in Batumi, Georgia, 15-18 April 2013.

¹² Kura-Aras River Basin Transboundary Diagnostic Analysis. RER/03/G41/A/1G/31: Reducing Trans-boundary Degradation of the Kura-Aras River Basin. UNDP/GEF project. 2007.

4.4.4.3. Natural capital/environmental services accounts

A number of studies have been undertaken in Georgia to assess the importance, economic value and contribution of ecosystem services and biodiversity to the economic sectors and people's well-being. Most of the economic valuation studies undertaken in Georgia relate to protected areas or forestry and they have been undertaken with support of international institutions such as the World Bank, UNDP, GEF and WWF.

Early studies by the World Bank

The earliest economic valuation studies commissioned by the Word Bank in 1999–2000 used contingent valuation methods to explore the revenue-generation potential of new national parks to be established under the GEF-funded Protected Areas Development Project. These studies found that there was a potential to generate resources for sustaining and developing Georgian protected areas through the introduction of entrance fees or other economic instruments.

The other study commissioned by the World Bank in 2000 used TEV methodology to assess all potential costs and benefits related to establishment of the Kolkheti National Park (KNP) on the Black Sea Coast of Georgia. Results of this study were used by the World Bank to provide recommendations to the Georgian Ministry of Environment for the preparation of the KNP Management Plan. The study results suggested that limitations on resource use by local people in the KNP should be less strict but within the limits of ecological sustainability. The study also recommended a compromise between the need to sustain local communities' livelihoods and to preserve the globally significant wetland resources for future generations, which in turn would help ensure that benefits to the local communities from resource use would be continuous.

There is a certain experience in Georgia in economic valuation of forest ecosystems. Studies on total economic valuation (TEV) of Georgian forests were undertaken in 2000–2003 with World Bank support. The objective of these studies was to provide Georgian forest policy-makers with general principles/guidelines on how to evaluate in economic terms the benefits and costs of different forest products and services under an alternative forest management regime.

Current National Statistics

The NSO collates physical environmental data, including on the extraction of some mineral resources and wastewater discharges, as well as on land, forest, water and biodiversity resources for the Georgian national accounts. There is no monetary valuation of the natural resources or their uses applied in the national accounts. There is also no information provided on natural resource use and management

expenditures, revenues from environmental taxes, increase or decrease of natural resource base (natural capital) of the economy, or the cost of environmental degradation.

The MoENRPs *State of the Environment Reports* are published every three years in cooperation with other ministries and institutions, and present consolidated information on ambient air and water quality, availability of water resources, land, mineral resources, flora and fauna, protected areas, radiation, natural and anthropogenic disasters, waste, chemicals, monitoring systems, control and enforcement of the national environmental legislation, environmental education and so on. These reports mostly provide biophysical data on various components of the environment and the use of natural resources. No information on economic valuation of natural capital, ecosystem services or cost of environmental degradation has been provided in the State of Environment Reports so far.

Recent pilot studies

The Georgian government's recent interest in undertaking economic valuation of protected areas has materialised in two studies undertaken with the support of UNDP/GEF and the WWF Caucasus Program in 2009–2012 including:

- Economic Valuation of the Contribution of Ecosystems in Protected Areas to Economic Growth and Human Well-Being in Georgia;¹³
- Valuation of the Contribution of Borjomi-Kharagauli and Mtirala National Parks Ecosystem Services to Economic Growth and Human Well-being in the Republic of Georgia.¹⁴

These studies used the so-called Sector Scenario Analysis methodology to assess the contribution of ecosystems in and around selected Georgian protected areas to economic development and human well-being in the country. This methodology builds on the approach used by UNDP for the valuation of ecosystems services in the Latin American and Caribbean Region, a sector-oriented approach which is relevant to policy-makers responsible for sector development and investment policies. Productivity sectors linked to ecosystem services provided by selected protected areas including agriculture, energy (hydropower), tourism and forests

¹³ Economic Valuation of the Contribution of Ecosystems in Protected Areas to Economic Growth and Human Well-Being in Georgia. Prepared by ECFDC/GCCW/AMECO, Marlon Flores, Malkhaz Adeishvili, for UNDP/GEF project Catalyzing Financial Sustainability of Georgia's Protected Areas System. July 2012.

¹⁴ Valuation of the Contribution of Borjomi-Kharagauli and Mtirala National Parks Ecosystem Services to Economic Growth and Human Well-being in the Republic of Georgia. Prepared by Marlon Flores, Malkhaz Adeishvili for WWF Caucasus Program. February 2011.

were analyzed. Sub-sectors related to human well-being such as drinkable water supply, subsistence agriculture and disaster prevention and mitigation were also analyzed in these studies. For each sector or subsector the studies explored the economic relations between production practices, ecosystem services, other inputs and their respective sectoral outputs. The studies explored how ecosystem degradation lowers outputs and discusses the associated costs. Ecosystem-friendly management practices that avoid damages and their economic benefits were highlighted. Two different scenarios, “Business as Usual” (BAU) and “Sustainable Ecosystem Management” (SEM), were used to facilitate the analysis and demonstrate the value of ecosystem services.

There are a number of additional ongoing initiatives related to the economic valuation of ecosystems and ecosystem services in Georgia. These include:

- Valuation of ecosystems services and biodiversity in the Oni Municipality – a study commissioned under the regional project “Support Development of Biodiversity Conservation Policies and Practices in Mountain Regions of the South Caucasus”. The project is implemented by the Regional environmental Centre for the Caucasus (RECC) with financial support from the Government of Norway.
- Valuation of ecosystems goods and services in the pilot watershed of the Rioni and Alazani river basins – a study commissioned by the USAID funded Integrated Management of Natural Resources in Watersheds of Georgia Program.

TEEB Study

A full TEEB study in Georgia is planned to start by the end of 2013 or the beginning of 2014. This will be a participatory process involving stakeholders from various sectors, including line ministries, private sector, academic institutions and non-governmental organisations. Draft NBSAP-2 underlines the importance of Georgia’s involvement in TEEB process. It is believed that the study will help policy-makers, businesses and society to know about and recognise the value of biodiversity and the services provided by ecosystems. It is hoped that it will also reveal new opportunities to work with nature in a sustainable way and thereby help to bridge the divides between economic development interests and biodiversity conservation needs. It will include valuation information for the four sectors identified in the scoping study as important to the economy and relying on ecosystem services, namely hydropower, tourism, agriculture and forestry.

4.4.5. Legislation

4.4.5.1. Policy

Georgia's 2005 NBSAP recommends "mainstreaming nature's value in decision making" to ensure appropriate financial and economic programmes are in place to support effective conservation of biodiversity, and to ensure the delivery of the NBSAP activities. Furthermore, NBSAP-2 underlines the significance of economic valuation of biodiversity and ecosystem services. It considers the Economics of Ecosystems and Biodiversity (TEEB) initiative as a useful approach that can help decision-makers recognise, demonstrate and capture the values of ecosystems and biodiversity, including how to incorporate these values into decision making. NBSAP-2 underlines the importance of economic valuation studies undertaken in Georgia in recent years with the assistance of the international community, and Georgia's involvement in the TEEB process.

4.4.5.2. Support and implementation of international objectives

Georgia is a signatory to the CDB, and as such submitted the Georgia *Second National Report to the Convention on Biological Diversity* in 2010 and the National Biodiversity Strategy and Action Plan in 2005. Georgia has also ratified international agreements as the Convention on Biological Diversity and its Protocol on Biosafety, laws which are supported by the Law on Genetically Modified Organisms of 2005.

4.4.5.3. Legislation (planned or in force)

There is no current legislation in place or under development related to ecosystem service valuation, or integration of environmental and natural resources values into national accounting or decision making. Nor does the country participate in international efforts to ensure that the value of natural capital is integrated into national accounts and economic policy-making.

4.4.6. Case Study

In 2000–2001 the WB conducted a study "*Benefits and Costs of Establishing the Kolkheti National Park*".¹⁵ The total economic valuation (TEV) methodology was adopted in estimating the costs and benefits associated with the establishment of the Kolkheti National Park (KNP).¹⁶ This approach accounts for all uses and services of wetlands that humans derive from them. Table 3 lists the wetland values considered in this study.

¹⁵ Benefits and Costs of Establishing the Kolkheti National Park. Tijen Arin, 18 January 2001.

¹⁶ Kolkheti National Park encompasses Kolkich Wetlands of global importance. Establishment of the National Park was financed by the GEF.

Table 3: Classification of total economic values for the Kolkheti National Park

Use values			Non-use values
Direct use value	Indirect use value	Option value	Existence
Crop cultivation	Nutrient retention	Potential future uses	Biodiversity
Grazing	Carbon Sequestration		Archeological treasure
Fuelwood	Flood control		Culture, heritage
Hunting	Water filtering		Bequest (preservation for future generations)
Fishing	Micro-climatic stabilisation		
Recreational and tourism (eco- and cultural)	Spawning grounds		
Peat harvesting	Groundwater regulation and protection		
Scientific research	Habitats for migratory birds		
Education			
Esthetic value			

Source: Benefits and Costs of Establishing the Kolkheti National Park. Tijen Arin, January 18, 2001.

The analysis derived net monetary values for the use and non-use benefits from the KNP. The net value was established at the point of use by subtracting from the market price the costs of extraction, transportation and processing.

The results of the cost–benefit analysis showed that the establishment of the KNP under the current KPA Law would lead to significant net losses to the local communities. A socially and ecologically sustainable alternative was needed. The study results suggested that in this alternative scenario, limitations on resource use in the KNP should be less strict but within the limits of ecological sustainability. A compromise was needed between the needs to sustain local communities' livelihoods and to preserve the globally significant wetland resources for future generations, which in turn would help ensure that benefits to the local communities from resource use would be continuous. Based on the findings of this analysis some specific recommendations were presented to guide the preparation of the KNP Management Plan.

4.5 Germany



4.5.1. Fact Box

Total estimated value of natural resources to the economy	Not currently available, although a National TEEB underway
Natural Capital Growth: average annual growth rates, 1990–2008 (from the Inclusive Wealth Report [49])	Natural Capital Growth (%): -0.47 Natural Capital per Capita (%): -0.70 IWI per Capita (%): 1.83
Status of Ecosystem Services	Stable, but degraded
Vulnerability to Climate Change and Anthropogenic action	Pollution, land use change and climate change are threats
National Ecosystem Assessment	National TEEB Assessment is currently underway
Key legislation or planned legislation	National Strategy for Sustainable Development (2002) Comprehensive environmental legislation, e.g. Federal Nature Conservation Act (BNatSchG)
National Biodiversity Strategy and Action Plan	National Strategy on Biological Diversity (2007) [128]

4.5.2. Abbreviations: Germany

BfN	Federal Agency for Nature Conservation, <i>Bundesamt für Naturschutz</i>
BMU	Federal Ministry for Environment, Nature Conservation and Nuclear Safety, <i>Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit</i>
DUX	German Environment Index
GEB	German Environment Barometer
UFZ	Helmholtz Centre for Environmental Research

4.5.3. Background

Europe's largest economy (and fifth in the world in PPP terms), and second largest population after Russia, Germany is a key member of Europe's political and economic organisations. It relies on natural resources such as coal, gas, minerals and timber, and is both one of the world's biggest exporters (e.g. of motor vehicles, chemicals, electronic products) and biggest importers (e.g. machinery, vehicles, chemicals, oil and gas). In addition, with arable land making up around a third of land area, Germany produces agricultural products such as grains, fruit and livestock for export and domestic consumption.

Germany has been a leader in promoting environmental conservation and sustainable development policies. Sustainability is a fundamental principle of German policy, and the government has committed to a variety of initiatives including 100% renewable electricity supply by 2050, ecological tax reform, globally recognised eco-labelling (Blue Angel), leadership in green technologies and financial incentives for reduced and renewable energy consumption.¹ Germany has also shown leadership in promoting natural capital accounting, initiating the TEEB studies, together with the EC,² and funding ecosystem services projects around the globe.

4.5.3.1. Status of national ecosystems and ecosystem services

Around 48,000 animal species have been found in Germany,³ of which over 33,000 are insects, 91 are mammals and 254 are birds (breeding). A recent biodiversity assessment identified a considerable number of species as endangered or critically endangered, including 48.4% of plants, around 38% of mammals and 37% of breeding birds. The most threatened group is that of amphibians and reptiles, with 71.4% of them considered endangered or extremely rare, closely followed by freshwater fish with 68.6% of them endangered. Natura 2000 sites⁴ make up

¹ <http://www.uncsd2012.org/index.php?page=view&type=6&nr=21&menu=32>.

² <http://www.teebweb.org/about/>.

³ <http://www.cbd.int/countries/profile/default.shtml?country=de#status>.

⁴ http://www.bfn.de/0316_natura2000+M52087573ab0.html.

13.5% of Germany's land area and 41% of marine areas (31% of the exclusive economic zone). In addition, 12 National Parks, 57,800 Nature Conservation Areas, 7,300 Landscape Reserves and 14 Biosphere reserves cover over a third of Germany's land area, overlapping partially with the 24% of the country made up of 92 Nature Parks. Forest covers 31.7% of Germany's land area.

The Inclusive Wealth Report [49] finds that the value of Natural Capital in Germany decreased slightly between 1990 and 2008, by 0.47% (or 0.70% per capita), while the World Bank's *Changing Wealth of Nations* [17] calculates an increase of 1% of Germany's natural capital between 1995 and 2005, as a percentage of change in total wealth. An overview of the state of natural capital [129] notes the following trends for ecosystem services in Germany:

- **Air quality:** significant overall decline in air pollution from 1990–2005, although issues of particulate matter and ammonia emissions continue.
- **Water quality:** continuous improvement in both surface and ground water quality since 1982, with reductions in ground water nitrate load. Focus is now on reducing nitrate and organic halogen compounds, probably originating from agriculture. No serious problems with water shortages.
- **Soil and land use:** there has been continuous loss of arable land due to settlements, industry and infrastructure. Soil erosion is also an issue, but is not considered severe.
- **Biodiversity:** Germany saw reasonable losses in biodiversity, particularly from 1950 to 1980, mainly due to agricultural intensification. Currently, 40% of vertebrate species, 25% of ferns and flowering plant species and 75% of ecosystem types are considered endangered. However, the trend seems to have stabilised over the last 15 years, possibly due to agricultural reforms and EU directives.

4.5.3.2. Ecosystems vulnerability to climate change and anthropogenic action

The main threats to ecosystems are identified as soil and water degradation (through pollution and eutrophication), air pollution, agricultural intensification, land use conversion and encroachments on the water balance.

Climate change is a threat to ecosystem services, and is predicted to cost Germany up to €800 billion by 2050 if global action is not taken, mainly through crop losses, flood damages, etc. [130], reported in [129].

4.5.4. Assessing natural capital

4.5.4.1. Institutions and institutional capacity for environmental accounting

- **Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)**⁵ is responsible for environmental policy, including international environmental policy debate.
- **Federal Agency for Nature Conservation (BfN)**⁶ is the central scientific authority of the German federal government for both national and international nature conservation, reporting to the BMU.
- **Federal Statistics Office, DeStatis**,⁷ provides and disseminates statistical information,
- **Environmental-economic accounting unit** of the Federal Statistics Office deals with the interrelations between the economy and the environment, describing three components: environmental burdens, state of the environment and environmental investments. It describes and analyses trends of various environmental indicators in the sustainability strategy and shows interrelations with economic and social aspects in the biennial Indicator Report.

4.5.4.2. Ecosystem and ecosystem services assessments

A national ecosystem services assessment for Germany has not yet been started. With the financial support of the German Ministry for the Environment, Nature Conservation and Nuclear Safety and the Federal Agency for Nature Conservation, a national TEEB study was launched in October 2012 (Naturkapital Deutschland – TEEB DE 2012 [131]).⁸ “Natural Capital Germany – TEEB-DE” will produce four reports focusing on: (1) biodiversity and climate; (2) green infrastructure in semi-natural and rural areas; (3) green infrastructure in urban areas; and (4) mainstreaming the economics of nature in Germany: instruments and policies (Synthesis Report), to be published between 2012 and 2015 [132]. It is planned to set up physical accounting and mapping of selected ecosystem services in Germany.

Other ecosystem assessments and valuation studies in Germany include a 2009 overview of the state of natural capital [129].

⁵ Often referred to simply as the Federal Environment Ministry, <https://www.bmu.de/>.

⁶ <http://www.bfn.de/>.

⁷ <https://www.destatis.de/>.

⁸ <http://www.naturkapital-teeb.de/>.

4.5.4.3. Natural capital/environmental services accounts

The German Federal Statistical Office was engaged in developing a system of EEA even in the early 1990s [133] as reported in [110]. These included five subject areas:

- material, energy and emission flows
- a GIS system on the use of land and space
- a state of environmental indicators
- environmental protection activities accounts
- accounts of the imputed costs of achieving standards for the sustainable use of the environment

The Federal Statistical Office has continued to develop these and other environmental-economic accounts which are regularly updated and used to inform potential policy [134]. Much of the current German EEA accounts are based on the UN SEEA, and include [135]:

- Physical Flow Accounts:
 - Economy-wide material flow accounts
 - Energy flow accounts by sector
 - Primary material by sector
 - Emission accounts by sector
 - Water accounts by sector
 - Physical input and output tables
- Physical Stock Accounts: quantitative and qualitative changes in the stock of natural assets in physical units
 - Housing and transport by sector
 - Intensity of use of agricultural ecosystems
- Environment related flows and stocks (in monetary terms):
 - Environmental protection measures
 - Environmental taxes

In addition, the follow sectors have separate reporting modules:

- Transport
- Agriculture
- Forestry
- Private households

Pilot projects have been carried out to develop accounting for ecosystems and landscapes, but these are not yet included in the EEA. There are also no accounts showing the stocks of mineral resources (a low priority for Germany) [135].

The integrated accounting data from the SNA, and its two satellite accounts, SEA and EEA, are used for various analyses, including descriptive approaches such as the calculation of an eco-efficiency indicator on a national or industry level. The same data are also used in environmental-economic models, simulating proposed measures and investigating the effects on variables such as energy use, CO₂ emissions, GDP and tax revenue.

4.5.5. Governance

4.5.5.1. Governance bodies for natural capital

The “Natural Capital Germany – TEEB DE” project is supported by the Federal Agency for Nature Conservation and funded by the Federal Environment Ministry. The work is coordinated by the Helmholtz Centre for Environmental Research (UFZ).

The Secretary of State Committee for Sustainable Development (“Green Cabinet”) is a newly established institution consisting of state secretaries from relevant sectors (e.g. economics, environment, agriculture, social affairs and transport). It is responsible for coordinating and supervising the implementation and further development of the National Sustainable Development Strategy. It meets regularly and is supported by a working committee (heads of under-directorates) from federal ministries.⁹

4.5.5.2. Mechanisms integrating natural capital values into policy

In Germany, Environmental-Economic Accounting (EEA) data are expressly used as a policy approach for integrating environmental concerns into policy, specifically for Sustainable Development Policy [136].

In addition to EIA and SEA requirements, since May 2009 ministries have had to carry out a sustainability check (an impact assessment from the point of view of sustainability) for each draft law or ordinance. The Parliamentary Advisory Council on Sustainable Development is responsible for reviewing these results.

4.5.5.3. Reporting

Every two years, a National Sustainable Development Strategy progress report is published by the Federal Statistical Office presenting and analysing trends in the sustainability indicators (e.g. the most recent was in 2012 [137]).

⁹ http://www.politischestrategie.com/publikationen/Tils_2007_European%20Environment.pdf.

Previously, two environmental monitoring tools, the German Environment Barometer (GEB) and the German Environment Index (DUX), were used to report on environmental trends. The GEB was introduced in 1998, and developed further after the introduction of the National Sustainability Strategy.¹⁰ Both were discontinued in 2011, replaced by the German Core Indicator System (KIS).

4.5.6. Legislation

4.5.6.1. Legislative process

In Germany, the Bundestag is the most important organ of the legislative branch. The German Bundesrat is also involved in the legislative process as an organ through which the sixteen *Länder* of Germany participate in the legislation of the Federation.

The Federal Government introduces most legislation; when it does so, the Bundesrat reviews the bill and then passes it on to the Bundestag. If a bill originates in the Bundesrat, it is submitted to the Bundestag through the executive branch. If the Bundestag introduces a bill, it is sent first to the Bundesrat. The Joint Conference Committee resolves any differences over legislation between the two legislative chambers. Once the compromise bill that emerges from the conference committee has been approved by a majority in both chambers and by the cabinet, it is signed into law by the federal president.

4.5.6.2. Support and implementation of international objectives

Germany is a signatory to the CDB, and as such submitted the Fourth National Report on Biodiversity in 2010 and the National Biodiversity Strategy and Action Plan. Germany is also subject to EU Resolution on Environmental Economic Accounts (see Box 10 [overleaf]).

4.5.6.3. Legislation and strategy

National Strategy for Sustainable Development, 2002

In 2002, the Federal Government adopted the National Strategy for Sustainable Development in Germany,¹¹ making sustainability a fundamental principle of German policy [13]. It integrates the three dimensions of sustainable development (economic development, social development and environmental protection) in four guidelines (intergeneration equity, quality of life, social cohesion, international responsibility).

¹⁰ [Http://connection.ebscohost.com/c/articles/18339876/germany-environmental-barometer-index](http://connection.ebscohost.com/c/articles/18339876/germany-environmental-barometer-index).

¹¹ [Http://www.politischestrategie.com/publikationen/Tils_2007_European%20Environment.pdf](http://www.politischestrategie.com/publikationen/Tils_2007_European%20Environment.pdf).

Box 10. European Union Regulation on Environmental Accounts
and 2020 Biodiversity Strategy

In 2011, the EU adopted Regulation No. 691/2011 on European Environmental Economic Accounts I [14] requiring the 27 member countries to regularly report on environmental taxes, various resources and emissions to air, land and water. This is to be revised every three years, with the opportunity to expand the scope of the areas covered by national accounts.

In 2011 the European Parliament adopted the EU Biodiversity Strategy to 2020 [15] aimed at halting the loss of biodiversity and ecosystem services by 2020. This is in line with global commitments made in Nagoya in 2010 and CBD targets, and follows commitments made by EU leaders in 2010. It also includes the 2050 vision that *“By 2050, European Union biodiversity and the ecosystem services it provides – its natural capital – are protected, valued and appropriately restored for biodiversity’s intrinsic value and for their essential contribution to human well-being and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided”*.

The EU Biodiversity Strategy to 2020 includes Action 5: improve knowledge of ecosystems and their services in the EU, calling for member states to *“assess the state of ecosystems and their services in their national territory by 2014, assess the economic value of such services, and promote the integration of these values into accounting and reporting systems at EU and national level by 2020”*.

Reporting on the proceedings, Dutch MEP Gerben-Jan Gerbrandy noted *“The services that nature provides us with, like clean water, clean air, fertile soil, food, are not only crucial for the well-being of human kind, they also represent an astronomical economic value. According to economists, each year we lose 3% of GDP due to the loss of biodiversity. That costs the EU €450 billion year after year. Compared to these figures, investing €5.8 billion per year in Natura 2000 is a bargain!”*

Since then, the EC have produced the technical report *Mapping and Assessment of Ecosystems and their Services*, an analytical framework for ecosystem assessments under Action 5 of the EU Biodiversity Strategy to 2020 [16].

To measure the effectiveness of Germany's 2002 National Strategy for Sustainable Development, a set of sustainability indicators on 21 topics with 38 targets was specified. Many of these indicators are embedded into Germany's expanded accounting system, which includes the SNA, and the EEA and SEA satellite accounts. This includes indicators on public sector financing, capital–outlay ratio, GDP, energy and raw materials productivity, greenhouse gas emissions, land use for housing and transport, transport intensity and share of railways in providing transport, air pollution and labour force participation rate. Particularly relevant to environment policy, the Sustainable Development Strategy includes the following goals:¹²

- To double raw material productivity between 1994 and 2020.
- To double energy productivity between 1990 and 2020.
- To reduce primary energy consumption by 20% by 2020 compared to 2008, and by 50% by 2050.
- To reduce greenhouse gas emissions by 21 percent (compared to 1990 levels) by 2010/2012. This goal was already achieved in 2008. Climate gas emissions are to be cut by 40 percent by 2020 and by 80 to 95% by 2050 (both compared to 1990 levels).
- To raise the share of renewable energies in final energy consumption to 18% by 2020 and to 60% by 2050.
- To increase the share of electricity from renewable sources in total electricity consumption to at least 35% by 2020 and at least 80% by 2050.
- To limit, by 2020, the use of undeveloped land in Germany to 30 hectares per day. In the period between 1993 and 1996 that figure was 140 hectares per day, in 2012 87 hectares per day.
- To increase biological diversity in Germany to an index value of 100 by 2015.
- To reduce the nitrogen surplus to 80 kg/hectare of agricultural land by 2010, and to achieve further reductions by 2020.
- To increase the share of organically farmed land in total agricultural land to 20% (no target year).

This also includes the aim to improve urban life, by increasing public parks areas, calling on the public sector to serve as a role model. Industry is called on to respect certain ecological standards and eco-balances from German industry shall include national and international effects on biodiversity at all stages of a product's life cycle.

¹² <http://www.bmu.de/en/topics/strategy-legislation/sustainability/sustainability/?cHash=708635c8a9f766bc5d0c165b53867c44>.

National Strategy on Biological Diversity, 2007

In addition to goals for improving the status of endangered species, increasing the area of natural forests and restoring habitats such as peat bogs, there are also ecosystem function goals, such as increasing storage capacity for CO₂ within terrestrial systems by 10%.

Other relevant legislation

- Federal Nature Conservation Act (BNatSch) of 2009 (entry into force: 1st March 2010)¹³

4.5.7. Case studies***4.5.7.1. The extinction of beavers reduces ecosystem functionality***

The loss of beavers, a keystone species in Germany, led to the loss of ecosystem functionality [17]. The subsequent reintroduction of beavers in the Spessart Mountains in Hesse, and the ecosystem changes caused by their dam building has increased the total river surface by 17%. As a result, the hydraulic load (the measure for denitrification) has reduced by 15%, which extrapolated to the whole study area would mean the retention of an estimated addition 2800kgN/a in the river and of 1900 kgN/year in the floodplains. In addition, the increased economic value for recreation and tourism in the region, as measured by the average willingness to pay (WTP), puts estimates for the benefits of biodiversity conservation in the Spessart mountains to at least €0.55 million per year.

4.5.7.2. Dam construction and floodplain transformation on the Danube leads to significant reduction in ecosystem services

Between 1985 and 1995, two dams were constructed on the Danube River, between Regensburg and Straubing. This led to a decline in fish species, which made fishing uneconomic in that stretch of the river. This alteration of the ecosystem also resulted in mass development of noxious insect populations, increasing the discomfort of homeowners near the dam [17].

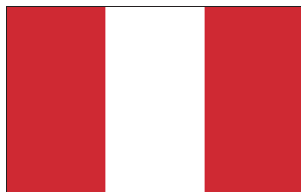
In other parts of the river, across the whole of the Lower Danube (Danube delta), it has been estimated that the changes to the floodplain, the intensification of agricultural techniques and the loss of ecosystem services led to a loss of US\$500 million per year in the 1980s [17]. Following significant restoration programmes, the value of stored ecosystem services were estimated in 2006 as over US\$160 million per year:

¹³ [Http://www.bmu.de/fileadmin/bmu-import/files/english/pdf/application/pdf/bnatschg_en_bf.pdf](http://www.bmu.de/fileadmin/bmu-import/files/english/pdf/application/pdf/bnatschg_en_bf.pdf).

- Restored river fisheries – around US\$16 million per year
- Restored habitat providing improved nitrogen and phosphorous absorption and cycling – around US\$112.5 million and US\$18.2 million respectively
- Restored wetland habitat and the consequent increases in tourism value – US\$16 million per year

For more EU case studies where the loss of biodiversity and ecosystem services has led to economic costs, see Kettunen and ten Brink (2006) [17].

4.6 Peru



4.6.1. Fact Box

Total estimated value of natural resources to the economy	MINAM calculated a value of US\$15.3 billion for selected ecosystem services in 2009 ¹
Natural Capital Growth: average annual growth rates, 1990–2008 (from the Inclusive Wealth Report [49])	Not currently available
Status of Ecosystem Services	One of the top ten “megadiverse” countries in the world
Vulnerability to Climate Change and Anthropogenic action	Climate change is a significant threat, as is deforestation, mining, mass tourism and pollution
National Ecosystem Assessment	Not currently available
Key legislation or planned legislation	2009 amendment to the 2001 MINAM Law No. 27446 on EIA
National Biodiversity Strategy and Action Plan	<i>Estrategia Nacional sobre Diversidad Biológica</i> , 2001 [138]

¹ [Http://www.ibcperu.org/doc/isis/13827.pdf](http://www.ibcperu.org/doc/isis/13827.pdf).

4.6.2. Abbreviations: Peru

BCRP	National Bank of Peru, <i>Banco Central de Reserva del Perú</i>
CICTEP	International Centre of Traditional Knowledge, Ecology and Policies
CONAM	National Environment Authority, <i>Consejo Nacional del Ambiente</i>
DGEVFPN	General Directorate for Natural Heritage Assessment, Valuation and Financing, <i>Dirección General de Evaluación, Valoración y Financiamiento del Patrimonio Natural</i>
INEI	National Institute for Statistics and Informatics, <i>Instituto Nacional de Estadística e Informática</i>
MINAM	Ministry of the Environment, <i>Ministerio del Ambiente</i>
SEIA	National Environmental Impact Assessment System, <i>Sistema Nacional de Evaluación del Impacto Ambiental</i>
SINIA	National Environmental Information System, <i>Sistema Nacional de Información Ambiental</i>
VMDERN	Vice-Ministry for the Strategic Development of Natural Resources, <i>Vice Ministerio de Desarrollo Estratégico de los Recursos Naturales</i>

4.6.3. Background

In the past ten years (2002–2012), Peru has had high GDP growth rates, averaging 6.4%, and has made significant advances in social and development indicators. Peru relies significantly on natural resources, with biodiversity sustaining a large part of the population, contributing 22% to Peru's GDP and 24% to its total exports [139]. In particular, biodiversity supports industries such as fisheries, agriculture, manufacturing tourism and pharmaceuticals. Peru is a lead exporter in organic bananas, coffee and cocoa, it is one of the top fish producers in the world,² and uses over 4,400 traditional plant species for a variety of medicinal, consumptive and cultural uses. 71% of tourists visiting Peru participate in nature-related activities, and around 65% of agriculture depends on local biodiversity resources. Peru also relies significantly on ecosystem services for soil fertility, air quality and water supply.

4.6.3.1. Status of national ecosystems and ecosystem services

Peru is one of the world's top ten "megadiverse" countries,³ with around 25,000 plant species (of which 30% are endemic), 10% of the world total. In addition, Peru has more fish species than any other country (close to 2,000 species, 10% of the world total), 1,736 bird species (second in the world), 332 amphibian species, 460 mammal species (third in the world) and 365 reptile species. Of these, 222 species are endangered.

² [Ftp://ftp.fao.org/docrep/fao/011/i0250e/i0250e01.pdf](ftp://ftp.fao.org/docrep/fao/011/i0250e/i0250e01.pdf).

³ [Http://www.conservation.org/documentaries/Pages/megadiversity.aspx](http://www.conservation.org/documentaries/Pages/megadiversity.aspx).

4.6.3.2. Ecosystems vulnerability to climate change and anthropogenic action

The MA sub-global assessment in the Peruvian Andes identified mass tourism and mining as threats to biodiversity and cultural diversity.⁴ Additional threats include deforestation, particularly due to illegal mining operations and logging [140], and urban expansion and agricultural development, and the resulting pollution. Hydrological services are particularly threatened, with reported high levels of urban water consumption compared to other South American cities,⁵ and high levels of watershed degradation and water pollution.

Peru is ranked the third most vulnerable country in the world to climate-induced disasters, exacerbated by the country's dependence on agriculture and fishing.⁶ Deglaciation is already occurring,⁷ which will have a critical impact on water supply for people, agriculture and hydropower. A study by Peru's national bank (BCRP) shows the negative impact on agriculture, public health, fisheries, hydropower and economic growth in Peru [141] of climate change under a range of scenarios.

4.6.4. Assessing natural capital

4.6.4.1. Institutions and institutional capacity for environmental accounting

The Environment Ministry (MINAM) was formed in 2008, absorbing the previous National Environmental Authority (CONAM) and Protected Areas Authority (SERNANP), among others. Within MINAM is the Vice Ministry for Strategic Management of Natural Resources (VMDERN), whose mandate includes developing the national strategy for the integrated management of natural resources, and overseeing its implementation.

Within VMDERN is the General Directorate of Natural Heritage Assessment, Valuation and Financing (DGEVFPN). The DGEVFPN is primarily responsible for natural resource valuations, and provide data for National Environmental Accounts by undertaking the following activities:

- Natural heritage inventory and valuation methodologies
- Capacity building for economic valuation of natural heritage (composing natural resources, environmental services, and biodiversity) at sector, regional and local levels. This has included capacity building at national

⁴ www.millenniumassessment.org.

⁵ Estimated 66 gallons of water consumed/day/person in Lima, compared to 40 gallons/day/person in Bogotá, <http://www.nature.org/ourinitiatives/regions/southamerica/peru/explore/aquafondo-the-water-fund-for-lima>.

⁶ <http://www.perusupportgroup.org.uk/article-174.html>.

⁷ CONAM estimate that the area of glacial ice in Peru decreased by 20% from 1970 to 1997.

level (SNIP), in the Ayacucho, Loreto and Madre de Dios departments (FONDAM-UP), and in the regional governments of Apurímac, Ayacucho and Huancavelica (CTB); see also the new diploma on environmental-economic valuation.⁸

- Studies on economic valuation
- Studies of public spending on natural resources and biodiversity
- Compensation mechanisms for environmental services

The National Institute for Statistics and Informatics (INEI), is responsible for producing the National Accounts, including the satellite environmental accounts.

4.6.4.2. Ecosystem and ecosystem services assessments

A sub-global Millennium Ecosystem Assessment was undertaken in the Vilcanota sub-region of the Peruvian Andes, a regional biodiversity hotspot with a large number of endemic species, by CICTEP (the International Centre of Traditional Knowledge, Ecology and Policies). It included assessments of cultural services (spirituality), provisioning services (water and food), supporting services (soil and primary production) and agrobiodiversity. As with Colombia and Costa Rica, Peru is also included in the NASCA natural capital project, which maps ecosystem services in parts of Latin America.⁹ Other regional case studies include ecotourism management in the Cuyas Ayabaca cloud forest, economic valuation of non-timber products in the Tumbes Pacific tropical forest, economic valuation of tourism in the San Martín region, environmental-economic valuation of ecosystem services in the Laguna Morona Cocha basin and economic valuation and assessment of recreation and tourism potential for the development of ecotourism at the Tumbes National Mangrove Sanctuary.¹⁰

4.6.4.3. Natural capital/environmental services accounts

Incorporating an economic-environmental valuation of the cost to environmental services and any relevant conservation management or mitigation costs as required for EIAs has taken place for hydrocarbons since 2006 and for mining since 2010.¹¹

⁸ <http://www.ecomilenio.es/desarrollo-del-diplomado-valoracion-economica-de-la-biodiversidad-y-los-servicios-de-los-ecosistemas-en-peru/2222>.

⁹ <http://www.naturalcapitalproject.org/nasca.html>.

¹⁰ http://www.minam.gob.pe/dmdocuments/propuestas_ganadoras.pdf.

¹¹ <http://www.ibcperu.org/doc/isis/13827.pdf>.

More recently, in 2011 MINAM produced a first version of a guide on implementing Satellite Environmental Accounts in Peru, *Una Primera Aproximación de la Cuenta Satélite Ambiental* [142], which it hopes will become the basis for a guide for Environmental Satellite Accounts in Peru. It is based on SESA methodologies, and includes:

- Pilot physical accounts for land and soil, subsoil resources, forestry, fisheries, water and biodiversity
- Pilot accounts for spending on environmental protection
- Pilot environmental-economic integrated accounts
- Methodologies
- Information on data gaps for other accounts such as energy and mining
- A set of 324 environmental indicators
- An action plan on implementing the satellite environmental accounts

MINAE estimated the total value of selected ecosystem services in 2009 to be US\$15.3 billion.¹² This includes:

- US\$2.5 billion from energy and water
- US\$8.0 billion from agriculture, forestry and livestock
- US\$4.9 billion from hotels and restaurants
- US\$864 million from fisheries

4.6.5. Governance

4.6.5.1 Mechanisms integrating natural capital values into policy

In a pioneering move, from 2011 all environmental impact assessments were legally required to include an ecosystem services valuation. This ensures that the values of environmental services are explicitly considered in any policy change.

4.6.6. Current initiatives based on ecosystem services

As with Colombia and Costa Rica, Peru has a number of PES projects, including a number of water funds projects (Box 11 [overleaf]). One such water fund, the Lima water fund called Aquafondo, is supported by The Nature Conservancy, Grupo GEA and the Fondo de Las Américas (FONDAM) and will use contributions from major water users in Lima to finance watershed restoration and conservation activities.¹³ Other watershed projects include the Watershed Services Incubator project¹⁴

¹² [Http://www.ibcperu.org/doc/isis/13827.pdf](http://www.ibcperu.org/doc/isis/13827.pdf).

¹³ [Http://www.nature.org/ourinitiatives/regions/southamerica/peru/explore/aquafondo-the-water-fund-for-lima.xml](http://www.nature.org/ourinitiatives/regions/southamerica/peru/explore/aquafondo-the-water-fund-for-lima.xml).

¹⁴ [Http://www.forbes.com/sites/stevezwick/2012/05/09/can-perus-swiss-style-mountaintop-finance-ease-the-global-water-crisis/](http://www.forbes.com/sites/stevezwick/2012/05/09/can-perus-swiss-style-mountaintop-finance-ease-the-global-water-crisis/).

launched by the Environment Ministry [96] and the Andean Watershed Project in the Jejelepeque and Piura micro-watersheds of Alto Mayo-Moyobamba, San Martín Department, supported by the German GTZ and CONDESAN. A fee charged to Moyobamba's water consumers by the municipal water company was used to subsidise upstream farmers willing to change sediment-prone land uses, such as planting shade-grown coffee in previous slash-and-burn areas, which would also improve incomes for these farmers [143].

Other relevant projects include a PES scheme where payments from tourism operators in Peru's Madre de Dios region are used to finance the conservation of scenic vistas [144], and a joint scheme between Peru and Chile for the management of the Humboldt Current Large Marine Ecosystem. This GEF-funded program focuses on transboundary and ecosystem-based diagnoses that are intended to lead to an ecosystem-based approach.¹⁵

Box 11. Watershed funds

Watershed funds are a type of PES or PES-like scheme focusing on delivery of hydrological services through the creation of a trust fund financial governing structure. They are based on the premise that practices taken to help conserve ecosystems by people living upstream in a watershed can help maintain a clean, regular supply of water paid for by downstream users (including water utility companies, hydropower companies, irrigation systems and other industries) who depend on these services.

Water users pay money to a water fund, usually a multi-institutional governing body with public and private partners. The water fund invests in the conservation of watersheds, generally aiming to improve or maintain water quality, quantity and regularity of flow for downstream users, improve or maintain human well-being for upstream users and maintain or enhance ecosystem function and biodiversity of the watershed [145]. This creates a long-term, sustainable source of funding and a decision-making body for long-term conservation efforts, and can help to avoid the costs of infrastructure for water treatment.

Water funds are increasingly popular in Latin America, particularly in Colombia and Ecuador. In 2011 seven water funds were operational in the Northern Andes alone, serving over 11 million people and helping to conserve 1.6 million ha of watershed [145]. At the time of the study, six additional water funds were under development, which once operational would serve a further 4 million people and add nearly 1 million ha more of protected watershed.

¹⁵ [Http://iwlearn.net/iw-projects/3749](http://iwlearn.net/iw-projects/3749).

4.6.7. Legislation

4.6.7.1. Policy

Peru's National Biodiversity Strategy and Action Plan aims that by 2021, Peru will be the first country in the world to have the most benefits for its population from the conservation and sustainable use of biodiversity and the restoration of all its biodiversity components in order to meet the basic needs and well-being of present and future generations.¹⁶

The National Environment Policy (2009) incorporates the concept of BioTrade as part of a green growth strategy [146].

4.6.7.2. Legislative process

Peru is a presidential republic made up of 25 administrative districts called regions. The federal legislature is a unicameral congress, composed of 130 representatives who are elected by popular vote for five-year terms. National legislation is proposed by the executive branch (the President, elected by popular vote for a five-year term, the Prime Minister, appointed by the President, and the council of ministers, also appointed by the President), members of Congress, the Judiciary, autonomous public bodies, municipalities or professional associations. Citizen groups and individuals are also constitutionally guaranteed the right to submit legislation to congress for consideration.

Laws passed by Congress and signed by the President represent the strongest form of legislation in the Peruvian juridico-legal system. Supplemental legislation exist by the way of legislative resolutions, which are employed to ratify international treaties or specify and modify rules and regulations of existing legislation. Likewise the executive branch may issue a "supreme decree" (executive decree), which does not need congressional approval but does require the signature of at least one sitting cabinet minister.

4.6.7.3. Implementation of international objectives

Peru is a signatory to the CDB, and as such submitted its *Fourth National Report to the Convention on Biological Diversity* in 2010 [147] and its National Biodiversity Strategy and Action Plan [148].

¹⁶ <http://www.cbd.int/countries/profile/default.shtml?country=pe#status>.

4.6.7.4. Legislation (planned or in force)

MINAM Law No. 27446, 2009 amendment to the 2001 law

In March 2010, Congress passed a new set of regulations for the 2001 Law No. 27446 on the National Environmental Impact Assessment System (SEIA).¹⁷ This requires all environmental impact assessments (EIA) to include an ecosystem service valuation (ESV) by 2011 [149]. Article 25¹⁸ includes the requirement for the assessment, conservation and valuation of Peru's natural heritage, including natural resources, genetic, species and ecosystem biodiversity, and the environmental services that they provide. Article 26¹⁹ includes the need for EIAs to consider environmental impact, including the costs of mitigation, monitoring, remediation or rehabilitation, as well as the cost of other conservation or management measures that may be applicable, such as compensation. The Peruvian Ministry of the Environment (MINAM) together with Earth Economics are developing a framework to help implement the new law [150].

For a full list of laws relevant to the environment in Peru, see the DGEVFPN website.²⁰

¹⁷ *Ley del Sistema Nacional de Evaluación de Impacto Ambiental y su Reglamento*, <http://cdam.minam.gob.pe/novedades/leyseiareglamento.pdf>.

¹⁸ Article 25 of the amendment: Assessment, conservation and valuation of natural heritage, *Evaluación, Conservación y Valoración del Patrimonio Natural*.

¹⁹ Article 26 of the amendment: Economic appraisal of environmental impact of iprojects, *Valorización económica del impacto ambiental de proyectos de inversión*.

²⁰ [Http://www.minam.gob.pe/valoracion/index.php?pag=41&cat=](http://www.minam.gob.pe/valoracion/index.php?pag=41&cat=).

4.7 Philippines



4.7.1. Fact Box

Total estimated value of natural resources to the economy	Marine and coastal resources (2009): US\$500 million/yr Forests (2009): US\$100 million/yr
Natural Capital Growth: average annual growth rates, 1990–2008 (from the Inclusive Wealth Report [49])	Not currently available
Status of Ecosystem Services	Environmental degradation recorded, particularly for forest, freshwater and marine ecosystems
Vulnerability to Climate Change and Anthropogenic action	Highly vulnerable to climate change and other threats including air and water pollution, deforestation, soil erosion and invasive species
National Ecosystem Assessment	<i>Philippines Country Environmental Analysis</i> [151]
Key legislation or planned legislation	The Philippine Economic-Environmental Natural Resource Accounting system was institutionalised and included as a satellite account to the SNA by Executive Order No. 406 (1997)
National Biodiversity Strategy and Action Plan	<i>The Philippine Biodiversity and Action Priorities</i> [152]

4.7.2. Abbreviations: Philippines

ADB	Asian Development Bank
DA	Department of Agriculture
DENR	Department of Environment and Natural Resources
ENRA	Environmental and Natural Resource Accounting
ENRAP	Environmental and Natural Resource Accounting Project
EO	Executive Order
FDES	Framework for the Development of Environmental Statistics
FMB	Forest Management Bureau
IAC	Inter-Agency Committee
ICRAF	World Agroforestry Centre
IEMSD	Integrated Management for Sustainable Development
IFAD	International Fund for Agricultural Development
IRR	Implementing Rules and Regulations
MGB	Mines and Geosciences Bureau
NEDA	National Economic and Development Authority
NSCB	National Statistics Coordination Board
PEENRA	Philippine Economic-Environmental Natural Resource Accounting
PSNA	Philippine System of National Accounts
RUPES	Rewarding Upland Poor for Environmental Services
SEPE	Survey on Environmental Protection Expenditures
TWG	Technical Working Group

4.7.3. Background

The Philippines is a global centre for biodiversity and endemism, with natural resources playing a significant role in local livelihoods and the national economy. In particular, the importance of hydrological services is recognised, with watersheds, river basins and coastal areas playing an important role in providing ecosystem services that contribute to livelihoods (particularly fisheries), recreation and tourism, agriculture, industry and power needs, and water supply. These are important to the Philippine economy, with marine and coastal resources contributing an estimated US\$500 million per year in net economic benefits [151], forests providing over US\$100 million per year and agriculture representing 18.4% of the country's GDP in 2007. The government has targeted several natural-resource based areas for growth in its national development plan, including nature tourism and minerals.

The Philippines was one of only a few countries constructing environmental accounts in the 1990s and early 2000s. Although there has been little implementation over the last decade due to budgetary and other constraints, increasing pressures on natural resources, and vulnerability to natural disasters and climate change, has led to renewed political interest in natural resource accounting.

4.7.3.1. Status of national ecosystems and ecosystem services

The Philippines is one of 17 mega-biodiverse countries in the world,¹ with 5% of the world's flora. Species endemism is very high, including 49% of terrestrial wildlife, at least 25 genera of plants and putting the country at fourth place globally for bird endemism.² It is also one of the world's biodiversity hotspots with at least 700 threatened species, including 42 species of land mammals, 127 species of birds, 24 species of reptiles and 14 species of amphibians. The Philippines also records at least 3,214 species of fish, of which around 121 are endemic and 76 threatened. The Philippines is located at the apex of the Coral Triangle, and is considered the global centre of marine shore fish biodiversity [153].

This biodiversity is supported by a large variety of ecosystems, including forests which make up roughly 24% of the total land area. The Philippines' agricultural ecosystem is also significant, being part of the centre of diversity of rice, coconut, mung bean, taro and yam, as well as the centre of origin and diversity of bananas in Southeast Asia, although agricultural diversity is also in decline.

4.7.3.2. Ecosystems vulnerability to climate change and anthropogenic action

Deforestation, soil erosion, air and water pollution, unsustainable exploitation of natural resources, invasive alien species and climate change have all been identified as threats to ecosystems in the Philippines [151]. Between 2000 and 2005, the Philippines had the second fastest rate of deforestation in Southeast Asia (and seventh globally), losing 2.1% of its forest cover annually, contributing to increased soil erosion and water quality declines. Freshwater ecosystems are also under pressure: the MA sub-global assessment for the Philippines focused on the country's largest lake, Laguna de Bay, and its tributary rivers [154], showing declines in water quality (including the presence of toxic and hazardous substances in the lake), fish production, forest cover in watersheds, biodiversity, biological productivity and cultural value. These were attributed to pollution (due to domestic, agricultural and industrial waste and runoff) and deforestation, with climate change also noted as a threat. In 2005, a review of the marine and coastal environments showed stable mangrove cover (with increases in selected areas, albeit against significant declines over the last few decades), but decreases in coral reef condition, sea grass cover and fish production [155].

¹ <http://www.conservation.org/documentaries/Pages/megadiversity.aspx>.

² <http://www.cbd.int/countries/profile/default.shtml?country=ph>.

Around 80% of the Philippines population and half its total area are considered vulnerable to natural disasters and extreme climatic events. Climate change is expected to exacerbate these events, making it a significant threat to the Philippines [151]. Indirect threats to ecosystems include population growth, increases in consumption patterns, agricultural intensification and urbanisation.

In 2009, the annual costs of environmental degradation in the Philippines were estimated as US\$120 million (in 2006 prices) for coastal and marine degradation, US\$60 million for forestry (mainly due to overextraction and deforestation), US\$600million for soil erosion and US\$1.4–2.8 billion for annual costs relating to water pollution, sanitation and hygiene [151]. Previously, national accounting studies in the early 1990s estimated resource depreciation for forestry, soil erosion and coastal fisheries, averaging at 4% GDP from 1970–1987 (the majority due to timber extraction) [156], as reported in [111].

4.7.4. Assessing natural capital

4.7.4.1. *Institutions and institutional capacity for environmental accounting*

The Philippines has a decentralised statistical system, with policy-making and coordinating separate from statistics production and the statistical resources and training centre.³ These include:

- The **National Statistical Coordination Board (NSCB)**: the highest policy-making body on statistical matters, playing a central role in coordinating statistical activities. Responsible for compiling the SNA, integrating the information from various data-producing agencies in the country.
- The **Inter-Agency Committee on Environment and Natural Resource Statistics (IACENRS)**: coordinates activities in the generation of environment statistics, the integration of statistics into the environmental-economic accounts, and the derivation of indicators. It brings together governmental agencies responsible for designing environmental policies and data production, determining priorities and data collection requirements, data gaps and overlaps, data quality expectations and dissemination policies. The committee also aims to improve the efficiency and cost effectiveness of the data production process.
- The **National Economic and Development Authority (NEDA)** leads the implementation of WAVES and chairs the WAVES Steering Committee (the Executive Committee of the NSCB).

³ [Http://www.nscb.gov.ph/](http://www.nscb.gov.ph/).

The generation of environmental accounts is supported by other agencies, including the Department of Environment and Natural Resources (DENR); the Forest Management Bureau (FMB) for forest resources; the Mines and Geosciences Bureau (MGB) for mineral resources; and the Department of Agriculture (DA) for fishery resources.

Under natural resource accounting projects in the 1990s, national accountants at the NSCB and other agencies were given significant training on the concepts of environmental accounts and how they related to economic accounts. Other staff and stakeholders also benefited from improved knowledge of natural resource accounting and its implications for policy [157].

4.7.4.2. Ecosystem and ecosystem services assessments

The 2009 World Bank's *The Philippines: Country Environmental Analysis* [151], assessed the state of the environment, with links to human welfare and sustainability, the monetary cost of environmental degradation, priority areas for action and governmental capacity for environmental management in light of the challenges identified. High priority subject areas were chosen for the study, including: outdoor and indoor air pollution; water pollution, sanitation and hygiene; coastal and marine resources; forestry; land management; and climate change. This followed an ecosystem service assessment on the Laguna de Bay basin [154] conducted as part of the Millennium Ecosystem Assessment.

In addition, there are many reports on ecosystems and biodiversity in the Philippines, including for mangroves [158], coastal and marine resources [153] and forests [159], and as recorded in the 4th National Report to the CBD [160].

4.7.4.3. Natural capital/environmental services accounts

Natural resource accounting in the 1990s

In the 1990s, a number of projects were launched to develop natural resource accounting in the Philippines [110, 156]. These included:

- **ENRAP (1993–2000):** The Environmental and Natural Resource Accounting Project (ENRAP) worked with the NSCB and aimed to add non-marketed natural goods and services to the marketed services already accounted for in the conventional accounts. This included physical accounts and some monetary accounts. These accounts differ somewhat from other environmental accounting systems (e.g. SEEA), being limited to items that, in principal, would command positive prices, should they be marketed [161]. Despite this, the ENRAP project pioneered natural resource accounting in the Philippines [157].

- **ENRA sub-programme (1995–1998):** A component of the UNDP IEMSD programme, managed by the DENR and NEDA, this programme piloted the SEEA with the NSCB as the implementing agency.
- **ENRA II (1998–2001):** a UNDP follow-up project to ENRA, this aimed to provide assistance in the institutionalisation of environmental accounts at the national level via the PEENRA system [162], as well as to operationalise environmental accounts at the sub-national level, with the NSCB as the executing agency.
- **FDES (1997–1999):** The Framework for the Development of Environmental Statistics (FDES) helped to improve the accessibility of environmental statistics from administrative records of different government agencies, achieved through the systematic organisation and compilation of data following the FDES framework in the Compendium of Philippine Environmental Statistics.

Through these projects, the Philippine Economic-Environmental and Natural Resource Accounting (PEENRA) Database Compilation System was developed to systematise and automate the consolidation, storage and retrieval of the SEEA/PEENRA estimates. This computerises the estimation processes used in the compilation of the asset accounts and the environmental impact of selected economic activities (both physical and monetary valuation), the calculation of environmental protection expenditures and the environmentally adjusted net domestic product. In the 1990s, this included first estimates for asset accounts for forests, minerals, land and soil, water resources and fisheries depletion.

Current natural capital accounting and WAVES

The Philippine government has institutionalised the recently endorsed international standard, SEEA 2012 [26] in the medium and long term, via its new 2012–2017 Philippines Statistical Development Programme which includes the adoption of the revised SEEA.

WAVES, in its first phase of the programme, is working with the Philippine government to strengthen the institutionalisation of PEENRA, and to develop ecosystem accounts for fisheries, coastal and marine ecosystems, and minerals. The preparation phase included analysis of past natural capital accounting initiatives, policy applications of those accounts, institutional capacity and available data on stocks and flows of ecosystem services within coastal and marine ecosystems. The project will then aim to:

- Develop a macro-level indicator of the long-term sustainability of economic growth, the Adjusted Net Savings (ANS), which includes natural capital valuation

- Generate detailed information on environment and natural resources for economic sectors and key social groups that would inform economic, environmental and natural resources management decisions and policies
- Increase the capacity for ecosystem services accounting

4.7.5. Governance

The Philippine Economic-Environmental and Natural Resources Accounting (PEENRA) Steering Committee oversees PEENRA and initially includes the NSCB, DENR, NEDA NSO, DTI and DA. The Philippines WAVES program is overseen by the Executive Committee of the NSCB that is chaired by the NEDA.

4.7.6. Current initiatives based on ecosystem services

There are many PES and PES-like projects in the Philippines, particularly related to watershed management. The ICRAF *Rewarding Upland Poor for the Environmental Services* (RUPES) programme, funded by IFAD, gives both cash and in-kind “rewards” for watershed services and carbon sequestration in pilot sites, and is now going into its second phase⁴ [163]. Other studies have shown a positive “willingness-to-pay” (WTP) for watershed protection among local and international tourists and domestic water users [164, 165], which in some cases has led to successful PES projects [166]. In another example, local water district transfer payments to the local government district provide funds which are earmarked for community PES-related watershed projects [167]. See Huang and Upadhyaya (2007) [168] for more examples.

4.7.7. Legislation and Policy

4.7.7.1. Legislative process

The legal system of the Philippines is a unique combination of civil law and common law, together with Muslim (Islamic) law and indigenous law. The current constitution was enacted in 1987, and is the supreme law of the Philippines. It defines the Philippines as a “democratic and republican state”, with the President heading the executive branch, the Congress as the legislative branch and the Supreme Court at the highest tier of the legislative branch.

Congress is bicameral, consisting of the House of Representatives (commonly known as the Lower House, but frequently referred to as the Congress) and the Senate (often referred to as the Upper House). The Senate is composed of 24 senators, who are elected by the entire electorate. Senators serve for six years each, with elections held every three years for half of them. Senators can serve for

⁴ [Http://www.worldagroforestry.org/sea/ph/node/25](http://www.worldagroforestry.org/sea/ph/node/25).

no more than two consecutive terms. The House of Representatives is composed of approximately 250 congressmen. These represent either geographical districts (provinces or cities) or different sectors. The latter represent no more than 20% of the House, and are referred to as party list representatives. All members of the House are elected for periods of three years, and for a maximum of three consecutive terms.

Proposed laws are called bills and may be introduced by the Senate or by the House of Representatives. A bill goes through a first reading in which the number and title are read, after which it is referred to an appropriate committee, which prepares a committee report. It is then passed to the Rules committee, and returned for a second hearing, and is subject to debate and amendment before proceeding to the final third hearing. After being passed in one House, the bill goes through the same process in the other House.

Major legislation is often introduced in both Houses in the form of companion (identical) bills, the purpose of which is to speed up the legislative process by encouraging both chambers to consider the measure simultaneously, and to emphasise the urgency or importance of the issue. After it has passed in both Houses and been signed by their respective leaders, it goes for final approval to the President. The President may sign the bill into a law, or veto all or part of it. A presidential veto can be overridden by a Congressional vote of two thirds of all its members.

Another form of legislation, equivalent to a bill, is a Joint Resolution, generally used when dealing with a single item or issue, such as a continuing or emergency appropriations bill. Joint resolutions are also used for proposing amendments to the Constitution.

4.7.7.2. Support and implementation of international objectives

The Philippines is a signatory to the CDB, and as such submitted its *Fourth National Report to the Convention on Biological Diversity* in 2009 [160] and its National Biodiversity Strategy and Action Plan [152] in 2005.

4.7.7.3. Legislation and Policy

Institutionalisation of the PEENRA System, Executive Order No. 406 (1997)

In 1997, March 21st, the then President Ramos approved Executive Order No. 406, institutionalising the PEENRA system and creating units within the DENR, NEDA and NSCB. This states that PEENRA will be a satellite account to the Philippine System of National Accounts (PSNA), generating macro-indicators that reflect interactions between the natural environment and the economy.

This order also included the creation of a steering committee chaired by the Secretary of Socio-Economic Planning, with members of the government and non-government sectors. In 1998, the PEENRA Steering Committee approved the Implementing Rules and Regulations (IRR) through PEENRA Resolution No. 01-98, stipulating the creation of an inter-agency committee (IAC) and various technical working groups whose members also come from the different stakeholders [157].

The Philippine Development Plan (PDP) 2011–2016

The Philippine Development Plan 2011–2016 (PDP) [169] emphasises governance reforms that include transparency and science-based decision making for sustainable and pro-poor growth. It includes the need for natural resource valuation and accounting and sustainable conservation financing, specifically calling for:

- Use of the ecosystem approach in management
- Enhanced governmental guidance at the local level
- “establish valuation of resources and develop a system of natural resources accounting”
- “determine the values and potential benefits of the natural resources”
- Use of appropriate valuation methods: fee, taxes and PES
- Interim biodiversity targets

The PDP follows the 1996 Action Plan for Sustainable Development, known as *Philippine Agenda 21*, which set guidelines for sustainable national development, putting nature at the centre of development initiatives, moving the focus away from maximum productivity, to “appropriate productivity” within the limits of the natural environment’s carrying capacity.

Other relevant policy and legislation

- **Philippine Environmental Policy, Presidential Decree No. 1151 (1977):** exploitation of natural resources should be done only on the condition that it shall not degrade the resource, or endanger human life, health and safety, and not negatively impact agriculture, commerce and industry
- **Philippine Constitution (1987):** recognises the right of people to “a balanced and healthful ecology in accord with the rhythm and harmony of nature”.⁵
- **Action Plan for Sustainable Development**

⁵ Article II, Section 16.

- **Presidential Memo Order No. 289 (1995)**: directs the integration of the NBSAP into national policy
- **Executive Order No. 578 (2006)** establishes national policy on biodiversity and directs all concerned government agencies and units to integrate and mainstream the protection, conservation and sustainable use of biodiversity into their policies, rules, regulations, programmes and development planning processes.

For a comprehensive list of environmental laws, see *The Philippines: Country Environmental Analysis* [151].

4.7.8. Case Studies

Economic value of mangrove forests

In 2008, the Philippine Supreme Court acted on environmental accounting information to initiate a massive clean-up in the heavily degraded Manila Bay. This was based on data estimating the costs no action at US\$7 million due to the impacts of illness and US\$29 million due to reduced fish exports (as a result of algal blooms). Action was also taken to protect local mangroves, whose direct benefits were estimated at US\$150 million in the early 2000s, a figure four times greater than shrimp aquaculture ponds, conversion to which is one of the main threats to mangroves in the Philippines [28, 158].

4.8 United Kingdom



4.8.1. Fact Box

Total estimated value of natural resources to the economy	Detailed estimation provided by National Ecosystem Assessment including: (i) the benefits that inland wetlands bring to water quality are worth up to £1.5billion per year to the UK; (ii) pollinators are worth £430 million per year to British agriculture; (iii) the amenity benefits of living close to rivers, coasts and other wetlands are worth up to £1.3billion per year; and (iv) the health benefits of living with a view of a green space are worth up to £300 per person per year
Natural Capital Growth: average annual growth rates, 1990–2008 (from the Inclusive Wealth Report [49])	Natural Capital Growth (%): -2.50 Natural Capital per Capita (%): -2.88 IWI per Capita (%): 0.88
Status of Ecosystem Services	30% of ecosystem services are in decline or a degraded state [170]
Vulnerability to Climate Change and Anthropogenic action	Primary drivers of change to UK ecosystems services over the last 60 years are (i) habitat change, (ii) overexploitation, (iii) pollution, (iv) climate change and (v) invasive species.
National Ecosystem Assessment	UK National Ecosystem Assessment (2011) [170]
Key legislation or planned legislation	Natural Environment White Paper (2011) [171]
National Biodiversity Strategy and Action Plan	<i>England:</i> Biodiversity 2020: A Strategy for England's wildlife and ecosystem services (2011) [172] <i>Northern Ireland:</i> Our Passion, Our Place. NIEA Strategic Priorities 2012–2022 [173] <i>Scotland:</i> Getting the Best from our Land – A Land Use Strategy for Scotland (2011) [174] <i>Wales:</i> Environment Strategy for Wales (2006) [175]

4.8.2. Abbreviations: United Kingdom

DEFRA	Department for Environment, Food and Rural Affairs
DFID	Department for International Development
ESRC	Economic and Social Research Council
JNCC	Joint Nature Conservation Committee
NEA	National Ecosystem Assessment
NERC	Natural Environment Research Council
NEWP	Natural Environment White Paper
NIEA	Northern Ireland Environment Agency
ONS	Office of National Statistics

4.6.3. Background

The UK is the third largest economy in Europe after Germany and France. Agriculture is intensive, highly mechanised and efficient by European standards, producing about 70% of the UK's food with less than 2% of the labour force, with enclosed farmland accounting for around 40% of the UK land area – the most extensive form of land use [170]. This is followed by mountains, moors and heaths (18% of UK land area), semi-natural grasslands (16%, of which high-diversity lowland grasslands comprise only 2%), woodlands (12%), urban areas (7%) and coastal margins (>1%). In addition, there are extensive areas of freshwater habitat in open waters, wetlands and floodplains, and UK marine habitats cover more than three and a half times the UK land area.

The UK has large coal, natural gas and oil resources, but its oil and natural gas reserves are declining. From a global perspective, biodiversity in the UK is not particularly diverse, but there are still a wide range of species present, including 1,500 native higher plants, and over 200 breeding bird species.

4.8.3.1. Status of national ecosystems and ecosystem services

The UK NEA [170] concludes that within the UK's landscape, different habitat types have significantly changed in extent and condition over the last 60 years. In particular, enclosed farmlands, woodlands and urban areas have significantly expanded, while semi-natural grasslands, upland and lowland heaths, freshwater wetlands and coastal margin habitats have both fragmented and decreased in size. These changes to habitats have had significant impacts on the ecosystem services they provide, and while a number of habitats are currently delivering some ecosystem services well, others are still in long-term decline.

Over the last 60 years, ecosystems services with a market value such as timber and the production of food from agriculture has dramatically increased, but other ecosystem services, particularly those related to air, water and soil quality have declined. Of the current range of services delivered by the eight habitat types

assessed by the UK NEA, about 30% are currently declining. Others are in a reduced or degraded state, including marine fisheries, wild species diversity and some of the services provided by soils. Of particular concern is the reduction in soil quality across all habitat types, and continuing decreases in biodiversity, especially the variety and abundance of pollinators. For detailed information on the relative importance of broad habitats in delivering ecosystem services and the overall direction of change in service flow since 1990, see the UK NEA reports [170].

4.8.3.2. Ecosystems vulnerability to climate change and anthropogenic action

The UK NEA [170] identified the primary drivers of change to UK ecosystem services over the last 60 years as habitat change, overexploitation, pollution, climate change and invasive species. While some of the drivers of change, such as air and aquatic pollution, have had previously large impacts on ecosystems services, recent legislation has gone some way to limit the impacts of the drivers in the last few years. In contrast, drivers such as climate change have had a lower impact on ecosystem services over the last 60 years, but are indicated to have a high impact across the board in more recent years, with further high impacts predicted in the future. These impacts are summarised below:

- **Habitat change**, particularly the conversion and intensification of natural habitats to farmland: Since the 1940s, this driver has had a very high impact on ecosystem services in five out of eight broad habitat types, and continues, since 1990, to have an increasing or continuing impact on services in seven of those broad habitat types.
- **Overexploitation of natural resources**, especially marine fish: Since the 1940s, this driver has had a high or very high impact on ecosystem services in four broad habitat types, and since 1990 has continued to have a high impact on services in six broad habitat types.
- **Air and aquatic pollution**, especially nitrogen, sulphur and phosphorus enrichment: This driver has had a high or very high impact on ecosystem services in six broad habitat types since the 1940s, but since 1990 is having a continuing impact on services in five broad habitat types, and a decreasing impact on three broad habitat types.
- **Climate change**: While this driver has previously had only a moderate to low impact on ecosystem services in seven of the eight broad habitat types since the 1940s, from 1990 it is indicated to have a high or very high impact on services in all eight broad habitat types.
- **Invasive species**, including plant pests and animal diseases: This driver has had only low or moderate impact on ecosystem services in all eight broad habitat types since the 1940s, but has currently (since 1990) had a high or very high impact on services in six of the eight broad habitat types.

4.8.4. Assessing Natural Capital

4.8.4.1. Institutions and institutional capacity for environmental accounting

The Office for National Statistics (ONS) is the executive office of the UK Statistics Authority, a non-ministerial department which reports directly to Parliament. It compiles information about the UK's society and economy, providing the statistical evidence-base for policy and decision making, the allocation of resources and public accountability. The ONS compiles the UK Environmental Accounts, and in conjunction with DEFRA is engaged in developing pilot natural capital accounts. The Environmental Accounts are based on data from a variety of sources, including the National Atmospheric Emissions Inventory (air and accounts), the UK Greenhouse Gas Inventory (air and energy accounts), DEFRA (environmental protection expenditure, water and waste accounts) and the Forestry Commission (forestry).

4.8.4.2. Ecosystem and ecosystem services assessments

The UK National Ecosystem Assessment, 2011

The UK National Ecosystem Assessment (NEA) was released in June 2011 [170], and is the first national independent and peer-reviewed assessment of the state and value of the UK's natural environment and ecosystem services in terms of the benefits it brings to society and future economic prosperity. It was called for on the recommendation of the House of Commons Environmental Audit in response to the 2005 global Millennium Ecosystem Assessment (MA) [1], to enable the development of effective policy responses to environmental degradation [176, 177]. The NEA builds on the MA conceptual framework of classifying ecosystem services, and also incorporates conceptual advances proposed for the TEEB for the economic valuation of ecosystem services, such as avoiding the double counting of services.¹

Conducted over two years by more than 500 scientists from biological, social and economic backgrounds, the UK NEA emphasises the contribution of ecosystems services to human well-being and provides a synthesis of current data and evidence on the value and trends in ecosystems over the last 60 years. It provides a quantitative and qualitative analysis of past and possible future changes to all ecosystem services relevant in the UK, and analyses a subset of these in terms of UK-wide estimates of ecosystem stocks or values of service flows.

The assessment covered UK terrestrial, freshwater and marine ecosystems contained within eight collections of "broad habitat" types, using the habitat classification system of broad habitat types followed in the Countryside Survey [178] and the UK Biodiversity Action Plan [179]. The UK NEA does not itself amount

¹ [Http://www.teebweb.org/united-kingdom/](http://www.teebweb.org/united-kingdom/).

to a set of environmental accounts, but it does provide a guide to the range of ecosystem services associated with broad habitats and an indication as to where the priorities might be in developing ecosystem accounts, as well as bringing together a huge wealth of data. It concludes with one of six key findings that *“The natural world, its biodiversity and its constituent ecosystems are critically important to our well-being and economic prosperity, but are consistently undervalued in conventional economic analyses and decision making”*.

4.8.4.3. Other efforts towards assessing ecosystem services

The UK government is supporting a number of initiatives on ecosystems services research. The Ecosystems Services research programme is funded by DEFRA, and was launched in 2006 to establish the basis for an ecosystems approach and how it might be used to assess effectively the benefits that the natural environment provides.² The Ecosystem Services for Poverty Alleviation (ESPA)³ research programme was launched in 2009 and is supported by the Department for International Development (DFID), the Natural Environment Research Council (NERC) and the Economic and Social Research Council (ESRC) to gather data on ecosystem services, their full value and links to sustainable poverty reduction. A two-year project *Safeguarding Local Equity as Global Values of Ecosystem Services Rise*⁴ 2010–2012 aimed to develop a conceptual framework to assess how changes in global values of ecosystem services affect equity at local levels.

Prior to the NEA, in 2008 the Northern Ireland Department of the Environment published its first State of the Environment Report [180] providing baseline indicators for various environmental measures, including indicators on air and climate, water, land, biodiversity, and waste and resources. Similarly, the Welsh government published its own State of the Environment Report in 2010 outlining progress on 102 State of the Environment Indicators [181].

4.8.4.4. Natural capital/environmental services accounts

ONS UK Environmental Accounts

The UK Office of National Statistics (ONS) has published the Environmental Accounts on a regular basis since 2003, as “satellite accounts” to the main National Accounts.⁵ Prior to the SEEA 2012 [26], these were compiled in accordance with the 2003 Handbook of National Accounting SEEA [24, 182] to measure what

² [Http://www.ecosystems-services.org.uk/](http://www.ecosystems-services.org.uk/).

³ [Http://www.espa.ac.uk/](http://www.espa.ac.uk/).

⁴ [Http://redd-net.org/files/ESPA%20equity%20project%203%20page%20summary.pdf](http://redd-net.org/files/ESPA%20equity%20project%203%20page%20summary.pdf).

⁵ [Http://www.ons.gov.uk/ons/rel/environmental/uk-environmental-accounts/index.html](http://www.ons.gov.uk/ons/rel/environmental/uk-environmental-accounts/index.html).

impacts the economy has on the environment, and how the environment contributes to the economy. They are used to inform policy and to evaluate the impacts of fiscal or monetary measures on the environment and the impact of changes in the environment on different sectors of the economy. Most data are provided in physical units, although where it is the only available or most relevant measure, monetary units are used.

The UK Environmental Accounts include only partial aspects of natural capital, being limited to a number of physical flow and natural resource asset accounts. The accounts are not currently aligned with ecosystem accounting and do not provide a fully integrated account of the stocks and flows, but they are relevant to the development of natural capital accounts, and indeed there are now plans to develop natural capital accounts as part of the UK Environmental Accounts (see next section). The most recent UK Environmental Accounts were released in 2012 [182], following some methodological changes in 2011 [183]. The UK Environmental Accounts include:

- Physical flow accounts
 - 1) **Atmospheric emissions:** Produced annually, and shows emissions of a wide range of pollutants.
 - 2) **Energy use:** Produced annually, and shows energy use by a number of industry sectors and fuel type.
 - 3) **Material flow:** Produced annually, showing information on the total mass of the natural resources and products used by the UK (e.g. fossil fuels, mineral, crops, etc) in physical terms at an economy-wide level.
 - 4) **Waste arisings:** Produced less regularly.
 - 5) **Water use accounts:** Produced less regularly.
- Natural resources accounts
 - 1) **Oil and gas reserves:** Information in both physical and monetary terms.
 - 2) **Forestry:** Reports on woodland area and diversity and consumption of wood products.
 - 3) **Land cover:** Includes the amount and condition of habitats and landscapes based on the results of the Countryside Survey and hence is only available for roughly 7 to 10 year intervals.
 - 4) **Fish:** A pilot fish stocks account was compiled for 2001, but discontinuation of data sources meant that this account was never further developed.

- Monetary accounts

This includes information on government revenue from **environmental taxes**, and a breakdown of **environmental protection expenditure** by General Government and Industry.

Previously, monetised environmental accounts for agriculture were developed by DEFRA [184, 185]. These aimed to value the environmental impacts from agriculture on other sectors and the general public (positive and negative) as annual flows but did not value the natural capital of agriculture in physical terms or take an explicitly ecosystems approach. Other early environmental accounting studies looked at energy, forests, air and water, and carbon sequestration values [186-188], reported in [110].

ONS natural capital accounts

In November 2011, ONS published a paper “Towards a Sustainable Environment – UK Natural Capital and Ecosystem Economic Accounting” [189] to outline its approach to including natural capital in the Asset Accounts. The paper identified the compilation of a pilot ecosystems account for woodlands as an important first step in the process of increasing the coverage of natural capital within the UK Environmental Accounts. The ONS prioritised the delivery of the SEEA Central Framework for a physical and monetary account during the development of these pilot accounts [189], and developed physical and monetary asset accounts for woodlands, including:

- Forestry physical asset account
- Provisioning services capacity – timber resources asset account
- Monetary valuation for timber resources
- Assessment of cultural and regulatory services (non-monetary flow accounts) for woodlands
- Monetary valuation of cultural, regulatory and other provisioning services
- Woodlands monetary asset account based on provisioning, cultural and regulatory services

Following the NEWP commitments, in December 2012 the ONS released “Accounting for the value of nature. A roadmap on the development of natural capital accounts within the UK Environmental Accounts” [190], outlining key proposals in the government’s plans for the production of natural capital accounts 2013–2015. These include:

- “Top down” accounts: improving natural capital estimates within the framework of comprehensive wealth accounts, to provide an overview of the value of natural capital within the UK.
- Enabling/cross-cutting accounts: including (1) land use/land cover accounts to provide the basic framework for the development of specific habitat accounts and (2) cross-cutting carbon accounts, enabling the monitoring of changes in the UK carbon stocks over time.
- Habitat-based accounts: including (1) woodlands accounts to inform the Public Forest Estate and private forestry balance sheets, (2) enclosed farmland accounts, enabling the valuation of the flows of ecosystem services which farmland provides, (3) wetlands ecosystems accounts and (4) initial accounts for the marine environment.

4.8.5. Governance

4.8.5.1. Governance Bodies for Natural Capital

The Natural Capital Committee

The Natural Capital Committee was created following the 2011 Natural Environment White Paper. It reports to the Economic Affairs Committee (chaired by the Chancellor of the Exchequer) and provides independent expert advice on the state of English natural capital. It aims to ensure that Government has a better informed understanding of the value of natural capital, and will help it to prioritise actions to support and improve the UK’s natural assets.⁶

Four Countries’ Biodiversity Group

The Four Countries’ Biodiversity Group is the lead governance body for the UK Biodiversity Framework. This group provides a forum for policy development issues common to all four countries of the UK in order to respond effectively to UK commitments made at Nagoya in 2010, and to meet other EU and international biodiversity targets. The Terms of Reference agreed in November 2012, include that the group is to be comprised of representatives from the UK, Northern Ireland, Welsh and Scottish Governments, JNCC, Statutory Agencies from each of the four countries and additional invited experts. Members of the wider UK biodiversity partnership continue to play a key role through their involvement in a number of subgroups, including: the JNCC/NGO stakeholder group, the UK Biodiversity Indicators Steering Group (BISG), and the UK Biodiversity Research Advisory Group (BRAG), each of which may establish “task and finish” groups as required. The Terrestrial and Freshwater Biodiversity Surveillance Strategy Implementation Group (TFBSSIG) also reports to the Four Countries’ Biodiversity Group.

⁶ [Http://www.defra.gov.uk/naturalcapitalcommittee/](http://www.defra.gov.uk/naturalcapitalcommittee/).

4.8.5.2. Mechanisms integrating natural capital values into policy

Ecosystems Approach Action Plan 2007, 2010

The government committed to the principles of the CBD's "ecosystem approach" with a 2007 Action Plan to mainstream an ecosystems approach, updated in 2010 [191]. This included a focus on ensuring that the value of ecosystems is reflected in policy appraisal tools [192]⁷ and outlines the principles of an ecosystems approach and the implications for a natural asset check. Among the key findings of this exploration was that although there are constraints in what is possible with ecosystem services valuation, incentives across government to do more and better environmental valuation are insufficient to offset perceived difficulties [193].

In 2010, DEFRA's strategy paper "Value Transfer Strategy" [194] investigated what steps should be taken to improve the use of environmental valuation evidence in the short and longer term and led to the development of Value Transfer Guidelines for use in policy appraisal.

Natural Capital Asset Check and Index

In 2010, the Government Economic Service Review of the Economics of Sustainable Development recommended that a natural asset check should be investigated for use in the appraisal of public policy options and their potential impact on the stock of specific environmental assets [195]. A DEFRA research study [196] went on to suggest that while the UK NEA does draw together a lot of the information needed to design a natural asset check, the NEA framework would need to be developed in order to perform the check. They also suggest that an accounting model would be more useful than the frameworks used for ecosystem assessments.

This was followed in the NEWP by a proposal for a "natural capital asset check" scoping study [171], published in 2012 [197], that gives a working definition of a natural capital asset check as *"An assessment of the current and future performance of natural capital assets, with performance measured in terms of their ability to support human well-being"*. Together with the UK NEA follow-on project Working Package 1 "Natural Capital Asset Check"⁸ they lay out a first elaborated version of the asset check that continues to be developed by the UK NEA follow-on project.

⁷ Action 10: DEFRA to review existing policy and project appraisal tools to explore how the principles of an ecosystem approach, including the valuation of ecosystem services, could be incorporated.

⁸ <http://uknea.unep-wcmc.org/NEWFOLLOWONPhase/Whatdoesthefollowonphaseinclude/WorkPackage1/tabid/143/Default.aspx>.

At the same time, Scotland has developed and published its Natural Capital Asset (NCA) Index [198], a “detailed attempt to measure annual changes in its natural capital based on an evaluation of ecosystem service potential”, with annual data from 2010. This data is not based on accounting frameworks, but on an index derived from ecosystem area multiplied by ecosystem quality.

4.8.6. Current initiatives based on ecosystem services

In 2010, the UK government began building on an action plan laying out a strategic approach to embed ecosystem services into policy-related decision making [191, 192]. This included a framework for payments for ecosystem services (PES) and an Ecosystem Markets Task Force.

4.8.6.1. Ecosystem Markets Task Force

Following the 2011 Natural Environment White Paper [199, and see below], the business-led Ecosystem Markets Task Force⁹ was launched in 2011, charged with reviewing opportunities for UK businesses to “drive green growth” including through expanding green goods, services, products, investment vehicles and markets which value and protect our natural environment. Their Interim Report was published in 2012 [200] and the final report in 2013 [201], making practical recommendations to government and business on where interventions would assist in the creation and development of new markets, enhancing opportunities for growth that also benefit the environment. One of the studies commissioned by the Task Force reviewed the UK NEA evidence to assess the scope for business-related ecosystem market opportunities in the UK [202]. This identified eight main “types” of business opportunity based on nature’s services, namely (1) product markets, (2) offsetting, (3) Payments for Ecosystem Services, (4) environmental technology, (5) markets for cultural services, (6) financial and legal services, (7) ecosystem knowledge economy and (8) corporate ecosystem initiatives.

4.8.6.2. Payments for Ecosystems Services

Following the UK NEA and the recommendations of the Ecosystem Markets Task Force [202], DEFRA published a number of reports providing an analytical background and evidence base on Payments for Ecosystem Services (PES). This includes a report setting out the economic framework and key design principles of PES [203], a Policy and Practice Note on PES [204] and a report on the barriers and opportunities to the use of PES [205]. DEFRA has also commissioned the Best Practice Guide for PES with a set of supporting PES case studies, and an Action Plan

⁹ [Http://www.defra.gov.uk/ecosystem-markets/](http://www.defra.gov.uk/ecosystem-markets/).

for PES, both due to be published in spring 2013.¹⁰ Among the conclusions of the reports so far are that PES can be a useful tool for better conservation of natural resources, but that it will not provide all the answers. Dunn [203] notes that although the PES concept is relatively new, there are many PES-type instruments that have been in use in the UK for a long time, such as the commonly cited agri-environment schemes, some of which have been in operation since the 1940s. Other examples include projects on watershed protection, carbon sequestration, wildlife and habitat conservation and bio-prospecting.

Guides on PES in specific environmental contexts have also been published. This includes guidance on PES in upland peat [206], restoring river catchment function [207] and marine and coastal systems [208].

DEFRA is supporting a number of pilot PES schemes across England and Wales. This includes the Sustainable Catchment Management Programme (SCaMP) water quality project¹¹ funded by United Utilities and DEFRA, an auction-based PES scheme to improve water quality¹² funded by South West Water, a sustainable urban drainage scheme¹³ funded by DEFRA, an RSPB project to help control river nutrient loads¹⁴ funded by DEFRA and a peatland carbon code project¹⁵ funded by DEFRA.

4.8.7. Legislation

4.8.7.1. Legislative process

Biodiversity and the natural environment are devolved responsibilities for England, Northern Ireland, Scotland and Wales, and consequently some legislation and policy applies only to individual countries. However, the UK government is responsible for certain international obligations.

Parliament is the centre of the political system in the United Kingdom. It is the supreme legislative body (i.e. there is parliamentary sovereignty), and Government is drawn from and answerable to Parliament. Parliament is bicameral, consisting of the House of Commons and the House of Lords.

¹⁰ <http://ekn.defra.gov.uk/resources/tools-guidelines/pes/>.

¹¹ <http://corporate.unitedutilities.com/scamp-index.aspx>.

¹² <http://www.cserge.ac.uk/research/current-projects/fowey-river-improvement-auction>.

¹³ <http://ekn.defra.gov.uk/resources/programmes/pes-pilots/hull/>.

¹⁴ <http://ekn.defra.gov.uk/resources/programmes/pes-pilots/poole/>.

¹⁵ <http://ekn.defra.gov.uk/wp-content/uploads/2012/12/DefraPESPilotflyer.pdf>.

Draft bills are issued for consultation before being formally introduced to Parliament. A bill is a proposal for a new law, or a proposal to change an existing law, which is presented for debate before Parliament. Bills are introduced in either the House of Commons or House of Lords for examination, discussion and amendment. When both Houses have agreed on the content of a bill, it is then presented to the reigning monarch for approval (a process known as “Royal Assent”). Once Royal Assent is given, a bill becomes an Act of Parliament and is law. An Act of Parliament creates a new law or changes an existing law.

“White Papers” are documents produced by the Government setting out details of future policy on a particular subject. A White Paper will often be the basis for a bill to be put before Parliament. The White Paper allows the Government an opportunity to gather feedback before it formally presents the policies as a bill.

“Green Papers” are consultation documents produced by the Government. Often when a government department is considering introducing a new law, it will put together a discussion document called a Green Paper. The aim of this document is to allow people both inside and outside Parliament to debate the subject and give the department feedback on its suggestions. Copies of consultation documents such as Green Papers and White Papers which are produced by the Government are available on the related departmental websites.

4.8.7.2. Implementation of international objectives

The UK government is committed to meeting its international targets on natural capital accounting. The devolved nations have each developed their own strategies to respond to the Nagoya Agreement and the Aichi Targets, outlined in the UK Post-2010 Biodiversity Framework [209]. The UK to date has met its commitments to the CBD new Strategic Plan for Biodiversity 2011–2020 [43], including the production of a National Biodiversity Strategy and/or Action Plan (NBSAP). The UK also has commitments to the EU, including the EU 2020 Biodiversity Strategy (see Box 11 [p. 80, above])

The Natural Capital Committee has responded to the SEEA Experimental Ecosystem Accounting Consultation Draft, saying that deriving a set of monetary valuations of natural capital is of fundamental importance. However, it also points out that restricting valuations, for practical purposes, to services that are marketed or marketable as implied in the Consultation Draft, is to underestimate substantially the extent of natural capital’s contribution.

The UK is also committed to EU regulations on natural capital accounting (Box 10 [p. 104, above]).

4.8.7.3. Legislation (planned or in force)

England

- Natural Environment White Paper

In June 2011, the government launched the Natural Environment White Paper, *the Natural Choice: Securing the Value of Nature* [199], announcing the creation of the Natural Capital Committee¹⁶ and including the provision to include natural capital within the UK Environmental Accounts and support for the creation of new markets for green goods and services.

Specifically, commitment 35 of the Natural Environment White Paper deals with UK accounting systems and states, “We will put natural capital at the heart of Government accounting. We will work with the Office of National Statistics to fully include natural capital in the UK Environmental Accounts, with early changes by 2013. In 2012 we will publish a roadmap for further improvements up to 2020,” including that over time the government will move from measuring the value of the physical stocks to systematically valuing the services they provide.

Similarly, Commitment 44 aims to increase business understanding of how to benefit from green goods and services: “The Government will set up a business-led Ecosystem Markets Task Force to review the opportunities for UK business from expanding green goods, services, products, investment vehicles and markets which value and protect nature’s services. It will report back to Government in 2012/13, through the Green Economy Council.”

Other relevant key activities include a scoping study for a natural capital asset check,¹⁷ and the production of a “Road Map to a Green Economy”.¹⁸ In addition the White Paper includes pledges to link work at EU and country levels to reform incentives and improve benefits to biodiversity, and to improve and share knowledge on the UK’s consumption of resources and the impact of this consumption on

¹⁶ NEWP Commitment 36: The Government will establish an independent Natural Capital Committee reporting to the Economic Affairs Cabinet Committee which is chaired by the Chancellor of the Exchequer. The Committee will advise the Government on the state of English natural capital.

¹⁷ NEWP Commitment 37: To support the initial work of the Natural Capital Committee, the Government will take forward a scoping study in 2011 for a natural capital asset check.

¹⁸ NEWP Commitment 38: Later this year, the Government will publish a “Roadmap to a Green Economy”, to provide businesses with as much clarity as possible about the future direction of policy.

global biodiversity. This includes helping businesses to understand their impact on natural capital.¹⁹

England's biodiversity strategy "Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services" [172] was published in 2011 and builds on the NEWP, highlighting the NEA findings that "nature is consistently under-valued in decision making and that many of the services we get from nature are in decline". It aims to "ensure that the value of biodiversity is reflected in decision making in the public and private sector" including through the development of new financing mechanisms to direct more funding towards biodiversity outcomes.

The NEWP applies only to England. Northern Ireland, Scotland and Wales have yet to legislate specifically on natural capital.

Northern Ireland

The Northern Ireland Environment Agency (NIEA) is an executive department within the Department for the Environment. The NIEA Strategic Priorities [173] recognises the importance of valuing ecosystem services. The Valuing Our Environment report [210] recognises the as yet uncalculated economic value of ecosystem services.

Scotland

Scotland's Biodiversity Strategy [211] is due to be updated this year. A *Consultation on the 2020 Challenge for Scotland's Biodiversity* is currently underway, specifically as a response to the EU's Biodiversity Strategy for 2020 and the CBD "Aichi Targets".

Scotland's first land use strategy was launched in 2011 [174]. This included ten Principles for Sustainable Land Use to reflect government policies on the priorities which should inform land use choices across Scotland. The third and fourth principles include the need to recognise the value of land for its "primary uses" (including flood management, water catchment management and carbon storage)

¹⁹ NEWP Commitment 40: The Government will support a new international coalition of businesses and business organisations to follow up on the "TEEB for Business" report. The TEEB for Business coalition will catalyse and coordinate action by helping participating businesses from the UK and elsewhere, to understand and address their environmental impacts.

NEWP Commitment 41: We will work with business to consider how voluntary approaches could work on key products or natural assets, learning from existing voluntary deals on other environmental issues.

in decision making, and the need for land-use decisions to “be informed by an understanding of the functioning of the ecosystems which they affect in order to maintain the benefits of the ecosystem services which they provide”. This land use strategy was followed by the Land Use Strategy Action Plan [212] outlining how its principles for sustainable land use would be applied and includes aims to investigate the relationship between land management changes and ecosystem processes to identify adaptation priorities, to develop methodologies to improve carbon accounting in soils and to demonstrate how the ecosystem approach could be taken into account in relevant decision making processes.

Wales

In 2011, the Welsh Government brought together the Natural Environment Framework and the Single Environment Body into a combined programme, known as Living Wales. In January 2012, the Green Paper, *Sustaining a Living Wales*, was launched to outline the proposed changes [213]. The proposed framework moves to an ecosystem approach and aims “to ensure that Wales has increasingly resilient and diverse ecosystems that deliver economic, environmental and social benefits now and in the future”. It recognises the supporting, provisioning, regulating and cultural services that the environment provides. Current work includes improving the understanding of ecosystems and their services and how they are valued, in order to inform current policies and future decision making.

4.8.8. Case studies

4.8.8.1. Peatlands restoration for improved water quality and reduced soil erosion

In England, it is estimated that only about 10% of the original area of lowland bogs remain, just 3,800 ha. In Northwest England, United Utilities and the RSPB are working towards peatland restoration, to improve local drinking water quality in microbiology and water colour, and to help prevent soil erosion. The value of these benefits has been estimated at between €1.8 million and €3.6 million per year – a total discounted benefit of between €5.5 million and €12 million [214].

4.8.8.2. Recolonisation of Ospreys brings economic benefit to local areas

It is generally considered that Ospreys (a bird species) were absent from the UK from 1916. In 1954 they very slowly started to recolonise naturally, and a reintroduction project in the 1990s brought the numbers up to an estimated 250-300 nesting pairs in 2011.²⁰ This has resulted in significant local economic and

²⁰ See www.rspb.org.uk.

recreational benefits, with an estimated 290,000 people visiting osprey nesting sites every year, bringing around £3.5 million per year to local areas and resulting in increases in local incomes and employment [214].

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Annex: GLOBE Recommendations on Natural Capital (v2)

This section defines a targeted set of actions for legislators to ensure that the value of natural capital is integrated into national accounts and the policy-making processes of their governments. In order truly to engrain the natural capital approach, legislators must utilise both their legislative and oversight functions. The first half of the recommendations outlines a set of possible actions that could be included in draft legislation, e.g. a “Natural Capital Act”, while the second half identifies ways in which legislators can support the natural capital approach through their oversight role.

The strength of the natural capital approach is that each country can develop their own nationally owned system without the need for complex international negotiations or financial transfers. Over time, it will be important to develop common approaches and standards; however, this is an agenda that can be controlled nationally through legislation and policy. Each of the proposals below must be amended to the national circumstances of each country; however, they provide an overview of how legislators can support the transition to a green economy by mainstreaming the valuation of natural capital through their parliamentary responsibilities.

1. Legislation

In order to ensure the long-term integration of the value of natural capital into government policy-making, legislation should be advanced that integrates the natural capital approach into every component of the policy analysis and decision-making system. Governments should create both supply and demand for information that more accurately reflects the relationship between the environment and the economy. To do this, they may need to change existing committees, roles, responsibilities and decision-making powers. This section outlines a set of possible actions that could be included in draft legislation, e.g. a “Natural Capital Act”.

1.1. Natural Capital Accounting

Natural capital should be included in the country’s national accounts. This requires the implementation of the System for Environmental-Economic Accounting (SEEA) Central Framework, which was adopted by the United Nations Statistical Commission at its 43rd Session in February/March 2012. Work on further parts

of the SEEA, including Part 2 which deals with ecosystem accounts, is ongoing, and should be integrated into the national accounts when approved by the UN Statistical Commission.

2. Natural Capital Reporting

The Natural Capital Accounts should be published annually, in the ideal situation, but at a minimum of every 3 years. These accounts should be accompanied by a complementary report that investigates the implications of the government's policies on the environment and the economy. This publicly available report will identify the projects, programmes and policies that became economic (or uneconomic) as a result of integrating the value of natural capital.

In addition, all government departments should be required to produce Natural Capital Inventories that identify as far as possible all the natural capital assets for which that department is responsible, or whose value may be affected (whether adversely or positively) by their departmental activity. Each government department would be required to coordinate with the Finance Ministry or Treasury (through the Minister of Natural Capital, see Section 1.5) on the valuation for the natural capital assets contained in their inventory (in line with the latest recognised valuation methodologies).

3. Natural Capital in Policy and Project Evaluation

All policy and project proposals should undergo economic appraisal that includes the valuation of natural capital and ecosystem services. The latest valuation methodologies should be inserted in the country's guidelines for civil servants on programme evaluation to ensure comprehensive cost–benefit analysis techniques are used across government.

Government departments should provide a costed explanation of how their policies will enhance natural capital or transform it into other forms of capital so that overall national wealth is increased. Where a policy proposal is estimated to deplete natural capital or result in declining ecosystem services, that depletion must be clearly costed and agreed by the Finance Ministry or Treasury.

4. Natural Capital Committee

An expert advisory group should be established to oversee the technical incorporation of natural capital into national accounting and policy-making processes. The “Natural Capital Committee” should include leading experts from academia and build upon the existing scientific and economic work. This advisory group should inform the government of the current status of the country's natural capital and provide policy advice on how it could be improved. Working groups could be

established to determine the true value of the key components of a country's natural capital, e.g. minerals, sub-soil assets, water resources, forests, marine fisheries etc. The Natural Capital Committee should report to the Treasury or Finance Ministry and work with civil servants from across government to:

- Oversee the necessary actions to measure the economic value of the key components of natural capital within national accounting procedures.
- Ensure that the values of natural capital are integrated into policy formulation and investment decisions across all government departments.
- Prepare a report that complements the Natural Capital Accounts that investigates the implications of the government's policies on the environment and economy (see Section 1.2).

1.5. Minister for Natural Capital

The mainstreaming of the natural capital approach into all aspects of government accounting and decision making requires the creation of a ministerial position within the Treasury or Finance Ministry. The "Minister for Natural Capital" will have responsibility for regulating the country's use of natural capital and signing off on all use and depletion of natural assets. This position would have the following responsibilities:

- Oversee the implementation of the latest environmental accounting methodologies as set out in the SEEA.
- Question why departments are pursuing intensive, consumption-based technological solutions that might be achieved more efficiently through an ecosystem-based approach or using a green technology.
- Ensure that a set of Natural Capital Accounts are published at least every three years.

2. Oversight and Scrutiny

Parliamentarians and legislators are responsible for scrutinising the performance of the executive branch of government and for providing oversight of their policies and programmes. This is done in a variety of ways, including through the process of budget approval, parliamentary/congressional committees, plenary sittings and proposing amendments to legislation. Each of these functions must be fulfilled in a manner that supports the natural capital approach.

2.1. Natural Capital in the Budgetary Process

Although the role of legislatures in budgetary processes varies around the world, it is very often the role of a parliament to scrutinise and pass national budgets. Therefore, the budgetary process provides legislators with an opportunity to ensure that their government is managing its natural capital in a sustainable manner. Legislators should support:

- Investing in “green infrastructure”. Ecosystem-based approaches often offer cost-effective solutions to providing municipal services as compared with resource-intensive, hard technology solutions, e.g. water supply and treatment are highly dependent on healthy ecosystems.
- Ensuring that the government agencies with the responsibility for enforcing environmental and natural resource legislation and managing conservation areas receive sufficient resources to carry out their duties effectively.
- Increasing the budget for environmental research to a level that is proportionate to the needs and challenges associated with tackling biodiversity loss and climate change, in order to help close identified knowledge gaps and support science-based policy-making.

2.2. Natural Capital and Parliamentary/Congressional Committees

There is significant variation in the structure, power and responsibilities of the committee systems across the parliaments of the world. While a number of committee systems perform a legislative function, here we focus on the oversight role of committees in relation to natural capital.

- Permanent committees that oversee the programmes of government departments should examine the positive and negative impacts of particular policies or projects on the countries’ stock of natural capital.
- Where political systems allow for ad hoc committee inquiries, these should be established to examine specific issues relating to the government’s use of natural capital, e.g. in relation to flooding, air quality, deforestation or overfishing.
- Committee hearings provide an opportunity for interaction with both the executive branch and experts from outside of government. Ministers with particular responsibilities for overseeing natural capital and academics with expertise on natural capital issues can both be called to present evidence to committee sessions.
- For Public Accounts Committees, see Section 2.3.

2.3. Natural Capital and Organisations that report to Legislators

Under certain political systems, a number of organisations that are involved in either generating public data or auditing government policies report directly to legislators. In these situations, legislators have the opportunity to request that these organisations support the institutionalisation of the natural capital approach.

- In most countries, the National Statistics Office publishes statistics related to the economy, population and society, and will play a central role in developing natural capital accounts. Ahead of environmental accounting being mandatory, legislators should call upon these agencies to provide sufficient data to embed the natural capital approach across government.
- The Supreme Audit Institution (SAI) usually delivers its reports to the Public Accounts Committee (PAC) or equivalent. Legislators on the PAC should ask the SAI to:
 - Take account of natural capital issues in their audit of financial statements and their determination of the legality of expenditure;
 - Issue public reports on the economy, efficiency and effectiveness of government policies concerning natural capital issues and;
 - Provide briefing papers on natural capital issues to parliamentary committees and, where requested, to individual legislators.

2.4. Natural Capital in Parliamentary Debates and Questions

Legislators can make use of the classic tools such as parliamentary questions and debates to hold the government to account in relation to the management of the country's natural capital. During the various stages in the passage of a bill, legislators can also consider and debate the proposed legislation's impact on the country's natural capital. Finally, parliamentary debates can be used by legislators to address specific issues or to highlight the work of committees on natural capital.

