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(Editors)

Global Green Accounting 2015

The first annual annotated bibliography of green national accounting efforts around the world

Fundación INESAD

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Abstract: *This document is an annotated bibliography of national environmental accounting efforts from around the world, as documented in research papers and technical or organisational reports. It separates efforts by global regions. Within each section we provide an overview, comparing and contrasting national strategies, followed by a summary of the papers and reports that are available for the region. This document is intended to serve as an accessible reference work for researchers, politicians, policymakers, and the general public.*

Keywords: Green national accounts, integrated environmental-economic accounting.

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Foreword

The importance of considering environmental costs as a key factor in Gross Domestic Product (GDP) calculations has now been recognised worldwide. Assessing the contribution of nature to the generation of output and income has helped us realise that economic growth cannot sustain itself without considering long-term environmental effects, which need to be taken into account and assessed previous to the design and implementation of development policies and strategies.

Even though green accounts are now part of the more general system of national accounts—for which the United Nations System of Environmental-Economic Accounting (SEEA) has developed a comprehensive methodology—few countries in the world compile and publish them on a systematic and regular basis.

This document puts together information on national environmental accounting efforts from around the world, as documented in research papers and technical or organisational reports. It represents the most comprehensive compilation of initiatives carried out by countries around the world to assess the environmental costs incurred during economic processes.

The document shows that experiences among countries and regions have been very varied. In some cases, efforts to compile environmental accounts have been carried out systematically, adopting accounting systems based on the United Nations SEEA model, compiled as part of the country's system of national accounts and assembled by their national statistics offices. In other countries, efforts have been less systematic, implemented as pilot projects by universities and other research institutions.

European countries, for instance, have made a concerted effort to implement integrated environmental and economic accounting (IEEA) systems. They have given priority to the regular production of a core set of accounts and, at the national level, to ensuring that national statistical institutes maintain and potentially expand their work on environmental accounting.

Canada started its efforts to quantify and value the environment in the 1970s. In 1991, the Government of Canada asked its national statistics body (Statistics Canada) to develop an actual system to analyse the relation between the economy and the environment. In 2006, Statistics Canada released a comprehensive document of Canada's environmental accounts.

The United States started implementing a system called Integrated Economic and Environmental Satellite Accounts (IEESA) in 1992. In 1995, the US Congress suspended its implementation due

to perceived problems with its methodology. Since then smaller, non-systematic accounts have been developed, but no institutionalised, national effort is underway.

Many Latin American countries implemented green accounting as pilot projects. However, these efforts faced several problems such as lack of funding and lack of the most basic data needed to start compiling the accounts. As a consequence, many of these projects have been discontinued. Ten out of the twenty Latin American countries have no governmental oversight of environmental accounts. International organisations, universities, and independent research institutions have tried to fill the gap.

In Africa, the issue of environmental accountability has received little attention due to the lack of political and social priority given to green accounting within the region. Despite this, some researchers have recently advanced the process of developing techniques to assess the question of environmental accounting and sustainability assessments as matters of national policy. Multilateral institutions, especially the World Bank, have supported other efforts.

In Asia, governments are starting to develop green accounts in a more systematic fashion. Countries like South Korea regularly produce accounts describing, for example, environmental expenditure and natural resource supply and have undertaken considerable efforts to fund green investments and maintain the country's 60% coverage by forests. China has also recognised the need to take into account environment costs.

In Oceania, Australia and New Zealand are leading the way in producing comprehensive accounts and widely-accessible reports and publications. Among Pacific Island nations, Vanuatu was selected by the European Commission as a country with good potential for implementing environmental fiscal reform. This is a good sign, but Vanuatu is a long way off any comprehensive green accounting projects. Sadly, none of the other Pacific Island nations have seen any efforts in this direction even though they may well stand to derive the most benefits from fully accounting for their natural wealth in the form of international mechanisms such as potential payments for ecosystem services and transfers through carbon offsetting programs.

This document will be a valuable reference guide for policymakers, researchers, and the public alike. It will help stakeholders compare methodologies and data sources, as well as results obtained from different countries that have already undertaken the compilation of green accounts. It will be particularly useful for countries that are newcomers in compiling green accounts by allowing them to learn from previous experiences in countries with similar economic structures and environmental problems. They will be able to learn beforehand how specific problems have been

tackled, especially in countries with poor data systems. They will learn what data is needed and how to obtain it, which will result in improved green account sets in the future and eventually help devise more economically and environmentally sustainable policies.

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Table of Contents

Acronyms and Abbreviations

Listed below are some common acronyms and abbreviations which are used throughout this document. The list does not include abbreviations that are unique to one particular country or project; these are explained fully in the text.

CBD	Convention on Biological Diversity
CEPAL	Comisión Económica para América Latina y el Caribe (Economic Commission for Latin America and the Caribbean)
CO_2	Carbon dioxide
CSD	Commission on Sustainable Development
EDP	Environmentally-adjusted net domestic product
EFR	Environmental fiscal reform
EGS	Environmental goods and services
EC	European Commission
EIA	Environmental Impact Assessment
EMS	Environmental management system
EU	European Union
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
gGDP	Green Gross Domestic Product
GGEI	Global Green Economy Index
GHG	Greenhouse Gas
GNI	Gross National Income
GNP	Gross National Product
GPI	Genuine Progress Indicator
HDI	Human Development Index
IEEA	Integrated Environmental Economic Accounting
INESAD	Institute for Advanced Development Studies
INTOSAI	International Organization of Supreme Audit Institutions
MCA	Millennium Capital Assessment
MEFA	Material and energy flow accounts
MENA	Middle East and North Africa
NA	National accounts
NAMEA	National Accounting Matrix with Environmental Accounts
NAS	National Account System
NC	Natural capital

NCC	Natural Capital Committee
NDP	Net Domestic Product
NGO	Non-government organization
N_2O	Nitrous oxide
NRA	Natural resource accounting
NRSA	Natural resource stock accounts
NTFP	Non-timber forest product
OECD	Organization for Economic Cooperation and Development
OPEC	Organization of Petroleum Exporting Countries
PEI	Poverty-Environment Initiative
PES	Payments for Environmental Services
SEEA	System of Environmental-Economic Accounting
SNA	System of National Accounts
SO_2	Sulphur dioxide
TEEB	The Economics of Ecosystems and Biodiversity
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNSD	United Nations Statistics Division
UAE	United Arab Emirates
UK	United Kingdom
USA	United States of America
WAVES	Wealth Accounting and the Valuation of Ecosystem Services
WTO	World Trade Organization
WWF	World Wildlife Fund

Notes on Style

Style This annotated bibliography uses British spelling and grammatical rules throughout, unless alternative spelling or grammar occurred in organisational and journal names or paper titles, or in text that is quoted directly. In such cases this document adheres to original spelling.

Chronology Papers and reports in the main sections of this document are listed in reverse-chronological order.

Multi-country projects described in the Multi-Country Reports and Projects section of this report and resource websites in the Data Portals and Other Resources section are presented alphabetically.

The bibliography/references section at the end is in the standard alphabetical order.

Authors Where a work was written by three or more authors, its citation in the body of this report is shortened by the use of et al. For a full list of authors, readers should consult the References section at the end.

Similarly, where organisations' acronyms are used in a publication's citation, the acronym is elaborated in the text and/or in the References section at the end.

Emails Where available, primary or corresponding author emails are provided for reference.

Web links Links to all the documents are also provided for reference.

Currency $ denotes US dollar amounts, unless otherwise stated, e.g. G$ denotes Guyana dollars.
€ denotes European Union's EURO amounts.
£ denotes the British pound.
Sums in other currencies are written in full, e.g. pesos (Colombia) and birr (Ethiopia).
All non-US currency amounts are presented with 2015 US dollar conversions for comparison purposes.

1. Introduction

1. Introduction

"When the last tree is cut down, the last fish eaten, and the last stream poisoned, you will realize that you cannot eat money."
Native American saying

"Gross national product … counts air pollution and cigarette advertising, and ambulances to clear our highways of carnage….Yet [it] does not allow for the health of our children, the quality of their education, or the joy of their play."
Robert F. Kennedy

The current way of life in developed countries, together with the aspirations of developing countries, is generally considered an unsustainable combination: If every country consumed resources and created waste at the same per person rate as the United States, we would need four planets to survive (NEF, 2012). Part of the problem lays in the fact that standard national accounting systems—which generate the main indicators used for advising global and domestic policy—have failed to include the environment in their calculations. That is, conventional national accounting has considered environmental goods and services free and unlimited. This may have been a reasonable assumption in some countries at one time, but in general it is no longer valid.

One of the proposals presented to at least partially correct this problem is the United Nations (UN)'s Systems of Integrated Environmental and Economic Accounting (SEEA). This approach attempts to assign values—higher than zero but less than infinite—to natural resources and environmental services such as minerals, oil, forests, fish, water, soil nutrients, natural habitat, clean air, beautiful views, genetic diversity, and other such things that are clearly important for life on earth. In addition, it assigns a negative value to harmful things, such as water contamination, noise pollution, habitat destruction, solid waste, air pollution, and so on (United Nations et al., 2003).

SEEA also helps keep track of the evolution of different capital stocks (human, natural, social, and produced) in the economy. This tracking is a significant improvement over conventional national accounting, which measures only income and not wealth, and even sometimes confuses a reduction in wealth with an increase in income. According to SEEA principles, the income of a nation can be defined as the amount that it can collectively spend during a period without depleting the multidimensional wealth base upon which it relies to generate this income (United Nations et al., 2003). This is very different from traditional gross domestic product (GDP), which

would look extraordinarily good one year if we fished every fish in the ocean, extracted every drop of oil, and cut every tree on the planet.

While SEEA represents a significant improvement over the status quo, some currents of thought suggest that it does not go far enough. Ecological economics, for example, considers our economies and societies to be part of, and dependent on, the global environment. Since a healthy environment is critical to our survival, ecological economics usually emphasises the need for strong sustainability, which rejects the proposition that natural capital can be substituted by human-made capital (Illge and Schwarze, 2006). Rather than estimating costs and prices, ecological economics attempts to measure the physical limits of extraction and emissions within which we need to stay in order to prevent overstepping critical tipping points. This strategy is more radical than that of the SEEA because, depending on the analysis, certain activities may have to be banned rather than just measured and disincentivised.

The Precautionary Principle is a related, but more extreme, concept. Its basic tenet is that we should not do something unless we are sure it will have no harmful or potentially harmful side effects. On the face of it, that may sound reasonable, but in reality it is a one-sided consideration, which ignores the benefits or potential benefits of any action, product, or invention. The Precautionary Principle does not weigh benefits against costs; it just says that if there are any costs at all, the action should not be carried out (Andersen, 2011). Since all actions will necessarily have some risk associated with them, this is not a very useful or constructive principle for guiding development policy.

In essence, calculations included in SEEA and other systems of integrated environmental and economic accounts—which may or may not be based on SEEA—are attempts at "greening" the GDP, and they are thus collectively referred to as national "green accounting" in the title of this report. However, it is of note that an exact and widely accepted definition of green accounts is currently lacking, which makes the concept somewhat problematic. For example, Hass, Kolshus and Køber (2013) point out that the SEEA does not define what it means by "green" and only includes a definition of environmental degradation, which could lead to underestimations of the environmental impact of activities otherwise considered to be "green". Moreover, extended accounts can and should include important social consideration, but these may not intuitively fit within a purely "green" framework.

Nevertheless, green accounting is a practical compromise. It does not assign a zero value to environmental goods and services as traditional national accounting does, but neither does it assign an infinite marginal value like the Precautionary Principle or the ecological approach.

The SEEA, for example, assigns progressively higher values as an environmental good or service becomes scarcer or more critical and progressively higher prices on contamination and waste when these approach irreversible and highly damaging levels. This kind of analysis and accounting is useful for guiding the design of public policies towards a more responsible use of our limited natural endowments.

The other main advantage with efforts to green national accounts is that harmonised approaches, concepts, definitions, and procedures are emerging. For instance, The World Bank's Wealth Accounting and the Valuation of Ecosystem Services (WAVES) project is a broad coalition of public, private, and non-government actors that promotes sustainable development by counting natural resources within nations' GDP calculations. Its wider goal is to develop and disseminate—on a global scale—an internationally agreed upon system for ecosystems accounting. Similarly, The Economics of Ecosystems and Biodiversity (TEEB)—a project launched by Germany and the European Commission (EC)—seeks to draw attention to the value of biodiversity, with the goal of developing a global standard for natural capital accounting. Both projects are now in their implementation stages: WAVES works with five countries (Botswana, Colombia, Costa Rica, Madagascar, and the Philippines) with another three (Guatemala, Indonesia, and Rwanda) recently added, while TEEB has thus far launched seventeen country and regional level projects. These indicate a much-needed move towards broadly accepted green accounting frameworks and definitions that allow for sensible comparisons across nations and over time.

However, as the Kyrgyz Republic recently pointed out, it is of note that the cornucopia of available approaches and methodologies—the UN's System Integrated Environmental and Economic Accounting (SEEA), the World Bank's Genuine Savings Index, the OECD's System of Environmental Indicators, the European Community's GARP1, GARP2, and TEPI, and EU's National Accounts Matrix including Environmental Accounts (NAMEA), to name just a few systems that one will encounter in this report—can cause confusion and prevent countries from prioritising green accounting above other national concerns, at least until more clarity is achieved.

Nevertheless, this report attempts to bring together the latest information on how the world's nations have gone about quantifying the relationship between the economy and the environment by providing summaries of published green accounting efforts from all major regions and economies. Ten sections make up the report, the first six of which, after this introduction, annotate publications on green national accounting for different geographical regions. Each major regional chapter begins with an overview of green accounting efforts for the countries included in it. The nation-level subsections are then presented in alphabetical order.

Section two covers countries of mainland and Eastern Europe, while section three delves into the Americas, which include North America, Latin America, and the Caribbean. The fourth section is devoted to the Middle East and North Africa (MENA) region, whereas section five tackles the rest of the African continent. Section six is an exploration of Asia, and section seven covers Oceania – Australia, New Zealand, and the Pacific Islands. Where the researchers did not find national level studies, green accounting reports for different economic sectors and other studies that present first steps to comprehensive green national accounts are included.

Section eight deals with more general publications, providing overviews of multi-country reports. Meanwhile, the appropriate national sections include the multi-country reports' single country case studies, as well as the country-level results of such projects as WAVES. Section nine reviews publications on the broad topic of green accounting. It is not designed to be as comprehensive; rather it aims to provide readers with some interesting "further reading" possibilities such as on the link between natural capital use and subjective well-being measures. Readers interested in country-level environmental accounting datasets will find a resource list in section ten.

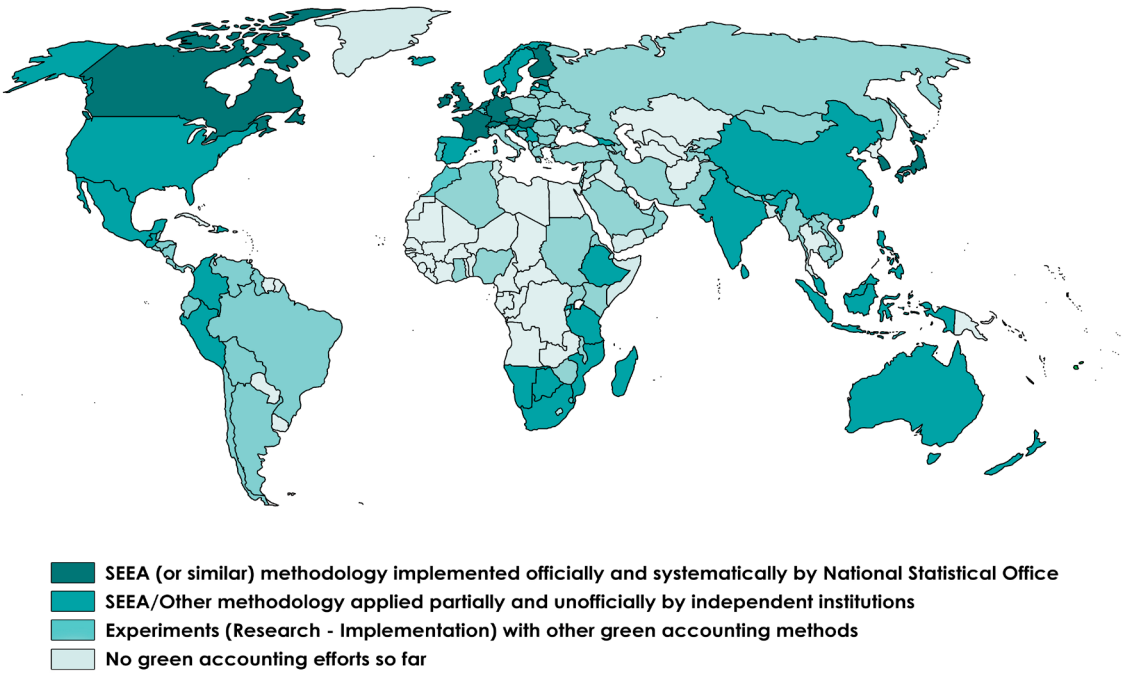
While our focus is overwhelmingly on green accounting on the national level, many countries and researchers are engaging in trials on sub-national, sectoral, or even firm or village levels. Studies that look at incorporating traditional wisdom into natural capital valuations in Bangladesh, at how Guyanese households use the forest in non-timber ways, or at how small- and medium-sized Lebanese businesses use Environmental Management Systems (EMSs), represent important, and often creative, attempts at accounting for the environment in human economic systems. Thus, while we prioritise national environmental accounting programs, where these are not readily available, we include smaller experiments that are laying the foundations for more systematic and comprehensive efforts.

The good news is that by the beginning of 2015, most countries in the World had initiated the implementation of some form of integrated environmental and economic accounting. Map 1 overleaf gives an overview of Green National Accounting progress to date. Meanwhile, the Multi-Country Reports section details efforts to rank and compare nations on their progress, such as the Dual Citizen LLC's Global Green Economy Index (GGEI) that measures 60 countries and 70 cities.

This is very encouraging. However, calculations that better reveal the true environmental, social, and economic wealth of nations are only the beginning. While data is certainly powerful, its ability to transform human systems is highly dependent on how it is used. The vast majority of documents included in this report stress the need to incorporate environmental accounts into regional, national, and local decision-making. Some countries, such as the United Kingdom,

Spain, Egypt, South Africa, and Costa Rica, have begun using their natural capital accounts to inform policy design and implementation. But, many have not. Finding the political will and financial resources to act on the national level—a process that would be helped by even greater collaboration with other nations, sub-national stakeholders, and supra-national organisations—is imperative if we are to successfully shift the global economic system onto a more environmentally and socially sustainable development path.

Map 1: The state of Green National Accounting efforts around the World, 2015



Source: Author's elaboration.

We must conclude the introduction with two disclaimers. Firstly, not all documents included in this book are written in English; we occasionally include non-English sources, especially where English-language works or translations were not available. Non-English papers are clearly marked.

Secondly, while we have taken every care to present the latest information from all nations, this report is a living work. The authors thus encourage readers to point out any omissions for inclusion in future updated versions of Global Green Accounting. Please email an electronic copy of the paper in question (or a link to its location) to landersen@inesad.edu.bo. If the document is not in English, if possible, please provide an English-language summary.

The Institute for Advanced Development Studies (INESAD) sincerely hopes that this report will prove useful to those interested in green accounting and helps to further the inclusion of our precious environment in national and international policy decision-making.

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2. Europe

European Union
Albania
Austria
Azerbaijan
Belarus
Belgium
Bosnia
Bulgaria
Croatia
Cyprus
Czech Republic
Denmark
Estonia
Finland
France
Georgia
Germany
Greece
Hungary
Iceland
Ireland
Italy
Latvia
Lithuania
Luxembourg
Malta
Moldova
Monaco
Montenegro
Netherlands
Norway
Poland
Portugal
Romania
Serbia
Slovenia
Russia
Slovakia
Spain
Sweden
Switzerland
Turkey
Ukraine
United Kingdom

2. Europe

Overview

Since the early 2000s, European countries have been making a concerted effort to implement Integrated Environmental and Economic Accounting (IEEA) systems. In 2011, the European Union (EU) passed a proposal that requires all EU member states to provide: (a) air emissions accounts, (b) environmental taxation statistics, and (c) economy-wide material flow accounts (how natural resources move through the economy). The second batch of regulations is underway for the coming years, including accounts on environmental protection expenditure, environmental goods and services sector, and physical energy flow accounts of each industry. The main objective of this policy at the European level is to give priority to the regular production of a core set of accounts and at the national level to ensure that national statistical institutes maintain and potentially expand their work on environmental accounting. Through this they have been able to assess important country and region-wide environmental-economic accounting statistics such as environmental taxation's 2.4% contribution to the EU's GDP.[1]

Protecting the environment is a task that cannot be tackled alone. EU member states are increasingly recognising this fact. Their combined efforts will certainly prove to be more fruitful than if they acted individually. Additionally, for neighbouring countries that are not currently part of the EU, accession promises many opportunities, but these do not come automatically. As with many other EU standards and regulations, countries that hope to join the Union are required to take steps towards fuller environmental accounting within their economies, often with the EU's help.

Environmental law has become one of the most far-reaching and important pieces of EU legislation. An integrated system of environmental-economic, or "green", accounting is a first step not only in decreasing environmental damage, but also in showing individual countries the economic benefit of adopting sustainable policies.

The United Kingdom is of note as it is actively moving beyond mere calculations and towards including natural capital valuations in policymaking decisions. May 2012 saw the launch of the

1 Data available at the Eurostat web pages: http://appsso.eurostat.ec.europa.eu/nui show.do?dataset=env_ac_tax-&lang=en, http://epp.eurostat.ec.europa.eu/tgm/refreshTableAction.do;jsessionid=9ea7d07d30db02c52adf992f42cf95f-f9a0bde1b563a.e34MbxeSaxaSc40LbNiMbxeNaNiRe0?tab=table&plugin=1&pcode=tec00001&language=en.

Natural Capital Committee (NCC), the British Government´s headline commitment in the "The Natural Choice: Securing the value of nature" White Paper. Although the young initiative´s effects on policy are yet to be seen, the independent committee—the first of its kind globally—is actively integrating natural capital across several legislative and academic spaces, and pushing for corporate green accountability.

Germany, on the other hand, leads the way not only in supporting green energy production in the country through obligatory feed-in tarriffs, but also in requiring full "green energy accounts" from power grid operators. In all, it is possible to conclude that the European Union is a leading region in terms of green accounting. More countries should follow the UK's example and push for the use of natural capital valuations in national policymaking and business decision-making. They would also do well to emulate Germany's support for green energy development and accounting.

European Union (general)

European Commission (2010) ***Proposal for a Regulation of the European Parliament and of the Council on European environmental economic accounts*****. Brussels: COM (2010) 132 final - 2010/0073 (COD), 9 April.**

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0132:FIN:EN:PDF

This proposal is a July 6, 2011, amendment to "Regulation (EU) No 691/2011 on European environmental economic accounts". The Regulation covers three modules: air emissions accounts, environmental taxes, and material flow accounts, but highlights that more modules could be added. This proposal seeks to extend the coverage, describing three new modules: "environmental protection expenditure", "environmental goods and services sector", and "physical energy flow accounts", which will allow for the expansion of integrated datasets and permit more comprehensive analysis. It presents their objectives, coverage, and characteristics, as well as other details. The proposal emphasises the centrality of these modules to key current and future concerns of environmental policy. Since current regulations of European environmental economic accounts are limited in scope, no new data collection is necessary for implementing the new modules.

Statistical Programme Committee (2008) Revised European Strategy for Environmental Accounting. In: ***68th Meeting of the Statistical Programme Committee*****, Item 7 of the Agenda, Luxembourg, 13 November.**

https://www.cbd.int/financial/values/eu-esea.pdf

This report was produced by the high-level Task Force that developed the European Strategy for Environmental Accounting (ESEA) in 2003. The Task Force re-convened in 2007 to review and revise the strategy in light of the then current and developing policy needs of European countries. The report includes a draft of the ESEA and the Implementation Plan by Eurostat, the EC statistics division. The primary objective of the strategy, at the European level, is to give priority to the regular production of a core set of accounts. At the national level, the objective is for national statistical institutes to maintain and potentially expand their work on environmental accounting. The report emphasises the need for EU member states to work together when producing environmental accounts since environmental issues are usually of an international nature and cannot be effectively addressed at the individual level. It includes are lists of those European countries that were active and efficient in terms supplying accounts, and those that were not. The Task Force wrote the report at the beginning of the policy process, before ratification, and the policy's evolution can be followed in subsequent documents.

O'Connor, M. et al. (2001) ***Greening National Accounts. CIRE Policy Research Brief No. 9,*** **Cambridge Interdisciplinary Research fon the Environment, prepared for the "Green National Accounting in Europe: Comparison of Methods and Experiences" Conference, Milan, Italy , 4-7 March 2000.**

http://www.clivespash.org/eve/PRB9-edu.pdf

This policy brief begins by describing the accounting system used in most of the EU – the National Accounts Matrix including Environmental Accounts (NAMEA). The Dutch Statistical Office developed the system in 1993. NAMEA is entirely consistent with standard economic and social data and indicators. It calculates the contribution of industries and households to a variety of environmental pressure indicators (air emissions, discharges into water, and solid waste) and compares it with their economic performance. Satellite accounts for natural resources, with resources measured in physical units rather than in monetary units, are a practical alternative for dealing with resources that are hard to value. The report continues by discussing the monetisation of the environment and the difference between the cost of avoiding environmental degradation and the benefits lost by environmental degradation. It then introduces two types of environmentally adjusted aggregates: change in the system boundary to include environmental assets and an adjustment of the economy itself based on new production processes, technologies, and revised levels of production and consumption activity with respect to specified environmental performance standards. Adjusted aggregates such as these can help with the calculation of

Aggregate Indicator of the Change, during the Current year, in the economic Assets of the Nation (AICCAN) measures of net change in natural and produced assets of commercial value, as well as the greened GDP (gGDP) estimates for future macroeconomic and environmental performance prospects. The final part emphasises the use of environmental accounting strategies to devise policies that are in harmony with the welfare of society and that also take responsibility for external environmental costs such as transport of exports and offshore production.

Albania

Sulanjaku, M. (2013) Environmental Management Accounting and Albanian Perspectives. *Research Journal of Finance and Accounting*, 4 (18), 41-50.

http://www.iiste.org/Journals/index.php/RJFA/article/viewFile/9475/9807

Albania established its first Environmental Ministry in 2001. The Albanian government is trying to harmonise its laws with the European Union's environmental legislation. In 2002, Albania passed an environmental protection law that provides a comprehensive framework to coordinate economic and social progress with environmental protection and sustainable development. Albania's primary strategy to combat environmental degradation is to tax businesses that have adverse environmental impacts. Based on interviews with representatives of many companies, Sulanjaku found that Albanian companies did not use environmental accounting, but international companies operating in Albania did. All the participating companies expressed interest in Environmental Management Accounting (EMA), but they did not have sufficient information or experience in adopting EMA. In conclusion, both the Albanian government and private sector are interested in being more environmentally accountable, but there is still a lack of information and resources for them to proceed.

Austria

Statistics Austria: The Information Manager (2007) *Energy and Environment.* [online] Government of Austria. [Accessed 19 August 2014].

http://www.statistik.at/web_en/statistics/energy_environment/index.html

Austria currently measures energy and resource flows in the nation. The measurements align with Organisation for Co-operation and Development (OECD) and Directorate-General of the European Commission (Eurostat) standards. Statistics Austria consolidates environmental flow figures with

the data in Austria's National Accounts (e.g. GDP, production value, employment rate). Austria has been measuring its energy balance since 1970 and material flows of environmental goods since 1995. Its environmental account consists of Material Flow Accounts (MFA), Environmental Protection Expenditure Accounts (EPEA), Environment Industry (Environmental Goods and Services), Eco-Taxes (Environmentally Related Taxes), National Accounting Matrix including Environmental Accounts (NAMEA), Environmental Conditions and Behaviour, and Indicators. Statistik, Austria's statistics website, publishes this data along with many other economic and social measures on an annual basis.

Azerbaijan

UN Statistics Division (2013) *Draft Document: Experimental Ecosystem Accounting – Extended Deadline for Comment January 15, 2013*. [online] UN Statistics Division. [Accessed 15 August, 2014].

http://unstats.un.org/unsd/envaccounting/seearev/chapter.asp?volID=2&chID=1

In 2012, the UN asked countries to submit their plans for implementing the SEEA nationally. The UN then sent comments back to the countries with suggestions on how they could improve their programmes. Azerbaijan´s SEEA proposal received this comment from the UN: "In my opinion, the structure of the document, the balance of material and the coverage of the draft are satisfactory. In my opinion, the Part II of the document is also satisfactory and does not require any corrections." The feedback suggests that Azerbaijan will be on its way to using SEEA for its national accounts if it follows the proposal it submitted to the UN.

Belarus

United Nations (n.d.) *Institutional Aspects of Sustainable Development in Belarus*. [online] United Nations Sustainable Development. [Accessed 19 August 2014].

http://www.un.org/esa/agenda21/natlinfo/countr/belarus/inst.htm

The UN keeps track of each country's progress in fulfilling Agenda 21, a voluntary sustainable development action plan that resulted from the 1992 Rio UN Conference on Environment and Development (UNCED). According to these UN records, Belarus' National Commission on Sustainable Development is charged with ensuring that the country's development strategy is environmentally sound and sustainable. The UN reports that Belarus does have a green

accounting programme, but we were unable to find more information about it. Belarus also has programmes for recycling, land use planning, forest and deforestation, encouraging biological diversity, freshwater management, hazardous waste disposal, solid waste disposal, radioactive waste disposal, and energy conservation. At the time that this web page was published, probably around 1993-1995, Belarus still needed to develop sustainable development indicators.

Vegera, C. (2014) Concept of ,,green" land accounting within the context of the state-of-the-art Rent Theory. *Journal of Economics and Management*, 3, 364-374.

http://www.zneiz.pb.edu.pl/data/magazine/article/391/1.25_vegera.pdf

The Ministry of Natural Resources and Environmental Protection of the Republic of Belarus has a developed an assessment system to compensate for damage caused to the environment. This system takes into account the type of environmental damage (land pollution, water and wind erosion, land deterioration, etc.), indicators (exceeding the maximum concentration rate, reduction of fertile soil layer, etc.), and degree (low, medium, high, and very high). Belarus also has a system for measuring environmental improvement indicators. However, the author notes that there is no mature land market in Belarus and, thus, no fair market value of many land plots. The article urges Belarus to implement a land valuation method by incorporating the cost of land degradation or improvement into the sale price, just like it does when assessing the environment.

Belgium

Belgium's assessments of the country's ecosystem services valuations are in their early stages and it has not yet fully integrated them into its GDP calculations. Currently, the nation's universities are valuing ecosystem services, with reference to their ecological and economic functions, using statistical mapping and modelling. For instance, the valuation of freshwater ecosystems is now complete. The Belgium Ecosystem Services (BEES) Community, an interdisciplinary network that is open to all interested parties, is playing a pivotal role in taking the ecosystem service valuation forward in the country.

[The following document is written in Flemish.]

Jacobs S. et al. (2010) *Ecosysteemdiensten in Vlaanderen: een verkennende inventarisatie van ecosysteemdiensten en potentiële ecosysteemwinsten.* Belgium: University of Antwerp, Ecosystem Management Research Group, ECOBE 010-R127.
Sander Jacobs: sander.jacobs@ua.ac.be

http://www.vliz.be/imisdocs/publications/246814.pdf

This report describes and maps ecosystem services found in Flanders, the Flemish part of Belgium. It calls for the inclusion of ecosystem services in decision-making processes by considering the benefits gained from them; it argues for the evaluation of ecosystem services to assess the status of the environment and to promote sustainable development in the region. The report is made up of two main parts. The first explores the ecosystems that are important in Flanders and provides an inventory of their services (albeit not an exhaustive one) together with a first evaluation of the benefits that they provide to society. This part includes chapters on ecosystem services, such as water resources, estuaries, and forests, as well as an analysis of carbon stored in ecosystems, and creates a background through which the case studies in part two are tested. The second part of the report presents five case studies for the areas of Melsterbeek, Stedelijk Groen, Netebekken, Kalmthoutse Heide, and De Wijers. The authors evaluate each of these in three steps: firstly, they desrcibe the area and the preparation of an inventory of existing ecosystem services; secondly, it evaluates the effects of the measures instigated by the current project; and thirdly, it suggests additional measures that can maximise ecosystem benefits. The report closes by emphasising that the consideration of ecosystem services can counteract the onset of the tragedy of the commons.

Bosnia

UN Statistics Division (2013) ***Draft Document: Experimental Ecosystem Accounting – Extended Deadline for Comment January 15, 2013.*** **[online] UN Statistics Division. [Accessed 15 August 2014].**

http://unstats.un.org/unsd/envaccounting/seearev/chapter.asp?volID=2&chID=1

In 2012, the UN asked countries to submit their plan for implementing the SEEA framework nationally. The UN then sent comments back to these countries on how they could improve their plans. According to these UN comments, the Agency for Statistics of Bosnia and Herzegovina is in charge of introducing green accounting into its current national accounting system. As of December 2012, the Agency still has not had much experience with green accounting or the SEEA framework, except for a few questionnaires about environmental expenditure from a couple of reporting entities. The Agency is working to translate “Chapter 1: Introduction to the SEEA Central Framework” to popularise and inform the public of SEEA. It seems that much work still needs to be done, but the Agency does want to incorporate this SEEA system into its current methodology.

Bulgaria

UN Statistics Division (2013) ***Draft Document: Experimental Ecosystem Accounting – Extended Deadline for Comment January 15, 2013.*** **[online] UN Statistics Division. [Accessed 15 August 2014].**

http://www.unstats.un.org/unsd/envaccounting/seearev/chapter.asp?volID=2&chID=1

In 2012, the UN asked countries to submit their plan for implementing the SEEA framework nationally. The UN then sent comments back to these countries on how they could improve their plans. The UN gave Bulgaria's "SEEA Experimental Ecosystem Accounting (Consultation Draft)" a positive review overall but seems to have reservations about its implementation, especially because the accounting scheme is on such a large scale.

Republic of Bulgaria: National Statistical Institute (n.d.) ***Sustainable Development.*** **[online] Republic of Bulgaria. [Accessed 19 August 2014].**

http://www.nsi.bg/en/content/7265/sustainable-development

Bulgaria has made much progress with SEEA since its proposal to the UN in 2012. The national statistical website includes a sustainable development section with established indicators for monitoring national and European strategies. With regards to the environment, the country annually measures: sources of emissions, waste activities, sea water pollution, noise pollution, natural scenery endowment, expenditure on protection and restoration of the environment, tangible fixed assets with ecological use, water statistics, municipal waste income, and production of packaged goods and packaging. It is unclear how these calculations factor into national accounts such as GDP, but this does not detract from the fact that Bulgaria already has a strong system of measurements of environmental factors in place.

Nesheva-Kiosseva, N. (2009) Environmental Management and the Impact of Regulation in Bulgaria. In: ***Third International Conference of Italian Association of Social and environmental accounting,*** **Rimini, Italy, 17-19 September 2008, E-Journal "Dialogue", 3, 1-33.**

http://www.uni-svishtov.bg/dialog_old/2009/3.2009-NK.pdf

By the time of this publication, Bulgaria had adopted all of EU's and the international community's primary documents on environmental protection. In 2007, the European Commission recommended that Bulgaria modify its current accounting system to a full cost accounting system

that better monitors its environmental impacts, which it subsequently did. Bulgaria has also adopted an eco-audit system, which is a first step towards collecting data for accounting and measuring the benefits and impacts of activities in environmental management. Two of the main challenges that still exist in Bulgaria are: lack of understanding and training in green accounting and encouragement of green accounting at the firm level.

Croatia

Mošnja-Škare, L., and Gržinić, J. (2008) *Environmental Accounting in Functions of Sustainable Development of Highly Touristic Region of Istria*. Juraj Dobrila University of Pula, Department of Economics and Tourism.
Lorena Mošnja-Škare: lmosnja@efpu.hr

http://eknjiznica.unipu.hr/3492/

This paper calls for the incorporation of environmental accounting and reporting into the tourism industry in Croatia, especially in the Istria region. Upon entry to the EU, Croatia planned to adopt the Management and Audit Scheme (EMAS), which has a component that encourages companies to disclose their ecological impact. The Croatian Business Council on Sustainable Development serves as a model for the rest of the country on sustainable development, including on environmental reporting. The Council encourages private companies to incorporate green accounting. Overall, environmental reporting is mostly voluntary, fragmentary, and ad hoc in Croatia, with green reporting in Istria still in its infancy at the time of the report's publication.

Cyprus

Financial Mirror (2014) *Cyprus promotes environmental tax reform to help fiscal consolidation.* [online newspaper] 6 June.

http://financialmirror.com/news-details.php?nid=32669

Cyprus' Ministry of Agriculture's new strategy for green growth includes institutional, social, and economic measures that will include the activities of many sectors, including agriculture, industry, tourism, fisheries, water, mineral resources, and forests. Currently, Cyprus' environmental policies vary across municipalities. The Chairman of the Council of National Economy of Cyprus, Christopher Pissarides, urges for a single national environmental policy. While the country still lacks a comprehensive and systematic system of environmental accounts, the Cypriot government

is taking preliminary steps to account for environmental factors in its national assessments.

Czech Republic

Hönigová I. et al. (2012) *Survey on grassland ecosystem services. Report to the EEA – European Topic Centre on Biological Diversity*. Prague: Nature Conservation Agency of the Czech Republic.
Iva Hönigová I: Iva.Honigova@nature.cz

http://www.teebweb.org/wp-content/uploads/2013/01/Survey-on-grassland-ES_2011_final-report_ISBN.pdf

This report is an extension of a 2010 pilot study carried out as part of the Millennium Ecosystem Assessment (MEA), which involved mapping and analysing the ecosystem services of the Czech Republic's grasslands. The report is divided into six chapters. The first introduces the report. The second reviews the ecosystem services provided by grasslands: provision services such as food products; regulating services such as the prevention of soil erosion; habitat services; and cultural services such as tourism opportunities. Chapter three presents a quantitative analysis of each of the ecosystem services assessed in the report—livestock provision, carbon sequestration, soil erosion regulation, water flow regulation, invasion resistance, recreation, and waste treatment i.e. nitrogen removal—providing a figure that quantifies the extent of each service together with an estimate of its economic value. Chapter four briefly discusses the importance of grasslands for biodiversity in the Czech Republic. Chapter five presents a comprehensive literature review of the effects of different land uses and management schemes on grasslands, finding that the economic value of grassland ecosystem services is declining due to changing land usage. The final chapter draws conclusions, one of which is that more detailed quantification of grassland ecosystem services is required before this knowledge can be considered in decision-making processes.

Kolar, J., and O'Connor, M. (2004) Natural resources and environmental accounting in the Czech Republic: an overview of methodology and results. *International Journal of Environment and Pollution*, 15 (6), 589-616.
Martin O'Connor: martin.oconnor@c3ed.uvsq.fr

http://www.environmental-expert.com/articles/natural-resources-and-environmental-accounting-in-the-czech-republic-an-overview-of-methodology-and--81505

This paper describes the main features of the study "Natural Resources and Environmental Accounting in the Czech Republic" (NREACR) (1998-9). It specifies five major methodological areas

were specified: NAMEA-type accounting, land cover/land use accounting, abatement cost curves (air – energy, transport, and industry; and water – agriculture, industry, and housing), economic appraisal of natural assets, and dynamic modelling and scenario development. The results from the first four modules can be used as inputs for modelling national economy scenarios. This allows for the exploration of the opportumities and constraints of setting and evaluating economic and environmental policies in the Czech Republic. After providing an overview of the modular approach adopted for environmental accounting and the main result obtained by such an approach, the paper discusses the outlook for further work.

Denmark

[The following document is written in Danish.]

Danmarks Statistik (2013) ***Grønne nationalregnskaber og det grønne BNP: metoder og muligheder.*** **Copenhagen: Danmarks Statistik.**
Ole Gravgård: OGP@dst.dk

www.dst.dk/publ/GrønNatBNP

This official document by Statistics Denmark provides a comprehensive background and context for the official green national accounting efforts in Denmark. Statistics Denmark is working in close collaboration with Eurostat to develop standardised green accounts using the SEEA methodology. The country has already calculated some parts of these accounts, such as energy accounts, greenhouse gas emissions, air pollution, and environmental taxes. It intends to implement others within the next few years, for example, water, forests, fish, land, solid waste, and environmental protection. The document includes examples of the kinds of analyses that can be carried out with the information in the green national accounts. For example, Figure 6.4 shows that the increase in CO_2 emissions from 1990 to 2005 is due exclusively to increases in exports, and Figure 6.5 shows the corresponding increasing difference between the consumption-based and production-based emissions calculations. The document ends with a discussion of the pros and cons of calculating a “Green GDP” for Denmark.

Estonia

Mertsina, T. (2009) ***Quarterly National Accounts Inventory*****. Estonia: Statistics Estonia.**
Tonu Mertsina**:** tonu.mertsina@stat.ee

https://www.stat.ee/dokumendid/37409

Statistics Estonia is the government body charged with collecting and calculating the official statistics of Estonia, with some support from the Bank of Estonia. Statistics Estonia is part of the statistical system in Europe and contributes to the development of international statistics. It is comprised of five departments: National, Financial and Environment Accounts Department, Price and Wages Statistics Department, Enterprise Statistics Department, Agricultural Statistics Department and Population, and Social Statistics Department. Statistics Estonia compiles national, financial, and environment accounts.

Finland

Kolttola, L. (2013) Implementation of environmental accounts. In: *XIV April international academic conference on economic and social development.* [powerpoint presentation] Moscow: Statistics Finland.
Leo Kolttola: leo.kolttola@stat.fi

https://view.officeapps.live.com/op/view.aspx?src=http%3A%2F%2Fwww.hse.ru%2Fdata%2F2013%2F04%2F11%2F1297422286%2FImplementation%2520of%2520SEEA.pptx

This Statistics Finland presentation outlines origins and framework of environmental accounts in the country. It explains the organisational structure and the advisory group for the accounts: how the accounts are used and how certain accounts correspond to the SEEA framework and to EU regulations. It summarises Finland's current environmental and energy statistics. It also describes the National Greenhouse Gas Inventory and the integrated data system used by Statistics Finland, as well as projects and modules currently in development.

Kolttola, L. (2011) Organisation of Environmental Accounting in Finland. Paper presented at the *Sixth Meeting of the UN Committee of Experts on Environmental-Economic Accounting,* New York, 15-17 June. New York: Department of Economic and Social Affairs, UN Statistics Division.
Leo Kolttola: leo.kolttola@stat.fi

http://unstats.un.org/unsd/envaccounting/ceea/meetings/UNCEEA-6-26.pdf

This paper outlines the organisation of green accounting in Finland under Statistics Finland, the national statistics agency. Statistics Finland coordinates and reports national energy statistics, environmental statistics, environmental accounts, greenhouse gas inventory and national

accounts. It emphasises the need for consistency of its own statistics in order to ensure comparability and usefulness. Environmental accounts contain environmental expenditures of the public and private sector, as well as types of environmental taxes. The author emphasises that increased coordination is needed to improve statistical quality. This short paper outlines the different frameworks and developments that led to the current organisation of Statistics Finland. It identifies forthcoming programmes, such as those in response to new EU environmental regulations, which include a new module for economy-wide material flow accounts. Pilot programmes on new types of accounts are continuously being developed (e.g. air emissions accounts and water accounts), as Statistics Finland expands the scope of its green accounting.

France

INTOSAI (2010) *Environmental Accounting: Current Status and Options for SAIs*. Washington DC: International Organization of Supreme Audit Institutions (INTOSAI).

http://www.environmental-auditing.org/LinkClick.aspx?fileticket=s%2FFCvUzSK-sk%3D&tabid=128&mid=568

This summary is for the France case study only. For an overview of the entire report, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Australia, Botswana, Canada, China, Colombia, Germany, Mexico, Namibia, the Netherlands, the Philippines, and Sweden, which can be found under their respective country sections.

France was a pioneer in several areas of environmental accounting, starting environmental accounts in the 1980s. It was one of the first countries to use an IEEA for Forests. Environmental accounts from 1997 have been used to determine that environmental services contributed 2.3% to France's GDP in that year. In 2006, France began constructing an account of water inventories using the European System for the Collection of Economic Information on the Environment (SERIEE), one of the major updates to the 2003 SEEA.

Georgia

According to an April 18, 2013 announcement on the TEEB website, Georgia was set to carry out its green accounting scoping study—focusing on energy, forestry, agriculture, mining, and tourism accounts—with the launch date set for later in the year. TEEB published the study for Georgia in September 2013:

http://www.teebweb.org/publication/teeb-scoping-study-for-georgia-main-findings-and-way-forward/

Allebone-Webb, S. et al. (2013) *The Globe Natural Legislation Study. A Review of Efforts*. London: The Global Legislators' Organisation.
Sophie Allebone-Webb: sallebonewebb@wcs.org

http://www.globeinternational.org/images/natural-capital-study/GLOBE-Natural-Capital-Legislation-Study.pdf

This summary is for the Georgia case study only. For an overview of the entire study, please see the Multi-Country Reports and Projects section of this book. The study also includes country case studies for Botswana, Colombia, Costa Rica, Germany, Peru, the Philippines, and the United Kingdom, which can be found under their respective country sections.

Georgia relies heavily on ecosystem services for hydropower, industry, agriculture, tourism, mining, and other sectors. Currently, hydropower is the main source of electricity in the country, although in rural areas wood energy is widely used for cooking and heating. Georgia's ecosystems are at risk due to deforestation and pollution. In particular, the utilities sector has caused a considerable amount of water pollution since the Soviet area. Environmental accounting exists in an extremely limited form in Georgia, with the Ministry of Environment and Natural Resources and the National Statistics Office being the agencies primarily involved in environmental accounting, although no organisation or individuals are officially tasked with environmental evaluation. They provide some physical data, but they are yet to attempt a systematic monetary valuation. However, this is changing. The Georgian Government has collaborated with the United Nations Development Programme (UNDP) and the World Wildlife Fund (WWF) to produce two reports addressing the valuation of natural resources and their possible contribution to the Georgian living standard. Since the accounting of environmental services is not yet developed, legislation relating to its use to inform policy does not yet exist.

Germany

Amelang S. (2015) Balancing the books: Germany's "green energy account". *Clean Energy Wire Factsheet*. 12 February.
Direct queries to: info@cleanenergywire.org

https://www.cleanenergywire.org/factsheets/balancing-books-germanys-green-energy-account

This factsheet describes the system of Germany's "green energy account". The system comprises of power-grid operators who are obliged to buy green electricity from renewable energy producers at a fixed price (the "feed-in tariffs"). The operators then resell this electricity on the power exchange at current market rates, which are usually much lower than the feed-in tariffs. The difference in price is covered by charging consumers a surcharge. These factors are then inserted into a national green energy account that is provided each month by grid operators. On the income side, it includes the income from reselling green electricity on the power exchange, plus the surcharge paid by consumers. In the long term, this income balances out the expenses side, which comprises the feed-in tariffs paid by grid operators to the green energy producers. Specifically, in 2014, the total income was €24.6 billion ($27 billion) versus €21.5 billion (€23.6 billion) of expenses. The surplus of roughly €3 billion ($3.3 billion) enabled Germany to reduce its electricity levy for the first time since its introduction.

Allebone-Webb, S. et al. (2013) ***The Globe Natural Legislation Study. A Review of Efforts.*** **London: The Global Legislators' Organisation.**
Sophie Allebone-Webb: sallebonewebb@wcs.org

http://www.globeinternational.org/images/natural-capital-study/GLOBE-Natural-Capital-Legislation-Study.pdf

This summary is for the Germany case study only. For an overview of the entire study, please see the Multi-Country Reports and Projects section of this book. The study also includes country case studies for Botswana, Colombia, Costa Rica, Georgia, Peru, the Philippines, and the United Kingdom, which can be found under their respective country sections.

Whether or not the state of the German environment is improving is a matter of controversy. According to the Inclusive Wealth Report, the rate of natural capital depletion was approximately 0.47% of Gross National Income (GNI) between 1990 and 2008. However, a separate study by the World Bank determined that between 1995 and 2005 there was actually a 1% *increase* in natural capital. The World Bank report noted improvements in air quality, water quality, and land quality, but a loss in biodiversity. While Germany's economy is no longer harming ecosystems on a net basis but climate change may cause damage to German ecosystems to an estimated value of €800 billion ($1 billion), with particular risks from crop and flood damage. A number of government agencies are involved in the assessment of natural capital, including a section of the National Statistics Office dedicated to the task. Since the 1990s, the Statistics Office has developed environmental accounts made up of physical stocks and flows, and monetary valuations thereof, mostly based on the UN SEEA. They are explicitly used in policy formulation, which has been

realised in part through a National Strategy for Sustainable Development, first promulgated in 2002. It included indicators for 21 topics with 38 targets and has assisted Germany in restoring wetlands, forests, and fisheries.

Leukhardt, F. and Allen, S. (2013) How environmentally focused is the German sustainability strategy? A critical discussion of the indicators used to measure sustainable development in Germany. *Environment, Development, and Sustainability,* 15 (1), 149-156.
Falko Leukhardt: falko.leukhardt@ed-alumni.ne

http://link.springer.com.proxy.library.emory.edu/article/10.1007/s10668-012-9380-6

This articles takes a critical look at Germany's sustainable development strategy, focusing specifically on the indicators the country uses to measure its progress. The paper begins with a thorough examination of the historical development of the concept of sustainable development and its application. It then outlines Germany's strategy for sustainable development, which focuses on intergenerational equity, quality of life, social cohesion, and international responsibility. These foci comprise 21 different areas with 36 individual sustainable development indicators (SDIs). The German Federal Statistics Office (FSO) is responsible for collecting and reporting on the SDI every two years. The authors briefly discuss each indicator in order to assess just how environmentally-oriented they are. The authors conclude that the environmental dimension is insufficiently integrated in the German National Sustainable Development Strategy.

Statistisches Bundesamt (2012) *Nachhaltige Entwicklung in Deutschland: Indikatorenbericht 2012.* Wiesbaden: Statistics Bundesamt.

https://www.destatis.de/DE/Publikationen/Thematisch/UmweltoekonomischeGesamtrechnungen/Umweltindikatoren/Indikatoren.html

NB: An English language summary can be accessed here:

https://www.destatis.de/EN/Publications/Specialized/EnvironmentalEconomicAccounting/EnvironmentalEconomicAccounting.html

This sustainability report is a summary of German environmental-economic accounting. It looks at various sectors—e.g. energy production and consumption, renewable energies, biodiversity, agriculture, air quality—and discusses the country's past and future goals and how likely it is to meet them. It links economic phenomena with natural occurrences, such as the 4.6% increase in

energy consumption in 2010 due to a colder winter than in previous years. The report also includes statistics on debt, research funding, education, equality, crime, employment, and the economy's ability to develop in a way that is compatible with the environment and society, amongst other data. It puts environmental and economic accounts side by side to show how relevant they are to one another. The report concludes by summarising all points in a final diagram that indicates which sectors need the most attention.

INTOSAI (2010) *Environmental Accounting: Current Status and Options for SAIs.* Washington DC: International Organization of Supreme Audit Institutions (INTOSAI).

http://www.environmental-auditing.org/LinkClick.aspx?fileticket=s%2FFCvUzSK-sk%3D&tabid=128&mid=568

This summary is for the Germany case study only. For an overview of the entire report, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Australia, Botswana, Canada, China, Colombia, France, Mexico, Namibia, the Netherlands, the Philippines, and Sweden, which can be found under their respective country sections.

Like France, Germany began using environmental accounting in the 1980s. Its accounts are based on the SEEA and are integrated into the system of national accounts. Particularly strong are its material and energy flow accounts but it has also developed indicators for emissions, land use, water, environmental expenditure, and environment-related taxes. The accounts have been used for a number of purposes including a study of the energy use and emission intensity of export markets.

Schoer, K. (2005) Sustainable Development Strategy and Environmental-Economic Accounting in Germany. Paper presented at the *Conference on Environmental Accounting and Sustainable Development Indicators,* Prague, 23-25 May. Wiesbaden: Federal Statistics Office Germany.
Karl Schoer: karl.schoer@destatis.de

https://www.destatis.de/EN/Publications/Specialized/EnvironmentalEconomicAccounting/SustainableDevelopmentGermany.pdf?__blob=publicationFile

This report showcases statistics obtained by the Federal Statistical Office pertaining to the contribution of nature as a factor of production in economic activity. The first section analyses productivity (GDP per unit of input factor) and consumption figures for the following environmental input factors: energy, raw materials, water, and area. It compares them to quantitative targets

set by the Sustainability Strategy drafted by the Federal Government in 2002. Trends indicated efficiency improvements across all the factors analysed between 1991 and 2001; for example, energy productivity increased by an annual average of 1.8%, requiring a 2.7% increase per year from 2001 to achieve targeted levels by 2020. In contrast, the average annual increase in area productivity (built-up and traffic area) was relatively low (0.6%). Productivity increases for each environmental factor were greater than the increase in GDP (an average of 1.5% per year) achieved between 1991 and 2001, indicating a decoupling between economic growth and environmental degradation. The second section details a decomposition analysis of total CO_2 emission and energy use by homogenous branches of production and private households, including both direct and indirect CO_2 emissions. The report concludes with a summary of the objectives, subject structure, and methodological concept of German Environmental Economic Accounting (EEA); it highlights the importance of natural capital statistics in incorporating greater resource efficiency and sustainability in policy and decision-making processes.

Höh, H. et al. (2002) Eco-efficiency Indicators in German Environmental Economic Accounting. ***Statistical Journal of the United Nations Economic Commission for Europe,*** **19 (1-2), 41-52.**
Karl Schoer: karl.schoer@destatis.de

http://content.iospress.com/articles/statistical-journal-of-the-united-nations-economic-commission-for-europe/sju00516

In German Environmental Economic Accounting (EEA) productivity indicators are used to measure eco-efficiency at the national level. This article describes how EEA defines productivities and which natural input factors it coveres. These inputs are divided into two groups: the supply of natural resources and the ecosystem services provided by nature to act as a sink for pollutants. The paper finds that from 1991 to 1998 the total material input of the German economy fell by 19%. In the same time period, direct CO_2 emissions decreased by 9.3%. In order to provide information on the extent to which German economy has met the goal of sustainability, the report defines targets for CO_2 emissions, energy productivity, raw material productivity, and area use. After comparing the actual measurements with the target values, the paper finds that there is a considerable discrepancy between the two, concluding that progress in sustainability needs to be accelerated.

Greece

Fousekis, P. and Lekakis, J. (1997) Greece's Institutional response to sustainable development. ***Environmental Politics*****, 6 (1), 131-152.**

Panos Fousekis: P.Fousekis@massey.ac.nz

http://dx.doi.org/10.1080/09644019708414314

The article observes that although Greece was a signatory of the 1992 Rio Convention, it has not yet produced any national plan on sustainable development. The article measures Greece's commitment to sustainable development by looking at several policy commitment mechanisms: policy coordination, targets, the integration of environmental considerations into sector plans, structures of accountability, green accounting, information and public participation, and awareness raising. Under Greece's current accounting system, the environment does not constitute a separate category and, at the time of report publication, Greece did not have plans to establish a national green accounting system. However, Greece has taken several other steps to measure its environmental impact: completing a national network to monitor air and water quality, extending the national network of environmental information to all 13 regions of the country, and devising a national cadastral. The article concludes that Greece's response to sustainable development has been limited overall, facing strategic, structural, and procedural impediments.

Hungary

Tóth, R. et al. (2012) Adoption of NAMEA Air Emission Accounts in Hungary. *Forum Geographic*, 11 (1), 11-18.

Roland Toth: roland.toth@ksh.hu

http://forumgeografic.ro/wp-content/uploads/2012/1/Toth.pdf

Hungary has adopted Eurostat's National Accounting Matrix and Environmental Accounts (NAMEA) as its green accounting methodology. NAMEA is a useful system because it links economic indicators with environmental material flows. In this article, the authors report the measurements that the Hungarian Central Statistical Office's air emissions measurement for the period of 2000 to 2009. Specifically, the Office measured greenhouse gases (GHGs), acidifying substances, ozone precursors, and the environmental-economic profile of main industries. Implementing NAMEA has given Hungary experience in measuring environmental factors, which will help it to expand these measurements to other environmental areas as well.

Ván, H. (2012) Environmental Accounting – A New Challenge for the Accounting System. *Focus on Accounting,* 4, 437-452.

Hajnalka Van: Van.Hajnalka@eco.u.szeged.hu

https://ideas.repec.org/a/pfq/journl/v57y2012i4p437-452.html

This article examines Hungary's accounting requirements on the private sector. Hungary's Accounting Act (Act C. of 2000) has no separate regulations for environmental accounting; indeed, there is little mention of environmental activity in the Act. It mentioned environmental accounting only with regards to material costs and some future impacts of activities on the environment. There are no obligations on private firms to report their environmental activities. Thus, environmental accounting in Hungary's private sector is voluntary and developing slowly.

Iceland

Stefánsdóttir, B. (2011) *Developing the Icelandic Genuine Progress Indicator: Accounting for the Use of Renewable Energy Sources when Estimating Icelandic GPI*. Lund University.
Birgitta Stefánsdóttir: birgitta@environice.is

http://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=2759819&fileOId=2759824

This paper looks at the possibility of developing a Genuine Progress Indicator (GPI) for Iceland that includes renewable energy. The GPI is different from GDP calculations because although both tend to increase together, after a certain point, GPI either stagnates or decreases because the pressure of production and consumption starts taking a toll on social and natural capital. GPI is equal to adjusted consumption, plus capital, plus human capital, minus military expenditure, minus social capital, minus environmental degradation, and minus natural capital. Most countries that use GPIs do not include renewable energy. However, because Iceland relies heavily on renewable energy, it will need to figure out a way to incorporate renewable energy if it were to start using the GPI. The article entertains four methods of how this could be achieved: the replacement cost, the El Serafy, the net price, and the Hotelling rent methods. The article concludes that the best method would be the El Serafy method, which subtracts the use of non-renewable energy from the revenue received to give a true income.

Hecht, J. (2007) National Environmental Accounting: A Practical Introduction. *International Review of Environmental and Resource Economics*, 1 (1), 3-66.
Joy Hecht: jhecht@alum.mit.edu

http://www.nowpublishers.com/article/Details/IRERE-0001

This article seeks to explain the SEEA methodology and reviews the implementation and

challenges of implementing SEEA in many developed and developing countries. There are three broad areas of environmental accounting: monetary or physical flows related to the environment, natural resource assets, and macroeconomic indicators. Iceland's case is used to illustrate how one country has chosen to calculate one aspect of its natural resource asset accounts, namely, fisheries accounts. Iceland uses a combination of two methods. The first method is based on the sale of fishing quotas called Individual Transferable Share Quota (ITSQ). The ITSQ specifies the share of the total annual quota for each species that a vessel may catch. The fishermen can sell both the shares and the quota and Iceland uses the values of shares and quota to value its fish stocks. However, this method showed a higher value of fish than was reflected in the fish stocks or the profitability of the industry. To correct for this distorted value, Iceland chose to use the net present value of fish, the second method, to value its fisheries. With these two methodologies, Iceland has contributed to developing mechanisms for valuing fish stocks.

Ireland

Lyons, S. et al. (2008) Environmental Accounts for the Republic of Ireland: 1990 – 2005. *Journal of The Statistical and Social Inquiry Society of Ireland*, 37, 190-213.
Karen Mayor: karen.mayor@esri.ir

http://www.esri.ie/UserFiles/publications/20080312111902/WP223.pdf

This paper amends previous environmental accounts for Ireland for the period 1990 to 2005 in order to make them more comprehensive, with the goal to forecast environmental emissions and resource use until 2030. New environmental accounts were necessary because the previous accounts established by the Central Statistics Office (CSO) of Ireland were limited in scope. The new accounts cover the expanded period 1990 to 2005 and cover more emissions and resource use. They are consistent with the SEEA, but the authors note they still only cover a small fraction of the full environmental accounts due to the lack of availability of certain reliable data in Ireland. Data on emissions, water, toxic chemicals, and heavy metals, for instance, are mostly absent and the report faces other constraints. Even with these limitations, though, the new environmental accounts for Ireland help to identify past trends in economic activity, pollution, and energy use of different sectors in order to establish a basis for projecting future emissions and energy use. The authors note a significant increase in carbon dioxide emissions over the period. There was also a notable increase in energy use, accompanied by a shift away from coal and peat to oil and gas. Other emissions have stayed constant or have fallen. The authors conclude by noting that due to certain omissions and the scarcity of certain data on environmental damages and natural resources, the new accounts do not allow for the estimation of the green net national product.

Italy

Constantino, C., et al. (2004) Integrated Environmental and Economic Accounting in Italy. In: *OECD, Measuring Sustainable Development: Integrated Economic, Environmental and Social Frameworks*, OECD Publishing, Paris.
Cesare Costantino: cecostan@istat.it

http://www.oecd-ilibrary.org/environment/measuring-sustainable-development/integrated-environmental-and-economic-accounting-in-italy_9789264020139-15-en

The paper introduces the first Italian strategy for sustainable development, the "Environmental action strategy for sustainable development in Italy" (EASSDI), issued by the Ministry of Environment and adopted by the Inter-Ministerial Committee for Economic Planning in 2002. It also discusses an environmental accounting bill (EAB) that the Italian Parliament was considering at the time of research (2003); the bill has remained under discussion since. The aim is for the government to adopt policies concerning ecological sustainability and link them to usual economic planning processes. The authors discuss the structure of the EAB, its main objectives, and the role it gives to environmental accounting frameworks. It also mentions the approach followed by the Italian National Institute for Statistics (Istat) to identify accounting frameworks to measure ecologically sustainable development. This approach involves documents concerning the ecological sustainability of development (DESDs). DESDs are environmental-economic planning tools that include information and targets for environmentally sustainable development. They also include environmental information apparatuses, such as environmental accounts, which local governments can approve on a regular basis to support the elaboration of the DESDs. Finally, the paper uses the example of the tourism sector to illustrate the methodology of identifying environmental pressures related to different types of activities within a particular sector, especially additional pressures that are not ordinarily accounted for. Thus, the authors conclude, an environmental accounting framework can stimulate better use of available data for policymaking from the perspective of sustainable development.

Latvia

Central Statistical Bureau of Latvia (2007) *Integrated Environmental and Economic Accounting for Forests (IEEAF). Final Report*. Latvia: Central Statistical Bureau of Latvia.

https://circabc.europa.eu/sd/d/0df6b36d-dc00-43ab-84d91dc554dd7b61/Forest%20accounts%20Latvia.pdf

Forests cover almost half of Latvia's territory and this area continues to grow. The country recognises forests as essential for rural development by providing livelihoods and income for many people. They are also important for biodiversity, the global carbon cycle, the Latvian landscape, the protection of cultural and historical sites, and human health. Consequently, the sustainable management of forest resources, as governed by the 2000 Forest Law (FL), is an essential part of sustainable development in Latvia. The main body of the report contains economic and stock accounts for forest and forest products, detailing forest coverage for different tree species, stock and economic accounts of forest products (data are available for tree/timber products, but none for related products such as animals and recreational services), and data on the use and wastage of forest products. Overall, the report demonstrates that Latvia is well on track to developing a comprehensive set of forest accounts.

Liechtenstein

EIG (2014) *EIG's Views on the Elements of the 2015 Agreement.* UNFCC.

https://unfccc.int/files/documentation/submissions_from_parties/adp/application/pdf/adp2-5_submission_by_eig_20140605.pdf

Lichtenstein is part of the Environmental Integrity Group (EIG)—a coalition in the global climate change negotiations—along with Mexico, Monaco, the Republic of Korea, and Switzerland. This document is a response and list of expectations from the group to Conference of the Parties to the United Nations Framework Convention on Climate Change (COP) 21 that took place in Lima in December 2014. Some of the expectations include binding agreements between participants and standardised accounting approaches that include land and emissions calculations. It is unclear whether Lichtenstein has implemented these requests, but it is eager to follow the recommendations in this document if other participant countries agree to do the same.

Lithuania

Dagiliene, L. and Mykolaitiene, V. (2010) Public Sector Environmental Accounting: The Example of Lithuanian Mineral Resources. *Economics and Management*, 17 (2), 425-432.
Lina Dagilienė: lina.dagiliene@ktu.lt

http://dx.doi.org/10.5755/j01.em.17.2.2162

The article looks at environmental accounting in Lithuania's public sector, specifically its assessment

of mineral resources. According to a 2007 study, mineral resources make up 30.5% of Lithuania's national wealth. Lithuania has no business accounting standards; the term "mineral resource" is found only in the Standards of Public Sector and Financial Accountability. The 16th Standard of Public Sector and Financial Accountability, "Biological Property and Mineral Resources", regulates the accounting of mineral resources. A study done between 2001 and 2010 shows that there has been an increase in the extraction of mineral resources in Lithuania. The article urges the use of present value for accounting mineral resources because it allows for the assessment of the total future taxes on extracted resources. The report concludes that because the tax rate for public mineral resources has been increasing since 2012, this shows that the value of, and demand for, mineral resources in Lithuania are increasing.

Luxembourg

Rugani, B. et al. (2013) *Ecological deficit and use of natural capital in Luxembourg from 1995 to 2009.* [Published online ahead of print]. The Science of the Total Environment.
Benedetto Rugani: benedetto.rugani@tudor.lu

http://www.ncbi.nlm.nih.gov/pubmed/24036220

This study determines the use of natural capital (NC) in Luxembourg, a small region with a highly developed economy, and estimates its ecological deficit (ED). The researchers calculate the ecological footprint (EF) and solar energy demand (SED) of Luxembourg's consumption over a 15 year timeframe (1995-2001) using hybrid input-output models. They estimate the bio-capacity and natural capital of the country over the same time period and the ecological deficit and natural use of capital. They find that natural capital is directly and indirectly overused by a factor of 23, estimating that 9 additional Luxembourg states would be needed to satisfy current land consumption and to balance the impact of the ecological footprint. The SED and EF have not increased substantially over time, so it is likely that current consumption patterns in the Luxembourg economy will not necessarily further deteriorate regional natural capital and bio-capacity. Finally, the authors discuss the added value and technical limitations of the modelling and methodological framework, proposing a road map to improve Luxembourg's environmental accounting for natural capital and bio-capacity.

Malta

Malta National Statistics Office (2013) *Annual Report 2012*. Lascaris: National Statistics Office.

https://www.google.com.bo/l?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CBwQFjAA&url=https%3A%2F%2Fnso.gov.mt%2Fen%2Fnso%2FAbout_NSO%2FDocuments%2FAnnual_Reports%2FAnnualReport2012.pdf&ei=1JhkVYeoComrgwT0i4D4Dg&usg=AFQjCNFLtxdtDRaqBj4y37Q50nc83rOo-Q&bvm=bv.93990622,d.eXY

Malta's National Statistics Office reports the status of its national accounts every year. It follows the European System of National and Regional Accounts (ESA95). It reports in four main domains: economic statistics, business statistics, social statistics and information society, and resources and support services. Under business statistics, it measures agricultural and fisheries statistics, and environment and resources. It has been collecting agriculture statistics, which include land use, livestock, agricultural labour force, produce, and machinery, since 2010. The main measures of environmental resources comprise of water, land, energy, air emissions, waste, environmental accounting and taxes, and sustainable development indicators. Eurostat provides Malta with technical and financial assistance for improving its measurement capability. Overall, Malta has a strong green accounting system in place.

Moldova

Statistics Denmark (2005) Republic of Moldova. In: *Ninth Meeting of the London Group on Environmental Accounting*, Copenhagen, 22-24 September 2004: Statistics Denmark, 44-46.

http://www.dst.dk/pukora/epub/upload/9250/ninth.pdf

Moldova has compiled water accounts for the years 1994, 1998, 2000, and 2002. In 1998, during a pilot study on water accounts, it was clear that one of the limiting factors to the accounting of water was the absence of an informatics database. Thus, in 2000, Moldova attempted to create a national database. Moldova then implemented an annual, mandatory questionnaire on water usage to all water suppliers and users. The Water Data Centre is now charged with overseeing Moldova's national water account.

Monaco

EIG (2014) *EIG's Views on the Elements of the 2015 Agreement.* UNFCC.

https://unfccc.int/files/documentation/submissions_from_parties/adp/application/pdf/adp2-5_submission_by_eig_20140605.pdf

Monaco, like Lichtenstein, is part of the Environmental Integrity Group (EIG)—a coalition in the global climate change negotiations—along with Mexico, the Republic of Korea, and Switzerland. This document is a response and list of expectations from the EIG group to COP 21 that took place in Lima in December 2014. Some of the expectations include binding agreements between participants and standardised accounting approaches that include land and emissions calculations. It is unclear whether Monaco has implemented these requests, but it is eager to follow the recommendations in this document if other participant countries agree to do the same.

Montenegro

Statistical Office of Montenegro (2014) *National Accounts. Government of Montenegro.* [online] Statistical Office of Montenegro. [Accessed 21 August 2014].

http://www.monstat.org/eng/page.php?id=17&pageid=17

Montenegro's statistical branch is the Statistical Office of Montenegro (MONSTAT). It uses the System of National Accounts 1993 (SNA 1993), which is consistent with the European System of National Accounts 1995 (ESA 1995). MONSTAT calculates national accounts and posts them in its website on quarterly and annual bases, depending on the indicator. The Department of Agriculture Statistics collects statistics on agriculture and fishing and it carried out general censuses on agriculture in 1931, 1960, and 2010. Annual surveys collect sub-national data on agriculture. The agriculture, forestry, and environment section collects statistics on forestry and environment. The forestry statistics sub-section has developed a methodology to provide comprehensive forestry data on, including information on produced forests, changes in forest areas, usage and damage of state and private forest; building, roads, and machinery in forests; and hunting (obtained from hunting associations). The environment statistics sub-section collects data on: water used and waste water in industries; water volume used in irrigation systems; supply of drinking water; discharged water volume; water treatment and sewage system; and municipal and industrial waste. MONSTAT strives to harmonise international standards with its national environmental accounting.

The Netherlands

The Netherlands' experience of developing environmental indicators began in 1990 when the government published the first set in 1991. While it typically does not incorporate natural capital use into its GDP calculations, the country's statistics bureau, Statistics Netherlands, has attempted adjustments based on mineral resource depletion. The INTOSAI working group estimates that

unless the Netherlands develops environmentally sound technologies, it risks a 56% reduction in future national income.

Remme R. et al. (2015) Monetary accounting of ecosystem services: A test case for Limburg province, the Netherlands. *Ecological Economics*, 112, 116-128.
Roy Remme: roy.remme@wur.nl

http://www.sciencedirect.com/science/article/pii/S0921800915000622

In this work the authors pilot monetary ecosystem accounting in a case study in the Limburg province of the Netherlands, developing accounts that specify the values generated by seven different ecosystem services. They find that crop production, nature tourism, and fodder production generated the highest value ecosystem services. The paper is structured in five parts. The introduction describes the SEEA Experimental Ecosystem Accounting (EEA) guidelines and the SNA. The second section describes the case study and the models and methods used in the rest of the work. Section three presents the results, showing the monetary values per hectare, per municipality, and per land cover type for the following ecosystem services: crop production, fodder production, drinking water extraction, air quality regulation, carbon sequestration, nature tourism, and hunting. Section four discusses the limitations of the methodology and implications for policymaking. The final section contains a summary and conclusions.

Hanemaaijer, A. et al. (2013) *Conditions For Greening The Dutch Economy: Policy Conditions.* The Hague: PBL Netherlands Environmental Assessment Agency.
Aldert Hanemaaijer: mailto:aldert.hanemaaijer@pbl.nl

http://www.pbl.nl/sites/default/files/cms/publicaties/PBL_2013_Conditions-for-greening_1037.pdf

This report by the Netherlands Environmental Assessment Agency (PBL) outlines the necessary steps for the Netherlands to establish a policy environment that encourages green growth through collaboration between the government, businesses, and the public, specifically through improved environmental pricing, fostering innovation, and behavioural incentives. The first part outlines the importance of greening globally and the second part outlines the importance of greening for the Netherlands specifically. In order to safeguard prosperity and natural capital in the long term, the Dutch economy must become more efficient and properly account for environmental costs in everyday life through “green growth”. The authors outline the risks of a failure to act, as well as the massive benefits green growth will have on the economy, competitiveness, and living

standards. There is a trade-off between short-term investments and long-term payoffs to this necessary action, which requires government action and public dialogue over the broader goals of greener growth. The paper's third part identifies the conditions necessary for greening, namely improvements to environmental pricing, the use of taxes as incentives for environmentally friendly behaviours, the elimination of "environmentally harmful subsidies", and dynamic regulation. The authors argue that conditions must be improved to encourage innovation, specifically by ensuring a stable policy environment, a stronger patents system, sufficient public and private investment in research and development, as well as increased collaboration. Ultimately, prices must factor in pollution and depletion of the country's natural capital, and the government must establish green growth as its long-term objective. The paper stresses that while the government should set the goals, it cannot impose green growth from the top down, but must create the necessary conditions for companies and other actors to reach the goals through trial and error. The authors also outline the importance and difficulty of measuring progress. They argue that a limited set of absolute and relative indicators would be best to measure green growth in the Netherlands and globally.

Statistics Netherland (2012) ***Environmental accounts of the Netherlands 2011.*** **The Hague: Statistics Netherland.**

http://www.cbs.nl/NR/rdonlyres/3F5F2C12-CB59-4C59-AE1A-FD46AF6D4DAD/0/2011c174pub.pdf

This report presents a broad quantitative overview of the most important recent developments in the relationship between the environment and the Dutch economy. The report begins with an overview of the SEEA and explains the adaptation of the SEEA concepts and definitions for use in the Dutch environmental accounts. The following sub-sections explain the term "green growth" in the context of The Netherlands and present all the accounts for which Statistics Netherlands produces data: water, solid waste, greenhouse gas (GHG) emissions and air pollution, policy instruments, and economic opportunities. The latter presents the taxes and subsidies in place in the country and gives detailed accounts of environmental protection expenditure and the value of environmental services. The report finds that: while the Dutch economy grew by 1% from 2011 to 2012, it has seen a strong 6% decrease in energy use and 5.6% decrease in GHG emissions; that government expenditure on climate change mitigation and flood control has increased from €2.5 billion in 2007 to almost €3.3 billion in 2010; and that two thirds of the nation's citizen live in areas of poor water quality, among other findings. While the report does not calculate a green GDP, it does adjust the accounts downwards between 0.7% and 2.1% for all considered years (1990, 1995, 2000, 2005, 2009, 2010, and 2011) to take into consideration the depletion

of mineral resources in the country. Part two of the document presents four themed articles. Drawing from the initiative to secure a supply of raw materials, the first article shows how the environmental accounts, especially the module of the economy-wide material flow accounts (EW-MFA), can be used to tackle issues in current Dutch resource policy. The second article calls for the improvement of the national water balance through evaluation and monitoring, explains the technical details of understanding this water balance, and assesses the water balance of The Netherlands from 2009. The third article focuses on the climate change expenditure of the Dutch government in terms of factors such as mitigation, adaptation, and flood control. The last article provides details of the Water Framework Directive, the water quality accounts, and their relation to environmental accounting.

INTOSAI (2010) *Environmental Accounting: Current Status and Options for SAIs.* Washington DC: International Organization of Supreme Audit Institutions (INTOSAI).

http://www.environmental-auditing.org/LinkClick.aspx?fileticket=s%2FFCvUzSK-sk%3D&tabid=128&mid=568

This summary is for the Netherlands case study only. For an overview of the entire report, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Australia, Botswana, Canada, China, Colombia, France, Germany, Mexico, Namibia, the Philippines, and Sweden, which can be found under their respective country sections.

The Netherlands has not developed environmental accounting systems to the same extent as other countries such as France and Germany. However, they do have highly developed pollution and material flow accounts and they expect to develop forest, land use, economy-wide material flows, and environmental subsidy accounts. The paper concludes that, with the current state of technology, the Netherlands does not have a sustainable level of national income. In the long run, if environmentally sustainable technologies are not developed, national income will fall by at least 56%.

Schenau, S. et al. (2009) *The Dutch environmental accounts: present status and future developments*. The Hague: Statistics Netherlands.
Sjoerd Schenau: sscn@cbs.nl

http://mdgs.un.org/unsd/statcom/statcom_09/seminars/environment/Present%20state%20and%20future%20developments%20of%20the%20Dutch%20environmental%20accounts.pdf

Statistics Netherlands has a long history of environmental accounting at the national accounts department. This culminated in the introduction of the National Accounting Matrix including Environmental Accounts (NAMEA) in 1991. This paper discusses the history, current status, and envisaged future extensions of the Dutch environmental accounts. The NAMEA is a hybrid descriptive accounting system created to combine national accounts and environmental accounts into a single matrix. It provides policymakers with a comprehensive framework to examine trade-offs between macroeconomic policy objectives and the prevention of environmental damages by measuring the contribution of the environment to the economy and the impact of the economy on the environment. Looking forward, NAMEA can expand its scope based on the SEEA to include greater detail and more themes, such as environmental subsidy accounts, climate change accounts, environmental permits, and more. The core set of the Dutch environmental accounts, which is published annually, consist of seven parts: the NAMEA matrix, air emission accounts, water accounts (NAMWA), energy accounts, waste accounts, subsoil accounts for oil and gas, and environmental tax accounts. The NAMEA consists of a conventional National Accounts Matrix (NAM), extended by two accounts: a substance account and an account for environmental themes.

[The following document is written in Spanish.]

Quiroga, R. (2007) ***Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe.*** **Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.**

Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Netherlands case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, New Zealand, Nicaragua, Panama, Peru, Spain, Sweden, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

The Netherlands' experience of developing environmental indicators began in 1990 when the government published the first set in 1991. This publication was designed to inform both the Parliament and the public, and is revised and published annually. The indicators are divided into the following themes: climate change, the ozone layer, acidification, eutrophication, disposal of

solid waste, spread of toxic substances, and the disturbance of local environments.

Norway

In 2002, Norway established a system of Norwegian Environment and Economic Accounts (NOREEA) that takes into consideration the environmental impacts of economic activities. They take into account the greenhouse gas emissions of various economic sectors and compare their environmental impacts. The trends in Norway from 1990 to 2011, which depict the changes in the emissions patterns from various sectors can be found here: http://www.ssb.no/en/natur-og-miljo/statistikker/nrmiljo/aar/2013-02-07#content. However, Norway has not explicitly included the value of nature or the environment in its national income calculations, although it is in the process of including the value of ecosystem services into national wealth accounting. In 2001, the nation set up a committee for this purpose and they will build their work on The Economics of Environment and Biodiversity (TEEB) global initiative focused on drawing attention to the economic benefits of biodiversity. The committee presented its recommendations report on 31 August, 2013.

Hass, J. et al. (2013) ***Green growth and challenges in "greening" statistical classifications*****. Notater Documents, 23/2013. Norway: Statistics Norway.**
Julie Hass: julie.hass@ssb.no

http://www.ssb.no/en/natur-og-miljo/artikler-og-publikasjoner/green-growth-and-challenges-in-greening-statistical-classifications

Norway takes into consideration the environmental impacts of various activities and production of goods and services in its national accounting, although it does not directly incorporate natural capital or environmental value into GDP calculations. This report uses Norway as an example to present the argument that the difficulty of "greening the economy" and producing "green statistics" is partly due to the lack of a concrete definition of what green national accounts are. For example, the UN SEEA does not define what is meant by "green" but rather only includes a definition of "environmental degradation". Thus, sectors that may be considered to be "green" may not truly reflect their environmental impacts.

Hass, J. et al. (2002) ***Norwegian Economic and Environment Accounts Project Report -2001.*** **Document no. 2002/15. Norway: Statistics Norway, Department of Economic Statistics.**
Julie Hass: julie.hass@ssb.no

http://www.ssb.no/a/english/publikasjoner/pdf/doc_200215_en/doc_200215_en.pdf

The Norwegian Economic and Environmental Accounts Project (NOREEA) was first established in 1997 with funding from Eurostat, Statistics Norway, and the Norwegian Ministry of the Environment. Three major areas are included in the larger NOREEA system. One area of development focuses on connecting the environmental statistics to the economic statistics (NAMEA). A second area involves separating out environment-related information already included in the economic statistics. The final area includes the valuation of important natural resources.

Poland

UN Statistics Division (2013) *Draft Document: Experimental Ecosystem Accounting – Extended Deadline for Comment January 15, 2013*. [online] UN Statistics Division. [Accessed 15 August 2014].

http://unstats.un.org/unsd/envaccounting/seearev/chapter.asp?volID=2&chID=1

In 2012, the UN asked countries to submit their plan for implementing the SEEA nationally. The UN then sent comments back to the countries on how they could improve their plan. Poland submitted a report in 2012, which received positive feedback from the UN. The UN suggests some revisions of Poland's definitions and methodology in calculating wealth accounts, land resources, and water resources. Poland's submission of this framework shows that it is intending to implement a national green accounting programme.

Pakowska, S. (2013) Environmental Accounting and Reporting – an Emerging Issue in Contemporary Economy. *Scientific Conference*, 1 (1), 209-212.
Sylwia Pakowska: sylwiap@doktorant.umk.pl

http://www.scieconf.com/archive/?vid=1&aid=3&kid=90101-30&q=f1.

This article elaborates on what environmental accounting means and notes that many different definitions exist. It then looks at how private companies in Poland have responded to the demand for green accounting by looking at Poland's 20 biggest companies. A 2012 joint report by the Warsaw Stock Exchange and Deloitte and Touche, a professional services company, found that institutional investors consider companies' environmental activity as generating real benefits, such as: cost savings, good image, higher trust of suppliers and financial institutions, loyal clients, and better financial results. Polish companies generally publish their environmental activities on

their websites. Companies increasingly include such information in their annual reports. While 45% of the 20 biggest Polish companies describe their environmental actions qualitatively, 40% of surveyed companies present this information in a separate environmental report. Only about 25% of the 20 biggest Polish companies present environmental information in financial terms. The article attributes this low reporting rate to the fact that there is no national Polish law requiring or explaining environmental reporting.

Giergiczny, M. (2008) Value of a Statistical Life – The Case of Poland. *Environmental Resource Economics*, 41 (2), 209-221.
Marek Giergiczny: marek.giergiczny@ctfc.es

http://link.springer.com/article/10.1007%2Fs10640-007-9188-2#page-1

The value of a statistical life (VSL) calculates the cost-benefit of regulations in the field of environmental protection, safety regulations, health care, and many others. It does not assign monetary value to a human life but to changes in risks. Giergiczny applies the VSL to study Polish job risk by occupation. According to the author, environmental factors, such as noise, heat, cold, or odour, should be included in calculating wages because they are factors that affect the work environment. Overall, this article proposes another way of calculating the value of labour that includes environmental and other welfare measures, which can be considered a complement to green accounting.

Portugal

Mota, R. and Domingos, F. (2013) Assessment of the theory of comprehensive national accounting with data for Portugal. *Ecological Economics*, 95, 188–196.
Rui P. Mota: rui.mota@novasbe.pt

http://www.sciencedirect.com/science/article/pii/S0921800913002681

This highly theoretical paper uses World Bank indicators of genuine savings and green net national income for Portugal and tests whether these two indicators are useful for predicting welfare changes. These tests check the validity of the theory of comprehensive national accounting, and more broadly of the theory of economic growth. It includes the value of technological progress, as well as the effects of business cycles. Overall, the results indicate that both genuine savings and changes in green net national income metrics show similar changes in welfare, but reject the hypothesis that the estimated comprehensive national accounting measures coincide with

the theoretical expressions. The results also suggest that comprehensive accounting indicators perform better than conventional national accounting indicators, implying that, in general, the corrections proposed by the comprehensive accounting theory add explanatory power to conventional measures. The exception is the inclusion of education expenditures and technological progress, which decrease explanatory power. Excluding business cycles from green net national income increases the agreement with the theory. Comparing both indicators, in general, genuine savings presents better results.

Mota R. and Domingos F. (2010) Analysis of genuine savings and potential green net national income: Portugal, 1990-2005. *Ecological Economics*, 69 (10), 1934–1942.
Rui P. Mota: rui.mota@novasbe.pt

http://www.sciencedirect.com.proxy.library.emory.edu/science/article/pii/S0921800910001850

Amongst other things, the authors estimate the financial burden of the depletion of various forms of natural capital and negative monetary impacts of environmental impacts of economic development. These include: the health effects of GHG emissions and other pollution; depreciation of Portugal's commercial forests, the value of technological progress; and green national accounting calculations for the 1990-2005 period. The authors estimate the need to adjust the Gross National Income (GNI) by 14-17% to account for the depreciation of physical capital, a trend that increases over time. They also suggest an overall environmental adjustment—that accounts for pollution, forest decline, and technological progress—of 15% of Portugal's GNI. The authors contribute to the environmental accounting literature by considering the effects of time and business cycles on green accounting calculations.

Romania

Ungureanu, M. (2012) Integration of Green Accounting Into Romanian Accounting System. *CES Working Paper Series*, 4 (1), 100-109.
Mihaela Ungureanu: myhaella5@gmail.com

http://www.ceswp.uaic.ro/articles/CESWP2012_IV1_UNG.pdf

This paper explains the concept of green accounting, its emergence at an international level, its entry in the Romanian economic environment, and the way in which it is understood and applied in Romania. In 1930, Romania passed its first environmental protection law, called the Law of Natural Monuments Protection. In 1931, Romania founded the Natural Heritage

Preservation Commission. Many environmental regulations ensued, but an environmental law was implemented only in 1973. Romania's aspiration to become part of the EU pushed it to robustly increase its environmental regulation and measurement efforts, and it finally acceded in 2007. The article goes on to explain some of the considerations and the necessity of green accounting. Overall, the article's purpose is to edify the private sector and hopefully encourage it to adopt green accounting, for which Romania still does not have national standards.

Stoicea, P. (2012) Environment management accounting in Romania companies operating in rural tourism. *International Journal of Energy and Environment,* 6 (1), 125-133.
Paula Stoicea: stoiceapaula@yahoo.com

http://www.naun.org/main/NAUN/energyenvironment/17-692.pdf

Environmental accounting emerged in Romania between 1971 and 1986, but it only increased in prominence after 2002 with more research into the field. This article argues for the incorporation of environmental accounting into rural tourism in Romania. According to the article, there are two main causes of environmental degradation besides natural disasters: factors that are the direct result of economic development and factors that are generated by the use of the natural environment for tourism and entertainment. The article sees the implementation of green accounting as consisting of two steps: reporting, and analysing and interpreting data. This form of accounting in Romania is especially needed because rural tourism is unrestricted and has been increasing in recent years. The article goes on to mention a few possible measures, indicators, and principles of green accounting.

Russia

Tattarinov, A. (2013) Introduction of Environmental-Economic Accounts in Russia: New Plans and Current Work. In: *International Conference "Global Implementation Programme for the SEEA"*, New York, June 17-19.
Andrey Tatarinov: tatarinov@gks.ru

http://unstats.un.org/unsd/envaccounting/workshops/SEEA_Conf_2013/session_3/Russia.pdf

This presentation outlines Russia's current and future activities to improve their environmental statistics, in particular natural resource statistics and resource productivity measurements. A research programme, started in 2013, is developing the methodology for the evaluation of several natural resources. Work is, and will be, concentrated on the development and production

of asset accounts, physical flow accounts, and environmental activity accounts related to land, water, minerals, energy, timber, natural aquatic resources, and biological resources. As of 2016, the SNA annual balance sheet will include natural resources and as of 2018, an assessment of natural resource productivity will be published on an annual basis.

Ryumina, E., and Anikina, A. (2009) Environmentally Adjusted Evaluation of Regional Economic Growth. *Studies on Russian Economic Development*, 20 (2), 169–180.
Elena Victorovna Ryumina: ryum@ccas.ru

http://link.springer.com/article/10.1134%2FS1075700709020063

This paper utilises SEEA indicators to take into account environmental factors in the regional economic growth of the 86 constituent members of the Russian Federation for the year 2003. In particular, it focuses on the environmentally adjusted Gross Regional Product (GRP^E) and the environmentally adjusted Net Regional Product (NRP^E) SEAA indicators, as well as their comparison against each other. The GRP^E takes into account regional growth minus natural resource depletion. The NRP^E is calculated by subtracting basic capital consumption and natural resource depletion from the GRP^E. In 2003 the regional GDP was 13.2 trillion rubles ($233 billion). However, when natural resource depletion and degradation are taken into account, that figure is revised down by almost 20% to a GRP^E of 10.8 trillion rubles and an NRP^E 10.6 trillion rubles ($190 billion and $187 billion, respectively). Along with these aggregate figures, the authors also provide detailed regional comparisons, finding substantial variation in resource consumption intensity across the Russian Federation. Resource consumption intensity compares the GRP environmental capacity to actual use. With a resource consumption intensity of 14.6%, they identify the Moscow oblast as one of the "leaders in sustainable development" (although it is of note that many more regions fall under this figure, as low as 1.6% intensity). Meanwhile, with an intensity of 93.9%, the Nenets Autonomous District in the northern arctic region of Russia leads on the unsustainable development path.

Ryumina, E. V., and Anikina, A. M. (2007) Analyzing the Impact of the Natural Resources Factor on the Level of Economic Development of Russian Regions. *Studies on Russian Economic Development*, 18 (8), 523-538.
Elena Victorovna Ryumina: ryum@ccas.ru

http://link.springer.com/article/10.1134/S1075700707050097

This paper investigates the role that natural resources play in Russia's economic growth. During

the 1995-2003 period, the country's GDP grew by 28%. However, this growth has been achieved partly due to aggressive natural resource use. For example, oil extraction increased by 37.1% during the study period, from 307 to 421 million tons. The authors show that while labour and capital expenditures did not hugely affect GDP growth, another factor that along with natural resource use is responsible for growth is research and development (R&D) spending. The paper concludes with a close analysis of different sectors of Russia's industrial production; in particular, sectoral resource use, per-capita and per-worker output, and share and structure of value added, on both the national and regional scales.

Serbia

Statistika Centralbryan (SCB) (2014) ***Balkan Project Office – Balkan Projects – National Projects – Serbia. Statistics Sweden.*** **[online] Statistika Centralbryan (SCB). [Accessed 23 July 2014].**
Dragan Ignjatovic: dragan.scb@beotel.net

http://www.scb.se/sv_/Applikationer-Engelska/Balkan-project-office/Balkan-projects/National-projects/Serbia/

The Statistical Office of the Republic of Serbia (SORS) is in charge of collecting national data for Serbia. SORS has been cooperating with Sweden in the "Partnership in Statistics" initiative since 2004. The first project in collaboration with Sweden included exchanging statistical business registers, energy statistics, and energy balances. SORS is now in its fourth phase of statistical development, which includes revisions of environmental statistics with an emphasis on emissions, air statistics, and environmental expenditure and accounts. Revisions are also in order for economic statistics, social statistics, statistical methodology, and quality and management measurements. These efforts contribute to compliance with EU accession standards.

Environmental Management Center in Serbia (2013). ***Project for Setting up Environmental Management Center in Serbia.*** **[online] Environmental Management Center in Serbia. [Accessed 23 July 2014].**

http://www.emc-project.gov.rs/en

The Environmental Management Center (EMC) in Serbia provides emissions monitoring and reporting within the Serbian Agency for Environmental Protection (SEPA). It connects the business sector, environmental authorities, and relevant EU institutions. In December 2012, EMC held a promotional event called "Reporting for Sustainability III". At the event, EMC launched its

software solution, "TEAMS", for environmental accounting and reporting to businesses.

Slovakia

Špulerová J. et al.(2011) *Ecosystem services of agricultural landscape.* Slovakia: Institute of Landscape Ecology, Slovak Academy of Sciences.
Jana Špulerová: jana.spulerova@savba.sk

http://www.bfn.de/fileadmin/MDB/documents/ina/vortraege/2011/2011_TEEB-EU_13_Spulerova_Slovakia.pdf

NB: Since full reports or studies for Slovakia were not located, this presentation is included instead.

This presentation outlines the evaluation of ecosystem services provided by agricultural land in Slovakia. Although considered semi-natural, these ecosystems have a high presence of biodiversity and provide several ecosystem services to human beings such as recreational space. The presentation describes a study into the historic structures of the agricultural landscapes and strategies to protect them for sustainable development, documenting the agricultural habitat, changes in biodiversity over time, and the landscape's cultural-historic and provisional services, such as medicine, raw materials, and food. The researchers found that the agricultural landscape in Slovakia contains high concentrations, and a wide variety, of biodiversity—making them important havens for plants and wildlife—while performing many functions for the area's residents. While far from offering a comprehensive assessment of Slovakia's natural endowments and their value and depletion, this presentation represent an important step in the direction of eventually creating environmentally-adjusted national accounts.

Slovenia

Rutar, T. and Vidic, T. (2011) *Environmental Economic Accounts with an Emphasis on Environmental Protection Accounts.* Slovenia: Statistical Office of the Republic of Slovenia.
Teja Rutar: teja.rutar@gov.si; Tanja Vidic: tanja.vidic@gov.si

http://www.stat.si/StatisticniDnevi/Docs/Radenci2011/Rutar_Vidic-Okoljsko-ekonomski_ra%C4%8Duni_in_EPEA-ppt.pdf

The Statistical Office of the Republic of Slovenia is in charge of collecting data important to public life in Slovenia. It was created in 1944, which means it has been in operation for 70

years. The Office presented this PowerPoint document to explain economic environmental accounts. Its methodology is mainly based on the 2003 SEEA. The authors show that expenditure on environmental protection services by producers and the Slovenian government steadily increased from €350 million ($390 million) in 2003 to just over €500 million ($555 million) in 2007, with only 2% coming from central and local governments. Slovenia still needs to create air emissions accounts, environmentally related taxes, and economy-wide material flow accounts and the authors include legislative backing for the development of full environmental accounts as a necessary step towards a greener economy.

Spain

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe*. Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.
Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Spain case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, New Zealand, Nicaragua, Panama, Peru, Sweden, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

The Spanish Environment Ministry initiated the development of environmental indicators in 1996. The aim was to organise and structure a system of indicators to provide information about the state of the environment in order to aid in environmental decision-making. In 2000, the Ministry started to select a group of indicators that would form the basis of a report aiming to assess the state and evolution of the environment. These indicators covered the following areas: air, water, soil, biodiversity, waste, agriculture, energy, industry, fishing, tourism, transport, housing, urban environment, and natural and technological risks. In 2005, the Ministry published a second report based on these indicators, which analysed the trends and changes shown by the indicators. It was also in 2005 that the country started to develop its first set of sustainable development indicators. These consisted of 55 indicators, 14 of which are highlighted by the EU and used by

Eurostat. A 2006 report based on a revised set of these indicators revealed that although there were signs that the country was moving towards more sustainable development, there were still many serious environmental, economic, and social deficiencies.

Feijoó, M. et al. (2000) Economic and Environmental Policy Analysis of the Flumen-Monegros Irrigation System in Huesca, Spain. *Geographical Analysis*, 32 (3), 187–204.
María Luisa Feijoó: mfeijoo@unizar.es

http://onlinelibrary.wiley.com/doi/10.1111/j.1538-4632.2000.tb00424.x/pdf

This study describes the results of a model that was built to reflect the agricultural activities in the irrigation system of the Spanish Flumen-Monegros region. It looks at the effects of economic policy and resource limitation on cultivation activities in the area. The simulation considered three possible scenarios: the suppression of the Common Agricultural Policy (CAP, i.e. EU agricultural subsidies) payments to farmers, an increase in water prices, and the implementation of limits on nitrogen (fertiliser) use. The results show that policies resulting in low crop prices or high water prices can lead to farmers either abandoning their land or switching over to high-value crops that demand an intensive use of inputs. Although this latter case might spur economic development, it may also result in environmental damage. The study is useful because it offers a model for calculating environmental costs related to agriculture and although it is applied to a specific region it is indicative for other Spanish areas.

Sweden

INTOSAI (2010) *Environmental Accounting: Current Status and Options for SAIs.* Washington DC: International Organization of Supreme Audit Institutions (INTOSAI).

http://www.environmental-auditing.org/LinkClick.aspx?fileticket=s%2FFCvUzSK-sk%3D&tabid=128&mid=568

This summary is for the Sweden case study only. For an overview of the entire report, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Australia, Botswana, Canada, China, Colombia, France, Germany, Mexico, Namibia, the Netherlands, and the Philippines, which can be found under their respective country sections.

During the 1990s several Swedish government departments developed environmental accounts. Today, Sweden has asset accounts for forests and flow accounts for water use, energy, chemicals,

air and water emissions, and waste. It also has accounts for environmental expenditures, environmental taxes, and environmental subsidies. They have used their accounts to determine the cost of acid rain and foreign sulphur-dioxide emissions.

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe.* Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.
Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Sweden case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, New Zealand, Nicaragua, Panama, Peru, Spain, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

Sweden has a notable history of producing environmental and sustainable development indicators. Between 1998 and 1999, the country began by developing a series of 12 "Green Headline Indicators" that focused on environmental problems and the underlying causes of these problems, which need to be addressed in order to obtain sustainability. In 2001, Sweden published a report called "Sustainable Development Indicators for Sweden: A First Set, 2001", this time including 30 sustainable development indicators based on information available at the time. These indicators were revised and adapted to be included in the National Strategy for Sustainable Development which was completed in 2006. This strategy includes 16 aims that need to be met to achieve sustainable development, measured by a total of 75 indicators divided into six main themes: health, sustainable consumption and production, social coherence, economic development, environment and climate, and global alliance.

Switzerland

Swiss Federal Statistical Office (2012) *Overall assessment: Complementing the GDP.* Document –ID: do-e-00-ebip-01. Neuchâtel: Swiss Federal Statistical Office.
Jürg Furrer (FSO, Strategic Support): juerg.furrer@bfs.admin.ch

http://www.bfs.admin.ch/bfs/portal/en/index/themen/00/09/blank/00.Document.160199.pdf

This document reports the efforts of the Swiss Federal Statistics Office (FSO) to complement the country's GDP with additional information in the areas of society, the environment, and the economy, without altering the conceptual basis of GDP, nor replacing it. The report comprises three sections. The first section introduces the project, discussing the need to complement GDP with other measures, and how national accounts (NAs), whilst containing information that goes beyond GDP (e.g. incorporating environmental information via NAMEA), do not provide any subjective information; therefore NA information is not sufficient for a comprehensive assessment of society. The second section puts the project in context, detailing the demographic background and economic development of Switzerland. The third, and main, section describes the information obtained by the indicators and the inter-relation between the economy, society, and the environment. Overall, the country presents a good picture in terms of economic performance, social progress, and environmental impact. In terms of the economy, the country has a high income level with a relatively balanced income distribution, low unemployment, and high levels of social security benefits. On the environmental side, the country has a low level of greenhouse gas emissions relative to other industrialised countries, but these need to be reduced further to meet the goals of the Kyoto Protocol.

Swiss Confederation (2008) *Environmental Accounting.* Neuchâtel: Federal Statistical Office FSO.

http://www.bfs.admin.ch/bfs/portal/en/index/themen/04/22/lexi.Document.107039.pdf

This brochure provides an introduction to the justification for environmental accounting, describing Switzerland's monetary, physical, and hybrid accounts. The monetary accounts are made up of environmental protection expenditure, environmental taxes and fees, and environmental goods and services accounts, although the latter are only in their pilot phase. These accounts show that state expenditure on the environment is increasing. However, the proportion of this expenditure, which comes from those directly responsible for environmental damage, is growing as the "polluter pays" principle is gradually introduced. Revenues from environmental taxes and fees have been rising since 1990. The Swiss physical accounts are material flow accounts which reveal that in 2006 all metals and fossil products were imported from abroad, whereas the majority of biomass and minerals were sourced from Swiss territory. Between 1990 and 1996, GDP stagnated whilst total material requirement decreased. Material productivity has stagnated since 1993. The hybrid NAMEA accounts show that greenhouse gas emissions from the primary sector declined between 1990 and 2002, along with a decline in production. They also fell in the secondary sector,

although this is attributed to technological progress and a shift away from polluting activities. Emissions rose in the tertiary sector due to increased transport emissions, though this rise is lower than the economic growth of the sector.

Turkey

Jaballi, O., and Sahin, S. (2004) Green Accounting and Climate Change Problem: A New Evidence from the Turkish Economy. In: *The 7th Annual Conference on Global Economic Analysis,* Washington DC, USA.
Olfa Jaballi: olfa.jaballi@univ-paris1.fr

https://www.gtap.agecon.purdue.edu/resources/download/1740.pdf

This largely theoretical study aims to include environmental quality indicators in the national accounts of a country experiencing high economic growth, taking Turkey as an example. Since the 1980s, the country's economy and population have been growing rapidly and energy and electricity consumption has increased accordingly. This increasing demand negatively impacts the environment, yet determining the optimal environmental policy without harming economic growth is a challenge for policymakers. The authors consider environmental quality to be defined only by greenhouse gas emissions and economic performance by the Weitzman criteria. They use a dynamic applied general equilibrium model (DAGEM) to quantify the impact of taking into account national environmental quality of Turkish national accounts, running the model for the period 1980-2050. They consider the impact of a consumption tax on sustainable lignite (a type of coal) consumption, showing their results but without drawing any firm conclusions or making any policy recommendations.

Ukraine

Veklych, O. and Shlapak, M. (n.d.) *Green GDP as an indicator of environmental cost of economic growth in Ukraine.* [Online archived document].
Oksana Veklych: okveklych@ukr.net

https://archive.org/stream/GreenGdpAsAnIndicatorOfEnvironmentalCostOfEconomicGrowthInUkraine/Veklych.Shlapak.GreenGdpAsAnIndicatorOfEnvironmentalCostOfEconomicGrowthOfUkraine_djvu.txt

This document provides the results of Ukraine's environmentally adjusted Gross and Net Domestic

Products (GDP and NDP), taking into account natural resource depletion and environmental degradation for the period 2001-2010. The purpose of this study is to analyse the environmental cost on Ukraine's economic growth by calculating the adjusted macroeconomic indicators, the first paper of its kind among ex-Soviet bloc countries. The authors show that Ukraine's available net domestic product had increased over the ten year time period due to consumption of natural resources. They also estimate that Ukraine's NDP should be adjusted downward by 3-4.5% to account for negative health effects of air pollution generated by the electricity industry. Meanwhile, although public expenditures on environmental protection have increased in absolute terms between 2001 and 2010, they have had negligible effects on the national balance sheet due to their negligible size of around 0.03% of NDP. The authors stress the need for investment in environmental protection and in expanding environmental accounting efforts. Overall, the authors estimate the country's green GDP to be 5.7% lower than the traditionally estimated national income for the study period. The paper concludes by stating that Ukraine's economic growth is significantly dependent on natural capital and has considerable environmental drawbacks.

Veklich, O. A., and Shlapak, N. Y. (2012) Environmentally adjusted GDP as an indicator of economic development. *Studies on Russian Economic Development*, 23 (3), 244–248.
Oksana Veklich: okveklych@ukr.net

http://link.springer.com/article/10.1134%2FS1075700712030100

This article describes the concept of the green GDP indicator and the method of its calculation, as a response to the need to develop new approaches to the estimation of economic growth. The authors stress the need to calculate an environmental GDP to show real growth of wealth in a country. They particularly mention a World Bank study that China's environmental degradation and natural resource depletion over the previous decade amounted to 8-12% of GDP, which makes the country's real economic growth effectively equal to zero. Given that there is not yet a single common approach for environmental-economic accounting, the article offers its own calculation method for the environmentally adjusted GDP for Ukraine as follows: Green NDP = GDP – CFC – CNR – EEP – DE, where GDP is traditional GDP; CFC is consumption of fixed capital; CNR is consumption of natural resources (reduction in natural resource reserves); EEP is the expenditures on environmental protection; and DE is the assessment of the environmental dam age as a result of economic activity (degradation of the environment). The Ukraine study found a 4.6% discrepancy between the traditionally calculated GDP and the green GDP during the 2000-2007 period that was worth 18.5 billion hryvnias ($865 million) in 2012 prices.

United Kingdom

Allebone-Webb, S. et al. (2013) *The Globe Natural Legislation Study. A Review of Efforts*. London: The Global Legislators' Organisation.

Sophie Allebone-Webb: sallebonewebb@wcs.org

http://www.globeinternational.org/images/natural-capital-study/GLOBE-Natural-Capital-Legislation-Study.pdf

This summary is for the United Kingdom case study only. For an overview of the entire study, please see the Multi-Country Reports and Projects section of this book. The study also includes country case studies for Botswana, Colombia, Costa Rica, Georgia, Germany, Peru, and the Philippines, which can be found under their respective country sections.

The government of the United Kingdom has measured the contribution of a number of environmental services. These include the value of wetlands to water quality (£1.5 billion/ $2.55 billion), pollinators (£430 million/ $731 million), living close to rivers (£1.3 billion/ $2.21 billion), and living with a view of green space (£300/ $510 per person per year). The office for National Statistics compiles and reports the data with the support of a number of government departments. It found that UK's natural capital declined at the rate of 2.5% per year between 1990 and 2008 and that 30% of ecosystems are degraded or in decline. The main reasons for the decline of ecosystem services are: human habitation, overexploitation of resources, pollution, climate change, and invasive species. The Office of National Statistics has published a record of environmental accounts since 2003. The accounts mainly measure physical data, but there are some monetary data as well. This includes data for natural gas and oil stocks, forestry products, and government expenditure and revenue derived from environmental taxes. The accounts were based on the UN SEEA. There are a number of initiatives under way to better tie environmental accounts to policy. A subset of these studies explores new markets for environmental services, which are now limited.

DEFRA (2013) *Realising Nature's Value: The Final Report of the Ecosystem Markets Task Force*. London: Department for Food, Environment & Rural Affairs.

https://www.gov.uk/government/publications/realising-natures-value-final-report-of-the-ecosystem-markets-task-force

DEFRA's report on realising nature's value is based on the idea of a circular economy: one that integrates reusing and recycling, zero waste, and the use of renewable energy. Such markets already exist; these arose from the necessity to recognise the dependence of the corporate

sector on the ecosystem. In many cases, the aim was to optimise business operations with respect to resource use. However, the report calls for a comprehensive system of valuing the economy, which recognises the value of natural assets even when they are not exchanged through market transactions. The report contains six sections. The first two introduce the work of DEFRA and the idea of a circular economy, respectively. The next two sections are a series of policy recommendations to the British government. The first group is a set of five priority recommendations which represents opportunities both for ecological conservation and for business: 1) to develop and use a system of national accounting that recognises the value of the ecosystem; 2) to encourage the use of farm waste products to generate energy for food production; 3) to encourage the expansion of renewable wood fuel; 4) to develop a set of standardised ecological consumer labels; and 5) to better manage water systems to preserve clean water supplies. The second set of 17 recommendations is aimed at ecosystem restoration, which has some potential for business opportunities. These are similarly based on agricultural management, water management, and revaluation of natural resources. The final two sections describe DEFRA's planned future actions and provide an appendix of data sources.

NCC (2013) *The State of Natural Capital: Towards a framework for measurement and valuation*. London: Department for Food, Environment and Rural Affairs (DEFRA).

http://www.environmentbank.com/files/state-of-natural-capital-report-2013-1.pdf

This is the first in a future series of State of Natural Capital reports put together by the Natural Capital Committee (NCC). Natural capital is defined as "the contribution made by the natural environment to our well-being which complements the other forms of capital" (p.11). The report sets out the goals of a national natural capital accounting project, stressing the need to count the environment in the corporate sector as well as at the local and national levels. It is structured in six parts. After a general overview of the NCC's key recommendations, section two assesses the state of natural capital degradation in the United Kingdom and recommends actions such as the development of a framework within which to define and value natural capital, calculating the potential cost of replacement of the capital assets and the ecosystem services they perform, as well as including the lost market value perspective. Section three justifies the need for natural capital accounting and discusses the NCC's future role in working with the Government to develop the UK's natural capital accounts, as well as guidelines and metrics for corporate natural capital accounting. Section four argues for an extensive natural capital cost-benefit analysis (CBA), including both market and non-market values, within government policymaking. It calls for better data and metrics suitable for Government policy analysis, such as the development of "decision-support tools" to aid the incorporation of economic valuations of natural capital assets

into decision-making. After discussing the limitations of GDP measures, the penultimate section promotes the view that economic growth and natural capital do not conflict if proper national accounting is performed, including natural, human, social, and manufactured capitals. This will exterminate perverse incentives that lead to the destruction of natural capital. The final section sets out the next steps for concerted action to develop a framework for measuring natural capital assets and embedding their values into the fabric of the British economy.

DEFRA (2012) *Independent Panel on Forestry: Final Report.* London: Department for Food, Environment and Rural Affairs (DEFRA).

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/183095/Independent-Panel-on-Forestry-Final-Report1.pdf

DEFRA's panel report on the forests of England stresses the opportunities for increasing people's well-being, conserving nature, and growing the economy through the conservation and regeneration of English woodlands. The body of the report details the importance of woodlands for people, nature, and the green economy: woodlands are beneficial to children's health, lowering obesity rates, and mental health; benefits to nature include the support of a wide range of flora and fauna that are under threat due to insufficient management practices; and green economy benefits include reduced costs of climate change abatement. In addition, forests also provide a source of renewable energy, as well as lumber and ecotourism opportunities. The report then discusses public forestry management organisations, noting that only 18% of English forests are publicly owned. It stresses the importance of providing incentives to the other multifarious owners of woodlands to promote forest regeneration and wider public access to woodland.

Her Majesty's Government (2011) *The Natural Choice: securing the value of nature.* UK: Department for Food, Environment and Rural Affairs (DEFRA).
All queries to naturalenvironment@defra.gsi.gov.uk

http://www.official-documents.gov.uk/document/cm80/8082/8082.pdf

This White Paper is a follow-up to an independent review of the state of England's ecosystem, by a team led by the British ecologist and biologist Professor Sir John Lawton. It concluded that the English ecosystem was at risk due to habitat fragmentation into small, isolated units. Specifically, 30% of the country's ecological services are in decline. The White Paper proposes a greater integration of the ecosystem and environmental concerns by taking advantage of economic opportunities related to the ecosystem and a greater general appreciation of the

environment. The report begins with a discussion of protecting and improving the environment. Key reforms in this regard are supporting local initiatives and encouraging ecological offsetting through increasing new nature improvement areas. Then it addresses the challenges of growing a green economy, such as supporting the development of green businesses as well as a more prominent evaluation of national capital alongside traditional measures of national worth. This is followed by a discussion of the various ways of connecting people to nature, such as increasing the number of designated green areas to improve public health and opportunities for children to learn outdoors. The report continues with a discussion of the leadership role that England can take globally and concludes with some remarks about monitoring based on an enhanced measure of national well-being.

Khan, J. (2011) T*owards a sustainable environment - UK natural capital and ecosystem economic accounting.* UK: Office of National Statistics.
Jawed Khan: environment.accounts@ons.gsi.gov.uk

http://www.ons.gov.uk/ons/rel/environmental/uk-environmental-accounts/2011---blue-book-update/artnaturalcapital.html

The Office for National Statistics, with the cooperation of the Department for Environment, Food and Rural Affairs (DEFRA), plans to put "natural capital" at the centre of Government accounting. This article outlines their plans for accomplishing this goal. Natural capital is defined as the value of biodiversity and ecosystems to the wellbeing of people and to economic prosperity; the aim is to give such concepts more value in economic analyses and decision-making. Touching on specific areas in which they wish to collect more data, the Office of National Statistics wishes to use new information to tax and monitor natural resources, particularly focusing on water and soil resources, forestry, and land management. These resources in particular are considered to make valuable contributions to the economy and the environment. However, an economic valuation of their services is often lacking, an issue which the UK plans to rectify.

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe.* Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.
Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the United Kingdom case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, New Zealand, Nicaragua, Panama, Peru, Spain, Sweden, the United States of America, and Venezuela, which can be found under their respective country sections.

The UK began developing its sustainable development indicators in 1994 when the government published the first Strategy for Sustainable Development and recognised the need to construct indicators in order to monitor progress. In 1999, a revised strategy proposed several objectives, including social progress which takes into account the needs of everyone, the effective protection of the environment, the prudent use of natural resources, and to maintain the (at the time) high rates of economic growth and employment. In total, the UK selected 147 indicators, organised into 21 groups and has made progress in measuring these indicators. Goals for the future are to identify and/or develop indicators for the following: to measure social justice, to measure human well-being and quality of life, to allow for the estimation of indirect CO_2 emissions, and to assess the impact of education on sustainable development.

Countries not included

No relevant works were found for the countries listed below, although some are included in the OECD and/or UN Environmental Performance Reviews (see the "Multi-country Reports and Projects" section of this Working Paper).

Andorra, Armenia, Kosovo, Macedonia, and San Marino.

3. The Americas

Latin America and the Caribbean
Argentina
Barbados
Bolivia
Brazil
Canada
Chile
Colombia
Costa Rica
Dominican Republic
Ecuador
Guatemala
Guyana
Honduras
Jamaica
Mexico
Nicaragua
Panama
Paraguay
Peru
United States
Uruguay
Venezuela

3. The Americas

Overview

United States and Canada

Canadian efforts to quantify and value the environment started in the 1970s, but in 1991 the government asked its national statistics body (Statistics Canada) to develop an actual system to analyse the relation between the economy and the environment. In 2006, Statistics Canada released a comprehensive document of Canada's environmental accounts. The system developed is called the Canadian System of Environmental and Resource Accounts (CSERA). It uses both physical and monetary measurements to account for the country's natural wealth (Natural Resource Stock Accounts), the material and energy requirements of the economy (Material and Energy Flow Accounts), and also for the expenditure in environmental protection (Environmental Protection Expenditure Accounts).

The accounts are very comprehensive and include measures of oil, natural gas, minerals, timber, land, greenhouse gas emissions, water, fish, and agricultural products. However, one key limitation of the CSERA is that it does not calculate sustainability indicators, such as the Environmentally Adjusted Net Domestic Product (EDP). The EDP is a way of calculating the sustainable income of a country, taking into account resource depletion and waste emissions.

Drawing on the same environmental stocks and flows accounts, a more recent 2011 study by Statistics Canada demonstrates progress in the sustainability of Canada's economy but also shows sectors that have not improved. On the one hand, waste diversion, recycling, business spending on environmental protection, and stocks of crude bitumen (a type of petroleum) have increased. On the other hand, household emissions of greenhouse gases have increased while water yield (the water that replenishes the stocks of water contained in the country's lakes, rivers, and aquifers) was depleted.

The United States started creating environmental accounts in 1992, with a system called Integrated Economic and Environmental Satellite Accounts (IEESA). The system for creating the accounts—led by the Bureau of Economic Analysis (BEA)—lasted only for three years when in 1995 the US Congress suspended its implementation due to perceived problems with its methodology. Since then smaller, non-systematic accounts have been developed, but no institutionalised, national-effort is underway.

Latin America

A 1997 study by Chilean economist Marcel Claude shows that by the mid-nineties many Latin American countries had plans or even pilot projects to implement green accounting. However, its development was not a high priority for local or national governments, thus little funding was channelled towards it and many countries lacked even the most basic data—like physical measures of oil reserves and forest area or proper statistics on soil erosion and water contamination—and needed to start compiling the accounts, a problem that still persists (Claude, 1997).

A 2005 research paper by the UN Economic Commission for Latin American and the Caribbean (CEPAL) showed that although the continent had experienced an experimental boom with green accounting by 2004, few of the projects continued (Isa, et al., 2005).

Unfortunately, despite the ability of green accounting to demonstrate the inconsistencies within government resource models, ten out of the twenty Latin American countries have no governmental oversight for environmental accounts. But where there is a dearth of government resources to compile green accounts, international organisations, universities, and independent research institutions often fill the gap. Some studies are limited to calculating environmental costs of specific industries like logging in the Brazilian Amazon (Ferraz do Amaral and Seroa de Motta, 1998) and mining in Chile (Figueroa and Calfucura, 2003). Others, like the Institute for Advanced Development Studies' (INESAD) Green National Accounts for Bolivia, take on the entire economy (Jemio and Andersen, 2013).

Latin America and the Caribbean (general)

[The following document is written in Spanish.]

Taboulchanas, K., and Fernández, F. (2008) ***Estado de situación de las estadísticas ambientales en América Latina y el Caribe al 2008: avances, desafíos y perspectivas.*** **Santiago de Chile: CEPAL.**
Kristina Taboulchanas: kristina.taboulchanas@cepal.org

www.eclac.cl/id.asp?id=35577

This paper presents and analyses the state of environmental statistics in Latin America and the Caribbean in the early 2000s and in 2008. The data was taken primarily from the Global Assessment of Environmental Statistics (produced by the United Nations Statistics Division—

UNSD, from interviews with representatives from organisations in the studied countries, and from secondary sources. In the early 2000s, the majority of countries did not have an integrated, systematic process for the production of ES, although many still developed some kind of ES. In 2008, most countries had both an ES unit (e.g. in an institute or in the government) and a legal framework for the development of the ES. Many had a vast number of organisations producing the statistics (e.g. 23 in Chile), which constitutes a potential source of confusion. However, most lacked human or financial resources for the development of ES and only a few produced proper documentation of the data collection processes (i.e. a manual). The document also discusses the presence of integrated economic and environmental accounts: only Mexico and Colombia had institutionalised, full implementations of environmental accounts, while a few (Guatemala, Honduras, Panama, and the Dominican Republic) were in the process of developing them, and many others were interested in doing so, but in different ways. There is a growing number of regional and sub-regional initiatives for the advancement of ES. Major policy recommendations include: the need for more financial and political support for ES, more institutional coordination, collection of more basic environmental data for the development of the statistics, better documentation, more methodological harmonisation of international, regional, and sub-regional environmental agencies (e.g. adhering to the UN SEEA model in the case of environmental accounts), and further training programmes in the field.

[The following document is written in Spanish.]

UN (2006) Bienes y Servicios Ambientales en América Central, Cuba y la República Dominicana; Contexto internacional y experiencias nacionales. In: *Conferencia de las Naciones Unidas sobre Comercio y Desarrollo,* New York and Geneva, United Nations.

http://www.oas.org/dsd/Tool-kit/Documentos/ModuleIIIdoc/Bienes%20y%20Servicios%20Ambientales.pdf

This document approaches the subject of environmental goods and services (EGS) in Central America, Cuba, and the Dominican Republic from the perspective of the commercial community. It reproduces the main elements of different national studies, including: the challenges and opportunities for commercial liberalisation; the relation between regional multilateral agreements and EGS; commercial, environmental, and developmental implications of the negotiations on EGS; and the opportunity to include “Productos Ambientalmente Preferibles” (environmentally preferred items) in the negotiations. It also stresses the important role of environmental accounting in offering precise information about the environmental market and its challenges related to economic valuation of environmental goods and services.

Grieg-Gran, M. et al. (2005) *How can market mechanisms for forest environmental services help the poor?* Preliminary lessons from Latin America. *World Development*, 33 (9), 1511-1527.
Maryanne Grieg-Gran: maryanne.grieg-gran@iied.org

http://www.sciencedirect.com/science/article/pii/S0305750X05000999

This article explores the impacts of eight market mechanisms for forest environmental services on development and livelihood in Latin America. The results are mixed, partly because of limited data availability. The schemes often bring challenges to the beneficiaries, such as application and transaction costs, and other factors that limit accessibility, which disadvantage poor beneficiaries disproportionately. The schemes also seem to have no adverse effect on the social capital of the beneficiaries and have mixed effects on employment and in promoting social development activities. The initiative used varied research methods, including household surveys, interviews, focus groups, and secondary information. However, they were not comprehensive. The authors do not give many policy recommendations since most of the initiatives are recent and thus cannot be evaluated fully. The exception is Costa Rica's Payment for Environmental Services (PES), for which the recommendation is to remove excessive access restrictions against mixed, pro-poor production systems.

[The following document is written in Spanish.]

Isa, F. et al. (2005) *Cuentas ambientales: conceptos, metodologías y avances en los países de América Latina y el Caribe.* Santiago de Chile: CEPAL.
Farid Isa: fisa@eclac.cl

http://www.eclac.org/publicaciones/xml/3/20993/lcl2229e.pdf

This paper provides brief overviews of the major countries in Latin America that have implemented satellite or integrated environmental accounts (SEEA) or that have plans/projects to do so. It presents the conceptual elements of the SEEA, a short analysis of the general Latin American experience, and a review of the SEEA 2003 manual. The paper points to the partiality and unevenness of the experience, observing that environmental accounts saw an experimental boom in the 1990s in the region, but in most cases did not last long, except in Mexico and Colombia. The reasons for the decay were a dearth of technical capacity, a lack of funding, and a want of existing solid national statistics. However, in the few years before 2005, there was a rising interest in environmental accounting and many new projects or plans were established in Argentina, Honduras, Panama, and the Dominican Republic. Nicaragua also started implementing

environmental accounting. After 2003, with the new SEEA manual, Mexico and Colombia furthered their environmental accounts. Besides the technical, financial, and statistical challenges, the implementation of environmental accounts has also been hindered by poor coordination among the different institutions involved in the processes.

Barria, L. et al. (2003) Trade and Environmental Review. Environmental Goods and Services: Challenges and opportunities for Central American and Caribbean countries. Paper presented at the *United Nations Conference on Trade and Development*, New York and Geneva, 4 April.
Luis Barria: l.barria@anam.gob.pa

http://unctad.org/en/docs/ditcted20034a3_en.pdf

This document describes and analyses the project "Building Capacity for Improved Policy Making and Negotiation on Key Trade and Environment Issues", through which UNCTAD is providing assistance to five Central American countries (Costa Rica, Guatemala, Honduras, Nicaragua and Panama) and two Spanish-speaking Caribbean countries (Cuba and the Dominican Republic) with a view to enhancing their ability to participate effectively in the World Trade Organization (WTO) negotiations on trade and environment, and to address key trade and sustainable development linkages. These countries have identified the examination of implications of trade liberalisation and strengthening of domestic capacities in environmental goods and services (EGS) as a priority issue to be addressed. Valuation of environmental goods and services and its integration into national accounts is one of the key objectives of the project. The document describes the activities carried out thus far (workshops and others) and the lessons learned. It also discusses possible orientation for further capacity-building work on EGS to help countries in the region to participate as effectively as possible in the WTO negotiations.

[The following document is written in Spanish.]

Claude, M. (1997) *Cuentas Pendientes: Estado y Evolución de las Cuentas del Medio Ambiente en América Latina.* Fundación Futuro Latinoamericano.
Marcel Claude: marcel.claude@gmail.com

http://unstats.un.org/unsd/envaccounting/ceea/archive/download.asp?pubID=7

This project is the first to collect experiences in environmental accounting from Latin America in a single document. It aims to outline what has been done in different countries in this field. It also looks at the institutions and methodologies involved in each case. It concludes that

most countries at the time of analysis had studies on and/or pilot environmental accounting projects, with many having plans to implement them. However, only a few countries actually carried out the implementation, of which the most notable for the breadth, depth, and scope of the programme is Mexico, followed by Chile and Colombia. Mexico's experience was led by its statistics institute (INEGI), with support from the UN and the World Bank. Most cases, however, only used satellite models of environmental accounting, with limited actual integration of environmental measurements into the national accounts. The author notes a "hegemony" of the UN methodology of environmental accounting. The paper concludes that there is strong technological and institutional capacity in Latin America for environmental accounting, although the main challenge lies in a lack of priority given to the issue by governments. Costa Rica provides an example of this lack of political will, where the initiative had to be ended for that reason.

Argentina

Coremberg, A. (2012) ARKLEMS+ Land Database, Measuring Productivity in Unstable and Natural Dependent Economies: Argentina. In: *The Second World KLEMS Conference Harvard University*, Cambridge, Massachusetts, 9-10 August.
Ariel Coremberg: acorem@econ.uba.ar

https://arklems.files.wordpress.com/2011/05/paper-wordklems.pdf

This paper measures Argentina's Source of Growth, through KLEMS methodology. According to its website, "The World KLEMS initiative has been set up to promote and facilitate the analysis of growth and productivity patterns around the world, based on a growth accounting framework." The KLEMS methodology includes not only information and communications technology (ICT) and non-ICT capital, labour and human capital, and intermediate inputs, but also land and subsoil services contributions to GDP growth. The main results show that that the Argentine economy could not take advantage in the long run from positive spill overs. Nor could it benefit from special inputs and dynamic sectors in every macroeconomic regime during the last two decades. In conclusion, the paper discusses the kind of growth strategies Argentina could follow and the different scenarios that the country could attain after the global financial collapse in order to achieve sustainable growth.

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe.* Santiago de Chile: Naciones Unidas CEPAL, División de

Estadística y Proyecciones Económicas.
Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Argentina case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, New Zealand, Nicaragua, Panama, Peru, Spain, Sweden, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

Although Argentina had systematically been producing a large number of indicators related to sustainable development for some time, the process of developing a unique System of Sustainable Development Indicators did not start until 2004. It was initiated by the Secretariat of Environment and Sustainable Development (part of the Ministry of Health and Environment) under the National Environment Agenda 2004. The construction of the system of indicators benefited from the technical assistance of the Sustainable Development (SD) division of the European Commission for Latin America and the Caribbean (CEPAL) and involved a large degree of inter-institutional cooperation, involving 28 state organisations in a national network for sustainable development. The report describes the structure of the Network and presents the first publications of the SD indicators from 2005.

Santopietro, G. (1998) Alternative methods for estimating resource rent and depletion cost: the case of Argentina's YPF. *Resources Policy*, 24 (1), 39–48.
George Santopierto: gsantopi@runet.edu

https://www.cbd.int/financial/values/argentina-estimaterents.pdf

The paper discusses and critiques the various methods available for quantifying the depreciation of natural capital, including net price, El-Serafy's depletion cost, sustainability price, transaction value, and replacement cost. It also discusses the Miller and Upton method, which uses the market value of a firm's liabilities. With data from the privatisation of Argentina's state-owned oil enterprise YPF, the author uses these alternative measures to estimate the resource rent and depletion cost of Argentina's petroleum reserves. The author concludes that two of those methods, net price and transactions, overvalue the resource rent of petroleum reserves and the preferred method in this case should be the derivation of rent from the value of a firm's stock.

Barbados

Schlegelmilch, K. et al. (2010) Fiscal Reform in EC Development Cooperation*. Contract No 2008/160146/2 – Version 2 Final Report*. Soges Consortium.
Kai Schlegelmilch: kai.schlegelmilch@green-budget.eu

http://www.foes.de/pdf/20100929_Final%20Report%20-%20Environmental%20Fiscal%20Report%20-%20FINAL.pdf

This summary is for the Barbados case study only. For an overview of the entire project, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Burkina Faso, South Africa, Uganda, and Vanuatu, which can be found under their respective country sections.

The EC chose Barbados as one of five countries with good potential for implementing environmental fiscal reform (EFR), as part of the project "Fiscal Reform in EC Development Cooperation". Barbados is already applying some EFR instruments in the form of taxes on energy products and transport, and through an environmental levy. However, experience in Barbados with EFR has been limited so far. The report recommends additional and increased environmental taxes in the energy sector, and reforms of land taxation to help support environmental policies.

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe.* Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.
Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Barbados case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, New Zealand, Nicaragua, Panama, Peru, Spain, Sweden, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

Barbados is one of the countries voluntarily participating in the UN Commission on Sustainable Development programme for sustainable development indicators (SDI). The Ministry of Environment has been established a sub-programme with the following objectives: to ensure the effective participation of Barbados in the relevant UN processes; to evaluate the indicators; to develop national level indicators; to develop a framework for the gathering, analysis, and regular dissemination of environmental data; and to build awareness. The programme should include 10 primary IDS and 100 secondary IDS. However, there are some obstacles that have blocked the development of IDS in Barbados, such as problems with access to and sources of information, and infrequent data gathering.

Bolivia

Jemio, L. and Andersen, L. (2013) Insights from Bolivia's Green National Accounts. *Latin American Journal of Economic Development*, 19, 125-136.
Luis Carlos Jemio: lcjemiom@inesad.edu.bo

http://www.inesad.edu.bo/pdf/wp15_2010.pdf

The purpose of the paper is to demonstrate the usefulness of green national accounting to guide policy, especially in taxation. The authors use SEEA methodologies to calculate natural resource rents for seven different productive sectors and compare these figures to the level of producer taxes in each sector. The paper finds that the Bolivian government has only been able to capture the natural resource rents from the hydrocarbon sector whilst the natural resource rents in other sectors, such as mining, forestry, and agriculture, accrue to producers in the form of extra profits. The authors also calculate the evolution of different capital stocks over time in order to judge whether or not Bolivia could be considered sustainable in the current development model. They show that while natural capital declines over time, this is more than compensated for by the increase in produced capital. Therefore, at least during the period of analysis (1990-2007), development could be called weakly sustainable in the sense that the total stock of productive capital increased every single year. The authors conclude that the country's Green National Accounts should be extended and a formal system developed.

[The following document is written in Spanish.]

Jemio, L. (2011) *Cuentas Ambientales: medioambiente y economía en Bolivia.* La Paz: Plural Editores.
Luis Carlos Jemio: lcjemio@inesad.edu.bo

http://www.inesad.edu.bo/index.php/en/publicaciones/pub-books/55-publicaciones/libros/1059-cuentas-ambientales

This book presents a first, informal version of the Green National Accounts for Bolivia following the SEEA methodologies. It analyses seven different natural resource intensive productive sectors and estimates natural resource rents in each of these sectors at the aggregate level. It reports that, in 2008, natural resource rents constituted at least 18% of GDP, implying a "gift of nature" of that magnitude to the national economy. The book uses the SEEA methodology to divide the natural resource rents into a sustainable income component and a depredation component, allowing for the identification of which sectors are more or less sustainable. It also enables the estimation of the environmentally adjusted net domestic production, which adjusts GDP downwards due to depredation of natural resources.

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe.* Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.
Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Bolivia case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Brazil, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, New Zealand, Nicaragua, Panama, Peru, Spain, Sweden, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

Bolivia made only slow progress in the elaboration of sustainable development indicators up until 2001, despite its voluntary participation in the UN Commission on Sustainable Development (CSD) Sustainable Development Indicators (IDS) programme. Until 2001, its only initiative was the creation of the Environmental Information System (SIA). An important step forward was the creation of the National Information System for Sustainable Development (SNIDS) by the Ministry of Sustainable Development and Planning. The objective of this system is to facilitate the circulation and exchange of data and information between the different agencies of the Ministry of Sustainable Development and other government entities. Furthermore, the National Statistical Institute (INE) started in 2002 to integrate a chapter on environmental statistics into its Statistical

Yearbook, presenting indicators on eight environmental topics: climate and atmosphere, water, ground and soil, biota, solid waste, natural disasters, costs and environmental management, and environmental records.

Brazil

Macedo, R. et al. (2012) ***Land cover and land use in Brazil and Environmental-Economic Accounts System.*** **Instituto Brasileiro de Geografia e Estatistica.**
Rodrigo de Campos Macedo: rodrigo.macedo@ibge.gov.br

http://www.spatial-accuracy.org/MacedoAccuracy2012

This document describes a project that will provide statistics to reflect the changes which have occurred in Brazil's ecosystems. It will measure environmental assets and liabilities through land use and cover change mapping and incorporate this data into national accounts. The objectives are to produce a land use and land cover map for 2000 and 2010, evaluate the land use and land cover map, and detect and map the processes of changes that occurred in the time period. The article describes the methodology, including the data sources and procedures. The latter will include mapping, classifying, and making quantification and comparison data from different years; evaluating and identifying the process of change of land cover and land use; and providing historical series of the chosen years. It is expected that quantification related to the measurement of processes of land use and land cover change will be a prerequisite for its evaluation and subsequent inclusion in national accounts, which will enable a more realistic calculation of GDP.

[The following document is written in Spanish.]

Quiroga, R. (2007) ***Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe.*** **Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.**
Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Brazil case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, New Zealand, Nicaragua, Panama, Peru, Spain, Sweden, the United

Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

Brazil is one of the countries that participated voluntarily in the UN Commission on Sustainable Development (CSD) indicators programme. The initial coordinating institution was the Ministry of the Environment (MMA), later complemented by a network of state agencies. Since 2000, a special Commission of the MMA and the Brazilian Institute of Geography and Statistics (IBGE) have managed these indicators. After synthesising the relevant information from diverse institutions, such as universities, private associations, and institutions of the MMA, the first edition of Sustainable Development Indicators (ISD) was published in 2002. The original publication included 50 indicators, covering social, environmental, economic, and institutional dimensions. The Brazil ISD are currently published every two years, analysing areas that are related to health, education, population, the atmosphere, biodiversity, patterns of production and consumption, institutional capacity, and others.

Ferraz do Amaral, C., and Seroa da Motta, R. (1998) *Estimating Timber Depreciation in the Brazilian Amazon.* Forestry Department at the Food and Agriculture Organization (FAO): Planning and Statistics Branch Policy and Planning Division Forestry Department.
Claudio Ferraz do Amaral: cferraz@econ.puc-rio.br

ftp://ftp.fao.org/docrep/fao/005/AB601E/AB601E00.pdf

This case study examines the depreciation of the Brazilian Amazon due to informal, legal, and illegal frontier logging. The first section of the study examines the current forest conservation patterns and how they often promote informal and frontier logging, or at least conflict in a manner such that regulations cannot be enforced. The second section addresses accounting methodologies for calculating the deprecation of natural capital, which often do not reflect the situation accurately due to the inability to regulate and monitor informal logging sectors. This is followed by an economic assessment of timber exploitation and the effects of informal and frontier logging on formal logging markets and sectors. The study concludes that informal logging sectors negatively impact the supply and market value of the logging industry.

Canada

Wang, J. (2011) *Human Activity and the Environment: Economy and the environment*. Canada: Statistics Canada.
Jennie Wang: jw56@stanford.edu

http://www5.statcan.gc.ca/bsolc/olc-cel/olc-cel?catno=16-201-XWE&lang=eng

This report presents information on the relationship between Canada's economy and the environment. It analyses statistics on Canada's environment from an international perspective, presenting them on the following themes: natural wealth, natural resource stocks, flows of energy and materials, and environmental protection efforts. On the one hand, waste diversion, recycling, business spending on environmental protection, and stocks of crude bitumen (a type of petroleum) have increased. On the other hand, household emissions of greenhouse gases have increased while water yield (the water that replenishes the stocks of water contained in the country's lakes, rivers, and aquifers) has been depleted. However, significant efforts are being made to increase environmental protection efforts, such as the installation of low-flow shower heads and low-volume toilets in households.

INTOSAI (2010) *Environmental Accounting: Current Status and Options for SAIs.* Washington DC: International Organization of Supreme Audit Institutions (INTOSAI).

http://www.environmental-auditing.org/LinkClick.aspx?fileticket=s%2FFCvUzSK-sk%3D&tabid=128&mid=568

This summary is for the Canada case study only. For an overview of the entire report, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Australia, Botswana, China, Colombia, France, Germany, Mexico, Namibia, the Netherlands, the Philippines, and Sweden, which can be found under their respective country sections.

Canada began using environmental accounts in 1994 and updates many of these accounts annually. There are stock accounts for natural resources, flow accounts for energy and materials, and monetary accounts on environmental expenditures. Accounts are used widely for political decision-making, for example when determining the environmental impacts of new government policies.

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe.* Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.
Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Canada case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, New Zealand, Nicaragua, Panama, Peru, Spain, Sweden, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

Canada is a leading country in terms of the development and implementation of a National System of Environmental Indicators, as well as in providing relevant environmental information to aid in decision-making. The country has both a System of Environmental Indicators and a System of Environmental and Sustainable Development Indicators. This report describes the details of the evolution of both systems. The former system is guided by the following goals: to ensure the integrity of the ecosystem, to ensure the well-being and health of humans and of natural resources, and to investigate the underlying factors which affect these. The latter system formed part of a three-year programme led by the National Round Table on the Environment and the Economy and led to the publication of the first Canadian Environmental Sustainability Indicators report in 2005, which covered water quality, air quality, and greenhouse gas emissions.

Statistics Canada (2006) *Concepts, Sources and Methods of the Canadian System of Environmental and Resource Accounts.* Canada: Statistics Canada.

http://www5.statcan.gc.ca/bsolc/olc-cel/olc-cel?catno=16-505-G&lang=eng

This report presents an overview of the Canadian System of Environmental and Resource Accounts (CSERA), a framework for linking the economy and the environment through physical and monetary statistics. The framework has three components: Natural Resource Stock Accounts (NRSA) that measure the quantities of natural resource stocks and their changes due to natural and human processes; Material and Energy Flow Accounts (MEFA), which record, in physical terms, the flows of materials and energy between the economy and the environment; and Environmental Protection Expenditure Accounts (EPEA), which identify current and capital expenditures by business, government, and households for the purpose of protecting the environment. The authors note that the CSERA is a work-in-progress and identify several conceptual issues and data shortcomings to be addressed. For MRSA, these include the development of stock estimates for land areas that offer environmental services rather than raw materials (e.g. wilderness areas); for MEFA, the estimates besides those of greenhouse gas emissions; and for EPEA, the consolidation of data.

Anielski, M. (2001) Measuring the Sustainability of Nations: the Genuine Progress Indicator System of Sustainable Wellbeing Accounts. Paper presented at the *The Fourth Biennial Conference of the Canadian Society for Ecological Economics: Ecological Sustainability of the Global Market Place*, Montreal, Quebec, Canada, August.
Mark Anielski: anielski@oanet.com

http://www.anielski.com/Documents/Sustainability%20of%20Nations.pdf

This paper explores the Genuine Progress Indicator (GPI) system of sustainable well-being accounts, which combines parts of various well-respected progress indicators. In particular, it discusses the strengths, weaknesses, and opportunities of the GPI in terms of measuring the sustainability of the real wealth of nations. The paper also explores GPI accounting as a fiscal policy tool for guiding sustainable development. In order to complete these objectives, the authors study the case of Alberta, which is the first region where the GPI was implemented, containing 51 subaccounts that track economic, social, human health, and environmental well-being for the period 1961 to 1999. The results show an inverse relationship between GDP and GPI for the region: during the time period, as the GDP Growth Index increases, the GPI Well-Being Index decreases. The authors conclude by praising the indicator as an alternative or companion to GDP. They describe it as a practical tool for measuring the sustainable well-being of communities and nations, which provides a holistic management tool for human, social, natural, and produced capital to fulfil the spirit and goals of sustainable development.

Chile

O'Ryan, R. et al. (2005) Computable general equilibrium model analysis of economy-wide cross effects of social and environmental policies in Chile. *Ecological Economics*, 54 (4), 447–472.
Raúl O'Ryan: roryan@dii.uchile.cl

http://ideas.repec.org/a/eee/ecolec/v54y2005i4p447-472.html

This paper focuses on the key interrelations between the economic, social, and environmental elements of the sustainable development triangle in Chile. In particular, it reviews in detail past social and environmental reforms that have underlined important economic growth. The economy-wide effects of such reforms are simulated using the Computable General Equilibrium (CGE) model of ECOGEM-Chile. On the one hand, results show that environmental tax policies have negative social effects, although the impacts are dependent on the use of new revenues and levels of employment. Furthermore, of all the environmental policies used, it was found

that taxing PM10 (particulate matter) emissions yields better results than taxing SO_2 (sulphur dioxide) or N_2O (nitrous oxide) emissions. On the other hand, social policies do not show negative environmental impacts, and combined social and environmental policies improve results. The authors therefore suggest that specific compensating social policies would improve environmental policy acceptance, whilst also reducing poverty and/or strong income distribution disparities.

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe.* Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.
Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Chile case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Canada, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, New Zealand, Nicaragua, Panama, Peru, Spain, Sweden, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

The National Commission of the Government of Chile for the Environment (CONAMA) has been developing a system of regional sustainable development indicators corresponding to each of the 13 administrative regions of the country since 1997. This document describes the methodology of the elaboration of the indicators, as well as their division into four main "families": 1) physical-environmental support of the human economy, 2) access to and appropriation of human needs satisfiers, 3) systems of life support, and 4) social and institutional response. The document then lists the Regional Sustainable Development Indicators of Chile for each region, and describes proposals for the development of a set of national indicators. These national indicators will aggregate the regional ones, as well as incorporate previously developed national indicators that were elaborated in 2000 by the statistical institutions of Chile.

Figueroa, E. and Calfucura, T. (2003) Growth and green income: evidence form mining in Chile. *Resources Policy*, 29, 165-173.
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http://www.politicaspublicas.udp.cl/media/publicaciones/archivos/304/Documento_completo.pdf

The purpose of this paper is to estimate the true economic income of the Chilean mining sector. With Chile's economic growth mainly based on the exploitation and exportation of natural resources, the depletion of natural assets and environmental degradation have negatively affected the population's welfare. To add to the problem, GDP and NDP measures of the National Account System (NAS) do not take into consideration the depreciation of natural resources and the degradation of the environment. The article shows that it is necessary to correct the usual GDP measure for man-made capital depreciation plus the total loss of natural capital. The standard mining GDP measure of the NAS overestimates the economic income generated by Chile's mining sector during 1985-1996 by 31-36%.

Colombia

WAVES (n.d.) *Colombia*. [online] WAVES. [Accessed 5 June 2015].

http://www.wavespartnership.org

This summary is for WAVES project progress in Colombia only. An overview of WAVES is provided in the Multi-Country Reports and Projects Section of this document. Summaries of WAVES project activities in its four other core country partners—Botswana, Costa Rica, Madagascar, and The Philippines—can be found under their individual country sections.

Work in Colombia started in January 2011 with initial consultations with key institutions. A draft assessment report was presented at a WAVES workshop in September 2011, including a discussion of institutional issues, the state of knowledge in Colombia, data gaps and data availability, and a draft work plan. Colombia had already, prior to the WAVES initiative, introduced stock accounts for energy and mineral resources as well as expenditure accounts for environmental protection. It had also made some progress toward undertaking renewable resource accounting (water, forest, gas, and solid waste). The National Planning Department has further introduced the Environmental Satellite Account in order to value ecosystems nationally under the Natural Capital Project for Conservation International, Colombia.

Allebone-Webb, S. et al. (2013) *The Globe Natural Legislation Study. A Review of Efforts*. London: The Global Legislators' Organisation.
Sophie Allebone-Webb: sallebonewebb@wcs.org

http://www.globeinternational.org/images/natural-capital-study/GLOBE-Natural-Capital-Legislation-Study.pdf

This summary is for the Colombia case study only. For an overview of the entire study, please see the Multi-Country Reports and Projects and Reports section of this book. The study also includes country case studies for Botswana, Costa Rica, Georgia, Germany, Peru, the Philippines, and the United Kingdom, which can be found under their respective country sections.

Colombia does not have official figures for the value of natural resources in economic terms, but it has estimated an annual depreciation of 0.39% per year between 1990 and 2008. As a response to this, the Colombian government has placed 43% of the nation's land area under some kind of conservation status. As in most countries, Colombia's natural resources—forests, coal, oil, and other minerals—are being depleted. This presents a threat to biodiversity in addition to the threat from deforestation, floods, droughts, pollution, and climate change. To address these concerns the National Administrative Department of Statistics manages the nation's environmental services accounts, with the cooperation of the Ministry of Environment and Sustainable Development and several other organisations. Additionally, several Colombian agencies have developed natural capital and environmental services accounts. They have estimated, for example, that Colombia's carbon stocks are worth $900 million. Furthermore, the Colombian government produced a 2010-2014 National Development Plan that acknowledges the importance of natural capital and calls for increased conservation efforts.

[The following document is written in Spanish.]

Departamento Administrativo Nacional de Estadística (2012) ***Cálculo piloto de la cuenta de flujos físicos del agua: Sectores industria, manufacturera, y hogares.*** **Dirección de Síntesis y Cuentas Nacionales (DSCN)*. Grupo de Indicadores y Cuentas Ambientales*. Colombia: DANE.**

https://www.dane.gov.co/files/investigaciones/pib/ambientales/Flujos_agua.pdf

This document is a coordinated effort between Colombia's Statistical Division and the Bureau of Environmental Accounts. The goal of the study is to offer a standardised data output of concepts and tables and to put forward a tool that organises water data and shows its links to the economic system. The document explains the water normative framework in Colombia and the main components, definitions and classification of water accounts (SACE-Water). Then it continues to apply this framework to three sectors, focusing on their water use in physical terms: industry, manufacture, and households in Colombia. However, the document does not offer analyses of

the flows of these three sectors, nor a comparison or assessment among the three.

INTOSAI (2010) *Environmental Accounting: Current Status and Options for SAIs*. Washington DC: International Organization of Supreme Audit Institutions (INTOSAI).

http://www.environmental-auditing.org/LinkClick.aspx?fileticket=s%2FFCvUzSKsk%3D&tabid=128&mid=568

This summary is for the Colombia case study only. For an overview of the entire report, please see the Multi-Country Reports and Reports section of this book. The report also includes country case studies for Australia, Botswana, Canada, China, France, Germany, Mexico, Namibia, the Netherlands, the Philippines, and Sweden, which can be found under their respective country sections.

Colombia began its environmental economic accounting efforts in 1992. Since then, the country has developed physical and monetary asset accounts for oil, gas, and coal for the years 1994 to 2004; nickel, iron, and copper for 2000-2004; and forests for the years 1998-2001. Environmental expenditure accounts exist for the following sectors: government, manufacturing, recycling, agriculture, transportation, and mining. The government intends to expand environmental protection accounts to include sectors such as health and construction. Material flow accounts were developed using a National Accounting Matrix including Environmental Accounts (NAMEA) for minerals, oil, and forests for the years 2000- 2003, and for water for the year 2000. Finally, Colombia has developed indicators for air quality and water quality (1994- 2004). Currently, the country uses the information to monitor environmental expenses as part of government planning.

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe*. Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.
Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Colombia case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Costa Rica, the Dominican Republic, Mexico,

the Netherlands, New Zealand, Nicaragua, Panama, Peru, Spain, Sweden, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections. This report presents the details of the three main phases (before 2005) of the evolution of the many initiatives and efforts to develop sustainable indicators in Colombia. The first phase was the elaboration in 1996 of the first System of Indicators of Environmental Planning and Assessment (SIPSA) by the Environmental Policy Unit, which today is the Environmental Policy Division of the National Department of Planning. SIPSA served as a tool for monitoring advances in policies and actions outlined in the National Development Plan and resulted mainly in generating a conceptual framework for the design and construction of a system of 256 environmental indicators and 177 methodological sheets. In 1998, the formulation of the National Environmental Policy (1998-2002), which recognised the importance of empirical data for decision-making, encouraged the production of environmental indicators and proposed to integrate and unify all existing information. This led to the design and launch of a unified System of Indicators for Planning and Management of the Environment (SUIGA), which later served as the basis for the construction of the Environmental Sustainability Indicators System (SISA), developed during the third phase. This system comprises of 26 indicators divided into the principal categories of environmental supply, natural resources and environmental services demand, waste management, and institutions.

[The following document is written in Spanish.]

Departamento Administrativo Nacional de Estadística (2003) *Metodología de la Cuenta Satélite Ambiental (CSA).* Colombia: DANE.

http://www.dane.gov.co/files/investigaciones/pib/ambientales/Met_Cuenta_Satelite_Medio_Ambiente.pdf

This document is largely a translation of the UN SEEA publications. It presents the statistical standards and methodologies of different types of environmental accounting (of environmental assets, water, energy, and environmental expenditure) outlined in recent UN SEEA papers and outlines how and from where the data can be compiled in the Colombian case. It also presents some of the main results of the environmental accounting of 2010, including physical measurements of mineral assets (oil, gas, coal, and metals), physical measurements of water (stocks and fluxes), physical and monetary accounts of the energy sector (although including only that from natural gas), and monetary measurements of environmental expenditures (governmental environmental expenditure in 2010 was $3,000 billion pesos ($1.14 billion), and manufacturing industry was of $577 billion pesos/$218 million). This document demonstrates that the Colombian environmental accounts still consist mostly of physical measurements and require more progress in monetary

valuations. There is also no mention of accounts from periods prior to 2010, which are also absent from the DANE website of the Colombian satellite environmental accounts.

Costa Rica

WAVES (n.d.) *Costa Rica*. [online] WAVES. [Accessed 5 June 2015].

http://www.wavespartnership.org

This summary is for WAVES project progress in Costa Rica only. An overview of WAVES is provided in the Multi-Country Reports and Projects Section of this document. Summaries of WAVES project activities in its four other core country partners—Botswana, Colombia, Madagascar, and The Philippines—can be found under their individual country sections.

WAVES began dialogue with the Government of Costa Rica in May/June 2011. The Steering Committee was formalised in April 2012. In preparing the feasibility study, the Committee reviews Costa Rica's experience with natural capital accounting, assessed the current capacity and institutional support for the SEEA, and studied the feasibility of constructing natural capital accounts for minerals, soils, land, water, forests, fisheries, and coastal and marine resources. Workshops and meetings complemented these efforts, involving officials from the areas of policy, planning, and statistics to identify policy priorities. A Concept Note for WAVES Costa Rica was being drafted at the time of this report's writing and a country coordinator was being recruited. A summary of a related presentation can be found below.

Allebone-Webb, S. et al. (2013) *The Globe Natural Legislation Study. A Review of Efforts*. London: The Global Legislators' Organisation.
Sophie Allebone-Webb: sallebonewebb@wcs.org

http://www.globeinternational.org/images/natural-capital-study/GLOBE-Natural-Capital-Legislation-Study.pdf

This summary is for the Costa Rica case study only. For an overview of the entire study, please see the Multi-Country Reports and Reports section of this book. The study also includes country case studies for Botswana, Colombia, Georgia, Germany, Peru, the Philippines, and the United Kingdom, which can be found under their respective country sections.

Although Costa Rica is a leader in ecosystem protection, and in recent years has been one of

the few nations to reverse deforestation, its valuation of the environment is fragmented. It does not estimate the value of the stock or flow of natural resources relative to the economy. There is also no national ecosystem services assessment or accounting. An independent study from 2012 estimated that the value of natural resources lost per year was the equivalent of 0.14% of Gross National Income (GNI). National environmental statistics do exist, however, and they are collected by the National Statistics Agency and the Ministry of Environment and Energy. They have been compiling data for forestry, soil erosion, and fisheries since 1991. Furthermore, the Costa Rican government, alongside the United Nations' WAVES programme, is updating these accounts to international standards. Also, although comprehensive statistics do not exist, Costa Rica does have a large number of projects in which environmental services are paid for. These include hydroelectric power, ecotourism, carbon offset markets, and many more. Legislation protects natural resources through a ban on mining as well as a moratorium on natural gas and oil exploration.

Guzman, R. and Zamora, J. (2012) WAVES – Costa Rica. In*: Presentation to the WAVES Global Partnership Meeting*, Washington DC, The World Bank, 2-4 April.

http://siteresources.worldbank.org/ENVIRONMENT/Resources/CostaRica-WAVES_Costa_Rica.pdf

This document is part of the Wealth Accounting and Evaluation of Ecosystem Services (WAVES) project. The project has the following Core Implementing Partner countries: Botswana, Colombia, Costa Rica, Madagascar, and the Philippines. These were recently joined by Guatemala, Indonesia, and Rwanda. Information about the WAVES project can be found under the Multi-Country Reports and Projects section of this book.

This presentation was made to the WAVES Global Partnership Meeting of the World Bank. It begins with a summary of the demographic, macroeconomic, and environmental context of Costa Rica. It also summarises the activities undertaken in the previous seven months, including relevant consultations, a scoping report, and a technical workshop. The presentation then outlines lessons learned in terms of the current system of national accounts, data availability, reconciling national development strategies, the need for capacity building, and the role of WAVES in the sustainable development agenda. The presentation concludes with an outline of policy entry points for WAVES Phase 2 that include water, forest, marine, and energy resources, as well as the tourism sector. It end with a summary of major challenges to implementation and next steps.

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe*. Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.
Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Costa Rica case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, the Dominican Republic, Mexico, the Netherlands, New Zealand, Nicaragua, Panama, Peru, Spain, Sweden, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

This report analyses the progressive adoption of environmental indicators in Costa Rica. The process began with the construction of national level indicators, supported by the World Bank and other international organisations. This led to the formation of the System of Sustainable Development Indicators (SIDES), which has been implemented in Costa Rica by the Ministry for National Planning and Economic Policy (MIDEPLAN). It covers social, economic, and environmental indicators. Its principal objectives are: 1) to contribute to information dissemination that helps to extend and deepen the analysis of national development, 2) to serve as a connection between producers and consumers of information, and 3) to advance the elaboration of aggregate indicators on sustainable development.

Dominican Republic

[The following document is written in Spanish.]

Congreso Nacional de la República Dominicana (2012) *Ley orgánica de la estrategia nacional de desarrollo de la República Dominicana 2030.* Ley Nº1-12.

http://www.opd.org.do/images/stories/Poder_legislativo/LEY%20ORG%C3%81NICA%20DE%20LA%20ESTRATEGIA%20NACIONAL%20DE%20DESARROLLO.pdf

The Law Nº1-12 outlined in this document includes several general objectives for the Dominican Republic's National Strategy of Development for 2030. One of the "action lines" of the law's fourth general objective promotes environmental accounting in the near future of the Dominican

Republic: to develop systems of monitoring, evaluation, and valuation of the state of the environment and the natural resources at national, regional, and local levels, starting with the consolidation of an Environmental Information System that would include the valuation of the natural resources in national accounts.

[The following document is written in Spanish.]

Ministerio de Medio Ambiente y Recursos Naturales (2011) *Resumen ejecutivo del proyecto establecimiento del sistema de cuentas ambientales y económicas integrado, con énfasis en el recurso agua, en la República Dominicana.* Dirección de Planificación y Desarrollo.

http://www.ambiente.gob.do/Transparencia/Proyectos/Proyectos/Proyectos%20Centrales/Resumen%20Ejecutivo%20Proy%20Ctas.AmbientalesSNIP4325pdf.pdf

This document is an executive summary of a pilot project in the Dominican Republic to establish a system of integrated environmental and economic accounts, with emphasis on water resources. The project used the methodology outlined in the UN manual on integrated environmental accounting for water resources and was implemented by several national institutions such as the Central Bank. The study chose a site in the east of the country where water is crucial to local tourist services. The project aimed to evaluate the availability of natural resources and their use in production and consumption, in order to include natural capital into the national accounts. The main body of this document explains the project in terms of preliminary studies, project financing, and division of responsibilities.

Ecuador

Kellenberg, J. (1996) Accounting for Natural Resources in Ecuador: Contrasting Methodologies, Conflicting Results*. Environmental Economics Series, No. 41*. Environment Department, World Bank.
John Kellenberg: jkellenberg@ifc.org

http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/1999/09/14/000178830_98101912354092/Rendered/PDF/multi_page.pdf

This study examines the natural resource depletion in Ecuador from 1971 to 1990, particularly that of oil reserves. It uses two natural resource accounting (NRA) methods, the Depreciation Method and the User Cost Method, to measure the economic value of natural capital depletion. The

Depreciation Method uses techniques similar to those used to value the decline in productivity of fixed capital in the valuing of natural capital depreciation. It subtracts the economic value of natural capital depletion from the Net Domestic Product (NDP) to estimate the environmentally-adjusted NDP (this requires the creation of physical accounts). The User Cost Method divides net revenues from the sale of exhaustible resources into a capital element—the user cost—that represents the erosion of capital, and a value-added element, which represents the true national income. It differs from the Depreciation Method in that it does not subtract the value of natural capital depletion from NDP. The study first examines Ecuador's macroeconomic performance from 1971 to 1990 and then calculated the value of natural capital depletion of Ecuador's petroleum sector. It estimates that between 1972 and 1990 natural capital depreciation totalled $7.8 billion (in 1987 dollars) according to the Depreciation Method, and $16.2 billion (more than double) according to the User Cost Method. The next section incorporates the economic value of natural capital depletion into Ecuador's national macroeconomic accounts while also offering indicators of environmentally sustainable development. The last section addresses policy implications related to the depletion of Ecuador's oil reserves.

Guatemala

WAVES (n.d.) *Guatemala*. [online] WAVES. [Accessed 3 June 2015].

http://www.wavespartnership.org/en/guatemala

Guatemala recently joined the Wealth Accounting and Evaluation of Ecosystem Services (WAVES) project as a Core Implementing Partner country. Other partners are Botswana, Colombia, Costa Rica, Madagascar, and the Philippines, which were also recently joined by Indonesia, and Rwanda. Information about the WAVES project can be found under the Multi-Country Reports and Projects section of this book.

[The following document is written in Spanish.]

Instituto de Agricultura, Recursos Naturales y Ambiente (2011) *Sistema de Contabilidad Ambiental y Económica Integrada: Síntesis de hallazgos de la relación ambiente-economía.* Segunda Edición. Guatemala: IARNA.

http://biblio3.url.edu.gt/IARNA/SERIETECNINCA/26-2.pdf

This document is the first release of preliminary results for the Guatemalan SEEA (SCAEI). It briefly describes the context of the SEEA in Latin America and outlines the history of the Guatemalan

initiative. The Guatemalan accounts have all four components recommended by the UN: asset accounts, fluxes accounts, environmental expenditure/transactions, and the compilation of environmental-economic aggregates (e.g. the environmentally-adjusted GDP), although not for all natural resources. Forest accounts showed unsustainable results with forest stocks significantly reduced, while their monetary value increased along with the rate of economic use. The results for water showed high demand and use, especially by the agricultural sector which contributes relatively little to the country's GDP. There was no longitudinal data for water. Total energy consumption increased by roughly 10% between 2001 and 2006, with electricity services being the major user; total CO_2 emissions increased by around 8% from 2001 to 2005, although energy efficiency (energy/dollar) improved for all industries. For subsoil/mineral resources, the study found that Guatemala's oil has a lifespan of between 52 and 67 years and that the most abundant metallic mineral is gold, while gesso and marble are the most abundant and least extracted non-metallic minerals. For fishing, overall extraction decreased significantly between 2002 and 2006, but its value and participation in the GDP increased. The report does not present sustainability/efficiency calculations for this category. Finally, government environmental expenditure decreased between 2001 and 2006 and local governments' expenditures focused principally on residue management. The authors make five conclusions: 1) natural stock is decreasing and becoming more contaminated; 2) fluxes' efficiency levels are disparate; 3) there is low government interest in environmental protection and sustainable management; 4) the deforestation-adjusted GDP reflects unsustainable growth; and 5) there are two conditions for the advancement of the SCAEI: better creation, administration, and processing of information, and the strengthening of administrative arrangements between the entities responsible for the SCAEI.

Guyana

Sullivan, C. A. (2002) Using an income accounting framework to value non-timber forest products. In: Pearce, D., Pearce, C., and Palmer, C. (Eds.) *Valuing the environment in developing countries: case studies*. Cheltenham, UK: Edward Elgar, 377-405.

Caroline Sullivan: caroline.sullivan@scu.edu.au

ftp://ftp.fao.org/agl/emailconf/wfe2005/dp_valuation_chapter.pdf

The aim of this paper is to demonstrate a method for assessing the use value of non-timber forest products (NTFPs), using an income accounting framework. By focusing on these NTFPs (e.g. fruits, animal products, and organic chemicals originating from plants), it is possible to demonstrate an extra dimension to forest valuation that is often ignored. The land-use strategies of many tropical countries have evolved from analyses that are based on rich country perspectives and, as

a result, many of them have been found to be unsustainable. Methodologies currently used for environmental valuation in developing countries are often inappropriate and subject to serious degrees of error, which inevitably has important policy implications. In particular, valuations of resources in tropical forest ecosystems often fail to take account of the full spectrum of forest products and services, since many of these have traditionally been ignored as being insignificant or non-marketed. This paper attempts to begin to address this methodological misalignment by conducting a survey of 143 households in three Amerindian villages in North West Guyana. The project estimates the value of forest inputs from the Net Village Product and includes calculation of household labour inputs, capital contribution to household and villages economies, and household and farm outputs. The study also considers the ecosystem service contributions to the human economy from hunting and trapping, fishing, palm heart cutting, forest food drinks, roofing materials, medicinal plants, fire wood, and handicraft materials. The authors show that "the total gross value of output from the three villages is G$98.2 million ($473,000) and of this, the net value added from nature is G$46 million ($222,000) this representing the value generated by the anthropogenic use of non-timber products from the forest… [and that] [t]aken across the total population of the villages of this study, the monetary value of forest use per household is G$322,327 per annum ($1,555)" (p.17-19).

Honduras

[The following document is written in Spanish.]

SERNA/DGA and CONABISAH (2005) *Estrategia Nacional de Bienes y Servicios Ambientales de Honduras.* National Strategy for Environmental Goods and Services.

http://www.upnfm.edu.hn/bibliod/images/stories/Maestria_MA/GESTION%20AMBIENTAL%208.pdf

This document presents the Honduras National Strategy for Environmental Goods and Services. The strategy was developed by the Secretariat of Natural Resources and Environment (SERNA) and the National Committee on Environmental Goods and Services of Honduras (CONABISAH) to help construct the normative and institutional basis for the deployment of the Payment for Environmental Services mechanism at the local, municipal, "supramunicipal", and national levels. Objectives include: the sustainable development of the tourism sector, the use of international environmental quality standards, incorporating stringent environmental criteria for clean production in the public and private sectors, prioritising investments in environmental goods and services, and integrating the value of environmental goods and services into the system of

national accounts.

Jamaica

Ruitenbeek. R. and Cartier, C. (1999) World Bank Research Committee Project RPO# 682-22 *"Marine System Valuation: An Application to Coral Reef Systems in the Developing Tropics".* Washington DC: World Bank.
Jack Ruitenbeek: hjr@island.net

https://www.cbd.int/financial/values/jamaica-valuation-wb.pdf

The aim of this study is to construct improved estimates of the economic benefits of coral reefs in Montego Bay, Jamaica to aid policymakers in managing and protecting coral reefs. The study endorses the use of a Total Economic Value approach, which includes direct use, indirect use, and non-use values; although the authors state the need to recognise that such values are frequently non-additive. Their results imply a net present value of approximately $400 million for the Montego Bay reefs. The authors conclude that biodiversity valuation is best implemented within a specific policy context and that specific policy questions or analytical issues should drive the choice of any given technique. Optimal policy choices are often very sensitive to assumptions regarding non-linear ecological-economic linkages, interdependencies and redundancy in the species discovery process, cost interdependencies in the research and development (R&D) process of bringing new products to market, and ecosystem yield in terms of species-area relationships for coral reef systems. They end by noting that substantial work also remains to be done in the area of risk analysis and industry structure.

Mexico

[The following document is written in Spanish.]

Instituto Nacional de Estadística y Geografía (2010) *Sistema de Cuentas Económicas y Ecológicas de México 2003-2008.* Mexico: INEGI.

http://www.inegi.org.mx/prod_serv/contenidos/espanol/bvinegi/productos/derivada/economicas/medio%20ambiente/2003-08/SCEEM_2003-2008.pdf

The major aim of the Mexican SEEA system is to measure natural assets and relate the measurement to economic data in order to calculate the environmentally-adjusted GNP (PINE). This 2010 report

builds on the 2006 report by the National Institute of Statistics and Geography (INEGI), which is included below, and comes to many of the same conclusions. This 2010 report uses five methods to assign monetary value to the non-produced natural assets: the Net Price Method, the User Cost Method (also known as the El Serafy Method), and Shadow Pricing calculate depletion, while the Maintenance Cost Method calculates degradation. Lastly, the report also calculates the expenditure on environmental protection. It shows that, over 2003-2008 period, degradation costs have decreased from 7.4% of GDP to 6.3% and depletion costs have oscillated between 1.4% and 3.0% of GDP. The difference between the environmentally-adjusted economic indicators (the PINE and the PIBE) in relation to the total GNP and GDP has decreased over the studied period, demonstrating that the economy became slightly more sustainable. However, if observed separately from the GNP and GDP, both depletion and degradation increased in absolute terms. The results also show an increase in environmental expenditure from 0.61% to 0.8% of GDP. The document discusses the current innovations of the Mexican SEEA, which includes attempts to establish international statistical standards and to develop Material Flow Accounts. The conclusion states that the Mexican SEEA has been successful in contributing to a better understanding of the sustainability of the Mexican economy and is a valuable and promising system, although it still needs improvement.

INTOSAI (2010) ***Environmental Accounting: Current Status and Options for SAIs.*** **Washington DC: International Organization of Supreme Audit Institutions (INTOSAI).**

http://www.environmental-auditing.org/LinkClick.aspx?fileticket=s%2FFCvUzSK-sk%3D&tabid=128&mid=568

This summary is for the Mexico case study only. For an overview of the entire report, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Australia, Botswana, Canada, China, Colombia, France, Germany, Namibia, the Netherlands, the Philippines, and Sweden, which can be found under their respective country sections.

Mexico has used environmental accounts since 1985. These include accounts cover asset accounts for minerals, energy, air, soil, and water. They also produced a pilot study for determining environmental protection expenditures. The accounts have been used to adjust national income by deducting resource use and pollution.

[The following document is written in Spanish.]

Quiroga, R. (2007) ***Indicadores ambientales y de desarrollo sostenible: avances y perspectivas***

para América Latina y el Caribe. **Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.**
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http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Mexico case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, the Netherlands, New Zealand, Nicaragua, Panama, Peru, Spain, Sweden, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

Mexico participated in the 1997-1999 pilot programme of the UN Commission on Sustainable Development (CSD) that aims at establishing a set of sustainable development indicators. Mexico has elaborated 113 of the 134 indicators proposed by the CSD and is particularly strong in the institutional, social, and economic areas because the country has produced corresponding indicators for some time. However, the availability and completeness of the environmental indicators is lower given that they have been developed only recently and even basic environmental information is not always available. There are several lessons to be learned from the Mexican experience: the need to refine the methodology of information collection in order to clarify availability and coverage of data, the necessity to link the analysis of indicators to national priorities, and the use of complementary tools to the indicators proposed by the CSD, such as geo-referenced data and maps to support the decision-making process. The results of Mexico's sustainable development indicators were first published in 2000. Since 2005, Mexico has published and systematically updated statistical information related to the environment in the "Sistema de Información Ambiental y de Recursos Naturales" (Environmental Information and Natural Resources System).

[The following document is written in Spanish.]

Instituto Nacional de Estadística y Geografía (2006) ***Sistema de Cuentas Económicas y Ecológicas de México 1999-2004.*** **Mexico: INEGI.**

http://www.inegi.gob.mx/prod_serv/contenidos/espanol/biblioteca/abrepdf.asp?upc=702825164102

The major aim of the Mexican SEEA system is to measure natural assets and relate the measurement to economic data in order to calculate the environmentally-adjusted GNP (PINE). Based on the natural resources data, the system also calculates environmental degradation and depletion of soil (stock, pollution, and erosion), water (stock and pollution), oil, and air (pollution). Mexico uses three methods to assign monetary values to the non-produced natural assets: the Net Price Method and User Cost Method (also known as the El Serafy Method) to calculate depletion and the Maintenance Cost Method to calculate degradation. Over the 1994-2004 period, degradation costs decreased from 9.9% of GDP to 8.3% and depletion costs remained stable at around 1% of GDP. The difference between the environmentally-adjusted economic indicators (the PINE and the PIBE) in relation to the total GNP and GDP has decreased over the studied period, demonstrating that the economy became slightly more sustainable. However, if observed separately from the GNP and GDP, both depletion and degradation increased in absolute terms. The conclusion states that the Mexican SEEA has been successful in contributing to a better understanding of the sustainability of the Mexican economy and is a valuable and promising system, although it still needs improvement.

[The following document is written in Spanish.]

Rivera, P., and Foladori, G. (2006) Reflexiones sobre la contabilidad ambiental en México. *Economía, Sociedad y Territorio*, VI (21), 177-217.
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http://www.redalyc.org/articulo.oa?id=11162108

This article assesses the two Mexican systems for measuring sustainability: the System of Economic and Ecological Accounts (SCEEM) and the Sustainable Development Indicators (IDS) system. The IDS consist of 113 indicators (of the 134 proposed), divided between environmental, economic, social, and institutional. (For a more detailed description of the SCEEM, see the above summaries of the 2006 and 2010 INEGI documents). This article assesses the gravity of the environmental situation based on the results of the calculations of the PINE (environmentally-adjusted-GDP) and the IDS. The PINE (the total cost of environmental depletion and degradation) averaged out to 10.5% of the GDP, while environmental expenditure amounted to only 0.53% of the GDP. The authors show that the results of these calculations are in accordance with two other sustainability measurements: the Índice de Sustentabilidad Ambiental (ISA) developed by Pearce and Atkinson (1993) and the Environmental Sustainability Index (ESI), an initiative of the World Economic Forum that is calculated by Yale and Columbia Universities. The authors' offer the following critiques of the Mexican approaches: 1) the SCEEM is not transparent in terms of

choices of valuation methodologies or the variables used for natural asset valuations, nor in how the national data were aggregated from municipal and state data; 2) the SCEEM methodology is biased towards the environment, ignoring the social aspects of environmental depletion and degradation (e.g. poverty and inequality), which the IDS does consider but with little efficacy. The "social failure" of the SCEEM is not compensated by the IDS, since the SCEEM calculates an aggregate indicator (the PINE) while the IDS is a compilation of many indicators that are not objective enough. The conclusion is that together the SCEEM and the IDS are a limited way of assessing sustainable development in Mexico.

[The following document is written in Spanish.]

Vázquez, F. A. (2004) Medición del Desarrollo Sustentable, Reto de Las Cuentas Nacionales: La Experiencia de México en el Cálculo del Producto Interno Bruto Ecológico. *Problemas del Desarrollo*, 35 (139), 93-119.

Francisco Almagro Vázquez: falmag@hotmail.com

http://www.redalyc.org/articulo.oa?id=11825939005

This article assesses the advances and challenges of environmental accounting, especially regarding sustainability indicators, with a specific focus on Mexico's experience. It explores the relationship between growth and development, arguing that sustainable development requires many more results than what has been achieved by environmental accounting and that a new sustainable development paradigm is needed. However, it also argues that there has been substantial enrichment of the SEEA methodology since 1993, which has demonstrated its importance in understanding environmental problems. The analysis of the Mexican case (drawn form a compilation of INEGI - Mexico statistics institute – publications from 1985 to 2001) shows large weaknesses in Mexico's sustainability. For instance, Mexican society only revokes 3.3% of its environmental damage. The authors point two major challenges. Firstly, there is a need to improve the SEEA's valuation methods since natural goods are not typically commercialised in the market. Meanwhile, the resources that are commercialised often do not express their full value. Secondly, the current methodology still fails to provide good indicators that allow us to compare the evolution of a certain economy since it does not provide a comparable ecological GDP. The first sections describe the emergence of environmental accounting in the global development arena and the appendix offers a more advanced and mathematical description of the environmental accounting methodology, including the calculation of the ecological GDP.

Nicaragua

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe.* Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.
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http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Nicaragua case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, New Zealand, Panama, Peru, Spain, Sweden, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

Nicaragua started to develop a System of Environmental Indicators in 2000 when it created the National System of Environmental Information (SINIA). This is administered by the Ministry of the Environment and Natural Resources (MARENA) and is integrated with public institutions, academics, and nongovernmental organisations. Its tasks include generating periodic reports on the state of the environment, organising basic regional and municipal environmental indicators that are useful for the implementation and development of various management instruments, and providing environmental indicators for the creation of environmental accounts that are to be integrated into the country's national accounts. At the time of publication of this report (2007), SINIA had also published two national reports on the State of the Environment (2002, 2004).

Panama

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe*. Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.
Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Panama case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, New Zealand, Nicaragua, Peru, Spain, Sweden, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

This report presents the construction process of environmental indicators in Panama based on the country's Environment Law of 1998. The process began in 2004 with the creation of the Inter-Institutional System of the Environment (SIA), led by the National Authority for the Environment (ANAM). The system contains 20 indicators divided into 9 thematic groups. The first stage of the process culminated in 2005, when an electronic publication entitled "Environmental Indicators of the Republic of Panama" made the indicators public. In 2006, the SIA published the results of the development process of the environmental indicators, including definitions of the indicators, the conceptual framework, and the implementation phases. Furthermore, it created a "construction and maintenance" platform to help develop the environmental indicators and to prepare the system for the second phase of implementation.

Paraguay

Naidoo R. and Ricketts T. (2006) Mapping the Economic Costs and Benefits of Conservation. *PLoS Biol,* 4 (11), e360.
Robin Naidoo: robin.naidoo@wwfus.org

https://www.cbd.int/financial/values/paraguay-economics.pdf

Recognising that resources for biodiversity conservation are severely limited and investment must be strategic and efficient, this paper conducts a spatial evaluation of the costs and benefits of conservation for a landscape in the Atlantic forests of Paraguay. It considers five ecosystem services: sustainable bush meat harvest, sustainable timber harvest, bio-prospecting for pharmaceutical products, existence value, and carbon storage in aboveground biomass. It compares the five indicators with estimates of the opportunity costs of conservation. Results find a high degree of spatial variability in both costs and benefits over the relatively small (3,000 km^2) landscape. Benefits exceeded costs in some areas, as with carbon storage, but in other cases the benefits associated with conservation were more modest and exceeded costs only in protected

areas and indigenous reserves. This cost-benefit information is used to show that one potential corridor between two large forest patches had net benefits that were three times greater than two otherwise similar alternatives. The author concludes that spatial cost-benefit analysis can be a powerful tool in conservation planning and can help understand the synergies between biodiversity conservation and economic development when the two are indeed aligned and the trade-offs involved are often times not clear.

Peru

Allebone-Webb, S. et al. (2013) *The Globe Natural Capital Legislation Study*. Washington DC: The Global Legislators' Organisation.

Sophie Allebone-Webb: sallebonewebb@wcs.org

http://www.globeinternational.org/images/natural-capital-study/GLOBE-Natural-Capital-Legislation-Study.pdf

This summary is for the Peru case study only. For an overview of the entire study, please see the Multi-Country Reports and Projects section of this book. The study also includes country case studies for Botswana, Colombia, Costa Rica, Georgia, Germany, the Philippines, and the United Kingdom, which can be found under their respective country sections.

This report shows that Peru's natural capital generated $15.3 billion dollars of services in 2009. This includes $8 billion from agriculture, forestry, and livestock; $4.9 billion from hotels and restaurants; $2.5 billion from energy and water; and $864 million from fisheries. Ecosystems are extremely diverse and biodiversity itself is estimated to contribute 22% of GDP, supporting fisheries, agriculture, tourism, and pharmaceuticals industries. Threats to the Peruvian economy include climate change, deforestation, mining, pollution, and mass tourism. Peru ranks third of all countries in terms of climate change vulnerability, partly due to its dependence on agriculture and fishing. The Environment Ministry is the agency responsible for environmental accounting and it has a dedicated division for this purpose: the Valuation and Financing Division. The division provides data to the ministry through: a National Heritage Inventory, capacity building for valuation, studies on valuation, studies on public spending on natural resources, and compensation mechanisms for environmental services. Peru has been estimating environmental costs for hydrocarbons and mining since 2006 and 2010, respectively. In 2011, the Ministry began standardising its environmental account methodologies in line with the SEEA. The work is preliminary but covers soil, fisheries, forestry, biodiversity, spending on environmental protection, and several other areas. The government supports a number of projects to create markets for environmental services such as water consumption fees and access to ecotourism areas. It has

also legally required environmental assessments for certain projects as early as in 2001.

Figueroa, E. et al. (2010) Green accounting and sustainability of the Peruvian metal mining sector. *Resources Policy*, 35 (3), 156-167.
Eugenio Figueroa: efiguero@econ.uchile.cl

http://politicaspublicas.udp.cl/media/publicaciones/archivos/301/Documento_completp.pdf

This paper corrects the measure of economic income generated by Peru's mining sector for the period 1992-2006, as calculated by the National Account System (NAS), by taking into account the depreciation of natural resources and environmental degradation. The authors present a formal model to correct the traditional economic measures, explain the chosen approaches to value the depreciation of natural resources, and apply a model of "sustainability and income" based on real data. The paper presents tables and graphs detailing the capital and resource depreciation results for each year, the environmental degradation each year, and other economic factors. For instance, total net natural capital loss that includes environmental degradation, resource depreciation, minus resource discovery has increased from $1,280 million in 1996 to $4,176 in 2006. The authors discuss the implications of these results for mining taxes and economic sustainability in Peru. They conclude that the conventional estimate of economic income is significantly higher than the corrected estimate calculated in this paper. For example, for the year 2006, the authors adjust Peru's GDP by half from $8,848 million to $4,444 according to one of the adjustment methods (the other two methods produce very similar results). They argue that although it seems necessary to introduce a tax on the mining sector to make the country´s economy sustainable, the issue is complex as it also depends on how the central and local governments spend the revenues. Finally, the authors suggest that the National Accounts System of Peru should be altered to incorporate the depreciation of natural resources and environmental degradation, although this will only be possible if more statistical data for valuing natural resources and the environment become available.

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe*. Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.
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http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Peru case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, New Zealand, Nicaragua, Panama, Spain, Sweden, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

Peru's National Environmental Council (CONAM) promotes and consolidates environmental information. Based on the framework provided by the 2004 law for a National System of Environmental Management, Peru has initiated a process of elaboration of environmental indicators at the national and regional levels. CONAM has been producing "State of the Environment" reports, concentrating on the priority areas of air, water, soil, energy, solid waste, noise, forests, biodiversity, and pastures, which are covered by 119 environmental indicators. This report describes the process of elaboration of the environmental indicators at the national level and discusses the relevant publications by CONAM and the National Institute of Statistics and Informatics (INEI), which include the monthly "Technical Report on Environmental Statistics".

United States

Schaefer M. et al. (2015) Nature as capital: Advancing and incorporating ecosystem services in United States federal policies and programs. *Proceedings of the National Academy of Sciences of the United States of America*, 112 (24), 7383-7389.
Mark Schaefer: markschaefer24@msn.com

http://www.pnas.org/content/112/24/7383.full

This article describes the process of incorporating ecosystem services into United States policies at the federal level. The article begins by describing the history of natural capital accounting in the United States and the country's move to incorporate ecosystem services assessments into policymaking. The next section describes the working groups, reports, and policies initiated by various governments in the United States. Despite the activities of the current and previous federal governments, few federal agencies are required to incorporate ecosystem services considerations into program planning. However, many have begun to do so on a voluntary basis, motivated by several factors such as enhancing investment in natural resource management. The authors highlight the importance of leadership, capacity and training, and communication for ensuring that federal agencies can successfully incorporate ecosystem services into their planning. They then discuss the importance of collaboration between government, academia, nongovernmental

organisations, and industry, providing several examples of the concepts and tools contributed by each of these groups to the effort. The closing section contains recommendations to ensure that progress continues in the field of ecosystem services accounting in the United States.

Muller, N. et al. (2011) Environmental Accounting for Pollution in the United States Economy. *American Economic Review,* 101 (5), 1649-75.
Nick Muller: nmuller@middlebury.edu

https://www.aeaweb.org/articles.php?doi=10.1257/aer.101.5.1649

This study presents a framework for including environmental externalities into a system of national accounts. The paper estimates the air pollution damages for each industry in the United States, using an indicator called Gross External Damage (GED). It uses an integrated assessment model to quantify the marginal damages of air pollution emissions for the United States. Solid waste combustion, sewage treatment, stone quarrying, marinas, and oil and coal-fired power plants produce air pollution damages that are larger than their economic value. The largest industrial contributor to external costs is coal-fired electric generation.

Kissinger, M., and Rees, W. E. (2010) Importing terrestrial biocapacity: The US case and global implications. *Land Use Policy*, 27 (2), 589-599.
Meidad Kissinger: mkissing@interchange.ubc.ca

http://www.sciencedirect.com/science/article/pii/S0264837709000866

This article argues that globalisation, which enables people to consume goods from all over the world rather than relying only on their local resources, removes people's awareness of the environmental degradation that their consumption causes; since they cannot see the negative effects of their consumption, they do not think about them. The authors perform an analysis of USA imports, presenting a method that takes into account the impacts of these imports on the ecosystems of the countries from which the goods are exported. Their method includes three steps: identifying and quantifying renewable resource commodities, identifying the source countries, and estimating the ecosystem area of the exporting country that is devoted to producing these exports. The study covered 59 countries and accounted for 10 different products, such as meat, wood products, and vegetables. The results show that the total area of land associated with imported food products is equivalent to the area of Germany, Italy, Spain, and the UK combined, and that the USA is becoming increasingly reliant on foreign imports in order to satisfy consumer demand. This study can contribute towards the implementation of policies for sustainable trade

and consumption, such as ecologically sensitive trade agreements and resource depletion taxes.

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe*. Santiago de Chile: Naciones Unidos CEPAL, División de Estadística y Proyecciones Económicas.
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http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the United States case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, New Zealand, Nicaragua, Panama, Peru, Spain, Sweden, the United Kingdom, and Venezuela, which can be found under their respective country sections.

The USA began constructing a system of sustainable development indicators in the 1990s; with the first experimental set of indicators was completed in 1998 and consists of 40 economic, environmental, and social indicators. These were divided into 20 diverse themes covering economic, social, and environmental well-being. The development of environmental indicators started in 2001 with the first set of indicators launched in 2003, consisting of 120 indicators separated into the themes of water, air, land, human health, and ecosystems. This report tracks the evolution of both the sustainable development and environmental indicators, and their associated publications.

Uruguay

[The following document is written in Spanish.]

Dirección Nacional de Medio Ambiente, República Oriental de Urugay (2014) *V Informe Nacional a la Conferencia de las Partes del Convenio de Diversidad Biológica.*

https://www.cbd.int/doc/world/uy/uy-nr-05-es.pdf
Uruguay, as a Party to the Convention on Biological Diversity (CBD), was required to submit its fifth national report on the value of biodiversity by March 2014. Reports by all member countries will help gage progress implementation of the Strategic Plan for Biodiversity 2011-2020. Uruguay's

fifth report is divided into five sections. The first section focuses on the progress the country has made in terms of knowledge on the state of biodiversity in Uruguay, as well as the ecosystem services of grasslands, native forests, marine ecosystems, and many others. Section two describes the state of implementation of the National Strategy for Biological Diversity, the progress that has been achieved, and the establishment of National Goals for Biological Diversity. The third section offers a preliminary analysis of Uruguay's contributions to the Aichi Goals, the CBD's Strategic Plan, and the Millennium Development Goals (MDGs). Sections four and five are annexes that list Uruguay's endangered species, and list and describe workshops held in preparation for the fifth report.

Piaggio, M. et al. (2014) Greenhouse Gas Emissions and Economic Structure in Uruguay. *Economic Systems Research*, 26 (2), 155-176.
Emilio Padilla: emilio.padilla@uab.es

http://www.tandfonline.com/doi/abs/10.1080/09535314.2013.869559

This paper uses input-output analysis to identify the key sectors in greenhouse gas (GHG) emissions in the Uruguayan economy. Responsibility for emissions in each sector is decomposed into an own component generated during the activities of the sector and an indirect component generated by the induced activities in other sectors. The authors point out that this is an important aspect to consider when designing mitigation policies that are appropriate, considering the non-place-specific nature of pollution. Technical improvements and best practices are effective only when applied to directly polluting sectors, while demand policies may be more appropriate for indirectly polluting sectors. The paper also analyses the pollution generated during the production of exports and shows that demand policies should be effective in the building industry, hotels and restaurants, the wholesale and retail trade, and in the repair process of motor vehicles and motorcycles. The authors also conclude that methane and nitrous oxide emissions are mainly the consequence of production for exports, while carbon dioxide emissions are mainly driven by production for domestic consumption.

Venezuela

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe*. Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.

Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the Venezuela case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, New Zealand, Nicaragua, Panama, Peru, Spain, Sweden, the United Kingdom, and the United States of America, which can be found under their respective country sections.

Venezuela participated in the Sustainable Development Indicators (IDS) elaboration programme by the Commission on Sustainable Development (CSD), with the Center for Statistics and Environmental Information (under the Ministry of Environment and Renewable Natural Resources) serving as the focal point. This center produced the first "State of the Environment" report in 1995. Out of all the CSD indicators, Venezuela chose a total of 33 indicators that were relevant to national priorities. However, due to limited time availability, only 13 have been evaluated and included in this report. Moreover, information on these indicators is limited, with the Ministry of Planning and Development including only the water indicator in its online system of indicators (along with social indicators). Also, the National Institute for Statistics, whose objective is the creation and consolidation of an integrated system of Environmental Statistics of Venezuela, only offers access to 16 environmental indicators that are based on national census data.

Countries not included

No relevant works were found for Antigua and Barbuda, Bahamas, Belize, Cuba, Dominica, El Salvador, French Guiana, Grenada, Haiti, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, and Trinidad and Tobago.

4. Middle East and North Africa (MENA)

MENA (General)
Algeria
Bahrain
Djibouti
Egypt
Iran
Iraq
Israel
Jordan
Kuwait
Lebanon
Libya
Morocco
Oman
Qatar
Saudi Arabia
Syria
United Arab Emirates

4. Middle East and North Africa (MENA)

Overview

Most of the countries in the MENA region depend heavily on the extraction of non-renewable natural resources and face severe scarcity of renewable resources such as fresh water and forests. This makes it particularly pertinent to implement integrated environmental and economic accounting, as it may differ substantially from conventional national accounting.

A relatively new and promising initiative to address environmental accounting and management within the MENA region is the funding and implementation of the global partnership "Wealth Accounting and the Valuation of Ecosystem Services" (WAVES). Especially of note is WAVES' collaboration with the Center for Mediterranean Integration (CMI). The partnership aims "to enhance the convergence of sustainable development policies by providing a platform for knowledge sharing and joint learning". The funding members of the CMI include the governments of most of the countries analysed in this report: Egypt, Jordan, Lebanon, Morocco, and Tunisia.

Due to the significance of MENA countries in terms of the global carbon footprint, their environmental management and mitigation methods have great importance. In comparison with other regions, the MENA region seems to be falling behind. On the one hand, in the countries discussed, a lack of adequate environmental accounting and law enforcement is persistent, which are two key factors for controlling the countries' impact on the environment. On the other hand, an increasing number of initiatives are starting to appear with promising proposals, including research and projects addressing environmental accounting at the firm level. While many countries are a long way off systematically greening their national accounts, smaller experiments are laying the foundations for more comprehensive future work.

There is also some way to go in terms of regional cooperation on green accounting; however, some progress is of note. At the moment, the CMI has three programmes underway concerning the environment and water that aim to facilitate collaboration between countries to solve common environmental challenges. The first is "Sustainable MED" ("Mainstreaming environment in economic development strategies"), a five-year project to reduce trans-boundary pollution, improve water management, and develop biodiversity conservation measures. The second is the "Economic approach to the management of water demand", specifically aimed at Mediterranean countries. The third programme is "Environmental Economic Valuation", which will provide a realistic estimation of the costs of alternative development scenarios.

In all, WAVES, CMI, and other initiatives are helping forward better natural wealth accounting in the MENA region. Yet, efforts are somewhat patchy and little exists in terms of systematic national green accounting. For example, none of the countries reviewed here have calculated environmentally adjusted GDP or GNP figures that can help policymakers understand the negative income effects of natural resource depletion and degradation, or, conversely, the positive national income effects of resource discovery. We encourage policymakers, academics, and other researchers to close the gap on MENA green accounting efforts.

MENA (general)

Eljayash, K. et al. (2012) The Quantity and Quality of Environmental Disclosure in Annual Reports of National Oil and Gas Companies in Middle East and North Africa. *International Journal of Economics and Finance*, 4 (10), 201-217.
Kamal Mehemed Elijayash: kamal.eljayash@usq.edu.au

http://ccsenet.org/journal/index.php/ijef/article/view/20698

This paper provides an overview of the environmental disclosures made by national oil and gas corporations of the Organization of the Petroleum Exporting Countries (OPEC) during 2008, 2009, and 2010. Moreover, it gives a history of oil and gas corporations' environmental disclosures in both MENA nations and other developed and industrialised nations across the globe. It uses statistical analysis to determine the quantity or quality of environmental disclosures within the OPEC nations. The authors found a general increase in quality and quantity of environmental disclosures. However, the extent of these positive developments varied hugely between similar corporations of different countries. In particular, Saudi Arabia, Qatar, and the UAE were producing environmental disclosures of higher quality than other oil and gas producing nations with similar companies.

M'henni, H. et al. (2011) Income Level and Environmental Quality in the MENA Countries: Discussing the Environmental Kuznets Curve Hypothesis. *The Economic Research Forum Working Paper 587*. Cairo: ERF.
Hatem M'henni: hatem_mhenni@yahoo.fr

http://www.erf.org.eg/CMS/uploads/pdf/587.pdf

The sustainability of growth in MENA countries has become a question of critical economic importance. Between 1990 and 2004, MENA's greenhouse gas emissions grew by 88%, and the

environmental damage cost in the Middle East and North Africa in 2000 was estimated at $9 billion per year, a mean estimate of 5.7% of GDP. This paper builds on earlier work that has examined the relationship between environmental quality and growth to test the existence of the Environmental Kuznets Curve (EKC) in the MENA region. Through a detailed empirical analysis, the authors extend existing studies that have investigated the relationship between economic growth and environmental degradation for countries in this region. The authors conclude that energy consumption in the long run has a significant positive impact on CO_2 emissions in the region, but that the size of the impact varies considerably across MENA countries. These findings support the inverted U-shape pattern associated with the EKC hypothesis for the region as a whole—emissions of CO_2 increase with real GDP, stabilise, then decrease—but the turning points vary depending on country; some MENA countries can achieve reductions in emissions through energy conservation without any impact on growth. The authors also conclude that no evidence exists for the EKC in of SO_2 emissions for the MENA region or for individual countries, apart from Egypt and Tunisia. This may be due to the high concentration of oil and gas production in the region. In summation, the EKC holds for the region as a whole, but on a country level it is only true for Jordan. This may signify that the environmental situation has improved over the last several years due to economic growth, but country-specific policies that target emissions of pollutants are also necessary in order to move forward.

Sakmar, L. et al. (2011) Sustainable Development and Environmental Challenges in the MENA Region: Accounting for the Environment in the 21st Century. *The Economic Research Forum, Working Paper No. 592*. Cairo: ERF.

Susan Sakmar: sakmar@usfca.edu, slsakmar@gmail.com

http://www.footprintnetwork.org/images/uploads/Sakmar_et_al_2011.pdf

This paper begins to address the major gaps in knowledge about the economics of the environment in the MENA region. It also analyses the current literature and trends regarding sustainable resource management for the 21st Century. The authors present a framework and various environmental accounting systems that could be used to study the economic ramifications of environmental issues: besides the fairly common SEEA and SNA, the paper proposes Ecological Footprint as an additional tool for resource and ecosystem service accounting. This method of ecological accounting measures how much productive land area is required to produce what a population consumes and to absorb its waste, using prevailing technology. It then compares this to the available bio-capacity of the world or each country. The paper concludes that more work is needed to integrate different environmental accounting systems.

MENA-OECD Business Council (2010) Spurring Growth of Renewable Energies in MENA through Private Sector Investment. In: *Fourth Meeting of the Task Force on Energy and Infrastructure.* [powerpoint presentation] Paris, 15-16 December, MENA-OECD Bussiness Council.

http://www.oecd.org/mena/investment/46874280.pdf

This presentation focuses on the key elements necessary for promoting investment in the renewable energy sector from the point of view of private sector investors with first-hand experience of working in the MENA region. It begins by outlining the particular advantages to governments of promoting investment in renewable energies in MENA, including gradually reducing dependence on oil and other fossil fuels, and through this stimulating economic growth, increasing economic security, and lowering carbon emissions. In addition, it cites the potential for a spur in education due to an increase in the local demand for skilled labourers; the creation of sustainable, local, non-transferable jobs in the local community; and a "leap-frog" in development for local communities through access to modern communication and better facilities, as positive side effects of implementing private investment renewable energy projects. A larger section of the paper then introduces the policies necessary for such a scheme to work: firstly, governments should aim to create a competitive business environment by establishing a predictable, accountable, and transparent investment climate; clear and properly enforced competition laws; protection of property; and greater openness to markets. Secondly, MENA governments should determine a clear energy policy which takes into account international agreements and commitments, as well as a national energy policy which clearly apportions the electricity generation to be derived from renewable sources and updates the grid. Lastly, the authors highlight the need for appropriate investment incentives.

Abaza, H. (2008) Financing of Environment Programmes: Private-Public Partnership. In: Tolba, M., and Saab, N. (eds.) *Arab Environment: Future Challenges. First Annual report of The Arab Forum for Environment and Development (AFED)*, 227-238.
Hussein Abaza: hussein.abaza@unep.ch

http://www.afedonline.org/afedreport/full%20english%20report.pdf

This chapter provides detailed insight into the current state of environmental financing in MENA nations. It begins by outlining the deficiencies in the SEEA in terms of environmental funding by MENA and, in particular, Arab governments. It then goes on to list in detail all the environment programmes and how they are financed, listing contributions from national governments, funds and awards, the private sector, NGO's, and international private sector and regional cooperation.

Lastly, it provides recommendations for the future: a more holistic approach, including integrating environmental and social considerations into policies and programmes by integrating environmental considerations into macroeconomic policies, reducing reliance on fluctuating foreign aid through the development of a permanent mechanism to finance environmentally sustainable projects, and enhancing the use of incoming money with national and regional schemes, i.e. improving regional cooperation and increasing national budgetary allocations. The author criticises the current system of national accounts as not reflecting depletion and degradation of environmental resources. In light of this, he suggests a comprehensive assessment of trade and trade liberalisation policies so that their consequences are known and addressed, the promotion of market incentives to encourage more sustainable production and consumption patterns, and, similarly, an attempt to build a more environmentally aware society.

Hussein, M. A. (2008) Costs of environmental degradation: An analysis in the Middle East and North Africa region. *Management of Environmental Quality: An International Journal*, 19 (3), 305-317.
Muawya Ahmed Hussein: muhawya@yahoo.com

http://www.emeraldinsight.com/journals.htm?articleid=1722970

The purpose of this paper is to use the SEEA to provide damage costs for several areas of the environment in MENA nations in 2000. Specifically, it estimates the cost of environmental degradation to GDP and aims to provide input into the inter-sectoral environmental priority setting. It does this by using a statistical framework that estimates six costs of environmental degradation for seven countries in the region. The results show that the damage cost of environmental degradation is an estimated $9 billion a year (2.1-7.4% of GDP). The authors attribute this abnormally high cost to a significant disease burden and aversive expenditures associated with a dearth of safe water, sanitation, and hygiene, substantial negative impacts on health from severe air pollution, and a significant degradation of coastal land. However, the study suffered from limitations due to data constraints: it does not provide cost estimates for industrial, hazardous, and hospital waste, biodiversity loss, or inadequately treated waste water.

El-Fadl, K., and El-Fadel, M. (2004) Comparative assessment of EIA systems in MENA countries: challenges and prospect. *Environmental Impact Assessment Review*, 24 (6), 553-593.
Mutasem El-Fadel: mfadel@aub.edu.lb

http://www.sciencedirect.com/science/article/pii/S0195925504000241

In response to the exceptionally heavy environmental damage in many MENA economies, this study aims to provide an insight into the current status of Environmental Impact Assessment (EIA) in MENA nations and a guide on how EIA policies can be enhanced and implemented with more vigour and pertinence. This is achieved via a comparative assessment of existing and planned legislative procedures. The study concludes that most of the deficiencies in MENA's EIA systems can be attributed to the poor performance of foundation measures such as availability of guidelines, EIA system implementation monitoring, and a generally weak prevalence of local expertise and training and capacity-building initiatives. Moreover, in view of the MENA nations' poor results in the SEEA, the authors make a number of recommendations for improvement. These include enactment of EIA legislation and practice, institutional strengthening, and capacity building.

Algeria

UN Statistics Division (2013) *Environmental-Economic Accounting*. United Nations, Statistics Division.
SEEA: seea@un.org

http://unstats.un.org/unsd/envaccounting/SEEA-Brochure-SC-2013.pdf

This brochure explains the SEEA's work, which includes creating standards for environmental accounting and assisting countries with developing their own systems. According to this brochure, the UN Statistics Division, along with an Inter-regional Adviser, has provided regional training workshops that bring together statisticians and water experts. It recently provided assistance to Algeria to help it improve its water accounting and statistics ability.

Bahrain

Gibbon, J. and Joshi, P. (1999) A survey of environmental accounting and reporting in Bahrain. *Journal of Applied Accounting Research*, 5 (1), 4-36.
Jane Gibbon: jane.gibbon@ncl.ac.uk

http://www.emeraldinsight.com/journals.htm?articleid=1718405

This article surveys twenty large and medium sized companies from the industrial sector of Bahrain to examine the environmental awareness, disclosure practices, and problems associated with environmental accounting. The survey found that most companies were environmentally sensitive, yet none of the companies actually report their environmental impact for external

purposes. Over 85% of the companies reported that they think both financial and non-financial information should be reported. About 40% of companies surveyed would start reporting their environmental impact by 2000, while 25% of companies responded that they would not do so. Some companies commented that if there were governmental requirements of green reporting they would be more likely to do it. Bahrain did not have any requirements on green accounting at the time of article publication, so any environmental disclosures would be purely voluntary.

Djibouti

Emerton, L. (1998) *Djibouti Biodiversity: Economic Assessment*. The World Conservation Union and the Bureau National de la Diversité Biologique.
Lucy Emerton: lucy@environment-group.org

https://www.cbd.int/financial/values/djibouti-economicassessment.pdf

This document is a report of the economic assessment of biodiversity in Djibouti, which forms part of a wider assessment of Djibouti's biodiversity carried out by the Bureau Nationale de la Diversité Biologique (BNDB) as part of the preparation of a National Biodiversity Strategy and Action Plan. The total economic benefit of biodiversity in Djibouti includes a wide range of component values that far exceed the direct uses made of biological resources. The study finds that rangeland, forest, and woodland biological resources form the basis of rural pastoralist production in Djibouti, providing a wide range of products, including wild foods, fuel, medicines, fibres, construction materials, fodder, forage, and pasture. The author finds that the variety of ecosystems are particularly important given Djibouti's limited production and consumption base, becoming especially relevant in rural areas where ecosystems provide basic livelihood security and fall-back in times of drought. The study provides a comprehensive list of estimates of economic value for a variety of natural resources in Djibouti, including rangeland, forest, and woodland, and marine and wildlife resources. It also provides estimates of the economic benefit of ecosystem services, including: erosion control functions of vegetative cover, coral reef and mangrove ecosystem services, and carbon sequestration functions of forest and marine ecosystems. The study concludes by summarising the economic justifications for biodiversity conservation in Djibouti and providing policy recommendations.

Egypt

Saber, M. (2009) Environment in Jeopardy: Consequences of Climate Change in Egypt. *Journal of Ecology and the Natural Environment*, 1 (15), 191-195.

Mohamed Saber: msaber1941@yahoo.com

http://booksreadr.net/pdf/environment-in-jeopardy-consequences-of-climate-change-in-egypt-22013885.html

According to the author, Egypt is one of the countries most vulnerable to the effects of climate change in the MENA region, and even in the world. In light of this, it is imperative to know exactly how climate will change in the coming decades: the magnitude of expected temperature increase and its consequences in Egypt. This paper outlines the extent and effects of increasing sea levels, water scarcity, loss of biodiversity and habitats, and agricultural and food insufficiency, on both ecosystem and human health. For example, the river Nile might lose 30-60% of its resources due to climate change, while the bleaching of coral reefs in the Red Sea is likely to speed up, negatively affecting the once highly diverse ecosystem of over 1,000 named species. The outlines Egypt's current CO_2 emissions status and the action the government is taking in order to confront potential major problems in the future related to climate change. The latter largely consists of joining climate change treaties and organisations, both global and within the MENA region, as well as implementing environmentally friendly public policies and investing in climate change research.

Iran

Latifian, B. et al. (2014) Environmental Accounting and Sustainability Report. *International Research Journal of Applied and Basic Sciences*, 8 (3), 325-328.
Corresponding Author email: behzadhesab@gmail.com

http://www.irjabs.com/files_site/paperlist/r_2145_140515010427.pdf

This article urges Iran to begin using green accounting and starts by defining environmental costs and explaining environmental accounting and its profitability. Iran has a National Committee of Sustainable Development, which consists of ministries, governmental organisations, and non-governmental organisations. It has succeeded in creating: a green government programme, which seeks to green the government from within so that it can be an example for the rest of the country; a green university programme, which was introduced by the Amir Kabir University; and a green building programme, which pushes for the construction of buildings that use less energy and considers environmental factors in all building stages. However, most of this Committee's actions have largely been symbolic. The article concludes that Iran should start implementing green accounting because it can be profitable in the long run.

Cobb, C. et al. (2000) *Environmental Accounting III: Iran's Workshop.* [online] Redefining Process. [Accessed 23 August 2014].
Corresponding Author email: info@rprogress.org

http://cbeweb-1.fullerton.edu/economics/mrahmatian/syllabus/333/environmentalaccounting3.htm

The UN kept track of each country's progress in fulfilling Agenda 21, a voluntary action plan that resulted from the UN Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, in 1992. At the time of the web page's publication in April 1998, Iraq had a national sustainable development policy, a national Agenda 21, and major groups that were involved in sustainable development decision-making. It also had a green accounting programme and legislation regulating environmental factors such as atmosphere, land use, forestry, desertification, agriculture, oceans, and freshwater management. No updated information on Iraq's green accounting effort could be found.

Iraq

UN (1998) *Institutional Aspects of Sustainable Development in Iraq.* [online] United Nations, Sustainable Development. [Accessed 19 August 2014].

http://www.un.org/esa/agenda21/natlinfo/countr/iraq/inst.htm

The UN kept track of each country's progress in fulfilling Agenda 21, a voluntary action plan that resulted from the UN Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, in 1992. At the time of the web page's publication in April 1998, Iraq had a national sustainable development policy, a national Agenda 21, and major groups that were involved in sustainable development decision-making. It also had a green accounting programme and legislation regulating environmental factors such as atmosphere, land use, forestry, desertification, agriculture, oceans, and freshwater management. No updated information on Iraq's green accounting effort could be found.

Israel

Israel Ministry of Foreign Affairs (1994) *Environmental Economics.* [online] Government of Israel. [Accessed 28 July 2014].

http://mfa.gov.il/MFA/PressRoom/1994/Pages/ENVIRONMENTAL%20ECONOMICS.aspx

This web page explains the concept of "environmental economics", which is an economic approach to environmental policy that seeks to internalise environmental costs and considerations into corporate decisions. Using this approach, a company's impact on the environment would be reflected in its balance sheet. There are two main mechanisms to encourage environmental accounting: taxes and fees that collect funds for environmental purposes and incentives for companies to reduce pollution. Levies, which are fees imposed on polluters to use an environmental resource, are Israel's most common mechanism for environmental regulation. The web page goes on to explain the different environmental fees and taxes that Israel imposes. The page does mention national green accounting and that Israel is beginning to explore this option. One example of such effort is a research project by the Natural Resources and Environmental Research Centre in Haifa University, which used surveys over the span of three years to measure the economic cost of air pollution in the city of Haifa. Israel also experimented with "green labelling", which publishes the overall assessment of a product's environmental quality relative to other products in its category. The product would be given the eco-label if it met certain environmental criteria.

Jordan

Pillet, G. (2005) ***Links between Cleaner Production and Environmental Economics: The Case of Jordan. Position Paper V2*****. Geneva: Ecosys.**
(Author deceased)

http://www.ecosys.com/spec/ecosys/download/Publications/CP_EconEnv_paper%20Jordan.pdf

This paper presents a SEEA for Jordan through field, statistical, and theoretical evidence on a number of issues, but specifically the issue of cleaner production. Firstly, it outlines the use and availability of natural resources in comparison to other MENA nations and highlights that these resources are under pressure from expanding businesses. Secondly, it assesses evidence concerning economic efficiency and the positive value of environmental contributions to economic activities, laying emphasis on the importance of environmentally priced goods and services. It then goes on to detail Jordan's failings in this department by presenting facts and figures regarding inefficiencies and the underrated value of environmental contributions. Fourthly, the paper makes comparisons regarding macro, meso, and micro environment-economic performance with other MENA nations and uses a Moroccan example to illustrate the benefits of cleaning up past inefficiencies. Lastly, it presents key instruments and recommendations for implementing a

system of cleaner production at the macro, meso, and micro levels.

Kuwait

Sherbinin, A. et al. (2013) ***Indicators in Practice: How Environmental Indicators are Being Used in Policy and Management Contexts.*** **New Haven and New York: Yale and Columbia Universities.**
Alexander M. De Sherbinin: adesherbinin@ciesin.columbia.edu

http://epi.yale.edu/files/indicators_in_practice_2013.pdf

This paper reviews the impacts of different indicators on environmental policies and management. It uses Africa, Cambodia, Denmark, Korea, Kuwait, Malaysia, and the US as its case studies. Recognising its limited capability for collecting data so far, the Kuwait Environment Public Authority (KEPA) has partnered with the UNDP and UNEP/ROWA to develop indicators for air and water quality, natural reserves and protected areas, and wastewater through a national monitoring programme. In 2009, KEPA created the Environmental Monitoring Information System of Kuwait (eMISK). Its Geo-Environmental Database is a repository for the Kuwait Air Quality Index and Kuwait Drinking Water Quality Index. This information is now being used to inform the development of the "Environmental Status Report for the State of Kuwait" and the "1st National Communication on Climate Change Convention". eMISK's information was also consulted during the approval process for two major future projects: the "Assessment of Damage and the Rehabilitation of the Marine Environment and Habitats in Kuwait" and the "Comprehensive Marine Inventory".

Lebanon

Zakka, J. and Ghattas, R. (2011) Environmental accounting in developing countries: the Lebanese case. ***Social Entrepreneurship and Innovation*****, 1 (1), 95-119.**
Janine Saba Zakka: jzacca@lau.edu.lb

http://www.inderscience.com/info/inarticle.php?artid=39815

This is a pilot study in which the authors aim to investigate the type and extent of the application of Environmental Management Systems (EMSs) by Lebanese companies in different industrial sectors. It looks at how companies report environmental costs and how this affects profitability in different industrial sectors of the Lebanese economy. Although the country has strong environmental legislation, enforcement has been difficult, not least because of instability in the region. The researchers used semi-structured and unstructured interviews with Lebanese

business leaders, as well as data obtained from governmental, industrial, and environmental organisations, to illustrate the effect of applying clean production (CP) on cost cutting. They found that most managers are reactive toward the environment, in that they act when a problem occurs, and that cost reduction is the main reason behind firms implementing EMSs. The small and medium sized businesses involved in the CP project showed a resulting cost reduction and benefitted from additional sales to "green consumers".

Libya

Ahmad, N. (2014) Using the Hofstede-Gray Framework for Explaining Corporate Environmental Disclosure (CED) in Libya. *International Journal of Innovation and Knowledge Management in Middle East & North Africa*, 3 (¾), 325-340.
Nassr Saleh Mohamad Ahmad: nassr.ahmed@hotmail.com

file:///Users/agnesgabrielamedinacelibaldivieso/Downloads/IJIKMMENA_V3_N3-4_2014_AHMAD.pdf

This paper seeks to explain the low level of corporate environmental disclosure (CED) in Libya and attributes culture as the reason for the minimal reporting. It builds upon the Hofstede-Gray framework, which argues that culture has a large impact on firm-level financial disclosures. Specifically, the paper argues that Libya's corporate tendencies are distant from each other, masculine, uncertainty averse, and collectivistic, causing a culture of secrecy and low environmental reporting. This paper suggests that it may be necessary to address national cultural characteristics to encourage more CED.

Morocco

Medeazza, G. (2004) Water desalination as a long-term sustainable solution to alleviate global freshwater scarcity? A North-South approach. *Desalination,* 169 (3), 287-301.
Gregor Meerganz von Medeazza: gregor.meerganz@uab.es

http://www.researchgate.net/publication/222528803_Water_desalination_as_a_long-term_sustainable_solution_to_alleviate_global_freshwater_scarcity_A_North-South_approach

This paper assesses the rise of reverse osmosis (RO) desalination processes as a solution to water scarcity. It uses the SEEA to investigate the long-term sustainability of RO desalination in view of the process in its current state, the inevitable increases in fossil fuel scarcity, and social

perceptions of water usage. Its main focus is on North Africa and in particular Morocco; however, it also briefly mentions countries on other continents that have a heavy reliance on desalination for water provision. Desalination is costly due to its heavy reliance on ever more expensive fossil fuels. This is a major challenge to the sustainability of RO water cleansing plants. In addition, in the absence of desalinated water arid regions have strict and effective methods for preserving water, but these quickly disappear when what seems like an infinite well becomes available. This shift in perception and expectation of water availability can also stand in the way of RO desalination program sustainability. Nevertheless, the authors do not completely condemn water desalination as an unviable method of tackling future water scarcity. They highlight that many countries which suffer most from water shortages also have a huge potential for renewable energy resources which could be used to run desalination plants, but at a cost. They also suggest that with education, water availability and economic development does not have to result in excess water usage.

Oman

UN Statistics Division (2013) *Environmental-Economic Accounting*. United Nations Statistics Division.
SEEA: seea@un.org

http://unstats.un.org/unsd/envaccounting/SEEA-Brochure-SC-2013.pdf

This brochure explains the SEEA's work, which includes creating standards for environmental accounting and assisting countries with developing their own systems. According to this brochure, the UN Statistics Division, along with an Inter-regional Adviser, has provided regional training workshops that bring together statisticians and water experts. It recently provided assistance to Oman to help it improve its water accounting and statistics ability.

Qatar

Government of Qatar (2014) *Statistical Reports and Data Released by the Ministry of Developing Planning and Statistics.* [online] Government of Qatar. [Accessed 29 July 2014].

www.mdps.gov.qa

The government body responsible for national statistical reporting in Qatar is the Ministry of Development Planning and Statistics. Its website publishes important national data on monthly,

quarterly and annual bases, depending on the indicator. In March 2014, it released the "Fourth Report of Sustainable Development Indicators", which measures the improvement of life quality and living standards of the country by monitoring progress in terms of social, economic, and environmental factors. It has a robust measurement system for emissions accounting. It also participated in the UN Statistical Commission's 45th session, which tackled important topics such as the Fundamental Principles of Official Statistics at the international level, the implementation of the new system of national accounts, environmental accounting, international trade, measurement of technology and communications, demographic and cultural statistics, crime and human settlement statistics, tourism statistics, and price indices.

UN Statistics Division (2013) ***Draft Document: Experimental Ecosystem Accounting – Extended Deadline for Comment January 15, 2013.*** **[online] UN Statistics Division. [Accessed 15 August 2014].**

http://unstats.un.org/unsd/envaccounting/seearev/chapter.asp?volID=2&chID=1

In 2012, the UN asked countries to submit their plans for implementing the SEEA nationally. The UN then sent comments back to the countries on how they could improve their proposals. Qatar submitted a consultation draft and received feedback from the UN. The UN comments that the draft is a good starting point. It questions several of the draft's definitions and its measurement methodology. These areas of vagueness will likely become clearer when Qatar actually executes these measurements and works out some of the imprecise points. In any case, Qatar shows a clear commitment to moving forward with implementing a green accounting system.

Saudi Arabia

Khanagha, J. (2011) Reform in Accounting Standards: Evidence from Saudi Arabia. ***International Journal of Management and Business Resource,*** **1 (3), 113-124.**
J. Barzegari Khanagha: barzegari@yazduni.ac.ir

http://www.ijmbr.org/pdf_17_847379b8d10d5b5e1423b4619f9a10c4.html

This article looks at the accounting practices of Saudi Arabian businesses. Saudi Arabia, unlike most of the other Middle Eastern countries, has tried to have its own national accounting standards that incorporate environmental and cultural factors. The article found that this reform, along with other accounting reforms in Saudi Arabia in recent years, is value relevant.

United Nations (n.d.) ***Institutional Aspects of Sustainable Development in Saudi Arabia.*** **[online]**

United Nations Sustainable Development. [Accessed 19 August 2014].

http://www.un.org/esa/agenda21/natlinfo/countr/saudi/inst.htm

The UN keeps track of each country's progress in fulfilling Agenda 21: a voluntary action plan resulting from the UN Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, in 1992. According to UNCED, Saudi Arabia's Meteorology and Environmental Protection Administration (MEPA) is the central environmental agency in charge of preparing environmental standards, monitoring and controlling environmental indicators, and conducting environmental impact assessments. At the time of this web page's publication, probably at some point between 1992 and 1995, Saudi Arabia had environmental impact assessment laws but no green accounting programmes.

Syria

The National Technical Committee for Sustainable Development (2001) ***The Syrian National Strategy Report for Sustainable Development: For the 2002 World Summit on Sustainable Development Johannesburg, South Africa.*** **Syrian Arab Republic: Ministry of State for Environmental Affairs.**

http://www.un.org/jsummit/html/prep_process/national_reports/syria_natl_asses.doc

The Syrian government prepared this national strategy report for the 2002 World Summit on Sustainable Development that took place in Johannesburg, South Africa. Syria's national environmental strategy includes preventing the misuses of land and water resources; improving the living quality in urban areas; reducing the effects of pollution on human health; protecting natural and cultural resources; and building the capacity, education level, and awareness of the general population. The Ministry of State for Environmental Affairs lacks staff who are trained in environmental economics and capable of performing cost-benefit analyses, but it recognises and is attempting to remedy this shortcoming. In short, the Syrian government sees a need for better economic-environmental cost analyses, but lacks the human capital to perform this task.

United Arab Emirates

Gallacher, D. and Hill, J. (2013) ***Intensification of rangeland grazed in an oil-rich state; causes consequences and possible solutions.*** **Dubai: Dubai Desert Conservation Reserve.**

David Gallacher: david.gallacher@zu.ac.ae

http://www.ddcr.org/reports/full/Intensification_of_rangeland_grazing_in_an_oil-rich_state.pdf

This paper reviews the threats to the ecology of the 225 square kilometre Dubai Desert Conservation Reserve (DDCR), highlighting the species conservation issues facing the United Arab Emirates. Groundwater depletion, habitat fragmentation, invasive species introductions, and overgrazing threaten Inland desert rangelands. The paper identifies overgrazing from camel overstocking as the most serious threat to the inland desert; it reduces botanical species diversity and available forage. Increased well water usage, imported feed, and feed produced under irrigation have led to overstocking beyond historical levels. The paper concludes by suggesting some solutions to combat overgrazing, including reducing the number of livestock with open access to rangelands and implementing rotational grazing patterns. Furthermore, the authors identify revision of pro-agricultural policies and the resolution of legal ambiguities surrounding common grazing lands as necessary for better rangeland management.

Countries not included

No relevant works were found for Palestine, Yemen, and West Bank and Gaza.

5. Rest of Africa

Africa (General)
Benin
Botswana
Burkina Faso
Cameroon
Comoros
Democratic Republic of the Congo
Eritrea
Ethiopia
Ghana
Kenya
Madagascar
Malawi
Mali
Mauritania
Mauritius
Mozambique
Namibia
Nigeria
Rwanda
Saint Helena
Senegal
South Africa
Swaziland
Tanzania (including Zanzibar)
Uganda
Zimbawe

5. Rest of Africa

Overview

Africa has traditionally been characterised as a region of rich natural resources with below-average levels of industrialisation and economic development. Until recent years, the region has given little attention to the issue of environmental accountability. The reasons for this are various: sometimes policymakers give priority to more urgent needs, while at other times the lack of political and social understanding within the region makes the task of assessing environmental impacts difficult. Despite this, some researchers have recently advanced the process of developing techniques to assess the question of environmental accounting and sustainability assessments as matters of national policy.

Sustainability assessment efforts can be traced back to the Brundtland Commission, formally known as the World Commission on Environment and Development, set up by the United Nations in 1983. Several ways of measuring sustainable development have been suggested for Africa and elsewhere in the world, which can be divided into four distinct categories: 1) welfare measures; 2) socio-political indicators such as the Index of Social and Economic Welfare (ISEW) and the Genuine Progress Indicator (GPI); 3) ecological/environmental indicators such as ecological footprints; and 4) single indicators such as air and water quality, soil erosion, etc.

Other efforts have concentrated on the application of environmental accounts (EAs) and environmental fiscal reforms (EFRs). The EFR, also called "Green Taxation and Budgeting", aims at harmonising fiscal and budgetary policy with environmental objectives. It has the potential to play an important role in helping developing countries raise revenues, while creating incentives that generate environmental benefits and support poverty reduction efforts. It may also include the funding and fiscal policies required to underpin an effective and comprehensive climate change strategy. EFR encompasses a wide range of taxation and pricing instruments, including taxes on the exploitation of natural resources, taxes and charges on water or air pollution, and the reform of water or energy subsidies. The suitability of individual instruments for specific countries will vary according to the country's level of development, resource endowments, and institutional capacity. Although they may present a challenge to design and implementation, the use of EFRs to encourage sustainable natural resource use will be particularly relevant to low and middle income countries (like the cases of African countries), which often rely heavily on natural resources for their development.

Multilateral institutions, especially the World Bank, have been fundamental to the implementation

of EA and EFR programmes in the region. Following the 1992 Earth Summit in Rio de Janeiro, the Bank has put increasing emphasis on mainstreaming environmental concerns and priorities into the whole spectrum of its operations. For the case of Africa, this strategy has driven the World Bank to support Strategic Environmental Assessments (SEAs) programmes in countries like Ethiopia. Other donors, such as the Netherlands, have been involved in a number of SEA or SEA-like processes. In Tanzania, for example, strategic assessments are part of the planning process for national parks and similar institutions related to environmental strategy.

South Africa is probably one of the African countries where most academic research has been conducted on the development of environmental accountability. Several papers by Statistics South Africa discuss the country's water, energy, and mineral accounts, within the National Resource Account (NRA) approach that was developed in 1993. The literature also contains some references to EFR strategies that provide yet another angle of approach to the environmental assessment for the case of South Africa and, to a lesser degree, for Burkina Faso and Uganda. These country studies show that revenues from environmental taxes contribute significantly to national budgets. In order for their contribution to be expanded in the near future, they require country specific designs that take into account social policy issues and seriously consider the question of poverty.

Plans to mainstream environmental accounting are also underway. The "Wealth Accounting and the Valuation of Ecosystem Service" (WAVES) partnership has provided grants to Botswana, Madagascar, and, more recently, Rwanda. Meanwhile, several African countries—Botswana, Gabon, Ghana, Kenya, Liberia, Mozambique, Namibia, Rwanda, South Africa, and Tanzania—signed onto the Gabarone Declaration at the 2012 "Summit for Sustainability in Africa", which aims to include valuations of natural resources in national accounts.

Africa (general)

University of Florida (n.d.) ***Environmental Accounting and Systems Synthesis of Land Management Interventions at Multiple Scales in the Sahel Region of West Africa.*** **[online] University of Florida and United Nations Environment Program. [Accessed 2 June, 2015].**

http://sahel.ees.ufl.edu/

Countries of implementation: Mali, Senegal, Mauritania, Burkina Faso, and Niger.
Dates: 2006-2011

This project is part of the UNEP "An Ecosystem Approach to Restoring West African Drylands and Improving Rural Livelihoods through Agroforestry" programme. Its overall goal is to develop policy and management recommendations to restore West African drylands and improve rural livelihoods through agroforestry-based land management interventions. The work plan addresses issues at several scales, from national to local, and proposes in-country hands-on training and web-based evaluation tools for capacity building and information gathering, respectively.

Hassan, R. and Mungatana, E. (eds.) Implementing Environmental Accounts: Case Studies from Eastern and Southern Africa. Special issue of *Eco-Efficiency in Industry and Science ,28*, Springer, 2013.
Rashid Hassan: rashid.hassan@up.ac.za

http://www.springer.com/economics/environmental/book/978-94-007-5322-8

This book looks into the experiences of countries in Sub-Saharan Africa with implementing the System of Economic and Environmental Accounts (SEEA). It is the third volume in the Centre for Environmental Economics and Policy in Africa's (CEEPA) environmental accounting book series, extending the Southern Africa efforts to other countries, mainly in the Eastern Africa region. It covers new resource sectors and extends work to account for ecosystem assets and their services. The authors provide a first step in developing indicators for total wealth in the case study countries of Namibia, Tanzania, Mozambique, Ethiopia, Uganda, and South Africa, which are known to suffer from the "resource curse": their wealth in resources and commodities has not created developments in infrastructure or education. Amongst other topics, this book shows how to synthesise environmental and national accounting data, explains how to deploy environmental accounts as a planning tool, and offers a more optimistic outlook for these countries than suggested previously. Summaries of the individual country case studies can be found under the relevant country sections of this book.

UNEP (2012) *Ecosystem Services and Rural Livelihoods in the Sahel: Environmental Accounting and Wealth Surveys.* Nairobi: UNPE.
Gemma Shepherd, Project Manager: gemma.shepherd@unep.org

http://www.unep.org/dewa/Portals/67/pdf/ME_Report_lowres.pdf

This paper attempts to implement the first comprehensive environmental accounts in the Sahel region of Africa. Due to the fragile nature of their ecosystems, both arid and semi-arid areas of the region are feeling the pressures of population growth and rapidly growing affluence. The environmental accounting techniques implemented by the authors permit a quantitative analysis

of ecosystem services in the Sahel, which allows them to survey rural wealth and examine its direct link with the surrounding ecosystem in unprecedented ways. The paper is divided into two parts. The first part summarises the results of the environmental accounting analysis for rural land uses in the region. The authors report the environmental accounts using "emergy", a unit of solar energy, and compare the environmental and economic flows in order to effectively evaluate policy. The report elaborates on 17 agricultural land use subsystems typical of the Sahel region in Western Africa and summarises their environmental accounting analysis. The second part of the paper examines the link between rural livelihoods and ecosystem services in rural Mali (we thus also include this overview in the Mali country section below). The authors evaluate three levels of ecosystem services (rainfall, rain-use efficiency, and rain-use efficiency trends) and their relationship with material wealth and animal wealth. They conclude that there are significant associations between the condition of the environment and the accumulation of rural wealth. The authors further note that Mali's rural farmers also use other ecosystem services that are not necessarily directly related to land, which allows them to compensate for some environmental degradation. Overall, the chief achievement of this paper is the empirical evidence it provides of the direct and compensatory links between ecosystems and the well-being of the populations that inhabit them.

UNEP (2012) ***Environmental Accounting of National Economic Systems: An Analysis of West Africa Dryland Countries within a Global Context.*** **Nairobi: UNPE.**
Mathew J. Cohen: mjc@ufl.edu

http://www.unep.org/dewa/Portals/67/pdf/EANE_Report_lowres.pdf

According to this UNEP report, the Sahelian rural population is heavily dependent on land resources, which makes human well-being in the region particularly vulnerable to desertification. Thus, the maintenance of stable agro-ecosystems in the Sahel is key for sustainability. The authors thus call for a new paradigm whereby policymakers recognise nature's value in order to justify redirecting policy at the local, national, and global scales. Specifically, they argue for the inclusion of natural capital and ecosystem services in national accounts by measuring stocks and flows of environmental systems. The report details the development of and results from the National Environmental Accounting Database that includes data for 134 economies, with a strong emphasis on the dryland farming countries of West Africa. It discusses the "emergy" metric that represents the sum of all the energy required to produce a product, focusing particularly on its relevance to and application in the Western African Dryland nations. The authors estimate the global value of natural capital of soil, water, fish, and forests, finding that the five West African countries in the study (Mauritania, Senegal, Mali, Niger, and Burkina Faso) are extremely vulnerable to natural

and economic catastrophes, because their economies are rapidly depleting the natural capital on which they heavily rely. The latter chapters of the report detail the environmental accounting of trade and debt and the resource basis of human development and system sustainability. The authors conclude by recommending policies that result in immediate and total debt relief since, when exports of natural resources are accounted for, all five focal nations have not only repaid their debts but have become "emergy" creditors to developed nations. The authors also stress the need for vigorous restructuring of trade agreements to address the gross disadvantage that West African nations face when trading with developed countries, and the gauging of national development progress in terms of the degree to which resource use is derived from renewable as opposed to non-renewable energy sources.

Benin

Canadian Environmental Assessment Agency (1997) Recent Developments with National and International Environmental Impact Assessment Processes. Paper presented at the *The International Association for Impact Assessment Annual Conference*, New Orleans, 27 May.

http://www.ceaa-acee.gc.ca/default.asp?lang=En&n=B4993348-1

This report summarises the proceedings of the 1997 Policy Forum on Environmental Impact Assessment held by the Canadian Environmental Assessment Agency, in collaboration with the UK Institute of Environmental Assessment, and the USA Council on Environmental Quality. The fourth section summarises Benin's experience with Environmental Assessments (EAs). Benin created the Ministry of Environment, Habitat and Town Planning in 1992 and the Benin Environmental Agency in 1995. The Agency developed national environmental legislation that includes a number of environmental protection and promotion principles, including polluter pays, participation by society, intergenerational equity, and pre-vetting potentially harmful activities through environmental impact studies. The paper ends by pointing out that lack of capacity and methodological difficulties represent the main obstacles to implementing Benin's environmental impact study procedure. To overcome the difficulties, the author suggests establishing a capacity building training programme for technical staff and partnership programmes with other countries.

Botswana

WAVES (n.d.) *Botswana.* [online] WAVES. [Accessed 5 June 2015].

http://www.wavespartnership.org

http://www.wavespartnership.org/waves/botswana-moves-ahead-water-accounts

This summary is for WAVES project progress in Botswana only. An overview of WAVES is provided in the Multi-Country Reports and Projects Section of this document. Summaries of WAVES project activities in its four other core country partners—Colombia, Costa Rica, Madagascar, and The Philippines—can be found under their individual country sections.

Since WAVES first engaged with the government of Botswana in July 2011, a work plan detailing activities for 2012-2016 has been developed and approved by the steering committee and shared with stakeholders. The project team is now working with relevant government ministries to develop the institutional arrangements needed to implement the work plan. It has drafted a scoping study and reviewed it at two stakeholder workshops. The national steering committee and several external experts were reviewing the work plan at the time of this report's writing. The study aims to determine whether Botswana's economic growth path is sustainable in the long term, to identify the ideal energy mix for the country, and to establish how Botswana should use its vast coal reserve and water resources. Additionally, two ecosystem valuation studies have been completed (but not published) on the Okavango Delta and the Makgadikgadi Pan. The first phase of water accounts was presented in November 2012, with preliminary findings showing that 45% of the country's water goes towards agriculture, a sector which contributes just 2% of GDP and an even lower share of employment. Botswana intends to implement other natural capital accounts, including land and ecosystem accounts, and the rest of the work plan, under the steering committee and country coordinator. Summaries of related papers can be found below.

Allebone-Webb, S. et al. (2013) *The Globe Natural Capital Legislation Study.* Washington DC: The Global Legislators' Organisation.
Sophie Allebone-Webb: sallebonewebb@wcs.org

http://www.globeinternational.org/images/natural-capital-study/GLOBE-Natural-Capital-Legislation-Study.pdf

This summary is for the Botswana case study only. For an overview of the entire study, please see the Multi-Country Reports and Projects section of this book. The study also includes country case studies for Colombia, Costa Rica, Georgia, Germany, Peru, the Philippines, and the United Kingdom, which can be found under their respective country sections.

Natural capital represents 31% of Botswana's national wealth, which makes environmental accounting in the country paramount. This is intensified by the fact that of its seven ecological

regions, four are considered vulnerable due to the relative lack of water in the landlocked country. Botswana lacks rich soil, a problem that is exacerbated by deforestation. However, the country has used its rich mineral supply—including diamond, coal, copper, nickel, and gold—to obtain recent gains in wealth. Due to the importance of these assets, as well as their limited nature, Botswana has been a regional leader in environmental accounting. Since the 1990s, it has employed natural capital accounting chiefly to monitor monetary accounts of minerals and physical accounts of water, minerals, and livestock. Although environmental accounting has not featured prominently in policy until now, in May 2012, Botswana signed the Gaborone Declaration together with nine other African countries. The Declaration sets out concrete development goals that place the value of natural capital at the center of development planning.

World Bank (2012) *Botswana: Natural capital as a diversification tool.* Washington DC: Wealth Accounting and the Valuation of Ecosystem Services.

http://siteresources.worldbank.org/ENVIRONMENT/Resources/WAVES_Botswana_Country_Brief.pdf

This document is part of the Wealth Accounting and Evaluation of Ecosystem Services (WAVES) project. The project has the following Core Implementing Partner countries: Botswana, Colombia, Costa Rica, Madagascar, and the Philippines. These were recently joined by Guatemala, Indonesia, and Rwanda. Information about the WAVES project can be found under the Multi-Country Reports and Projects section of this book.

This document outlines milestones for the Botswana WAVES project, contact personnel on the country team, and Botswana project initiation and goals. So far, WAVES in Botswana has developed a work plan detailing activities for 2012–2016, which has been approved by the steering committee. The committee has already drafted and reviewed a scoping study and conducted two ecosystem valuation studies.

World Bank (2012) *Wealth Accounting and Valuation of Ecosystem Services (WAVES) in Botswana: Priority Policy Objectives*. Washington DC: Wealth Accounting and the Valuation of Ecosystem Services.

http://siteresources.worldbank.org/ENVIRONMENT/Resources/Botswana_Policy_brief_w_work_plan_v3.pdf

This document is part of the Wealth Accounting and Evaluation of Ecosystem Services (WAVES) project. The project has the following Core Implementing Partner countries: Botswana, Colombia,

Costa Rica, Madagascar, and the Philippines. These were recently joined by Guatemala, Indonesia, and Rwanda. Information about the WAVES project can be found under the Multi-Country Reports and Projects section of this book.

This document details the priority policy objectives of the WAVES project. The first section summarises the goals of WAVES in Botswana and the organisational structure for the project as a whole. Section two describes the macroeconomic and environmental context in Botswana, with an emphasis on the role of natural resources, especially diamonds, in the economy. The third section explains the activities that took place during the preparation phase of WAVES, including consultations and the development of work plans. Section four details phase two policy priorities: tracking of macroeconomic indicators for better monitoring of sustainable development and optimising the use of natural capital in the mining, energy, and water sectors, and in the management of land and ecosystems. The final report sections and the appendix outline the full work plan, the country budget, institutional arrangements for work plan implementation, and next steps.

INTOSAI (2010) *Environmental Accounting: Current Status and Options for SAIs*. Washington DC: International Organization of Supreme Audit Institutions (INTOSAI).

http://www.environmental-auditing.org/LinkClick.aspx?fileticket=s%2FFCvUzSK-sk%3D&tabid=128&mid=568

This summary is for the Botswana case study only. For an overview of the entire report, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Australia, Canada, China, Colombia, France, Germany, Mexico, Namibia, the Netherlands, the Philippines, and Sweden, which can be found under their respective country sections.

Botswana began using environmental accounts in 1990, which were partially based on the SEEA. They have covered stock and flow accounts for water until 2002 and conducted some preliminary work on monetary accounts for minerals. The government has used the water accounts to monitor consumption patterns as well as to determine the state's water pricing.

Arntzen, J. (2006) Water Accounting in Botswana: progress and challenge. In: Lange, G. and Hassan, M. (eds.) *The economics of water management in Southern Africa: An environmental accounting approach.* UK: Edward Elgar Publishing, 15-43.
Jaap Arntzen: jaap.arntzen@gmail.com

http://www.elgaronline.com/abstract/1843764725.00009.xml

This work describes the framework for water accounts for Botswana and the development of physical stock and flow accounts for the water sector in the country. The Department of Environmental Affairs (formerly the National Conservation Strategy Agency) and the Department of Water Affairs have established a strong footing in water accounting. This will be helpful in meeting the obligations to produce integrated water resource management and water efficiency plans, as Botswana promised during "The 2002 World Summit on Sustainable Development". However, the author shows that the country still lacks stock and monetary accounts, and the inclusion of wastewater in the calculations.

Lange, G., and Hassan, R. (2006) Comparison of water use in Botswana, Namibia and South Africa. In: Lange, M. and Hassan, M. (eds.) *The economics of water management in Southern Africa: An environmental accounting approach.* UK: Edward Elgar Publishing, 169-185.
Glenn-Marie Lange: gml1@nyu.edu

http://www.elgaronline.com/view/1843764725.00013.xml

This paper compares water use and resources across Botswana, Namibia, and South Africa. Each country modified the SEEA water accounting framework to reflect national policy priorities and data availability in each country, so the full accounts are not directly comparable. The accounts diverge mostly in the treatment of asset and supply accounts. Botswana and Namibia only have partial water asset accounts, while South Africa has extensive accounts derived from a comprehensive model of the hydrological cycle and water resources developed by the Department of Water Affairs and Forestry (DWAF). Namibia and South Africa have detailed water supply accounts that show the inter-institutional transfers, while this component has not yet been developed in Botswana. All three countries have water use accounts, with complete physical use accounts and at least partial monetary use accounts.

Government of Botswana (2001) *Botswana's Natural Resource Accounts: Water Accounts: Phase 1.* Botswana: Central Statistics Office (CSO) and National Conservation Strategy Agency (NCSA).

http://unstats.un.org/unsd/envaccounting/ceea/archive/Water/Botswana's%20Natural%20Resource%20Accounts%20-%20Water%20Accounts,%20Phase%201.PDF

This paper provides an overview and trend analysis of water usage in Botswana between 1993 and 1998, with the intention of informing future water policies. Through the use of natural resource accounting (NRA), it presents data concerning overall trends, water use by economic

sectors, and unaccounted water and water losses, as well as a domestic comparison of different sectors' water use and an international comparison. The NRA analysis shows that the government and households are the major "growth sectors" in water usage and that, in the mining sector, diamond mining has increased it water usage whilst copper mining uses less water than before. The authors argue that this information should be used as an "early warning system" among water users. Because it shows specific macroeconomic contributions per water unit of each different economic sector, policymakers can make more informed decisions regarding the allocation of water to different economic activities. Lastly, the authors highlight that the second phase of the NRA for water in Botswana should address gaps in data on stock accounts, cost-benefit-analysis-based monetary accounts, and the re-use of treated effluent.

Burkina Faso

Schlegelmilch, K. et al. (2010) ***Fiscal Reform in EC Development Cooperation.*** **Contract No 2008/160146/2 – Version 2 Final Report. Soges Consortium.**
Kai Schlegelmilch: kai.schlegelmilch@green-budget.eu

http://www.foes.de/pdf/20100929_Final%20Report%20-%20Environmental%20Fiscal%20Report%20-%20FINAL.pdf

This summary is for the Burkina Faso case study only. For an overview of the entire project, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Barbados, South Africa, Uganda, and Vanuatu, which can be found under their respective country sections.

The EC chose Burkina Faso, as one of five countries with good potential for implementing environmental fiscal reforms (EFRs), to participate in the "Fiscal Reform in EC Development Cooperation" programme. Economic instruments for environmental management are poorly defined and largely inconsequential in Burkina Faso, but the country has carried out major fiscal reforms aimed at improving domestic revenue and is in the process of developing its new strategy for sustainable development. The report recommends that Burkina Faso carries out detailed assessments of the existing market-based instruments in order to develop an effective EFR.

Somda, J. and Nianogo, A. (2010) ***TEEB case: Wetland valuation changes policy perspectives, Burkina Faso.*** **The Economics of Ecosystems and Biodiversity.**
Jacques Somda: jacques.somda@iucn.org

https://www.cbd.int/financial/values/burkinafaso-valuewetland.pdf

This study measures the economic value of wetland services in Burkina Faso. Traditionally, development policies in the country have focused on harnessing the agricultural potential of wetlands in the Sourou river valley. However, preliminary results of this study show that agriculture accounts for only 3% of the total value of the wetlands' multiple services. These results have stimulated discussion among policymakers about how to define the appropriate role of natural ecosystems in Burkina Faso's national strategy for growth and sustainable development.

Cameroon

UN Statistics Division (2011) Workshop on Environment Statistics: Final Report. Paper presented at the *Workshop on Environment Statistics, Cameron*, 5-9 December.

http://unstats.un.org/unsd/environment/envpdf/UNSD_Yaounde_Workshop/Yaounde_Workshop_Final%20report_English.pdf

This report summarises the "Workshop on Environment Statistics" organised by the United Nations Statistics Division (UNSD), in collaboration with the United Nations Economic Commission for Africa (UNECA) that took place in Yaoundé, Cameroon from 5 to 9 December, 2011. Participants from various international organisations as well as Ministries of Environment of the Central African region (Cameroon, Chad, Congo, Equatorial Guinea, Gabon, and São Tomé e Príncipe) attended the workshop. The workshop's main objective was to develop technical capacity in environmental statistics in the region and for each country to adopt a list of environmental indicators and statistics. A representative from Cameroon's National Institute of Statistics (INS) noted that, in 2009, the INS created the Mapping and Environment Statistics Unit to address the insufficiency of reliable environmental data/information. Since its creation, the Unit has collected data on water and waste in the country's ten regions, conducted a study of surface and ground water pollution in Yaoundé, and created a data collection mechanism to establish an environmental and climate change database. Although the representative did not mention plans to incorporate environmental accounts into national economic accounting, it is of note that developing environmental statistics and indicators is a necessary first step in the process.

The World Conservation Union (2003) *Case Studies in Wetland Valuation #4. Waza Logone Floodplain, Cameroon: economic benefits of wetland restoration. Integrating Wetland Economic Values into River Basin Management.*
Lucy Emerton: lucy@environment-group.org

https://www.cbd.int/financial/values/cameroon-valuewaza.pdf

This study looks to justify investment in flood release in the Waza Logone floodplain, a semi-arid ecosystem in northern Cameroon that covers 6,000 km^2 (2,300 sq. mi.). It does so by estimating the economic value of re-inundation of the floodplain and the economic costs of flood loss. The report begins by describing the Waza floodplain and listing the negative impacts of the reduction in inundated on the ecology and biodiversity, of the area, as well as on the social and economic aspects of human well-being. The study found that re-inundation contributes $10 million a year, or more than $3,000/km^2 ($1,864/sq.mi.) of flooded area. The author then related these changes to further recovery of floodplain ecology and biology. The results showed that, compared to the situation at the time of writing, re-inundation would generate additional incremental economic benefits of between $1.1 million and $2.3 million a year. This translates into positive Net Present Value (NPV) of between $5.6 million and $7.8 million when investment and operation costs are taken into account.

Comoros

[The following document is written in French.]

UNEP, Union of the Comoros and Global Environment Facility (2014) *5ème Rapport National Sur la Diversite Biologique.*

http://www.cbd.int/doc/world/km/km-nr-05-fr.pdf

As a Party to the Convention on Biological Diversity, Comoros was required to submit its fifth national report on the value of biodiversity by March 2014. Reports by all member countries will help gage progress implementation of the Strategic Plan for Biodiversity 2011-2020. Comoros' fifth report found that biodiversity provides the country with 40% to 50% of national food needs. Livestock and poultry play an important role, representing 41% of GDP ($209 million), and about 90% of export revenue. The report makes two important recommendations. First, it suggests that the government should focus attention on the underlying causes of biodiversity loss, especially state regulation. Additionally, it advises that the international community should provide Comoros with assistance to fight environmental degradation and biodiversity impoverishment.

Democratic Republic of the Congo

Blom, A. (2004) An estimate of the costs of an effective system of protected areas in the Niger

Delta – Congo Basin Forest Region. *Biodiversity and Conservation,* 13, 2661–2678.
Allard Blom: allard.blom@wwfus.org

https://www.cbd.int/financial/values/DRCongo-costprotectedareas.pdf

This paper analyses the costs of conserving biodiversity via an effectively-managed and representative protected-area network in the Niger Delta's Congo Basin Forest Region that reaches from Nigeria across Cameroon, Equatorial Guinea, Gabon, Central African Republic, Congo, and the Democratic Republic of Congo (DRC). The study finds that maintaining the biodiversity of an additional 76,000 km (to the existing 135,000 km of protected area) would cost over $1 billion in an initial ten-year investment. The project would need an additional $87 million a year to maintain the system. The author concludes that if the international community values the biodiversity of the Niger Delta Congo Basin Forest Region it is going to have to cover the costs of maintaining its biodiversity.

Eritrea

Zeremariam, T. and Quinn, N. (2007) An evaluation of environmental impact assessment in Eritrea. *Impact Assessment and Project Appraisal,* 25 (1), 53-63.
Nevil Quinn: Nevil.Quinn@uwe.ac.uk

http://www.tandfonline.com/doi/abs/10.3152/146155107X190604#.UoFQzR_I1UQ

This paper evaluates the environmental impact assessment (EIA) system in Eritrea. It analyses the institutional aspects, process, and other features of the EIA system, concluding that the current EIA system in Eritrea meets eleven of the eighteen evaluation criteria, partially meets three, and fails to meet four. Weakness of Eritrea's EIA system include: a lack of legal provisioning for EIA, inadequacy of resources, failure to make the EIA findings a key aspect of decision-making, and a lack of formal provision for Strategic Environmental Assessment (SEA). The authors recommend investing in stakeholder training and continuing professional development, and establishing a sound legal basis for the EIA system.

Ethiopia

Nune, S. et al. (2013) Forest Resource Accounts for Ethiopia. *Eco-Efficiency in Industry and Science*, 28, 103-142, special issue on "Implementing Environmental Accounts: Case Studies from Eastern and Southern Africa".

Sisay Nune: nune.sisay@gmail.com

http://link.springer.com/chapter/10.1007/978-94-007-5323-5_5

This discussion paper is a product of the Natural Resource Accounting in Eastern and Southern Africa (NRAESA) project that is targeted at governments in these regions in order to help them to adopt environmental accounting and use it for policy purposes. It argues that a failure to properly capture the accumulation and depletion of natural resources in the System of National Accounts (SNA) leads to the generation of incorrect measures of economic performance and well-being, such as the rate of savings and capital formation. The authors attempt to construct complete sets of forest accounts for Ethiopia for the years 1995 and 2005, using the SEEA. They describe the forestry sector of Ethiopia, categorising forest resources and detailing the utility of the forestry sector within the economy in terms of biomass energy, employment opportunities, estimated share of GDP, and ecological benefits. The paper also discusses the SEEA for forests and its implementation in Ethiopia, laying out the framework for physical forest accounts by area and volume, as well as a framework for monetary asset accounts, before applying these to Ethiopia's forest sector. The authors adjust the GDP to estimate that the country's forest resources were worth 89 billion birr ($4.3 billion) in 1995 and 83 billion birr ($4 billion) 2005. They conclude by making recommendations, such as the creation and management of a forestry information system to provide forest resources accounting data.

Nune, S. et al. (2013) Forest Resource Accounts for Ethiopia. In: Hassan, R. and Mungatana, E. (eds.) *Implementing Environmental Accounts: case studies from Eastern and Southern Africa*. The Netherlands: Springer, 103-142.

Sisay Nune: sisaynune@yahoo.com

http://link.springer.com/chapter/10.1007%2F978-94-007-5323-5_5

This study aims to construct forest resource accounts for Ethiopia, including both physical and monetary accounts, for the years 1995 and 2005, and to identify current data gaps in order to allow for the construction of more complete accounts. The authors detail the choice of goods and services included in the accounts and the data and methods used to construct them. The results show that natural forest assets are being depleted due to conversion to other land uses. However, it is not clear whether the well-being of Ethiopians has increased or decreased as a result; to ascertain this would require a more inclusive wealth accounting system that takes into account forest depletion in order to contribute to more accurate measures of well-being. The authors argue for a forestry information system in order to provide sufficient data for forest

accounts construction and to collect data on the value of natural forests so that a time series of these values can be produced in the long run.

Ruffeis, D. et al. (2010) Evaluation of the environmental policy and impact assessment process in Ethiopia. *Impact Assessment and Project Appraisal,* 28 (1), 29-40.
Dominik Ruffeis: dominik.ruffeis@boku.ac.at

http://www.tandfonline.com/doi/pdf/10.3152/146155110X488844%E2%80%8E

This paper reviews the Ethiopian Environmental Policy, focusing on the institutional setup and implementation of an Environmental Impact Assessment (EIA). Specific legal provision for EIA application is well documented and the Environmental Protection Authority exists as the legal body. A chronological evaluation of the establishment of the environmental policy reveals that the process was more a result of donor requirements than of political will. Inconsistency at the institutional level, non-existence of complementarities between institutions, and lack of environmental and investment policy contradict the enforcement of the EIA law. Furthermore, a lack of multidisciplinary experts, missing environmental baseline data, and lack of monitoring and post-auditing adversely affect the effectiveness of the EIA law. The paper concludes that, besides other important measures, the Ethiopian EIA law needs to be strengthened.

Ghana

Kurantin, N. (2011) Integrating Environmental Accounting into Ghana's Emerging Oil and Gas Economy. *International Conference on Petroleum and Sustainable Development*, 26, 66-77.
Napoleon Kurantin: nkurantin@gmail.com

http://www.etlibrary.org/?m=fbook&a=details&aid=5132

This paper examines how emerging oil and gas economies, such as Ghana, can integrate SEEA-based environmental accounting into their national accounting systems. The author aims to develop a framework that will enable the implementation of sound policy decisions, good governance, and economic growth and development in Ghana. The author suggests a list of indicators to guide environmental accounting priorities in the country, including economic, social, and environmental. The latter refers to material flows, energy consumption, and water use, amongst others.

Kenya

Republic of Kenya and UNPEI (2010) ***Poverty-Environment Initiative: Policy Brief on Achieving the MDGs and Vision 2030 through Sustainable Development.*** **Kenya: Ministry of State Planning, Republic of Kenya and United Nations Environment Programme.**
PEI Kenya Project Manager: samson.wasao@undp.org

http://www.unpei.org/sites/default/files/PDF/kenya-Policybrief.pdf

This policy brief addresses the lack of measurement of the contribution of environment and natural resources (ENR) to Kenya's development. Because there is no clear understanding, in statistical terms, of the value of ENR to the economy, there is a general lack of awareness and understanding of the economic, social, and ecological contributions of ENR goods and services. The authors recommend improving ENR valuation by: 1) building human and institutional capacities in the area of valuation; 2) adopting Natural Resource Accounting (NRA); 3) developing a set of Indicators of Sustainable Development (ISDs); and 4) using different economic instruments.

Krassowska, K. (2009) ***Environmental Mainstreaming in Kenya – Status and Strategies for Stability and Development.*** **Nairobi: Royal Danish Embassy (Danida).**
Krystyna Krassowska: kkrassowska@hotmail.com

https://www.google.co.uk/l?sa=t&rct=j&q=&esrc=s&source=web&cd=17&ved=0CFAQFjAGOAo&url=http%3A%2F%2Fwww.environmental-mainstreaming.org%2Fdocuments%2FDanida%2520-%2520Kenya%2520EM%2520report%2520(2009).c&ei=M8mhUoDpE4SshQfT8IDIDw&usg=AFQjCNHRPm5lOgUzSy81WIwvhwdWY2ARWA&bvm=bv.57752919,d.ZG4&cad=rja

This report presents the main challenges for Kenya's sustainable development and recognises the environment as critical to the country's stability, security, and development. It then explains the concept of environmental mainstreaming as comprising "all processes which directly strive to incorporate environment and natural resource issues into programs and projects, development plans, national budgets, sector policies and sector budgets, and core business strategies" (p.10). Furthermore, it identifies green accounting as a key prerequisite for making budgets reflect the true investments required to ensure sustainable environmental management. The report then analyses the critical issues and opportunities for environmental mainstreaming in Kenya. Finally, the authors propose a set of recommendations for widening and deepening understanding of the strategic importance of the environment in Kenya across the political and institutional board, encouraging its prioritisation and pushing for further donor support.

Madagascar

WAVES (n.d.) *Madagascar*. [online] WAVES. [Accessed 5 June 2015].

http://www.wavespartnership.org

This summary is for WAVES project progress in Madagascar only. An overview of WAVES is provided in the Multi-Country Reports and Projects Section of this document. Summaries of WAVES project activities in its four other core country partners—Botswana, Colombia, Costa Rica, and The Philippines—can be found under their individual country sections.

The WAVES project in Madagascar has so far focused on developing a detailed work plan. In May 2012, the government issued a decree to establish a national WAVES Steering Committee that will provide strategic guidance on WAVES activities. A WAVES country coordinator has been recruited by the government to act as its focal point and as liaison for WAVES Madagascar. The Committee, with support from the World Bank, created a work plan outlining activities from 2012 to 2015. It also produced two detailed case studies on water services in the eastern humid forest ecosystems and the policy and economic aspects of the fisheries sector. The Steering Committee met formally for the first time in August 2012, during which the work plan for WAVES activities was validated. It has also scoped out the first technical studies, focusing on the creation of natural capital accounts related to the mining, forestry, and water sectors. An international environmental accounting specialist commenced work in April 2013 to provide technical support and training for the Steering Committee and national counterparts for accounts development in these sectors. Meanwhile, Conservation International, the Basque Centre for Climate Change, the University of Vermont, and Earth Economics have worked together to develop the Artificial Intelligence for Ecosystem Services (ARIES) technology, a tool that uses maps to show the connections between the regions that provide ecosystem services (such as freshwater supply) and the regions that benefit from these provisions. They partnered with the World Bank-led WAVES partnership to deploy ARIES as the principal tool to perform a biophysical assessment and valuation of selected ecosystem services in Madagascar's Ankeniheny-Zahamena forestry corridor. Summaries of related papers are included below.

Portela, R. et al. (2012) *Assessing and Valuing Ecosystem Services In The Ankeniheny-Zahamena Corridor (CAZ), Madagascar: A Demonstration Case Study For The Wealth Accounting and The Valuation Of Ecosystem Services (WAVES) Global Partnership*. WAVES, Conservation International and The World Bank.
Rosimeiry Portela: r.portela@conservation.org

http://www.wavespartnership.org/waves/sites/waves/files/images/WAVES_Madagascar_Report.pdf

This document is part of the Wealth Accounting and Evaluation of Ecosystem Services (WAVES) project. The project has the following Core Implementing Partner countries: Botswana, Colombia, Costa Rica, Madagascar, and the Philippines. These were recently joined by Guatemala, Indonesia, and Rwanda. Information about the WAVES project can be found under the International Projects section of this book.

This report is a demonstration case study for WAVES in Madagascar, involving an in-depth assessment of the contribution of key ecosystem services from the Ankeniheny-Zahamena Forestry Corridor (CAZ), the largest remaining contiguous patch of humid forest in eastern Madagascar. The aim was to demonstrate the feasibility of techniques to model and value ecosystem services in a data-scarce environment. The authors further set out to prove the utility of such an approach in identifying the relative importance of different areas, such as forest and non-forest areas, or protected and non-protected areas. The analysis focuses on three ecosystem services that are critical for human well-being: carbon storage and sequestration, water supply, and sediment retention. The report details the economics of ecosystem services and lays out the study methodology, including both the biophysical and economic analytical methods. The results show that, as well as acting as an important carbon sink, the CAZ provides important benefits in terms of water supply and sediment regulation that many economic sectors dependent on. The authors also developed methods to quantify four key dimensions of ecosystem services, each with a different relevance for policy assessments: input productivity, economic value, sustainability of supply, and quality of supply, demonstrating their relevance for the assessment of economic contributions of Madagascar's ecosystem services. The authors discuss the indicators resulting from the analyses, the utility and replicability of the multidisciplinary methodology, how ecosystem services can be integrated into policy development, and the opportunities for scaling up and out to other regions.

WAVES Madagascar and The World Bank (2012) *Priority Policy Objectives and Workplan for WAVES Phase 2 Activities in Madagascar*. Washington DC: WAVES and the World Bank.

http://www.wavespartnership.org/waves/sites/waves/files/documents/Second%20Partnership%20Meeting/WAVES_Madagascar_Policy_Review.pdf

This document is part of the Wealth Accounting and Evaluation of Ecosystem Services (WAVES) project. The project has the following Core Implementing Partner countries: Botswana, Colombia,

Costa Rica, Madagascar, and the Philippines. These were recently joined by Guatemala, Indonesia, and Rwanda. Information about the WAVES project can be found under the Multi-Country Reports and Projects section of this book.

This seven-section document starts by outlining the goals and initial phases of the WAVES project within the country. The report then explores the macroeconomic and environmental context of Madagascar, showing that natural capital accounts for roughly half of the country's total wealth, but is decreasing at a worrying rate. The report discusses the preparation of the Phase 2 WAVES work plan in Madagascar and the factors that influenced this process. It also lays out the policy objectives included in the WAVES Phase 2 work plan relating to macroeconomic indicators, the mining sector, managing water sheds and water resources, valuing protected areas and forest ecosystems, and coastal zone management. The latter part of the document describes the relation of the Phase 2 work plan to policy objectives, expected outputs, and estimated budgets and explains the institutional arrangements for implementing the work plan. It details the next steps for the WAVES project in Madagascar: ensuring readiness to commence implementation and preparing for project presentation at Rio+20.

Malawi

UNDP and Government of Malawi (2013) *Environment and Natural Resources Management Support to Malawi, 2013-2016.* UNDP and Ministry of Environment and Climate Change Management.

http://www.undp.org/content/dam/undp/documents/projects/MWI/Signed%20ENR%20PSD%202013-2016.pdf

This document outlines a strategy for a partnership between Malawi and the UNDP to deal with the country's Environment and Natural Resources Management (ENRM) issues. It prioritises activities into four main themes: mainstreaming, coordination, capacity development at the national and district levels, and information and knowledge management. For the latter, it recommends direct investments in improving data collection and management and the development of specific indicators and survey techniques. The document highlights the need to use official accounting methods, other than GDP, to make the importance of natural resources apparent and thus potentially motivate greater budget allocations in the ENRM sector.

Bass, S. et al. (2010) *Mainstreaming the environment in Malawi's development: experience and next steps.* UK: International Institute for Environment and Development (IIED).

Steve Bass: steve.bass@iied.org
http://pubs.iied.org/pdfs/11072IIED.pdf

This report reviews Malawi's various approaches to environmental mainstreaming, the lessons learned, key challenges for the future, and the best ways of addressing these challenges. The report resulted from a collaborative project between the Ministry of Development Planning and Cooperation (MDPC), the Poverty-Environment Initiative (PEI) project, and the International Institute for Environment and Development (IIED). The report discusses: the issue of integrating the environment into Malawi's central policy, planning, and finance; the potential for mainstreaming the environment on the local and sectorial levels through partnerships between poor groups and local government, business, and sector authorities; the need for mobilising science and local traditions in environmental management; and the different success factors in mainstreaming, remaining constraints, and opportunities. The authors offer ten recommendations for projects attempting to integrate environmental stewardship with poverty reduction objectives. Among these recommendations is the need to build an environmental valuation and accounting system that supplements the System of National Accounts (SNA), including better information on physical environmental stocks and flows of forest, fish, and water resources and systematic monetary valuation of key environmental assets.

Mali

UNPEI (n.d.) *Mali Country Factsheet*. UNDP-UNEP Poverty-Environment Initiative.
Moussa Barry: barrymous@yahoo.fr

http://www.unpei.org/sites/default/files/country_factsheets/Mali_Country_Factsheet_140414.pdf

This factsheet describes Mali's Poverty-Environment Initiative (PEI) in Mali that was established in 2005 to support the government in promoting sustainable development. Among the programme's recent achievements is the creation of the Public Environmental Expenditure Review (PEER) by the Ministry of Economy and Finance. The Review found that the country loses 21% of its GDP due to unsustainable use of natural resources. It further highlighted that natural resources and the environment contribute more than 40% of the GDP and yet the Ministry of Environment only receives 1% of the national budget, contributions that tend to be irregular and unplanned. As a result, the Government of Mali's 2013 plan for sustainable recovery names the integration of the environment into policies and strategies as one of twelve themes to be prioritised for immediate support.

UNEP (2012) *Ecosystem Services and Rural Livelihoods in the Sahel: Environmental Accounting and Wealth Surveys*. Nairobi: UNPE.
Gemma Shepherd: gemma.shepherd@unep.org

http://www.unep.org/dewa/Portals/67/pdf/ME_Report_lowres.pdf

This paper attempts to implement the first comprehensive environmental accounts in the Sahel region of Africa. Due to the fragile nature of their ecosystems, both arid and semi-arid areas of the region are feeling the pressures of population growth and rapidly growing affluence. The environmental accounting techniques implemented by the authors permit a quantitative analysis of ecosystem services in the Sahel, which allows them to survey rural wealth and examine its direct link with the surrounding ecosystem in unprecedented ways. The paper is divided into two parts. The first part summarises the results of the environmental accounting analysis for rural land uses in the region. The authors report the environmental accounts using "emergy", a unit of solar energy, and compare the environmental and economic flows in order to effectively evaluate policy. The report elaborates on 17 agricultural land use subsystems typical of the Sahel region in Western Africa and summarises their environmental accounting analysis. The second part of the paper examines the link between rural livelihoods and ecosystem services in rural Mali. The authors evaluate three levels of ecosystem services (rainfall, rain-use efficiency, and rain-use efficiency trends) and their relationship with material wealth and animal wealth. They conclude that there are significant associations between the condition of the environment and the accumulation of rural wealth. The authors further note that Mali's rural farmers also use other ecosystem services that are not necessarily directly related to land, which allows them to compensate for some environmental degradation. Overall, the chief achievement of this paper is the detailed view of the direct and compensatory links between ecosystems and the well-being of the populations that inhabit them.

Mauritania

UNPEI (n.d.) *Mauritania Country Factsheet.* UNDP- UNEP Poverty-Environment Initiative.
http://unpei-staging.azri.de/sites/default/files/dmdocuments/Country%20factsheet%20Mauritania%202012%20revised.pdf

This factsheet describes Mauritania's Poverty-Environment Initiative (PEI) that was launched in 2005 and whose first phase ran into 2008. The PEI supported the development of the country's first Poverty Reduction Strategy (PRS) as well as regional plans for poverty reduction. In 2008, it developed Mauritania's first State of Environment Report and conducted an economic analysis

of the cost of environmental degradation and unsustainable management of natural resources in the country, focusing on water, fish resources, and rural development (livestock and agriculture). The PEI has analysed the extent to which the environment has been integrated into Mauritania's main national development strategies and, in 2010, it assisted the Ministry of Environment in the development of an environment database. Finally, the PEI has also launched pilot integrated ecosystem assessments that focus on wetlands. Although the factsheet does not mention comprehensive green national accounting, the creation of an environmental database and preliminary ecosystem valuations are promising first steps.

Mauritius

Manase, G. (2010) *Mauritius Pilot Report – Final. Southern African Development Community Economic Accounting of Water Use Project*. SADC.
Gift Manase: g.manase@gmail.com

http://www.sadcwateraccounting.org/_system/writable/DMSStorage/771en/SADC-EAW%20Mauritius%20Pilot%20Report.pdf

Mauritius is a water-stressed country; it has 1,028 cubic meters of freshwater per capita compared to 5,705 cubic meters per capita in Sub-Saharan Africa. The National Environmental Action Plan (NEAP) emphasises the need to protect the country's water resources since water is critical in sustaining Mauritius' sugar and manufacturing industry (agriculture and manufacturing account for 6.8% and 23.6% of GDP, respectively). A pilot programme for water accounts resulted in the establishment of a National Task Team and the compilation of two water accounts (water asset and physical supply and use accounts). The author uses these accounts to create useful indicators for policymaking, such as the Water Intensity Indicator, which shows that agriculture requires 200 times more water to generate $1 of output compared with industry. The report concludes with recommendations for further development of water accounts.

Mozambique

Mungatana, E. et al. (2013) Fisheries Resource Accounts for the Maputo Coastal Districts of Mozambique. *Eco-Efficiency in Industry and Science,* 28, 71-101, special issue on "Implementing Environmental Accounts: Case Studies from Eastern and Southern Africa".
Eric Mungatana: mungatana@up.ac.za

http://link.springer.com/chapter/10.1007%2F978-94-007-5323-5_4

This work is an assessment of the development of SEA systems for the fisheries sector in Mozambique. GDP ignores the interactions between economic activity and the environment (including natural resources), although these interactions are increasingly evident. The study establishes the classification to be used in constructing marine fisheries accounts for Mozambique and for estimating the physical and monetary accounts for fisheries. As a result of population growth, persistent rural poverty, and a fast pace of growth and development in the private sector, the degradation of a number of environmental and natural resources has reached such a level that economic growth capabilities are already being compromised.

Namibia

Barnes, J. et al. (2013) Wildlife Accounts: A Multi-sectorial Analysis. *Eco-Efficiency in Industry and Science,* 28, 25-47, special issue on "Implementing Environmental Accounts: Case Studies from Eastern and Southern Africa".
Jon Barnes: jibarnes@iafrica.com.na

http://link.springer.com/chapter/10.1007%2F978-94-007-5323-5_2

The focus of this work is the evolution of wildlife resource accounts and wildlife-tourism-generated accounts for Namibia in 2004. The authors describe Namibian government's efforts to complete a wildlife inventory in 2004 and the consequent development of a set of wildlife accounts for the country. Findings suggest that development in the sector should emphasise both non-consumptive and consumptive tourism. It recommends securing property rights through the concessions policy and the community-based natural resource management (CBNRM) programme, as well as directing investments into the building up of appropriate stocks of wildlife on both communal and private land.

Lange G. (2013) Wealth, Natural Capital, and Sustainable Development: Contrasting Examples from Botswana and Namibia. *Environmental and Resource Economics,* 29 (3), 257-283.
Glenn-Marie Lange: gml1@nyu.edu

http://link.springer.com/article/10.1007/s10640-004-4045-z?no-access=true

This paper uses newly available natural capital accounts to construct total national wealth accounts for Namibia, with an emphasis on performance since the country's independence in

1990. The paper derives wealth accounts using net foreign financial assets, produced capital, and natural capital accounts associated with minerals and fisheries. It then uses trends in the level and composition of wealth to examine whether per-capita wealth increased and whether an increase in other forms of wealth compensated for the depletion of natural capital. Both monetary and physical accounts showed that the value of Namibia's natural capital had decreased, largely due to the depletion of mineral assets and the failure to restore fisheries. Findings also illustrated that this decline in natural capital was not offset by investments in produced capital in the pre-independence period. The author attributes the reversal in these trends after independence to new resource management and development policies. The report concludes by emphasising the importance of including environmental accounting in national economic reports to establish a more sustainable indicator for growth. It further recommends the expansion of analysis to include human capital and terrestrial ecosystem accounts in order to derive more representative national wealth accounts for Namibia.

Lange, G. (2013) Natural Capital, Total Wealth, and Sustainable Development in Namibia. *Eco-Efficiency in Industry and Science*, 28, 1-23, special issue on "Implementing Environmental Accounts: Case Studies from Eastern and Southern Africa".
Glenn-Marie Lange: gml1@nyu.edu

http://link.springer.com/chapter/10.1007/978-94-007-5323-5_1

This paper uses newly available accounts for natural capital in Namibia to create total national wealth accounts in order to assess the country's development path compared to that of neighbouring Botswana. The wealth of a country includes produced, natural, human, and social capital; as international agencies increasingly recognise this, they place less emphasis on Gross National Product (GNP) as an indicator of progress. Instead, the idea is to move towards a "portfolio management" economic development process that optimises the management of each asset and the distribution of wealth among different kinds of assets. This paper presents Namibia's natural capital accounts and analyses the country's economic sustainability for the pre- and post-independence period. It finds that, pre-independence, natural and produced capital was liquidated, whereas post-independence period (after 1990) there existed an opportunity for new resource management and development policies. As a result, Namibia has begun to rebuild its national wealth, although per capita wealth is yet to recover to 1980 levels. Its neighbour Botswana aimed to reinvest all mineral revenues into national development, including investments in human capital and public infrastructure, a commitment that has made the country a poster child for good policymaking in resource-rich developing countries. The author emphasises that, in order to achieve sustainable development, natural capital should not be liquidated without

adequately provisioning for the replacement of these assets for future generations.

Sahlén, L. and Stage, J. (2012) Environmental fiscal reform in Namibia: A potential approach to reduce poverty? *Journal of Environment and Development*, 21 (2), 219-243.
Linda Sahlen: linda.sahlen-ostman@konj.se

http://jed.sagepub.com/content/early/2012/01/24/1070496512442506

This paper uses a Computable General Equilibrium (CGE) model to examine the likely effects of an environmental fiscal reform in Namibia. The authors find that obtaining the triple goals of improving the environment, increasing employment, and reducing poverty, all at the same time, remains elusive. The authors argue that subsidising unskilled labour would give the most favourable result in terms of real GDP and employment, but the worst in terms of environmental effects. Transfers targeted towards poorer households have the best distributional and environmental impacts, but do not lead to increases in GDP or employment. Thus, there is scope for different environmental fiscal reforms to create additional benefits for society, but no single option clearly outperforms the others in all respects.

INTOSAI (2010) *Environmental Accounting: Current Status and Options for SAIs*. Washington DC: International Organization of Supreme Audit Institutions (INTOSAI).

http://www.environmental-auditing.org/LinkClick.aspx?fileticket=s%2FFCvUzSK-sk%3D&tabid=128&mid=568

This summary is for the Namibia case study only. For an overview of the entire report, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Australia, Botswana, Canada, China, Colombia, France, Germany, Mexico, the Netherlands, the Philippines, and Sweden, which can be found under their respective country sections.

Namibia began using environmental accounts in the 1990s, including data on stocks, flows, and monetary values of water, fisheries, livestock, and minerals. The accounts are related to, but not based on, the SEEA, and have been used for policy analysis and implementation, including a rise in fishery quota fees.

Lange, G. (2009) Natural Capital, Total Wealth and Sustainable Development in Namibia. *CEEPA Discussion Paper No. 42.* South Africa: Centre for Environmental Economics and Policy in Africa (CEEPA).

Glenn-Marie Lange: glange1@worldbank.org

http://www.ceepa.co.za/uploads/files/CDP42.pdf

The ability of resource-rich developing countries to convert their natural wealth into development depends, among other factors, on the ability to measure natural capital. This study presents the environmental accounts of Namibia, attempts to estimate the country's total wealth, and analyses the sustainability of its economy. It finds that, in constant 1995 prices, the value of Namibia's natural capital fell by 36% from N$11.3 billion ($920 million) in 1980 to N$7.2 billion ($585 million) in 2005. The study found that, despite a good period of growth in per capital wealth after independence, Namibia has not converted this depreciation of natural capital into national wealth. That differs from its neighbour Botswana, who successfully reinvested resource rents in national development.

Lange, G. (2006) Water accounts and water policy in Namibia. In: Lange, G. and Hassan, M. (eds.) *The economics of water management in Southern Africa: An environmental accounting approach.* UK: Edward Elgar Publishing, 44-113.
Glenn-Marie Lange: gml1@nyu.edu

http://www.e-elgar.com/shop/the-economics-of-water-management-in-southern-africa

This work is an overview of the water accounts framework developed for Namibia. The author covers the various aspects needed for the development of stock and flow variables and discusses the accountability of water resources in the country. A thorough assessment of water pricing, subsidies/taxes and their economic impact are beyond the scope of this study, although the water accounts provide a good indication of where to start such an assessment.

Lange, G. (2003) The contribution of minerals to sustainable economic development: Mineral resource accounts in Namibia. *DEA Research Discussion Paper No. 54.* Namibia: Directorate of Environmental Affairs, Ministry of Environment and Tourism.
Glenn-Marie Lange: gml1@nyu.edu

http://www.drfn.info:85/pdf/RDP54.pdf

This report addresses the issue of sustainable development in Namibia, which is an economy dependent on mineral resources. It constructs SEEA-based physical and monetary accounts for the 1980-2001 period for Namibia's three major minerals: diamonds, uranium, and gold. It then uses

this data to discuss policy implications in terms of two criteria for sustainable development: the recovery of resource rents through taxes and the reinvestment of resource rents in other assets. The report compares its findings with those of a neighbouring mineral-rich country, Botswana. The results show that Namibia recovered approximately 42% of its diamond rates over the prior 20 years, which is fairly good but much lower than Botswana. It also lags behind Botswana in reinvestment policies. Nevertheless, Namibia has managed to partly recover its economy since 1990 through careful contemplation of how to spend mining revenues.

Lange, G. (2003) The value of Namibia's commercial fisheries. *DEA Research Discussion Paper No. 55.* Namibia: Directorate of Environmental Affairs, Ministry of Environment and Tourism.
Glenn-Marie Lange: gml1@nyu.edu

http://mdgs.un.org/unsd/envaccounting/ceea/archive/Fish/Namibia_Value_Commercial_Fisheries.PDF

This paper constructs SEEA-based physical and monetary accounts for Namibia's three major commercial fisheries: pilchard, hake, and horse mackerel. It then discusses the policy implications of these and the light that they shed on fisheries management. The results show that fish stocks increased by 37% in the 1990s. Moreover, the quota levies on fish generate significant government revenues. However, they appear to have declined from around 50% in 1991 to around 20% in 2000, suggesting that many of the resource rents accrue to the private sector rather than the government. The author praises the management of the fish industry and suggests that it almost reaches a level of complete sustainability.

Lange, G. (2000) Fisheries accounting in Namibia. In: *International Workshop on Environmental and Economic Accounting*, Manila, Philippines, 18-22 September, NSCB.
Glenn-Marie Lange: gml1@nyu.edu

http://www.nscb.gov.ph/peenra/workshop/technical%20papers/session%205%20glenm-namibiafishery.pdf

This paper presents the fisheries accounts for Namibia from 1990 until 1998 and describes their use to assess the management of the industry. It begins with a brief description of the Namibian fishing industry and its past and current policy. The main fish in the industry are hake, pilchard, and horse mackerel, with tuna and crab making up a much smaller portion. The report presents the fluctuation of fish stocks over the set period, the influence of fisheries to the Namibian economy, changes in policies concerning the fishing industry, and the sustainability of the industry. The

author praises the Namibian management of their fisheries, pointing out that it has achieved sustainable management of fisheries, while increasing their contribution to the economy, all without subsidisation.

Lange, G. and Montinga, D. (1997) The Contribution of Resource Rents from Mineral and Fisheries to Sustainable Economic Development in Namibia. *DEA Research Discussion Paper No. 19.* Namibia: Directorate of Environmental Affairs (DEA), Ministry of Environment and Tourism.
Glenn-Marie Lange: gml1@nyu.edu

http://millenniumindicators.un.org/unsd/envaccounting/ceea/archive/Fish/Namibia_ResourceRent_Fisheries_Minerals.PDF

This article discusses Namibia's attempt to use its natural resource accounts (NRA) to monitor and improve resource rents from mining and fishing industries. The aim is to promote tools for sustainable management and to improve the effectiveness of NRA to fully recover resource rents. The study concludes that mining resource rents tend to be higher than that of fishing industries due to a larger investment from foreign and domestic institutions that have expanded over a much greater time. Since fishing is a relatively new industry, resource rents tend to be lower than mining because there is less time to effectively evaluate taxation. In both cases, at the time of the writing, the NRA's ability to monitor mining and fishing stocks was limited. In the case of fishing, this is because fish can move freely between aquatic boundaries; for mining, it is because information about the stocks of the most important minerals is usually confidential.

Nigeria

Ayoola, T. (2011) Gas Flaring and its Implication for Environmental Accounting in Nigeria. *Journal of Sustainable Development*, 4 (5), 244-250.
John Tajudeen Ayoola: alabiayoolaaca@oauife.edu.ng

http://www.ccsenet.org/journal/index.php/jsd/article/view/11356

Using data sourced from the annual reports of oil and gas companies involved in gas flaring, this study examines the theoretical framework for gas flaring and its implication for environmental accounting in Nigeria. The results reveal that the issues plaguing environmental accounting disclosures relate to a lack of standardised requirement for disclosure, as well as a lack of political will for legislation, enforcement, and the allocation of environmental costs. The author therefore recommends the development of an integrated corporate environmental policy with legal backing

in order to streamline environmental information disclosures in annual accounts.

Rwanda

WAVES (n.d.) *NCA is a Tool that can Help Realize Africa's Ambitions.* [online] WAVES. [Accessed 2 June 2015].

http://www.wavespartnership.org/en/rwanda

Rwanda recently joined the Wealth Accounting and Evaluation of Ecosystem Services (WAVES) project as a Core Implementing Partner country. Other partners are Botswana, Colombia, Costa Rica, Madagascar, and the Philippines, which were also recently joined by Guatemala and Indonesia. Information about the WAVES project can be found under the Multi-Country Reports and Projects section of this book.

FONERWA (n.d.) *Environmentand Climate Change.* [online] Kigali City, Rwanda: FONERWA. [Accessed: 2 June 2015].

http://www.fonerwa.org

The Government of Rwanda established the Environment and Climate Change Fund – FONERWA – as a cross-sectoral financing mechanism to achieve development objectives of environmentally-sustainable, climate-resilient, and green economic growth. FONERWA is the vehicle in Rwanda through which environment and climate change finance is channelled, programmed, disbursed, and monitored. As a national basket fund, FONERWA facilitates direct access to international environment and climate finance. It also streamlines and rationalises external aid and domestic finance. Access to the Fund is open to line ministries and districts, charitable enterprises, and private entities, including businesses, civil society, and research institutions.

Saint Helena

Ellick, S. et al. (2013) *St. Helena, State of the Environment Report April 2012 - March 2013.* Environmental Management Division, St. Helena Government.
Shayla Ellick: ellick@enrd.gov.sh

http://www.sainthelena.gov.sh/wp-content/uploads/2012/08/State-of-the-Environment-Report-2012-2013-FINAL-v2.pdf

Saint Helena is undergoing a period of rapid economic development, including the construction of the island's first airport and increased development of the tourism industry. In a response to the anticipated increases in demand for natural resources and an increase in waste output resulting from economic development and tourism, the island's government commissioned the first State of the Environment Report for 2012-2013. This report combines currently available environmental statistics in order to present the current status of the physical environment and to highlight information gaps. The report contains statistics and measures on air and climate, inland waters, biodiversity, fisheries, waste, and energy. It outlines the current National Environmental Management Plan, which is part of the country's goal of effective environmental management (one of three goals of the Sustainable Development Plan) and describes the status of current policies and projects. Over the next few years, the government will establish a set of environmental indicators to use in the management of Saint Helena's environment.

Senegal

Bishop. J and Garzon P. (2003) ***The Economic Value of Wild Resources in Senegal: A preliminary evaluation of non-timber forest products, game, and freshwater fisheries.*** **[Discussion draft]. Senegal: The World Conservation Union.**
Joshua Bishop: josh.bishop@iied.org

https://www.cbd.int/financial/values/Senegal-wildvalue.pdf

This study attempts to measure the economic contribution of wild resources, including non-timber forest products (NTFPs), game, and freshwater fisheries in Senegal in order to fully consider the costs and benefits of alternative land uses. Results suggest that a full accounting of the harvest of NTFPs in two major producing regions in Senegal would add at least 1.4 billion francs ($2 million) a year to national income. The research also shows that wild plants and game contribute up to 50% of annual cash incomes in poor households, although the economic importance of these resources varies from region to region. The paper estimated the annual economic contribution of freshwater fisheries in two of three surveyed major fishing areas of 9.2 billion francs ($13 million), which represents value added from distribution through wholesale markets but excludes value added in retail distribution. The authors estimate the total value added of all non-timber wild plants, animals, and freshwater fisheries in Senegal – currently excluded from the national accounts – at no less than 14 billion francs and possibly as much as 25 billion francs ($19-35 million a year). In conclusion, they state the need for sustainable management of wild plants and animals to benefit those whose livelihoods depend on these resources.

South Africa

Crafford, J. and Hassan, R. (2013) Valuing Regulating and Supporting Ecosystem Services of the Subtropical Estuaries of KwaZulu-Natal in South Africa. *Eco-Efficiency in Industry and Science,* 28, 207-218, special issue on "Implementing Environmental Accounts: Case Studies from Eastern and Southern Africa".
Jackie Crafford: j.crafford@primeafrica.net

http://link.springer.com/chapter/10.1007%2F978-94-007-5323-5_8

This study aims to contribute to the development of methodologies for the valuation of ecosystem assets and their integration into national accounting frameworks. In particular, the authors extend the known production function formulation to value the contributions of regulating and supporting ecosystem services of the estuaries of the KwaZulu-Natal province in southeast South Africa. They aim to do this by establishing an explicit link between various estuarine habitat components and processes (physical structure, composition, and functional ecosystem dynamics) and provision of the final services (fish biomass for food).

Statistics South Africa (2013) *Environmental Economic Account Indicators: 2002-2009/2010.* Discussion document D0405.2.1. Pretoria: Statistics South Africa.
Statistics South Africa: info@statssa.gov.za

http://beta2.statssa.gov.za/publications/D040521/D0405212010.pdf

This document provides an overview of the environmental economic account indicators in South Africa. First, it describes the elaboration of national indicators in the context of the UN efforts to address human impacts on the environment at the local, national, and global levels, conceptualised in the action plan set out in Agenda 21. The second section presents a model of human interaction with the environment, a "pressure-state-response" framework for indicators, and the key indicator characteristics based on the "SMART" concept. The authors then detail indicators based on the internationally adopted SEEA framework. These include physical accounts, ecosystems, environmental themes, economic and environmental-economic indicators, and environmental-economic profiles. They offer ten practical selection criteria to help determine an optimal indicator set: measurable, practical, reliable, relevant, direct, sensitive, responsive, objective, comparable and useful to policy and decision management. The authors end by presenting the 2002-2009 environmental-economic accounts indicators for South Africa covering

four main areas of energy, fisheries, minerals, and water, and stressing the need to constantly revise and update them and their measurements.

Schlegelmilch, K. et al. (2010) Fiscal Reform in EC Development Cooperation*. Contract No. 2008/160146/2 – Version 2 Final Report*. Soges Consortium.
Kai Schlegelmilch: kai.schlegelmilch@green-budget.eu

http://www.foes.de/pdf/20100929_Final%20Report%20-%20Environmental%20Fiscal%20Report%20-%20FINAL.pdf

This summary is for the South Africa case study only. For an overview of the entire project, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Barbados, Burkina Faso, Uganda, and Vanuatu, which can be found under their respective country sections.

The EC chose South Africa as one of five countries with good potential for implementing environmental fiscal reforms (EFRs) to participate in the "Fiscal Reform in EC Development Cooperation" programme. The South African 2009/10 budget proposed new environmental initiatives to promote sustainable development, thus demonstrating advanced understanding of the EFR concept in the country. South Africa is already applying some EFR instruments in the form of taxes on energy products and transport; user charges for water, sanitation, and waste; and feed-in tariffs for renewable electricity. It also applies product taxes on plastic bags. The report finds that environmental sustainability, fiscal/economic reform, and poverty reduction can all be achieved simultaneously in the country if the EFR is appropriately designed.

Crafford, J., and Hassan, R. (2006) Environmental and economic accounts for water in South Africa. In: Lange, G. and Hassan, R. (eds.) *The Economics of Water Management in Southern Africa: An Environmental Accounting Approach*. UK: Edward Elgar Publishing, 114-166.
Jackie Crafford: j.crafford@primeafrica.net

http://www.elgaronline.com/view/1843764725.00011.xml

Despite data scarcity and conceptual difficulties, this book chapter documents attempts to construct and use water resource accounts to inform water policy and management in South Africa. First, the authors provide a brief review of the country's past experiences in the construction and use of water resource accounts and describe the principles guiding water resource management in South Africa that motivate the framework adopted for compiling

national water resource accounts. The accounts are based on the UN System for Integrated Environmental and Economic Accounting for Water Resources (SEEAW), although they adapt it for consistency with the principles of water management in South Africa. Finally, the authors present physical and monetary water accounts and explore the possibility of integrating them with Statistics South Africa's national accounts. They conclude with some implications for further research and water policy.

Statistics South Africa (2005) ***Natural resource accounts: Energy accounts for South Africa, 1995-2001.*** **Pretoria: Statistics South Africa.**
Statistics South Africa: info@statssa.gov.za

http://www.statssa.gov.za/publications/DiscussEnergyAcc/DiscussEnergyAcc.pdf

This report provides natural resource accounts for energy in South Africa from 1995 to 2001, compiled in accordance with the 2003 SEEA recommendations. It lists national energy resources that include coal, wind power, solar power, wave power, biomass power, nuclear power, and hydro power, stating what they are, how they are used, their disadvantages and advantages, and their percentage contribution to the country's energy portfolio. The report then details the extent to which different sectors use electricity, natural gas, oil products, biomass, and other fuels. More specifically, it focuses on the different types of energy used by the industrial, commercial, agricultural, residential, and transport sectors, providing detailed supply and use tables and energy production and import graphs. The authors do not make statistical comparisons, however, they do offer some conclusions. Mainly, the paper states that the use and supply of energy is critical to the economy because almost all economic activities are connected to energy consumption in some way; that energy accounts enable the tracking of energy requirements of various industries relative to their output; and that these accounts are also indispensable for reliably estimating carbon dioxide emissions related to energy consumption.

Statistics South Africa (2005) ***Natural Resource Accounting: Water Accounts of the Upper Vaal Water Management Area 1991-2000.*** **Pretoria: Statistics South Africa.**
Statistics South Africa: info@statssa.gov.za

http://www.statssa.gov.za/publications/DiscussWaterAcc/DiscussWaterAcc.pdf

This paper stems from Statistics South Africa's natural resource accounts (NRA) for water, which forms part of the process of completely implementing the 1993 System of National Accounting. The document presents the techniques and methods used to construct NRA; it explicitly discusses

the compilation of water accounts between 1991 and 2000. Supply and asset accounts for the Upper Vaal Water Management Area (WMA), which includes five rivers and eight dams, form the basis for the discussion. The most important conclusion drawn from this study is that it is possible to complete water resource accounts for the Upper Vaal WMA using the SEEA framework proposed by the United Nations. For the physical accounts, the paper found that the total use of water in the Upper Vaal WMA had an annual growth rate of 2.7%, and that the total storage capacity of the Upper Vaal WMA has been pushed up since 1988 from 5,618 to 8,505 million m^3.

Statistics South Africa (2002) ***Natural Resource Accounting: Mineral Accounts for South Africa 1980-2001.*** **Report 04-05-02. Pretoria: Statistics South Africa.**
Statistics South Africa: info@statssa.gov.za

http://www.statssa.gov.za/publications/Report-04-05-02/Report-04-05-02.pdf

This paper uses the SEEA to provide mineral accounts for South Africa between 1980 and 2001. The document gives a background of natural resource accounts (NRAs) together with an explanation of the techniques and methods used to compile the mineral accounts, which include physical and monetary accounts. The primary focus is on South Africa's principal resources: gold, platinum, and coal. The authors compile and present many statistics concerning the environmental and economic implications of the nation's mining system, including their contribution to gross value added, employment, years to depletion, resource and unit rent, output and intermediate consumption, and the value of closing stock for South Africa. However, they do not make a comprehensive comparison between the three mining industries or present any conclusions concerning South Africa's extractive sustainability.

Statistics South Africa (2000) ***Natural resource accounts: water accounts for nineteen management areas.*** **Report No. 04-05-01 (2000). Pretoria: Statistics South Africa.**
Statistics South Africa: info@statssa.gov.za

http://www.statssa.gov.za/publications/Report-04-05-01/Report-04-05-012000.pdf

According to Statistics South Africa, the creation of water accounts is crucial to the policymaking process and sustainable development in South Africa. This paper constructs water accounts for South Africa and its 19 water management areas (WMAs) for the hydrological year 2000 (1 October, 1999 to 30 September, 2000). The physical accounts for water comprise water supply accounts, water use accounts, and water asset accounts. The authors examined the water supply accounts by: industry, final consumer, other water management areas, and the environment.

Water asset accounts describe how transfers of water between the environment and the economy, as well as internal transfers of water in the hydrological system, affect stocks of water over the accounting period. Physical water accounts are beneficial because they describe the whole system of water flows in physical terms between the environment and the economy, as well as within the economy, which allows for the study of the impact of different sectors of the economy on the environment, as well as the resource requirements of the economy. According to the paper, water accounts "offer an integrated view of water supply and water use by industry and by purpose. They further assist in identifying water availability for various uses, stresses on water, and qualitative and quantitative water scarcity" (p. 9).

Swaziland

Hassan, R. et al. (2002) ***Natural Resource Accounts for the State and Economic Contribution of Forests and Woodland Resources in Swaziland.*** **Pretoria: University of Pretoria.**
Rashid Mekki Hassan: rashid.hassan@up.ac.za

http://unstats.un.org/unsd/EconStatKB/Attachment50.aspx

This study is an effort to account for the true contribution of forest and woodland resources to economic well-being in Swaziland. It uses a natural resource and environmental accounting approach to correct national accounts for the missing values of forest resource stocks and flow benefits. It establishes the values of timber and carbon assets in cultivated plantations for the 1988-1999 period. The study found that when assets accounts were corrected for the net accumulation in timber and carbon stocks of plantations, gross domestic savings improved by more than 2.3%. Furthermore, timber and non-timber products of natural forest and woodland resources accounted for about 44% of average rural household consumption expenditure, rising to 57% with the inclusion of livestock benefits. The contribution of natural forests to rural communities' consumption expenditure equated to 2.2% of national GDP and 20% of agriculture's GDP. Moreover, the measure of GDP for 2000 rose by 2.2% with corrections for the flow benefits of natural forests and woodlands, with timber products accounting for 90% of this increase. However, it was also shown that woodland resources are not sustainably utilised and face threats of depletion from overexploitation by communities and conversion to other land uses.

Tanzania (including Zanzibar)

Lange, G. and Jiddawi, N. (2009) Economic value of marine ecosystem services in Zanzibar: Implications for marine conservation and sustainable development. ***Ocean & Coastal***

***Management,* 52 (10), 521-532.**
Glenn-Marie Lange: glange1@worldbank.org

http://www.sciencedirect.com/science/article/pii/S0964569109000994

Coastal and marine ecosystem services play a critical role in developing countries, especially in poor communities. Yet, they continue to be degraded. This article provides an environmental-economic valuation of such ecosystem services in Zanzibar, Tanzania and discusses the relationship between these services and different stakeholders. The authors discovered that ecosystem services such as recreation and tourism, fishing and related activities, seaweed farming, and mangrove harvesting accounted for 30% of Zanzibar's GDP. The benefits from these services are distributed among three kinds of stakeholders: 1) Zanzibar local communities where activities based on marine ecosystems occur; 2) beneficiaries in Zanzibar who are not in communities where these activities occur; and 3) beneficiaries outside Zanzibar. Based on the incentives and disincentives that the distribution of benefits cause, the authors argue that sustainable management of Zanzibar's marine environment requires special attention and investment in the tourism industry. A crucial challenge in this case is to bring together the interests of all stakeholders in non-fragmented processes of management and decision-making.

Mungatana, E. (2009) Accounting for Mineral resources in Tanzania: data challenges and implications for Resource Management Policy. *Eco-Efficiency in Industry and Science,* 28, 49-69, special issue on "Implementing Environmental Accounts: Case Studies from Eastern and Southern Africa".
Eric Mungatana: mungatana@up.ac.za

http://link.springer.com/chapter/10.1007%2F978-94-007-5323-5_3

In this paper, the author attempts to measure the value of important subsoil assets of Tanzania as a step towards developing more comprehensive measures of total national wealth and to construct a SEEA-based system of environmental accounting in the country. The author argues that the results from implementing the SEEA could potentially be used to better represent natural assets in the System of National Accounts (SEA).

Mkanta, W., and Chimtembo M. (2002) *Towards natural resource accounting in Tanzania: a study on the contribution of natural forests to national income.* Pretoria: University of Pretoria.
William Mkanta: william.mkanta@wku.edu

http://www.eldis.org/go/display&type=Document&id=17147#.UoIb5B_I1UQ

This study had two primary objectives: to complete a valuation of non-market forest resources and to propose a means for generating modified national accounts that will cover the full value of forest resource production and consumption in Tanzania. However, these aims could not be fully completed as the study suffered from data constraints. The study focused on flue-cured tobacco growing areas at three points in time: 1975, 1987, and 1997. Results showed that woodland cover reduced by 60%, 46%, and 39%, for each of the years respectively. Furthermore, tobacco curing alone put a huge strain on forest resources, accounting for approximately 32% of the total annual per-capita value of natural forest products. Lastly, the authors recommend policies that would ensure regular delivery of data from governmental departments, which could facilitate accurate and regular NRA.

Uganda

Masiga, M. et al. (2013) Contribution of Uganda's Forestry Sub-sector to the National Economy: Natural Resource Accounting Approach. *Eco-Efficiency in Industry and Science,* 28, 143-185, special issue on "Implementing Environmental Accounts: Case Studies from Eastern and Southern Africa".

Moses Masiga: apollomoses@enrafricacentre.org

http://link.springer.com/chapter/10.1007%2F978-94-007-5323-5_6

Forest and forest products have high monetary and non-monetary values in Uganda. This study aims to determine the annual contribution of the country's forestry resources to the national economy. The specific objectives of this work are: 1) to determine the physical forestry stocks and flows and ecosystem services in Uganda; 2) to determine the monetary value of the physical stocks and flows of forestry resources in Uganda; and 3) to estimate the aggregate contribution of forestry resources to the national economy. The authors find that forest resources in Uganda contribute significantly to the national economy but that some of this value is missing in the current System of National Accounts (SNA). Also, in order for the natural resource accounting methodology to be used effectively for forest resource management and policy design, more effort is required to develop institutional capacity to generate information on the supply and use of forest resources. The study highlights the need to: enhance the soil protection services of forests, better use carbon markets and trade, improve hydrological services, and conserve biodiversity. The authors conclude by emphasising the need to extend natural resource accounting to all major natural resources, although they acknowledge that this will require the strengthening

of existing institutions.

Schlegelmilch, K. et al. (2010) Fiscal Reform in EC Development Cooperation. *Contract No. 2008/160146/2 – Version 2 Final Report*. Soges Consortium.
Kai Schlegelmilch: kai.schlegelmilch@green-budget.eu

http://www.foes.de/pdf/20100929_Final%20Report%20-%20Environmental%20Fiscal%20Report%20-%20FINAL.pdf

This summary is for the Uganda case study only. For an overview of the entire project, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Barbados, Burkina Faso, South Africa, and Vanuatu, which can be found under their respective country sections.

The EC chose Uganda as one of five countries with good potential for implementing environmental fiscal reform (EFR) to participate in the "Fiscal Reform in EC Development Cooperation" programme. Like South Africa, Uganda has in place a range of environmental taxes and charges in the forms of: taxes on energy products and transport; user charges for water, sanitation, and waste; feed-in tariffs for renewable electricity; and product taxes on plastic bags. However, the concept of EFR is not well-known. The report recommends that any revision of existing or newly introduced EFR measures must be closely linked to the Poverty Eradication Action Plan (PEAP), especially since the PEAP predicts that setting up water tariffs would not be practicable.

Zimbabwe

Mabugu, R., and Chitiga, M. (2002) Accounting for Forest Resources in Zimbabwe. *Disscussion Paper ISBN 0-9584508-7-0.* Pretoria: Resource Accounting Network for Eastern and Southern Africa.
Ramos Mabugu: rmabugu@postino.up.ac.za
http://ageconsearch.umn.edu/bitstream/18021/1/dp020002.pdf

Using resource accounting techniques to determine the extent of the gain and loss of forestry resources, this study describes activities and outcomes of Zimbabwe's forest sector. It also attempts to value forests' ecological services, such as carbon sequestration and water abstraction. Results show a negative accumulation of commercial forest stocks due to harvests, cyclones, resettlements, and fires reducing timber stocks at a rate greater than that of reforestation. The authors suggest that this is the product of an underestimation of forest value due to shortcomings

of using a System of National Accounts (SNA) as a measure of economic welfare. For Zimbabwe to fulfil its potential as a carbon sink country, the authors point out the need for more accurate valuation of forest resources, as well as for more forestry sector research, especially on the issues of resource benefit and cost sharing.

Mabugu, R. et al. (1998) ***Incorporating Fuelwood Production and Consumption into the National Accounts: A Case Study for Zimbabwe.*** **FAO.**
Ramos Mabugu: rmabugu@postino.up.ac.za

ftp://ftp.fao.org/docrep/fao/005/AB603E/AB603E00.pdf

This case study aims to adjust the system of national accounts in Zimbabwe to include consumption. The study identifies analytical methods, data gaps, and requirements that can be used to improve the quality of economic information for policymakers tasked with addressing forest management issues. It explores new methodologies of environmental accounting; while most studies measure economic rent using average net price, the authors experiment with using Vincent and Hartwick's more refined approach of using marginal net price. The results show that, on a national level, there is no significant difference between normal GDP and an adjusted NDP in Zimbabwe. However, the authors suggest that the results may mask local sustainability issues with forest stocks since many regions suffer from severe and unsustainable deforestation. Lastly, the study demonstrates some of the advantages, disadvantages, and practical data limitations inherent in trying to adjust national accounts for resource depletion in a developing-country context.

Adger, N. (1992) Sustainable National Income and Natural Resource Degradation: Initial Results for Zimbabwe. ***CSERGE GCE Working Paper No. 92-32,*** **Centre for Social and Economic Research on the Global Environment (CSERGE).**
Neil Adger: n.adger@uea.ac.uk

http://www.cserge.ac.uk/publications/cserge-working-paper/gec-1992-32-sustainable-national-income-and-natural-resource-degra

This paper aims to define and operationalise sustainable national income. The study attempts to modify Zimbabwe's net national income. It makes adjustments to net product degradation of natural capital within the agricultural and mineral sectors, which in 1987 accounted for 10.9% and 5.5% of GDP, respectively. As a result, it suggests that the combined commercial and communal areas agricultural net product, as traditionally measured, should be revised downwards by 9%

to account for natural capital loss. The authors also estimate that, for 1987, soil erosion and forest stock depreciation equalled 30% of net product as usually measured. The study shows the need for sustainability modifications in national accounting systems, as economic growth measured by traditional economic indicators will not necessarily reduce poverty or protect the environment. It also points to the large data requirements and analytical problems inherent in making sustainability adjustments. Finally, it stresses that, rather than take full impacts into account, market liberalisation and exchange rate devaluation policies ignore the effects that that can negatively affect the natural resource base.

Countries not included

No relevant works were found for Angola, Burundi, Cape Verde, Central African Republic, Chad, Equatorial Guinea, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lesotho, Liberia, Mayotte, Niger, Republic of the Congo, Sahrawi Arab Democratic Republic, Sao Tomé and Príncipe, Seychelles, Sierra Leona, Somalia, Togo, Tunisia, and Zambia.

6. Asia

Asia (General)
Bangladesh
Bhutan
Cambodia
China
East Timor
India
Indonesia
Japan
Kazakhstan
Kyrgyzstan
Laos
Malaysia
The Maldives
Mongolia
Myanmar
Nepal
Pakistan
The Philippines
Singapore
South Korea
Sri Lanka
Taiwan
Tajikistan
Thailand
Uzbekistan
Vietnam

6. Asia

Overview

Many parts of Asia have enjoyed miraculous economic growth over the last few decades. However, this growth has led to enormous environmental damages. As a result, many Asian governments are starting to consider environmental costs as important factors within their GDP calculations.

Leading the way in green accounting are countries like South Korea. It regularly produces accounts of environmental expenditure and natural resource supply, amongst others, and undertakes great efforts to fund green investments and maintain the country's 60% coverage by forests.

Japan, too, has adopted an accounting system based on the United Nations SEEA model. It produces data on waste, wastewater management, and pollution reduction. These accounts present fundamental first steps to more economically- and environmentally-sustainable policies.

China has a record of neglecting environmental issues in favour of economic development. However, it has also recognised the need to take environmental costs into account. Although it has collected some environmental accounts since 1988, it is still in the process of devising a full environmental accounting system. Part of the problem is that green accounting is a highly politicised issue in China; political struggles effectively ended a 2006-2007 green GDP accounting program. Still, China is in the process of implementing Five-Year National Economic and Social Development Plans (FYPs) and Five-Year Environmental Plans (FYEPs), which provide a strong framework for pursuing environmental goals. This progress could not come too soon since, when environmental depletion and degradation are taken into account, China's real economic growth may well be close to zero (Veklich and Shlapak, 2012).

Smaller Asian economies are also making progress. Bhutan is a small landlocked South Asian country that is home to less than 750,000 people. It is famous for its development and use of Gross National Happiness (NGH), a measure that prioritises happiness and social well-being above monetary wealth and GDP. It is thus not surprising that, although it is still perfecting its methodology, Bhutan is making significant strides towards developing a comprehensive green national accounting system.

Elsewhere, researchers have adjusted Cambodia's GDP for natural resource depletion, showing a substantial difference between the GDP and gGDP figures, a difference that is only increasing with time. Meanwhile, scholars of Bangladesh are thinking creatively about the green accounting

process, using their qualitative work to argue for the use of traditional knowledge, wisdom, and practices to inform national sustainability accounting processes.

Researchers of the region are also thinking out of the box in terms of green accounting methodologies. Rather than focusing on the more standard SEEA or NAMEA methodologies, one group has investigated Cambodia's Sustainable Net Domestic Product (SNDP), while another group introduces a new system of indicators called Ecological Domestic Product (EcoDP) into the Chinese context.

Such creativity notwithstanding, Asia still has a long way to go. We encourage researchers to fill the gap in full environmental accounting and green GDP adjustments, as well as to engage in more comparative and regional work that can demonstrate country inter-dependence on natural resources. Such efforts can significantly contribute to evidence-based and socially- and environmentally-conscious policymaking across Asia.

Asia (general)

King, P. (2003) *Integrated Economic, Social and Environmental Planning in the Pacific Region.* Melbourne: Melbourne University.
Peter King: pnking1948@yahoo.com.au

http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.97.6257&rep=rep1&type=pdf

This review examines the practice of integrated economic and environmental (E-c-E) planning, at all levels, in all Asian Development Bank (ADB) member countries. It concludes that a nested hierarchy (a connected series from global to project levels) of integrated E-c-E planning could play a pivotal role in sustainable development in the region. Furthermore, evidence from ADB case studies suggests that E-c-E planning may be most affordable and effective at the sub-national level. The review covers the historical evolution of integrated economic and environmental planning, a description of the application of E-c-E planning from the global level to the project level with particular emphasis on applications in Asia, an outline of the planning methodologies used at each level, and a brief review of supporting tools and techniques.

Bangladesh

Khan, M. H. et al. (2015) Traditional Sustainability Accounting Principles in Bangladesh. *World Journal of Social Sciences,* 5 (2), 201-210.

Mahmood Hassan Khan: pitukhan@yahoo.com.au

http://www.wjsspapers.com/static/documents/April/2015/17.%20Dora.pdf

The authors of this paper use their personal experiences of rural sustainability management to interpret the values and practices of the rural people of Bangladesh in terms of sustainability accounting. They begin with a brief discussion of green accounting and its history. They then explain their new approach of using traditional wisdom and practices to inform accounting practices. This is based on the philosophy that cultural values such as the 'greening of nature' and 'kindness to all creatures' should be recognised as key factors in sustainability accounting. The authors present findings obtained from a qualitative analysis of the role of the Baul spiritual leaders in Bangladesh, identifying the three main themes of kindness, modesty, and resilience. The authors propose that these themes can act as policy principles for sustainability accounting.

Bhutan

UNDP/UNEP (2011) ***PEI Bhutan Launches its 2nd Public Environmental Expenditure Review Report.*** **UNDP and UNEP.**

http://www.unpei.org/sites/default/files/event_documents/PEER%202%20Press%20release%2014%20Nov%202011.pdf

The actual Public Environmental Expenditure Review Report (PEER) document could not be found, but, in this press release the UN Poverty-Environment Initiative (PEI) reports that Bhutan has produced environmental budget review reports for 2003/04-2007/08 and 2008/09-2009/10 periods. In the latest report, 6% of Bhutan's public expenditure went towards meeting its environment policy objectives. Within the two fiscal years, there was a 4.7% decrease in expenditure on soil conservation and land management; a 2.5% increase in climate change initiatives; and an 8.8% increase in environment mainstreaming initiatives. For more complete picture of green national accounting, the PEER recommends additionally reviewing environmental expenditures of the private sector, NGOs, and foundations. These observations show that although Bhutan is still developing its methodology, it is actively working towards a comprehensive green national accounting system.

Cambodia

Chhinh, N. and Lawn, P. (2007) The Sustainable Net Domestic Product of Cambodia, 1988-

2004. *International Journal of Environment, Workplace and Employment*, 3 (2), 154-174.
Nyda Chhinh: chhinh.nyda@rupp.edu.kh

http://www.inderscience.com/info/inarticle.php?artid=17881

In this work, the authors use a measure of national income called Sustainable Net Domestic Product (SNDP) to show that during the 1988-2004 period. Cambodia's SNDP was lower than its GDP. Moreover, the difference between the two figures increased six fold during the time period, from 715 billion riel ($174 million) in 1988 to 4,186 billion riel ($531 million) in 2004. Adjustments to the per capita calculations revealed a reversal of trends: while the real per capita GDP per capita during the study period, the adjusted per capita SNDP actually decreased. The authors conclude that Cambodia's economic growth occurred at the expense of a depletion of natural resources, specifically due to increased consumption of forestry and fishery products.

China

Wang, J. et al. (2015) Chinese Environment Audit System for the Government. *The Chinese Environmental Policy Research Working Paper*, 4 (2), No.2. Beijing: Chinese Academy for Environmental Planning.
Xiaolan Yang: yangxl@caep.org.cn

http://www.caep.org.cn/uploadfile/The-Chinese%20Environmental-Policy-Research-Working-Paper-Issue-4.pdf

The Chinese Academy for Environmental Planning (CAEP) is a public institution that provides technical support in environmental planning, environmental policies, and environmental engineering projects. In this publication, they acknowledge that strengthening the government's environmental audit systems must be part of the solution to China's serious environmental problems. China already has an established economic accountability audit system for senior officials and aims to include natural resource and environment audits to its systems. According to the guidelines jointly issued by several agencies of the Chinese government, the economic accountability audit should also include officials' performance with respect to environmental protection, natural resource management, and improvement of people's livelihood. Moreover they aim to standardise their environmental audit systems based on the guidelines laid out by the International Organization of Supreme Audit Institutions (INTOSAI). Nonetheless, China continues to have problems related to environmental auditing, such as inadequate training and knowledge; narrow audit scopes; the lack of appropriate audit standards and procedures; and weak audit

institutions. This publication covers an overview of environmental audits at home and abroad; the design and implementation of environmental systems in China; the revision, verification, and overall evaluation of senior officials' environmental performance; the major challenges in implementing government environmental audit; and policy recommendations.

Yao, S. et al. (2012) Measuring China's regional ecological development through "EcoDP". *Ecological Indicators*, 15 (1), 253-262.
Yao Shi: shiyao8451@163.com

http://yadda.icm.edu.pl/yadda/element/bwmeta1.element.elsevier-375158cd-5f13-3105-b25f-11e8f5defdba

This paper proposes a new indicator, "EcoDP", which is used to analyse China's regional ecological development level from 1999 to 2008. The EcoDP is based on complex ecosystem theory which covers many positive and negative ecosystem values that are not included in the conventional national accounting system. Examples include positive values provided by natural ecosystems (eco-service domestic product) and by ecological and environmental construction (eco-construction domestic product). They also include negative values associated with natural disasters (eco-disaster domestic product), human activities in natural ecosystems (eco-threat domestic product), and the costs of ecological and environmental protection (eco-protection cost input). Results for the ten years analysed indicate an overall drop in China's EcoDP. The drop is not a result of a fall in the ecosystem's inherent value. Rather, it is due to the ecological disruption caused by urban construction and road construction, as well as, in some regions, the gradual decrease in arable land resources and the degradation of grassland resources. Based on various uncertainties inherent in the research methodology, the paper concludes by considering alternative means of computing natural resource accounts through combining indicators such as the GDP and the Human Development Index (HDI).

Lin, W. et al. (2011) Temporal and Spatial Analysis of Integrated Energy and Environment Efficiency in China Based on a Green GDP Index. *Energies*, 4 (9), 1376-1390.
Weibin Lin: lyland_lin@163.com

http://www.mdpi.com/1996-1073/4/9/1376

This article aims to measure the energy and environmental efficiency of 30 provinces in China, based on the Green GDP Index (GGI), over the period 2005-2010. The environmental indicators used correspond to solid waste emissions, SO_2 emissions, soot emissions, dust emissions,

chemical oxygen demand (COD) emissions, and ammonia nitrogen emissions, while the energy indicator corresponds to industrial emissions. The document explains the benefits of the Data Envelopment Analysis (DEA) modelling technique that the authors use. It also explains in detail how the GGI will be measured, describing the DEA model, the Malmquist Index, and the data sources and variables included in the study. The study presents five main findings: 1) there are major regional discrepancies in energy and environmental efficiencies; 2) these differences in GGI reflect specific development modes, which shows the presence of a positive correlation between GGI values and per-capita GDP; 3) there was an increase in GGI between 2006 and 2008; 4) energy and environmental efficiency is lower for central and west China, and the gap between these regions and the east coast is still increasing; and 5) the current economic development mode of China is unsustainable and will exceed the carrying capacity if it does not change.

Baster, N. (2010) Adjusting China's GDP: a green accounting illustration. *International Journal of Green Economics*, 4 (2), 197-204.
Naomi Baster: naomi.baster@googlemail.com

http://www.inderscience.com/info/inarticle.php?artid=35340

This article argues for the use of green accounting to adjust countries' GDPs to better estimate national wealth and well-being. It uses the example of China to prove the hypothesis that the adjusted green GDP, which takes into account the environmental degradation and loss of natural capital, is lower than the actual GDP. The article looks at the costs of water pollution and air pollution, specifically its health and non-health impacts, and adjusts these figures in the China's GDP. The adjusted GDP shows a lower value than the actual GDP. The authors also use the example of forests to account for the cost of depletion of natural capital. While for most countries such a calculation would show a negative trend, in the case of China, it points in the opposite direction due to the Chinese government's afforestation programmes. However, these results do not alter the fact that the adjusted GDP is lower than the standard GDP. The paper concludes by reiterating the importance of calculating the adjusted green GDP to more accurately measure national growth.

INTOSAI (2010) *Environmental Accounting: Current Status and Options for SAIs.* Washington DC: International Organization of Supreme Audit Institutions (INTOSAI).

http://www.environmental-auditing.org/LinkClick.aspx?fileticket=s%2FFCvUzSK-sk%3D&tabid=128&mid=568

This summary is for the China case study only. For an overview of the entire report, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Australia, Botswana, Canada, Colombia, France, Germany, Mexico, Namibia, the Netherlands, the Philippines, and Sweden, which can be found under their respective country sections.

China began assembling environmental accounts in 1988 and implemented flow accounts for energy and pollution in 2001. In 2003, the country began using monetary accounts for measuring pollution. The accounting techniques are unique, but the Chinese government plans to bring them more in line with the 2003 UN SEEA. Policymakers are yet to use the accounts explicitly for policy formulation, but they do intend to so in the future.

Li, V. and Lang, G. (2010) China's "Green GDP" Experiment and the Struggle for Ecological Modernisation. *Journal of Contemporary Asia,* 40 (1), 44-62.
Graeme Lang: graeme.lang@cityu.edu.hk

http://www.tandfonline.com/doi/abs/10.1080/00472330903270346#.UoKnFB_I1UQ

China conducted green GDP accounting in 2006-2007 after a 2004-2006 national-level pilot project. This attempt brought to light the long-standing conflict between ecological modernisation, proposed by Chinese scholars, and the need for economic growth—the "treadmill of production"—supported by the Communist Party state. While ecological modernisation tries to mitigate environmental degradation, the "treadmill of production" refers to a purely capitalist model of economic development that does not typically take into account externalities. The paper describes in detail the Chinese green GDP accounting experiment. It represents an account of the arbitrary adjustments made to China's GDP figures and the failure of local governments to cooperate, and criticises attempts made by certain party-officials to adjust figures in order to downplay the actual impacts of environmental destruction on the GDP. This ultimately resulted in the failure to provide accurate figures for green GDP and ended future attempts to carry out green accounting. The authors summarise the difficulty in carrying out green accounting, its politicised nature, and its application in the context of China. They end on a positive note, expressing hope that increasing political awareness of environmental issues will promote future attempts at green accounting in China.

Zhang, Y. (2010) Forest accounts: a primary case study in China. *International Journal of Green Economics*, 4 (2), 205-216.
Yin Zang: zhangyin@bjfu.edu.cn

https://ideas.repec.org/a/ids/ijgrec/v4y2010i2p205-216.html

This paper pioneers the development of physical and monetary accounts for forests in China. It presents the opening and closing forest asset balances and their related changes over the time period 1999-2003. The study indicates that the total stock value of forest lands and standing timber in 1999 was 4,300 billion yuan ($693 billion), and in 2003 it had increased to 4,890 billion yuan ($788 billion). The total flow value of forest resources from 1999 to 2003 was 530 billion yuan ($485 billion) annually, but the trend of afforestation has slowed down in China. The paper highlights the need for valuation and sustainable use of forest ecological services and emphasises the need to integrate these into macroeconomic and sectoral policy formulation and evaluation.

Li, J. (2009) Design and discussion of a model for China's environmental and economic accounting system. *Social Sciences in China*, 30 (3), 5-24.
Jinhua Li: lijh@cass.org.cn

http://www.tandfonline.com/doi/abs/10.1080/02529200903128225?journalCode=rssc20#.UoKkvR_I1UQ

The purpose of this article is to provide ideas for the design of a Chinese SEEA (CSEEA). In accordance with the structure of the SEEA, the author designs a model for the CSEEA, whose theoretical foundations are the relevant theories and methods of environmental studies, economics, and statistics. Stocks and flows of environmental resources, resource consumption, natural disasters, environmental costs, environmental protection inputs, and the re-evaluation of environmental assets form an important part of the accounting contents in the CSEEA.

Anderson, R. et al. (2006) *International experiences with environmental and Economic accounting*. The World Bank and Italian Trust Fund.
Ryan Anderson: randerson@delta-institute.org

http://siteresources.worldbank.org/INTEAPREGTOPENVIRONMENT/Resources/GreenaccountinginternationalexperienceFinalEN.pdf

This report, submitted to the State Environmental Protection Administration (SEPA) of China and the World Bank, gives an overview of environmental valuation methodologies, environmental accounting approaches, and environmental and valuation experiences throughout the world, and finishes with a particular focus on China. It recognises that the traditional GDP measure comes up short of providing an accurate measure of a sustainable development path. In light of this,

the paper gives insights into three environmental valuation methodologies: the direct market approach, the surrogate market approach, and the hypothetical market approach. The paper then looks into different environmental accounting approaches as there is no single coherent system or standard. They describe the Integrated Environmental and Economic Accounting (SEEA) approach, the World Bank's wealth of nations and genuine savings approach, the National Accounting Matrix including Environmental Accounts (NAMEA) approach, the System for the Collection of Economic Information in the Environment (SERIEE) approach, and other indices of sustainability. Finally, the paper provides a brief summary of experiences of environmental valuation and accounting in Korea, Canada, the USA, Mexico, Norway, the Philippines, and finally the Mediterranean Environmental technical assistance programme. The authors concluded that, at the time of writing, there was no environmental and economic accounting approach that enjoyed international approval. They focus on China, a country that recognises the need to establish a green national accounting system. However, because the Chinese green GDP project was still at an early stage, they could not provide specific recommendations for an accounting framework. The authors make the following observations, amongst others: the implementation of accounting approaches are complex and demanding, so it is important to not be overly ambitious; and the accounting system should be well established and based on a rigorous measurement approach, under the SEEA standards.

Cao, D. et al. (2004) ***A Framework of Pollution-Based Environmental and Economic Accounting for China.*** **Chinese Academy for Environmental Planning.**
Dong Cao: caodong@craes.org.cn

http://www.caep.org.cn/english/paper/A-Framework-of-Environmental-and-Economic-Accounting-in-China.pdf
This paper introduces the integral framework of the Chinese SEEA (CSEEA). It then presents CSSEA's physical and monetary accounting of environmental pollution and its environmentally adjusted GDP. It introduces accounting approaches for physical quantification of water pollution, air pollution, and solid waste in different sectors and regions, and relates it to environmental protection expenditure, maintenance cost, and the cost of environmental degradation. Although the authors faced a number of data and methodological challenge, they estimate that environmental maintenance cost China 1.8% of its GDP in 2004, while the same year environmental pollution accounted for 3.09%. They believe that an accounting approach based on the environmentally adjusted GDP is very feasible, although there is still much work to be done in order to perfect a green national economic accounting system.

East Timor

Ministry of Economy and Development (2012) S*ustainable Development in Timor-Leste: National Report to the United Nations Conference on Sustainable Development (UNCSD) On the Run Up to Rio+20.* Government of Timor Leste, UN DESA, and UNDP.

http://www.laohamutuk.org/econ/Rio20/TLReportRio20.pdf

This report finds that, in East Timor, Environmental Impact Assessment legislation exists, but is currently not being implemented and lacks sanctions. East Timor enacted the Environmental Licensing Decree in February 2011, which aims to create a system of environmental licensing for public and private projects that are likely to produce environmental impacts. However, this process is not adequately understood or applied. East Timor is currently trying to green its economy and has several efforts in place, such as investing in renewable energy projects. Due to a lack of resources and expertise, there have been several isolated environmental assessments, but there does not seem to be any indication that these assessment strategies will be integrated into a national accounting system.

India

Chakraborty D., and Mukhopadhyay, K. (2014) Estimates of Green GDP. In *Water Pollution and Abatement Policy in India: A Study from an Economic Perspective, Springer*, 165-187.
Kakali Mukhopadhyay: kakali.mukhopadhyay@mcgill.ca

http://link.springer.com.proxy.library.emory.edu/chapter/10.1007/978-94-017-8929-5_8

The authors of this chapter recognise that Natural Resources Accounting (NRA) has an important role to play in measuring any country's sustainable development. They follow the SEEA framework to take into account water pollution in India and thus calculate both India's resulting environmentally adjusted domestic product and its welfare loss. They calculate water pollution's environmental hazard, crop loss, and potential defensive damages for the 2006-2007 period using a number of different scenarios. The authors find that water pollution necessitates a downward adjustment of GDP of 3.6-3.9% (depending on scenario uses). This figure is expected to increase when other environmental factors are taken into account.

Expert Group Convened by the National Statistical Organization Ministry of Statistics and Programme Implementation, Government of India (2013) *Green National Accounts in India: A*

***Framework*. Ministry of Statistics and Programme Implementation.**

http://mospi.nic.in/mospi_new/upload/Green_National_Accouts_in_India_1may13.pdf

This study by the Expert Group Convened by the National Statistical Organization Ministry of Statistics and Programme Implementation, commissioned by the Government of India, aims to outline what is needed for a comprehensive set of national accounts in India. The authors argue that governments and international agencies need to go beyond green national accounts by reclassifying some goods and services and adding others that are currently missing. These recommendations have not been taken into account by the UN System of National Accounts (SNA), although some do appear in the UN SEEA. The report outlines the production and expenditure systems currently in place in India's SNA and explains the steps that need to be taken to adapt the existing system of national. While India's current calculations do incorporate some environmental measures, the report details a plethora of environmental goods and services that are still missing from the country's national accounts. These include: 13 factors relating to land, such as soil degradation and land productivity; 21 forest factors, such as deforestation and the value of non-timber forest products (NTFPs); depletion of and pollution from the mineral sector; three water related factors, including surface and ground water quality and sedimentation; and eight factors relating to air, including various GHGs emissions and fuel consumption figures. Lack of data is by far the biggest barrier to the inclusion of these factors in India's SNA. The authors conclude by mapping out the steps required to adapt the report's recommendations to India's national accounts.

Gundimeda, H. et al. (2007) Natural resource accounting for Indian states—Illustrating the case of forest resources. *Ecological Economics*, 61 (4), 635-649.

Haripriya Gundimeda: haripriya@mse.ac.in

http://www.sciencedirect.com/science/article/pii/S0921800906004563

The aim of this study is to apply a SEEA-based methodology to reflect the true value of forest resources in India's national and state accounts. It addresses four forest components: timber production, carbon storage, fuelwood usage, and the harvesting of non-timber forest products. The authors construct physical and monetary flow accounts for India's forestry sector, demonstrating that its resources are undervalued to different degrees in different regions. For example, they show that the income accounts of North-eastern states are particularly poor representatives of true wealth, especially the loss of natural capital due to deforestation and degradation. The authors use their data to make adjustments to Gross/Net Domestic Product (GDP/NDP) and Gross/Net State Domestic Product (GSDP/ NSDP), fining that in 10 out of the

26 states development has become unsustainable as income wealth has come at the expense of natural capital. The papers concludes by emphasising the need to integrate natural resource accounting into the national accounting framework and policymaking processes in order to enable the sustainable management and conservation of forests and forest resources.

Indonesia

WAVES (n.d.) *Indonesia*. [online] WAVES. [Accessed 3 June 2015].

https://www.wavespartnership.org/en/indonesia

Indonesia recently joined the Wealth Accounting and Evaluation of Ecosystem Services (WAVES) project as a Core Implementing Partner country. Other partners are Botswana, Colombia, Costa Rica, Madagascar, and the Philippines, which were also recently joined by Guatemala and Rwanda. Information about the WAVES project can be found under the Multi-Country Reports and Projects section of this book.

Kustiyo, K. et al. (2015) Annual Forest Monitoring as Part of Indonesia's National Carbon Accounting System. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, XL-7/W3.
Orbita Roswintiarti: oroswin@indo.net.id

http://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XL-7-W3/441/2015/isprsarchives-XL-7-W3-441-2015.html

This paper presents the technical elements of Indonesia's National Carbon Accounting System (INCAS) remote sensing program. INCAS was designed to meet national and international policy requirements and the associated remote sensing program provides the required data to monitor forest cover change in order to meet these requirements. Specifically, the program is producing spatially-detailed monitoring of forest cover changes from time-series satellite imagery for the whole of Indonesia, from 2000 to the present day. The paper introduces the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD) in Indonesia, an overview of the remote sensing program, and a description of INCAS. Launched in 2008, UN-REDD "is an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development" (UN-REDD website). The report also details the data and methodology used in the INCAS program. It then presents both

map and tabular results to demonstrate forest cover changes at the national and regional scales. For the latter, changes on the island of Sumatra show a depletion of forest cover—represented by the difference between forest cover lost and forest cover gained in the same year—every year between 2000 and 2012. The figure range from the loss of around 30,000 hectares during 2004-2005 to almost 390,000 hectares in 2009-2010.

Gustami, Z. (2012) Indonesian Experience in Developing Sustainable Development Indicator. Paper presented at the *Measuring the Future We Want: An International Conference on Indicators for Inclusive Green Economy/Green Growth Policies*, Geneva, Switzerland, 4-6 December. [powerpoint presentation] Republic of Indonesia: Ministry of Environment.

http://www.unep.org/greeneconomy/Portals/88/documents/INDICATORS%20PPT/d3s3%20Gustami%20INDONESIAN%20EXPERIENCE%20IN%20DEVELOPING%20SUSTAINABLE%20DEVELOPMENT%20INDICATORs.pdf

This presentation describes Indonesia's experience of developing indicators related to sustainable development. It begins with an overview of economic growth in Indonesia. The country has enjoyed around 7% GDP growth in recent years. Almost a quarter of its GDP and 40% of its working force are associated with the natural resources sector and there is a high rate of deforestation and forest degradation. These statistics motivate the need to move towards a more sustainable economic model. The presentation descries Indonesia's experiences with four different indicators: environmentally-adjusted national income, SEEA, genuine savings, and green GDP. The development of indicators faced a number of problems: limited data availability; a lack of expertise in conducting economic valuation of natural resources; and a lack of political commitment, a legal framework, or inter-organisational cooperation in developing sustainable development indicators.

Alisjahbana, A., and Yusuf, A. (2004) Assessing Indonesia's sustainable development: long-run trend, impact of the crisis, and adjustment during the recovery period. *Asean Economic Bulletin*, 3 (21), 290-307.
Armida Alisjahbana: alisjahbana@bdg.centrin.net.id

http://mpra.ub.uni-muenchen.de/1736/

In this paper, the authors define sustainability as "non-declining welfare per capita" and use measures of genuine savings and the change in wealth per capita to determine whether Indonesia's development is sustainable. The results of the changes in wealth per capita indicate

that Indonesia's development has not been sustainable during the past 20 years, although the situation has been improving due to a shift away from the oil and gas sector towards secondary and tertiary economic activities. However, the 1997-1998 financial and economic crisis in the region adversely affected this trend. The authors conclude that the county needs: better management of mineral and forest resources, and industrial pollution; and fiscal policies to maintain a stable exchange rate in order to decrease the earnings obtained from extractive exports.

Saleh, K. (1996) ***Environmental Accounting for Sustainable Growth and Development with Special Reference to a System of Integrated Environmental and Economic Accounting (SEEA): The Indonesian Experience*****. Statistical, Economic and Social Research and Training Centre for Islamic Countries.**
Kusmadi Saleh: bpshq@bps.go.id

http://www.sesric.org/files/article/52.pdf

This paper highlights the need to clarify the issue of environmentally sound and sustainable socio-economic development and to develop methodologies for its assessment and implementation. The author describes the SEEA system and other approaches to environmental accounting. This is followed by an account of the Indonesian experience of natural resource and environmental accounting. Indonesia has already established policies and a framework for environmental protection. However, the institutions responsible for their implementation face various constraints, such as a lack of administrative capacity. Closing the gap between policy and implementation requires the strengthening of the institutional framework and capacities for environmental management. Specifically, the paper calls for: improving environmental information systems and data analysis to inform policy design; strengthening the institutions responsible for environmental management, including clarifying their roles and improving coordination; and enhancing local participation in policymaking, monitoring, and enforcement. The author also suggests that reliance on market-based instruments to further develop the environmental policy framework would lessen the load on the scarce administrative capacity. Environmental information systems must also be strengthened, particularly: more data must be collected about environmental conditions, government laboratories must be improved, data analysis and management must be computerised, and public access to environmental data must be improved. The paper ends with some case studies of resource accounts, with data tables of oil and natural gas resources.

Japan

Ariyoshi, N. (2005) New System of Integrated Environmental and Economic Accounting. Paper

presented at the *International Conference, Economic and Social Research Institute Cabinet Office*, Nagasaki, 24 March. [Powerpoint presentation].
Noritoshi Ariyoshi: ariyoshi@gpo.kumamoto-u.ac.jp

http://www.esri.go.jp/jp/workshop/050325/050325paper-c.pdf

This presentation introduces historical efforts in Japan to date to account for the environment in national wealth calculations. The Cabinet Office of the Government of Japan established the Economic and Social Research Institute (ESRI) in 2001. Japan conducted initial experiments with the Japanese SEEA between 1992 and 2000 and, subsequently, the Institute worked to compile data using both the SEEA and the Dutch-NAMEA-framework-based Hybrid Accounting System integrating Environmental Pressures and Economic Activities (HASEPEA). This includes monetary flows within the national accounting matrix (NAM) and physical stocks and flows for the environmental accounts (EAs). The presentation outlines seven advantages of the HASEPEA, including: accounting for pollution emitted by governments as well as households; recording depletion of resources in the rest of the world caused by imports; and recording hidden material flows of domestic activities and imports. In the future, the author plans to develop a regional version of the accounting system and to apply it to policy analysis.

Kazakhstan

Ismalgulova, G. (2012) *Resource Efficiency Gains and Green Growth Perspective in Kazakhstan.* Friedrich Ebert Stiftung (FES) Foundation.

http://library.fes.de/pdf-files/id-moe/09362.pdf

Kazakhstan is an oil-rich country and lacks an environmental tax system. According to this report, a national greenhouse gas emissions quota should have been introduced in 2013, as well as other conservation and renewable energy laws, but these efforts remain fragmented. The Friedrich Ebert Stiftung (FES) Foundation estimates that in 2011, Kazakhstan's GDP increased by 1.95 times over its level in 2001. However, when computed through the World Bank's Genuine Savings Index method, an accounting system that integrates environmental and economic accounting, the adjusted GNI actually decreased by 33-38% in 2009, but still showed a positive growth rate of 7.2% in 2010. FES showed that expansion of physical and human capital drove Kazakhstan's growth between 2001 and 2007, but this came at the expense of a reduction of natural capital. Mining of mineral resources accounted for 41-57% of GNI for 2001-2007. The author finds that Kazakhstan's conditional damage (not defined in the FES report) from carbon dioxide emissions

is eight times higher than in developed countries and two times higher than the world average. Meanwhile, health damage from air pollution in cities is the same as in the cities of developed countries. Kazakhstan does not have a systematic system of environmental-economic accounts, but, given the large discrepancy between GDP and adjusted GNI, this study highlights the importance of true wealth accounting in the country.

Kyrgyzstan

Kyrgyz Republic. (2012) T*he Prospects for 'Green' Economy in the Kyrgyz Republic*. Kyrgyz Republic.

http://www.cawater-info.net/green-growth/files/rio20-national-position-eng.pdf

The Kyrgyz Republic prepared this report in preparation for the UN Conference on Sustainable Development that took place in June 2012 in Rio de Janeiro. The report explains the conceptual framework for sustainable development and a green economy; the proposed model for what a green economy would look like in the Kyrgyz Republic; explanations of the geopolitical, social, and economic development landscape of the Republic; Kyrgyzstan's priorities; the environmental dimension of development; the human capital required; and a message to the international donor community. In section V.5.2, called "Ecosystem-based management models", the report urges the Kyrgyz government to include an environmental component in its main economic indicators. It recognises that many international organisations are developing different systems of environmental indicators, such as the UN's Integrated Environmental and Economic Accounting, the World Bank's Genuine Savings Index, the OECD's System of Environmental Indicators, and the European Community's GARP1, GARP2, and TEPI. The report recognises that the vagueness and complexity that still surrounds environmental accounting systems are obstacles to their implementation, so it is unclear how much of a priority this accounting system is for the Kyrgyz government in relation to other matters.

Laos

UNDP/UNEP PEI (2014) *Lao PDR: Factsheet*. [online]UNPEI. [Accessed 18 August 2014].

http://www.unpei.org/what-we-do/pei-countries/lao-pdr

The Poverty-Environment Initiative (PEI) is a joint project between the UNDP and UNEP that aims to encourage environmentally-sustainable economic growth in poor areas. The PEI program in

Laos was launched in 2009. Phase I of the project lasted from 2009-2012 and Phase II spans 2012-2015. The budget for Phase II is $4.81 million. So far, PEI and the Laotian government have made several achievements in environmental accounting. The country's new Provincial Investment Monitoring Framework identifies economic, environmental, and social impacts of investments and keeps track of them in a new database. The 7th National Socio-Economic Development Plan now includes a monitoring framework that tracks poverty and environmental factors. Environmental and Social Impact Assessments (ESIA) are more systematically applied and penalties more enforced. The next step in Laos' development is to increase the monitoring capacity of local authorities to review Initial Environmental Evaluation (IEE) reports.

Malaysia

UN Statistics Division (2013) ***Draft Document: Experimental Ecosystem Accounting – Extended Deadline for Comment January 15, 2013.*** **[online] UN Statistics Division. [Accessed 15 August 2014].**

http://unstats.un.org/unsd/envaccounting/seearev/chapter.asp?volID=2&chID=1

In 2012, the UN asked countries to submit their plans for implementing the SEEA nationally. The UN then sent comments back to the countries on how they could improve their proposals. Malaysia submitted an SEEA plan that includes the creation of an Ecosystem Accounting system, which reflects Malaysia's commitment to implementing an SEEA system.

Sawani, Y. et al. (2010) Preliminary insights on sustainability reporting and assurance practices in Malaysia. ***Social Responsibility Journal*****, 6 (4), 627-645.**
Yussri Sawani: yussrii@sarawak.uitm.edu.my

http://www.emeraldinsight.com/doi/abs/10.1108/17471111011083482
Alongside the national government, for several years, the Malaysian private sector has led the way towards green accounting. The Association of Chartered Certified Accountants (ACCA) of Malaysia has been organising the Malaysian Environmental and Social Reporting Award (MESRA) since 2002. (It is now called the ACCA Malaysia Sustainability Reporting Awards, or MaSRA.) In 2005, there was only one comprehensive sustainability report made available. By 2009, there were 11 such reports; pressure from practicing companies pushes other companies to report their environmental impact. Overall, environmental reporting is voluntarily incorporated into a company's comprehensive disclosure report, but there is no national Malaysian legislation requiring such practice.

Economic Planning Unit of the Prime Minister's Department of Malaysia (1993) *Malaysian National Conservation Strategy: Towards Sustainable Development*. Volume 1: Executive Summary and the Strategy. Kuala Lumpur: Government of Malaysia.

http://repository.wwf.org.my/technical_reports/M/MalaysianNationalConservationStrategyVolume1ExecutiveSummaryAndTheStrategy.pdf

This report, published by the Malaysian Economic Planning Unit (EPU), outlines a strategy for sustainable development. The report, which focuses mainly on conservation, describing several important environmental factors in Malaysia, also contains guidelines for environmental impact assessment and accounting. At the time of this report, various government departments were already collecting data and quantifying environmental factors such as timber, fish, water supply, land, and environmental quality. The EPU wished to include these calculations in its database under its sub-department, the Resource and Economic Section. It also calls for a Natural Resource Accounting (NRA) system. Together, Environmental Auditing and NRA would provide a clear picture of Malaysia's environmental state and assist developers in their planning decisions. It is unclear, however, how much EPU has implemented either of these two systems or to what degree of success.

The Maldives

Aslam, M. (2009) *Maldives National Strategy for Sustainable Development.* The Maldives Ministry of Housing, Transport, and Environment.
Muhammad Aslam Chaudhry: aslam.chaudhry@utah.edu

http://www.rrcap.ait.asia/nsds/uploadedfiles/file/sa/md/maldives%20april%202009.pdf

The Republic of Maldives is especially vulnerable to global warming and sea level rises. As a result, the island nation has developed a comprehensive plan for sustainable development. It has seven National Sustainable Development Goals: adapt to climate change; protect coral reefs; achieve carbon neutrality in energy; ensure food security; establish a carbon neutral transport system; protect public health; and achieve full employment and ensure social security. To assess its progress in reaching these goals, Maldives will develop a comprehensive set of sustainable development indicators (SDIs) for monitoring the National Sustainable Development Strategy (NSDS). Even though the government has not explicitly defined these as such, these SDIs will serve as a step towards developing a national green accounting system in the Maldives.

Mongolia

Sinanoglu, S. (2011) *Post 2015 Country Consultations: Final Reporting Format – Mongolia.* UNCT.
Sezin Sinanoglu: sezin.sinanoglu@one.un.org

http://www.worldwewant2015.org/file/371032/download/404410

Mongolia engaged with the UN Country Team (UNCT) on a consultation that touched several large themes, including governance, economy, culture and society, environment, and regional and local development. Regarding the environment, UNCT recommends that Mongolia, "Conduct environmental and socio-economic baseline studies; Improve formal and non-formal education, training, information and communication activities; Mobilise resources and improve public and private partnership; Encourage environmental friendly technology; and Improve Environmental Evaluation and monitoring; Green housing in Ger area; Green technology research and development; Combat desertification; Rehabilitate and vegetate degraded land; Mitigation and adaptation measures to respond climate change; Improve disaster risk management; Responding climate change with RRR: Renovate technology (for greening), Re-engineering of economic and social systems (of scales from local to national) towards Rehabilitation and/or restoration of nature, the environment and natural renewable resources" (p.6). After this consultation, however, it is unclear whether Mongolia has moved towards developing measures to assess environmental indicators as the UNCT recommended.

Emerton, L. et al. (2009) *The Economic Value of the Upper Tuul Ecosystem.* Washington, D.C.: World Bank.
Lucy Emerton: lucy@environment-group.org

https://www.cbd.int/financial/values/mongolia-valuetuul.pdf
This document reports the findings of a study carried out by the World Bank and the Government of Mongolia that investigated the economic value of the Upper Tuul River basin's water eco-services to Ulaanbaatar's (Ulán Bato), the country's capital. The study found that the land and resources of the Upper Tuul currently contribute income and marketed products worth close to 28 billion tughrik ($14.3 million) per year in tourism, herding, and forest-based sectors. Additionally, the study estimates that water use in Ulaanbaatar is worth at least 90 billion tughrik ($45.8 million) a year. The authors conclude that continued ecosystem and watershed degradation and biodiversity loss, especially as resources become scarcer due to population and wealth growth, will prove extremely costly in terms of the loss of water and other services. Conversely, conservation of the resources could generate an additional 76 billion tughrik ($36.6 million) net

present value over 25 years.

Myanmar

National Commission for Environmental Affairs (2009) *National Sustainable and Development Strategy for Myanmar*. Myanmar: National Commission for Environmental Affairs, Ministry of Forestry.

http://www.rrcap.ait.asia/nsds/uploadedfiles/file/Publication%201-NSDS%20Myanmar.pdf

In 1997, the National Commission for Environmental Affairs (NCEA) formulated Myanmar's Agenda 21, a framework for integrating environmental considerations into future national and sectorial development plans. In 2009, in collaboration with UNEP, Myanmar created its National Sustainable Development Strategy (NSDS). The NSDS is a more comprehensive framework that integrates additional environmental considerations into social and economic development not covered by Agenda 21. The document outlines Myanmar's environmental and social conditions, discusses the process of NSDS development, and presents the country's goals for integrating the environment, economy, and society, detailing how the country will implement, monitor and evaluate its proposed indicators. This plan presents firm intentions for national green and social accounting, however, it is unclear how much progress Myanmar has made on the NSDS.

National Commission for Environmental Affairs (2008) *Myanmar: National Environmental Performance Assessment (EPA) Report*. Myanmar: National Commission for Environmental Affairs, Ministry of Forest.

http://www.gms-eoc.org/resources/myanmar-epa-report

The UNEP partnered with the National Commission of Environmental Affairs (NCEA) of Myanmar to produce the Environmental Performance Assessment (EPA) in 2008. The EPA measured seven of Myanmar's key environmental concerns: forest resources, biodiversity, land degradation, management of water resources, waste management, air pollution from mobile sources, and climate change. The assessment uses a structure of performance indicators and is supported by detailed statistical information. While the NCEA is in charge of managing and monitoring environmental issues, the report acknowledges that Commission needs more administrative and financial support to further increase its effectiveness and capacity to measure Myanmar's natural resources at the national level.

Nepal

Nepal, G. et al. (2011) ***Nepal Status Paper: United Nations Conference on Sustainable Development 2012 (Rio+20) Synopsis.*** **Nepal: National Planning Commission, Government of Nepal.**
Govinda Nepal: gnepal@npc.gov.np

http://sustainabledevelopment.un.org/content/documents/1018nepalnationalreport.pdf

This document was created in preparation for the 2012 Rio+20 Conference. It shows that Nepal has made significant progress on policy, legislation, and institutional aspects of sustainable development but has remained weak in implementation. Nepal's focus is on valuing nature's contributions to its economy and society in order to establish systems of Payments for Environmental Services (PES) to farmers, landlords, and others who agree to take measures to conserve and enhance watersheds, forests, and the like. The Government of Nepal recognises that "[a] green economy would entail developing national accounting systems to measure human welfare benefits, or the true value of ecosystem services benefiting the national, regional and global economies and environment" (p. 4). Nepal sees the importance of incorporating environmental-economic measures into national accounting systems, which it calls a "natural resources accounting index". No other documents could be found to indicate that Nepal has succeeded in implementing such a system for itself.

Pakistan

Ministry of the Environment, Government of Pakistan (2005) ***National Environmental Policy 2005.*** **Government of Pakistan.**
http://environment.gov.pk/NEP/Policy.pdf

In 1997, Pakistan passed the Pakistan Environment Act, which includes provisions for national Environmental Impact Assessments (EIAs). The National Environmental Policy of 2005 calls for a more diligent application of the 1997 provisions. Furthermore, it calls the use of EIAs during policymaking processes. It also urges for environmental and natural resource accounting to be integrated into the national accounting system. Regarding capacity development, the report calls for the establishment of a national environmental information management system so that decision-makers are more informed. Last, it also encourages industries to integrate environmental accounting systems in their financial management systems. The Pakistani government recognises the need to better measure human effects on the environment, but, as with many recommendations, especially those from developing countries that lack human and

capital resources, these suggestions have probably received little heed.

The Philippines

WAVES (n.d.) *The Philippines*. [online] WAVES. [Accessed 5 June 2015].

http://www.wavespartnership.org

This summary is for WAVES project progress in the Philippines only. An overview of WAVES is provided in the Multi-Country Reports and Projects Section of this document. Summaries of WAVES project activities in its four other core country partners—Botswana, Colombia, Costa Rica and Madagascar—can be found under their individual country sections.

The Philippines' WAVES programme commenced in 2011. Prior to this, the country had already begun to implement natural resource accounting but had stalled due to budgetary constraints. Renewed interest from political leaders and a recognition of the environmental and developmental implications of natural resource led to the WAVES partnership. The partnership began with feasibility studies that reviewed the previous natural capital accounting (NCA) experience in the Philippines and assessed the current capacity and institutional support for a SEEA. In addition, it assessed the feasibility of NCA for minerals, soils, land, water, forests, fisheries, and coastal and marine resources in the country. Workshops and meetings with officials from policy, planning, and statistics offices to identify policy priorities complemented these efforts. At the time of this report's writing, the national steering committee has reviewed the work plan, approved a concept note, and finalised the following components of the work: macroeconomic indicators, accounts for minerals and mangroves, ecosystem accounts for Southern Palawan and Laguna Lake Basin, and institutionalisation of the SEEA modules.

Allebone-Webb, S. et al. (2013) *The Globe Natural Capital Legislation Study.* Washington DC: The Global Legislators' Organisation.
Sophie Allebone-Webb: sallebonewebb@wcs.org

http://www.globeinternational.org/images/natural-capital-study/GLOBE-Natural-Capital-Legislation-Study.pdf

This summary is for the Philippines case study only. For an overview of the entire study, please see the Multi-Country Reports and Projects section of this book. The study also includes country case studies for Botswana, Colombia, Costa Rica, Georgia, Germany, Peru, and the United Kingdom,

which can be found under their respective country sections.

In 2009, marine and coastal resources in the Philippines were worth an estimated $500 million and forests, $100 million. The country has significantly degraded its environment in recent years, particularly in terms of air and water quality, soil erosion, and invasive species. The total cost of such degradation in 2009 included $120 million for coastal and marine degradation, up to $2.8 billion for other water pollution, $600 million for soil erosion, and $60 million for forestry. The Philippines ranks seventh in the world for the highest rate of deforestation: between 2000 and 2005, it saw an annual loss of 2.1% of its forest cover, which exacerbated soil erosion. The Philippines began constructing environmental accounts early, in the 1990s. Since it does not centrally coordinate its statistics, there are numerous government agencies involved in environmental accounting. The accounts cover physical and monetary flows and, rather than being based on the UN SEEA, follow an independent Philippine methodology. However, the 2012-2017 Philippines Statistical Development Programme plans to incorporate the SEEA standards. Unfortunately, the statistical development has led to little concomitant policy action, with the exception of paid environmental services in the form of markets for carbon sequestration and watershed protection.

INTOSAI (2010) *Environmental Accounting: Current Status and Options for SAIs.* Washington DC: International Organisation of Supreme Audit Institutions (INTOSAI).

http://www.environmental-auditing.org/LinkClick.aspx?fileticket=s%2FFCvUzSK-sk%3D&tabid=128&mid=568

This summary is for the Philippines case study only. For an overview of the entire report, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Australia, Botswana, Canada, China, Colombia, France, Germany, Mexico, Namibia, the Netherlands, and Sweden, which can be found under their respective country sections.

The Philippines' first experience with environmental accounting was in 1991. This was an account of the value of the removal of forests. During the 1990s, the country developed stock accounts of forests, energy, fisheries, and soil. Furthermore, it estimated the cost of air and water pollution. These latter accounts are based on the SEEA. The Philippines has used these environmental accounts for studying a variety of policy issues.

Singapore

ACCA (2013) ***The Business Benefits of Sustainability Reporting in Singapore: ACCA Sustainability Roundtable Dialogue on 24 January 2013.*** **Singapore (ACCA).**

http://www.accaglobal.com/content/dam/acca/global/PDF-technical/other-PDFs/sustainability-roundtable.pdf

The private sector plays an important part in Singapore's green accounting efforts. The Association of Chartered Certified Accountants (ACCA) encourages its members to incorporate environmental factors into their business accounting. In 2011/12, 12 companies published sustainability reports that measure organisational performance against environmental, social, and governance criteria. This document walks accountants through: 1) the sustainability reporting process; 2) the role of frameworks in the reporting process; 3) the business benefits of sustainability reporting; 4) the barriers to sustainability reporting; 5) the value of mandating sustainability reporting; and 6) sustainability reporting in Singapore. Despite these efforts, there is little push for widespread sustainability reporting in the country. Interviews with business revealed several barriers. One of these is a lack of understanding of what sustainability reporting involves and a perception that it entails many costs but few benefits. Still, the report urges for implementation of sustainability reporting within each company.

ICPAS (2012) ***Why Sustainability Reporting Matters?*** **Singapore: ICPAS Directory.**

http://icpasdirectory.icpas.org.sg/media/uploads/pdf/ICPAS_Why_Sustainability_Reporting_Matters.pdf

This article demonstrates that green accounting in Singapore is mainly a private effort. In 2011, 79 out of 562 companies listed in the Singapore Exchange Limited (SGX) engaged in sustainability reporting (14%). This is a 25% increase over the previous year. Indeed, "sustainability reporting", or SR, is now a buzzword among many companies in Singapore. As more companies engage in SR, non-participating companies feel pressured to report as well. Despite efforts in the private sector, the national government has neither created formal requirements for business to engage in sustainability reporting, nor reported on its own sustainability on a national level.

South Korea

Lee, J. et al. (2012) ***Korea's Green Growth based on OECD Green Growth Indicators*****. Daejeon:**

 Ioulia E. Fenton, Lykke E. Andersen, and Tracey Li

Statistics Korea.
E-mail: nsokrca@korea.kr

http://www.oecd.org/greengrowth/Korea%27s%20GG%20report%20with%20OECD%20indicators.pdf

This document, published by Statistics Korea, the statistical and data office of South Korea, describes the statistical work done to achieve green growth. Statistics Korea is committed to statistically support OECD "Green Growth Strategy" because it regards green growth as a solution to help curb greenhouse gas emissions and other environmental pollution. The report splits indicators into four main groups: environmental and resource productivity; natural asset base; environmental quality of life; and economic opportunities and policy responses. Results of the 2012 green growth indicators show that most indicators are improving compared to the year 2005. The authors credit this improvement to the green growth policies implemented on a full scale from 2009.

Lee, K. (2011) Motivations, barriers, and incentives for adopting environmental management (cost) accounting and related guidelines: a study of the Republic of Korea. *Corporate Social Responsibility and Environmental Management*, 18 (1), 39-49.
Ki-Hoon Lee: ki-hoon.lee@griffith.edu.au

http://onlinelibrary.wiley.com/doi/10.1002/csr.239/abstract

This research identifies the factors that motivate and/or hinder the adoption of Environmental Management/Cost Accounting (EMA/ECA) within the private sector. The author surveyed a random sample of Korean manufacturing companies on the current status of their EMA/ECA practices and their reasons for adopting or rejecting the guidelines. The study determines three main reasons for adopting EMA/ECA guidelines: 1) internal managerial purpose; 2) internal decision-making; and 3) monetary information measurement. The author concludes that corporate management faces three main difficulties when adopting EMA/ECA systems: 1) there is a mismatch between existing cost accounting items and the guideline items; 2) difficulty of including and interpreting non-monetary and non-quantifiable information; and 3) perceived irrelevance of environmental costs within commonly used business cost accounting systems.

Korea Environment Institute (2000) Environmental Accounting of Korea. In: *First Subregional Training Workshop on Environmental Statistics*, Bangkok, 8-19 May.

http://unstats.un.org/unsd/envaccounting/ceea/archive/Framework/Korea.PDF

This report outlines the objectives and framework of the Korean SEEA, presenting results for the 1985-1989 period. At the time of writing, the Korean SEEA exercise was limited as it only counted mineral resources in the cost estimations of environmental degradation and depletion. For more comprehensive environmental accounting efforts, the authors recommend enhancing data collection in the areas of environmental protection expenditure, fishery resources, and water resources, and separating the industrial environmental protection expenditures from depletion and degradation costs.

Sri Lanka

Dissanayake, R. et al. (2012) Environmental Accounting in Sri Lanka. *Pakistan Journal of Social Sciences (PJSS)*, 32 (1), 1-20.
Randika Dissanayake: randikad@gmail.com

http://www.bzu.edu.pk/PJSS/Vol32No12012/Final_PJSS-32-1-01.pdf

This article looks at how environmental accounting is applied in the private sector of Sri Lanka. The study compares the Corporate Social Responsibility (CSR) reports of ten British companies with ten Sri Lakan companies. It found that UK companies allocated about 3% of their overall annual reports to CSR reporting, while Sri Lankan companies allocated about 8% of their reporting space to CSR. One possible explanation for this observation is that percentages hide importance differences, namely that the UK companies' reports are longer and cover more topics, so the allocation to CSR is minimal in proportion. Overall, both countries' companies are actively engaged in CSR and environmental accounting, but the reporting practices are more formalised in the UK than in Sri Lanka.

Taiwan

National Statistics Bureau of the Republic of China (Taiwan) (2014) *Green National Income*. [online] National Statistics Bureau of the Republic of China [Accessed 3 June 2015].

http://eng.stat.gov.tw/np.asp?ctNode=1540

Taiwan has a SEEA-based green accounting system and regularly calculates and publishes Green National Income figures on the National Statistics website. The statistical tables include air

pollution, water pollution, solid waste, mineral, earth, and rock resources, and water resources.

Jao, C. (2000) ***International Symposium on Indicators of Sustainable Development: The Green Accounting in Taiwan.*** **Taipei: Bureau of Statistics, DGBAS.**
Jao Chih-Chien: jaocc@dgbas.gov.tw

http://unstats.un.org/UNSD/envAccounting/ceea/archive/Framework/Green_Accounting_Taiwan.PDF

At the time of this report's publication, Taiwan had adopted the 2000 version of UN SEEA for its national green accounting framework. Yet, it had not done so fully. According to this report, the nation had hitherto accounted for the following seven resources in monetary terms: groundwater, crude oil, natural gas, coal, gravel, marble, and limestone, estimating a loss of NT$217.3 billion ($7 billion) in these resources between 1992 and 1998. Taiwan is working to develop data for other factors, such as noise pollution, soil pollution, greenhouse effects, and ozone depletion. The Directorate General of Budget, Accounting, and Statistics (DGBAS) of the Executive Yuan is in charge of green accounting for Taiwan.

Tajikistan

UNDP and UNEP (2014) ***Project Document: Tajikistan Poverty and Environment Initiative (PEI) Phase II.*** **UNDP and UNEP.**

http://www.tj.undp.org/content/dam/tajikistan/docs/projects/environment_and_sustainable_development/Tajikistan%20PEI%20Phase%20II%20ProDoc%20eng.pdf

The Poverty-Environment Initiative (PEI) is a joint project between the UNDP and UNEP that aims to encourage environmentally-sustainable economic growth in poor areas. From 2010 to 2013, PEI engaged with Tajikistan to implement Phase I, which integrates poverty and environmental considerations with development policy, planning, and budget processes. Phase II of the project, 2014-2017, has a budget of $1,100,000. It has three main components: integrating poverty-environmental considerations with sectorial and national development strategy; institutionalisation of cross-sectorial budget, expenditure frameworks, and environment-economic accounting systems; and regional cooperation and knowledge sharing of pro-poor environmental outcomes.

UNDP and UNEP (n.d.) ***The Economic Costs of Agricultural Land Degradation in Tajikistan.***

UNDP and UNEP.

https://www.cbd.int/financial/values/tajikstan-economiccost.pdf

This two-page report summarises the findings of a UNDP-UNEP Poverty-Environment Initiative (PEI) study that investigates the full range of costs of current land management practices in Tajikistan. Some 97% of the country's agricultural land is eroded to some extent. The study estimates the economic cost of land degradation (due to foregone production on degraded and unused agricultural land) to be close to 2 million somoni ($442 million) – 7.8% of Tajikistan's GDP – in 2010. It suggests, however, that the actual cost is likely to be much higher if off-site costs of land degradation are taken into account, such as damage to infrastructure and costs incurred by farmers who compensate for declining soil fertility by the purchase of fertilisers. The report makes five policy recommendations: 1) improving data management and coordination between Government Institutes; 2) generation of key physical data that is currently missing; 3) determining marginal benefits of corrective policies to aid decision-makers; 4) conducting pilot studies of different ecological zones in order to understand regional variation; and 5) prioritisation of pastured areas for analysis since these make up the bulk of agricultural land-use.

Thailand

UNEP-DESA-UNDP Green Economy Joint Programme (2012) ***Implementing Inclusive, Green Economy Approaches: Asia Regional Dialogue on Country Experiences and Ways Forward for Economic Decision-Makers. Summary Report.*** **UNEP.**

mptf.undp.org/document/download/10144

In September 2012, the United Nations held a two-day Regional Dialogue in Bangkok, Thailand, for government officials, experts, civil society actors, and UN agencies and partners to discuss how best to move forward with executing policies that would foster a green economy in the context of sustainable development and poverty eradication. Participants discussed the issue of how to account for environmental factors in development goals. Thailand sent nine environmental experts, both government and non-governmental, to participate in the Dialogue. Despite this participation, it is unclear whether the Thai government has taken steps to implement a national green accounting system.

 Ioulia E. Fenton, Lykke E. Andersen, and Tracey Li

Uzbekistan

Center for Economic Research (2011) Uzbekistan: Capabilities and Prospects for Transitioning to a Green Economy. *CER Development Focus, Issue 14*. Tashkent: Government of Uzbekistan and UNDP.

http://www.cer.uz/upload/iblock/561/one%20pages_14_eng.pdf

This report suggests that Uzbekistan has put in place critical elements for a strategy of "green" transformation in various sectors of the economy. It notes that the country has all but exhausted its oil reserves, gas and coal reserves are projected to run out within 20-30 years, and water scarcity is a growing issue. Given this context, transitioning to a "greener" economy will be vital to improving quality of life for current and future generations in Uzbekistan. The report suggests several ways in which sustainability can be improved in the sphere of renewable energy, the housing and communal sector, the transportation sector, and the land and water management sector. It estimates annual benefits of over $9 billion with more than one million jobs created in the sector by 2020 and almost five million jobs by 2050 if Uzbekistan invests in the green economy sector. The report concludes with suggestions for how the Uzbeki Government can implement the recommendations.

Vietnam

Hong, V. et al. (2012) *Final Report – Green GDP Index: Research for Methodology Framework Development.* Ha Noi: Central Institute for Economic Management, Ministry of Planning and Investment.
Vu Xuan Nguyet Hong: vxnhong@mpi.gov.vn

http://www.ciem.org.vn/en/tabid/227/articletype/ArticleView/articleId/682/default.aspx

Vietnam has experienced strong economic growth over the past 25 years. However, this has been heavily dependent on intensive natural resource extraction, the growth of polluting industries, and high energy usage. The Vietnamese government is increasingly aware that the economy needs to shift towards more a sustainable development path and has implemented a variety of environmental policies and regulations over the past few years. It planned to introduce a "green GDP indicator" in the overall national socio-economic indicator system in 2014. This report serves as one of three outputs for the participatory development of a SEEA-based green accounting framework for Vietnam. Its purpose is to describe the SEEA methodology and its future application

in the country.

Countries not included

No relevant works were found for the countries listed below, although Turkmenistan is included in the UNECE Environmental Performance Reviews (see the "Multi-country Reports and Projects" section of this book).

Afghanistan, Brunei, North Korea, and Turkmenistan.

7. Oceania

Australia
New Zealand
South Pacific Island Nations (general)
Fiji
Vanuatu

7. Oceania

Overview

Although there is not a large existent literature on environmental accounting in the Oceania region, several countries in the area have actively included environmental factors in their national accounts for over two decades. For example, Australia constructed its first environmental accounts in 1993 and it prominently features carbon management accounting (CMA) in its national accounts. Furthermore, in 2005, the Australian government commissioned the production of the "Balancing Act" report – a triple bottom line account of the Australian economy based on three financial, three social, and four environmental indicators. This is the first analysis of this scale and depth that has been performed in Australia, and possibly in the world.

New Zealand also began its efforts in the 1990s and its national statistics institute (Statistics New Zealand) takes charge of tracking the country's progress with respect to sustainability. It produces comprehensive reports that are accessible to the public and to policymakers.

Amongst the Pacific Island nations, the EC selected Vanuatu—a country with good potential for implementing environmental fiscal reform (EFR)—to participate in the "Fiscal Reform in EC Development Cooperation" programme. Although it does not have an established environmental accounting system, the nation's fiscal, environmental, and natural resource situations imply that there is great potential for developing several EFR elements and adopting more sustainable development.

While Australia and New Zealand are clearly making headway in green national accounting and Vanuatu is receiving support from the EC, efforts in the other eleven Pacific Island Nations are practically non-existent. Ironically, these are precisely the countries that could benefit the most from demonstrating true economic growth that accounts for the role of natural capital depletion and degradation, as well as environmental gains.

This is because Pacific islanders rely heavily on the islands' natural wealth for subsistence and in some places like Fiji for tourism. Those nations with extensive forest reserves also provide vital ecosystem services to the rest of the world in terms of carbon capture and climate change mitigation. Meanwhile, the islands' fish stocks are also vital for the region's fish supplies.

Properly accounting for and valuing these resources could help domestic policymakers steer the economies onto more sustainable development tracks. It could also help bring vital

financial resources to the region in terms of payments for ecosystem services, carbon offsetting programmes, and other international mechanisms.

It is the hope of this report's authors that green accounting researchers turn their attention to the hitherto left out Fiji, Kiribati, Marshall Islands, Micronesia, Nauru, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, and Tuvalu, and thus help these nations fully account for their natural wealth.

Australia

OECD (2015) Towards Complete Balance Sheets in the National Accounts: the case of mineral and energy resources. *OECD Green Growth Papers*. April 2015.

http://www.oecd-ilibrary.org/environment/towards-complete-balance-sheets-in-the-national-accounts_5js319256pvf-en;jsessionid=gfo3kketao3at.x-oecd-live-02

The OECD launched its Green Growth Strategy in May 2011. It provides recommendations and measurement tools to support countries in attaining sustainable economic growth without depleting ecosystem services. OECD Green Growth Papers describe preliminary results or research in progress among member countries. In this work, the authors describe a consistent approach towards the valuation of both subsoil natural assets and produced capital. The authors construct volume and price indexes using SNA and SEEA methodologies, and then apply these indexes to Australian data, finding an upward trend in Australia's volume index of mineral and energy resources between 1989 and 2011.

Obst, C. and Vardon, M. (2014) Recording environmental assets in the national accounts. *Oxford Review of Economic Policy*, 30 (1), 126-144.
Carl Obst: cobst@unimelb.edu.au

http://www.researchgate.net/profile/Michael_Vardon/publication/270786131_Recording_environmental_assets_in_the_national_accounts/links/54c9c12e0cf298fd2626c174.pdf

This bulk of this paper describes the general treatment of environmental assets within national economic accounts and covers recent developments that extend the UN SEEA approach. It also describes Australia's implementation of the system and its extensions. ABS has calculated physical and monetary stock and flow accounts in the national balance sheet for land, minerals, energy, timber, and fish, annually since 1996. It has also calculated water accounts since 2000, annually

since 2010. Latest 2012 additions include annual waste accounts and experimental greenhouse gas emissions accounts (embedded in final demand). The ABS has also experimented with incorporating depletion of natural resources into national accounting, an exercise that depreciates income figures but has little effect on the overall economic growth rate. This is because while Australia has increasingly depleted its energy, mineral, and soil resources between 2000 and 2010, with the rate of depletion doubling over the time period, over the ten years, resource rents, return on natural resources, and rent payments to government have all increased by two and half to three times. The authors provide five lessons learnt from Australia's experience with green accounting, including: the need for repeat systematic environmental accounts since they get more accurate and useful with time; the need for strong institutional support for accounts and for robust international partnerships; and the need for stakeholder engagement for better utilization of the accounts.

Van Dijk, A. et al. (2014) Environmental reporting and accounting in Australia: Progress, prospects, and research priorities. *Science of the Total Environment*, 473-474, 338-349.
Albert Van Dijk: albert.vandijk@anu.edu.au

http://www.sciencedirect.com/science/article/pii/S004896971301526X

The paper's purpose is to review progress made on SEEA at national level in Australia in terms of collecting data, producing national environmental accounts, identifying challenges and opportunities, and analysing the potential role of research in addressing them. The challenges include: the diversity of environmental information, which makes it difficult to collect data and analyse it; lack of agreement on data standards at different governmental levels; over-reliance on business for data; and a short-term outlook. The study found that the most successful efforts in environmental accounting were the ones with a specific data requirement and a legislative instrument that aids data collection by assigning responsibility to a specific agency. The document suggests enhancing monitoring networks, increasing data management, and creating new environmental modelling platforms.

Lodhia, S. (2011) The Australian National Greenhouse and Energy Reporting Act and its implications for accounting practice and research: a mini-review. *Journal of Accounting & Organizational Change,* 7 (2), 190-198.
Sumit Lodhia: sumit.lodhia@unisa.edu.au

http://www.emeraldinsight.com/journals.htm?articleid=1931128

The Australian National Greenhouse and Energy Reporting (NGER) Act of 2008 states that public and private organisations that meet certain criteria must annually disclose their greenhouse gas emissions, energy production and consumption, and carbon abatement projects. This process is essential to an eventual carbon pricing scheme. This paper outlines the accounting implications of the NGER Act, and argues that in the accounting process can play a major role in organisational attempts to manage, communicate, and price carbon emissions. The paper demonstrates carbon management accounting (CMA) became prominent in Australia as a result of the Act, changing the accounting practices of many organisations. The author notes optimistically that this process went beyond simply adding an emissions reporting requirement to business operations, but has involved actual organisational change, which has allowed companies to become more proactive in taking climate change into account within their internal systems.

INTOSAI (2010) *Environmental Accounting: Current Status and Options for SAIs*. Washington DC: International Organization of Supreme Audit Institutions (INTOSAI).

http://www.environmental-auditing.org/LinkClick.aspx?fileticket=s%2FFCvUzSK-sk%3D&tabid=128&mid=568

This summary is for the Australia case study only. For an overview of the entire report, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Botswana, Canada, China, Colombia, France, Germany, Mexico, Namibia, the Netherlands, the Philippines, and Sweden, which can be found under their respective country sections.

Australian environmental accounts were originally created in 1993 and are consistent with the SEEA. They cover stock and flow accounts for energy, air pollution, fisheries, minerals, and water. They also have monetary accounts for land, minerals, and forests. Australia is prone to droughts, so the water accounts play a particularly important role in analysing and managing water usage.

Foran, B. Lenzen, M. and Dey, C. (2005) *Balancing Act: A triple bottom line analysis of the 135 sectors of the Australian economy.* CSIRO Technical report.
Barney Foran: bforan@csu.edu.au

http://www.isa.org.usyd.edu.au/publications/latest.shtml

This report, commissioned by the Government of Australia, provides an overview of the 135 sectors of the Australian economy. It uses a set of ten environmental, social, and financial indicators. The environmental indicators are water use, land disturbance, greenhouse emissions

and energy use; the social indicators are employment, government revenue and income; and the financial indicators are operating surplus (or profits), exports and imports.

New Zealand

Statistics New Zealand (2008) ***Measuring New Zealand's Progress Using a Sustainable Development Approach: 2008.*** **Statistics New Zealand.**
Geoff Bascand: rbnz-info@rbnz.govt.nz

http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/Measuring-NZ-progress-sustainable-dev-%20approach/sustainable-development.aspx

Presenting an all-encompassing view of New Zealand's environmental, economic, and social progress, this paper looks at whether or not the progress is consistent with sustainable development. It looks into how resources are being used, while keeping in mind efficiency and sustainability. In all, it considers 85 indicators for 15 topics for the period of 1998-2008. The topics include water, air, biodiversity, population, health, economic resilience, culture and identity, and more. Each topic's results are presented via easy-to-understand summary graphs and tables that are well worth exploring. The discussion that follows each of these clearly summarises the results' implications.

[The following document is written in Spanish.]

Quiroga, R. (2007) ***Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe.*** **Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.**
Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This summary is for the New Zealand case study only. For an overview of the entire report, please see the Multi-Country Reports section of this book. The report also includes country case studies for Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, the Netherlands, Nicaragua, Panama, Peru, Spain, Sweden, the United Kingdom, the United States of America, and Venezuela, which can be found under their respective country sections.

New Zealand began developing Environmental Indicators in 1996 when it implemented the "Environmental Performance Indicators Program" (EPIP), which continues to be led by the country's Ministry for the Environment. The goal of the program was to develop a series of environmental indicators to aid decision-making of the general public, the national government, local authorities, and the private sector. In 2010, it identified the following priority indicators: air quality, water, climate change, waste, wasteland management, soil, ecological footprints, biodiversity, ocean, transport, and consumption.

Statistics New Zealand Christchurch (2002) *Natural Resource Accounts for New Zealand: Overview.* Statistics New Zealand.
Geoff Bascand: rbnz-info@rbnz.govt.nz

http://www.stats.govt.nz/~/media/Statistics/browse-categories/environment/natural-resources/natural-resource-account/nra-overview.pdf

This article covers New Zealand's switch to focus more attention on sustainable development. At the time of publication, the nation hoped to develop natural resource accounts to provide a complete picture of the nation's economic and environmental performance. The paper presents New Zealand's asset and flow accounts.

South Pacific Island Nations (general)

Lodhia, S. (2004) Environmental Accounting for South Pacific Island Nations: A possible mechanism for encouraging Sustainable Development by the Corporate Sector. *Fijian Studies: Special Issue on Sustainable Development*, 2 (1), 111-138.
Sumit K. Lodhia: sumit.lodhia@unisa.edu.au

http://search.informit.com.au/documentSummary;dn=708966905017272;res=IELNZC

South Pacific Island nations suffer from severe environmental problems such as water and air pollution that arise from industrial activities. They also suffer from problems such as deforestation and soil degradation that arise from inadequate environmental management. This article advocates for the use of environmental accounting in the corporate sector (both for private and public sector companies) as a means of minimising environmental damage. The author argues that accounting is not just a bureaucratic activity, but that it also has social significance: for example, accounting plays a role in the way that income is distributed between e.g. corporate polluters and local communities. Environmental accounting is necessary in corporations because they

have the greatest impact on the environment. The paper outlines the elements that the process should involve: environmental management accounting; environmental financial accounting; and corporate environmental reporting. The final part of the paper is a brief bibliography of environmental accounting efforts from around the world.

Fiji

Lodhia, S. (1999) Environmental Accounting in Fiji: An Extended Case Study of the Fiji Sugar Corporation. *Journal of Pacific Studies – Banking, Finance and Accounting Special Issue*, 23 (2), 283-309.

Sumit K. Lodhia: sumit.lodhia@unisa.edu.au

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=290452

This paper focuses on the role that accountants play in environmental management and reporting. It argues that voluntary environmental efforts are not always effective and advocates for the introduction of environmental accounting legislation in Fiji. The author argues that accountants should be involved in the production, reporting, and auditing of environmental policies and programmes. The main body of the work is a case study of environmental accounting practices in the Fiji Sugar Corporation (FSC). While the FSC, like other manufacturing companies, releases many pollutants into the air and sea through its processes, it is the only public company in Fiji that discloses environmental information in its annual reports. It uses environmental accounting to demonstrate accountability to shareholders, to improve the company's public image, and to avoid incurring fines. Accountants participate in the auditing and reporting procedures, but play no role in contributing to the company's environmental management systems. The author recommends that FSC accountants play an active role in drawing up the company's environmental plans, that the FSC should improve processes such as the identification of environmental costs and benefits, and that the company should improve the quality and quantity of environmental information disclosed in its reports.

Vanuatu

Schlegelmilch, K. et al. (2010) Fiscal Reform in EC Development Cooperation. *Contract No. 2008/160146/2 – Version 2 Final Report.* Soges Consortium.

Kai Schlegelmilch: kai.schlegelmilch@green-budget.eu
http://www.foes.de/pdf/20100929_Final%20Report%20-%20Environmental%20Fiscal%20

Report%20-%20FINAL.pdf

This summary is for the Vanuatu case study only. For an overview of the entire project, please see the Multi-Country Reports and Projects section of this book. The report also includes country case studies for Barbados, Burkina Faso, South Africa, and Uganda, which can be found under their respective country sections.

The EC chose Vanuatu as one of five countries with a good potential to implement environmental fiscal reform (EFR), as part of the project "Fiscal Reform in EC Development Cooperation". Vanuatu does not have an established system of environmental charges. However, the report argues that its current and future-projected state of the fiscal situation, the environment, and natural resources, is favourable to the development and implementation of EFR.

Countries not included

No relevant works were found for Kiribati, Marshall Islands, Micronesia, Nauru, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, and Tuvalu.

8. Multi-country Reports and Projects

8. Multi-Country Reports and Projects

Multi-Country Reports

Hedden-Dunkhorst B. et al. (2015). TEEB emerging at the country level: Challenges and opportunities. *Ecosystem Services*, 14, 37-44.
Bettina Hedden-Dunkhorst: bettina.hedden-dunkhorst@bfn.de

http://www.sciencedirect.com/science/article/pii/S2212041615000509

This paper discusses the initiation of TEEB country scoping studies. These can differ substantially in terms of scope, ecosystem services included, stakeholder involvement, the sectors and policies considered etc. The report includes an overview of scoping studies known to date, covering countries in Europe, Asia, the Americas, and Africa. Georgia and Nordic countries (Finland, Sweden, Norway, Denmark, Iceland, Nordic islands) completed their studies in 2003. Germany and Netherlands have very wide-ranging scoping studies. At the time of writing, Asia, India, China, the Philippines, and Bhutan were all initiating TEEB processes. In Latin America, Brazil, Ecuador, and Mexico have all made some progress. In Africa, Liberia, Tanzania, and South Africa are leading the way. The authors go on to discuss the common key challenges in implementing TEEB at the country level. These challenges are: how to ensure that the findings from TEEB are actually relevant to policy; how to decide which stakeholders to include given limited resources, choice, and assessment of the application of the assessment and valuation methodology; and dealing with complications that arise from interdependent policy goals and/or trade-offs between different ecosystem services. The authors explore how TCSs can be combined synergistically with national and local development strategies to advance issues related to ecosystems and biodiversity, and how they can contribute towards decisions about regional environmental policies and initiatives. Ultimately, the authors argue for the need to move beyond country studies to further TEEB progress.

Tamanini J. (2014) *The Global Green Economy Index.* GCEI 2014: Measuring National Performance in the Green Economy. 4th Edition. Dual Citizen LLC.
Jeremy Tamanini: Jeremy@dualcitizenin.com

http://dualcitizeninc.com/GGEI-Report2014.pdf

Dual Citizen LLC works with government ministries, international organisations, and private firms to further their growth and development agendas. To support this work, in October 2014, it published the fourth edition of the Global Green Economy Index (GGEI) that measures how 60 countries and 70 cities perform in the global green economy (performance measure), as well as how expert practitioners rank this performance (perception measure). The GGEI aims to inform policymakers, international organisations, the private sector, and citizens which countries are successfully orientating their economies toward greener economic growth and which are currently failing. The performance index is defined by 32 underlying indicators and datasets, divided in four main dimensions: leadership and climate change; efficiency sectors; markets and investment; and environment and natural capital. Germany and Sweden top the latest GGEI country rankings on perception and performance measures, respectively, showing great progress in economic and environmental areas, and displaying consistent green leadership. Costa Rica, which was covered for the first time, also stood out, ranking third on the GGEI performance measure. City results show that Copenhagen continues to be the top green city.

Allebone-Webb, S. et al. (2013) *The Globe Natural Capital Legislation Study.* Washington DC: The Global Legislators' Organisation.
Sophie Allebone-Webb: sallebonewebb@wcs.org

http://www.globeinternational.org/images/natural-capital-study/GLOBE-Natural-Capital-Legislation-Study.pdf

The Globe Natural Capital Legislation Study is a summary of the initiatives in eight countries to account for environmental and ecological capital and the services derived from that capital. It discusses the existing accounts, how they are constructed, who is responsible for them, and what effect they have on policy and, ultimately, the environment. The report notes that 60% of environmental services have declined because retaining environmental services has not been a major policy priority. It warns that incomplete data is not a valid excuse for lack of political action. It then details 13 different initiatives that attempt to value ecosystem services, classifying them according to their function: policy or legislative, voluntary multilateral initiatives, voluntary NGO initiatives, and government/multilateral reports. One of the most important is the UN SEEA. The final section makes up the substance of the report, giving natural capital case studies for eight countries: Botswana, Colombia, Costa Rica, Georgia, Germany, Peru, the Philippines, and the United Kingdom. Summaries of these national efforts are included under their relevant country sections of this report.

WAVES (2013) ***The Global Partnership on Wealth Accounting and the Valuation of Ecosystem Services.*** **Annual Report 2013. Washington DC: WAVES and the World Bank.**

http://www.wavespartnership.org/waves/sites/waves/files/images/WAVES-Annual-Report.pdf

This is the annual report of the Wealth Accounting and the Valuation of Ecosystem Services (WAVES) project. More information about the WAVES project can be found in the Multi-Country Reports and Projects section of this document. The report outlines the progress made by the five original WAVES partner countries—Botswana, Colombia, Costa Rica, Madagascar, and the Philippines. These countries have completed their preparation phase activities: establishing National Steering Committees, conducting extensive multi-stakeholder consultations, undertaking detailed scoping studies to diagnose readiness and policy priorities for natural capital accounting (NCA), and designing four-year work plans to implement NCA. WAVES countries are now beginning to execute their work plans. The report also briefly outlines efforts to reach out to other countries at Rio+20, the United Nations Conference on Sustainable Development held in 2012. This helped move NCA to the top of the global agenda with 62 countries and 90 private sector organisations expressing their support for natural capital accounting. Following this, WAVES drafted a Global Action Plan in consultation with key partners and is building South-South learning into the programme.

INTOSAI (2010) ***Environmental Accounting: Current Status and Options for SAIs.*** **Washington DC: International Organization of Supreme Audit Institutions (INTOSAI).**

http://www.environmental-auditing.org/LinkClick.aspx?fileticket=s%2FFCvUzSK-sk%3D&tabid=128&mid=568

This report by the Working Group on Environmental Auditing is an update of the progress of the United Nations, as well as some independent national initiatives, on environmental accounting. Currently, national environmental accounting includes national resource accounts, pollution and material flow accounts, monetary and hybrid accounts, and environmentally adjusted macroeconomic aggregates. The report states that environmental accounting standards have finally reached the high level standard of national accounts, noting that, as of 2007, 72 countries had adopted some kind of environmental accounting, most extensively for managing water resources. It then details the efforts in Australia, Botswana, Canada, China, Colombia, France, Germany, Mexico, Namibia, the Netherlands, the Philippines, and Sweden (summaries of which can be found in the relevant country sections of this book). Summaries of these national efforts are included under their relevant country sections of this report.

Schlegelmilch, K. et al. (2010) Fiscal Reform in EC Development Cooperation. *Contract No. 2008/160146/2 – Version 2 Final Report.* Soges Consortium.
Kai Schlegelmilch: schlegelmilch.kay@mbu.de

http://www.foes.de/pdf/20100929_Final%20Report%20-%20Environmental%20Fiscal%20Report%20-%20FINAL.pdf

Environmental fiscal reform (EFR) refers to the application of a range of taxation and pricing measures in domestic policies that can raise fiscal revenues while furthering environmental goals. EFR has the potential to play an important role in helping developing countries raise money for vital services, such as healthcare, whilst creating incentives that generate environmental benefits and support poverty reduction efforts. The "Fiscal Reform in EC Development Cooperation" projects aimed to study EFR activities in developing countries for two reasons: to identify how the EFR process can be effectively implemented and to select several African Caribbean Pacific (ACP) countries with good potential for implementing EFR. The EC chose five countries for this project: Burkina Faso, South Africa, Uganda, Barbados, and Vanuatu. The report concludes that the use of EFR instruments is widespread but varied in ACP countries; that strengthening domestic revenue bases is vital for funding the needs of developing countries; that ACP countries all have distinct political and economic conditions and therefore a "one-size-fits-all" EFR approach is inappropriate; that payments for ecosystem services are attracting interest in ACP countries; and that the reform of user charges for water, sanitation, and waste is necessary in all ACP countries, but that social considerations must be taken into account when designing these pricing tools.

[The following document is written in Spanish.]

Quiroga, R. (2007) *Indicadores ambientales y de desarrollo sostenible: avances y perspectivas para América Latina y el Caribe.* Santiago de Chile: Naciones Unidas CEPAL, División de Estadística y Proyecciones Económicas.
Rayén Quiroga Martínez: rquiroga@terra.cl

http://www.eclac.org/deype/publicaciones/xml/4/34394/LCL2771e.pdf

This report discusses the current state of environmental quality and sustainable development indicators, with particular focus on the Latin American and Caribbean region. It details the Latin American and Caribbean Initiative for Sustainable Development (ILAC), as well as initiatives for several individual countries of Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, Nicaragua, Panama, Peru, and Venezuela, summaries of which

can be found under the respective country sections of this document. Some countries in the region have advanced substantially, systematically publishing environmental and sustainable development indicators based on their own initiatives, or strengthening the indicators deployed by the Economic Commission for Latin America and the Caribbean (CEPAL). The author points out that environmental and sustainable development indicators have been increasingly legitimised as useful tools for policy formulation, strategy evaluation, and environmental management in most of the countries of the region. However, there are still important technical and financial obstacles to their deployment. One of the main challenges is the need to construct stable national environmental statistical series in each country, which would in turn allow more complete and sophisticated calculations of environmental and sustainable development indicators. The report similarly analyses global initiatives, such as the Sustainable Development Indicators (SDI) programme of the Commission of Sustainable Development (CSD), and those o developed countries like Canada, the Netherlands, New Zealand, Spain, Sweden, the UK, and the USA). Again, summaries of the individual country studies can be found under the relevant country sections of this book. The author concludes by noting that richer developed countries have much to learn from Latin America and the Caribbean in terms of developing sustainable development indicators that are contained within a single unified system, but that are successfully deployed at different scales.

Hamilton, K., and Clemens, M. (1999) Genuine Saving Rates in Developing Countries. *World Bank Economic Review*, 13 (2), 333-356.
Kirk Hamilton: khamilton@worldbank.org

http://wber.oxfordjournals.org/content/13/2/333.abstract

This article provides empirical estimates of genuine savings rates in different developing countries for the period of 1970 to 1993. Genuine savings equal traditional net savings, minus the value of resource depletion and environmental degradation, plus the value of investment in human capital. The authors use consistent time series data on resource depletion and CO_2 emissions for their calculations. Their results show negative genuine savings in a wide range of countries, particularly in Sub-Saharan Africa. Latin America and the Caribbean showed a consistently positive trend in regional genuine savings, but values remained below 5%. East Asia and the Pacific region occasionally topped 15%, perhaps due to the fact that the calculations did not include the effects of important local pollutants. The Middle East and North Africa region showed consistent negative genuine savings; and South Asia exhibited moderately positive rates over the period, consistent with the region's experience of moderate rates of economic growth. Adjusting rates of genuine savings to embrace changes in human capital assets shifted regional genuine

savings rates markedly upward. Genuine savings rates in high-income industrial countries were thus found to be high. The paper concludes by exploring the importance of incorporating genuine saving measures into policies for sustainable development. It also further examines the extent to which monetary and fiscal policies, exports of exhaustible resources, stronger resource policies, and pollution abatement measures boost genuine savings rates.

OECD Environmental Performance Reviews

http://www.oecd-ilibrary.org/environment/oecd-environmental-performance-reviews_19900090
[Accessed 3 June 2015].

The OECD Environmental Performance Reviews (EPRs) programme began in 1992, after Environment Ministers of OECD countries called on the OECD to review environmental performance in member countries. The reviews prioritise the identification of national objectives and international commitments regarding the environment and statistically assess the extent to which targets have been achieved.

Each review is conducted by a team of eight to ten people, typically including experts from three OECD countries, secretariat staff, and consultants. The team meets with government and non-government representatives of the country under review, including environment and ministry officials, industry representatives, trade unions, NGOs, independent experts, and local governments, to discuss the evaluation of environmental performance and policy response.

Cooperation with the United Nations Economic Commission for Europe (UNECE) has led to the development of a daughter programme for non-OECD UNECE countries, described later on in this section. Since the start of the programme, most OECD member countries have been reviewed twice; the first time during the 1992-2000 cycle, and the second in the 2001-2009 cycle. The third cycle began in 2009. Additionally, some non-OECD countries – China and Russia – have also been reviewed. The reviews identify good practices and make recommendations to improve the reviewed country's environmental policies and programmes. The most recent review for each country is listed below and can be accessed from the above link.

Australia (2007), Austria (2013), Belarus (1997), Belgium (2007), Bulgaria (1996), Canada (2004), Chile (2005), China (2007), Colombia (2014), Czech Republic (2005), Denmark (2007), Finland (2009), France (2005), Germany (2012), Greece (2009), Hungary (2008), Iceland (2014), Ireland (2009), Israel (2011), Italy (2013), Japan (2010), Korea (2006), Luxembourg (2009), Mexico (2013),

Netherlands (2003), New Zealand (2007), Norway (2011), Poland (2015), Portugal (2011), Russia (1999), Slovakia (2011), Slovenia (2012), South Africa (2013), Spain (2015), Sweden (2014), Switzerland (2007), Turkey (2008), UK (2002), US (2006).

The Economics of Ecosystems and Biodiversity (TEEB)

http://www.teebweb.org/
[Accessed 3 June 2015].

The Economics of Ecosystems and Biodiversity (TEEB) is a global initiative focused on drawing attention to the economic benefits of biodiversity, including the growing cost of biodiversity loss and ecosystem degradation. The project was launched in March 2007, after a meeting of environment ministers from the G8+5. TEEB has so far comprised three phases. In the first phase, various organisations contributed their resources and expertise to a study, the results of which formed the TEEB Interim Report which was presented at the Convention on Biological Diversity in Bonn, Germany, in 2008. In the second phase, five further publications were produced which were presented at the CBD COP-10 in Nagoya, Japan, 2010. These were: "TEEB Ecological and Economic Foundations", "TEEB in National and International Policy Making", "TEEB in Local and Regional Policy", "TEEB in Business and Enterprise", and the "TEEB Synthesis Report". Several other studies are currently underway, focusing on the value provided by ecosystems and ecosystem services to relevant economic sectors and assessing the costs of biodiversity loss and ecosystem degradation. The third phase of TEEB consists of country studies. This will involve developing guidance material on how to incorporate the value of ecosystems and biodiversity into decision-making at the national level, and providing technical expertise to five pilot countries (Bhutan, Ecuador, Liberia, the Philippines, and Tanzania) to undertake assessments of their ecosystems and biodiversity. These studies will take place over the three years of the project. They will identify the ecosystem services that are vital to meeting the country's policy priorities and make recommendations on how these services can be integrated into policies, such as poverty alleviation, land use management, and national accounting to include natural capital.

UNECE Environmental Performance Reviews

http://www.unece.org/env/epr/publications.html
[Accessed 5 June 2015].

The United Nations Economic Commission for Europe (UNECE) Environmental Performance Reviews (EPRs) constitute a daughter programme of the OECD EPRs (described earlier in this

section). The objectives of the review, as well as the methodology, are similar to those used in the OECD reviews. The most recent reviews for each country are listed below and can be accessed from the above link.

Albania (2012), Armenia (2000), Azerbaijan (2011), Belarus (2005), Bosnia and Herzegovina (2011), Bulgaria (2000), Croatia (1999), Estonia (2001), Georgia (2010), Kazakhstan (2008), Kyrgyzstan (2009), Latvia (1998), Lithuania (1998), Macedonia (2011), Moldova (2005), Montenegro (2007), Romania (2013), Serbia (2007), Slovenia (1997), Tajikistan (2012), Turkmenistan (2012), Ukraine (2007), Uzbekistan (2010).

Wealth Accounting and the Valuation of Ecosystem Services (WAVES)

http://www.wavespartnership.org
[Accessed 5 June 2015].

The Wealth Accounting and the Valuation of Ecosystem Services (WAVES) project was launched at the 2010 Convention on Biological Diversity meeting, held in Nagoya, Japan. WAVES is a global partnership between several UN agencies, governments, international institutes, nongovernmental organizations (NGOs), the private sector, and academics. There were initially five WAVES partner countries – Botswana, Colombia, Costa Rica, Madagascar, and the Philippines – which were joined by Guatemala, Indonesia, and Rwanda in 2013. The project aims to promote sustainable development by counting natural resources within usual GDP calculations of nations. This will entail establishing environmental accounts for partner countries, developing internationally agreed systems for ecosystems accounting, and disseminating such systems globally. Having completed initial preparations between January 2011 and June 2012, WAVES is currently in phase II of its 2012-2015 programme implementation.

9. General Work

9. General Work

This section is not designed to be as comprehensive as the sections that cover actual efforts of integrated environmental and economic accounts. Rather, it points readers to some interesting further readings to explore.

Bartelmus, P. (in press) Do we need ecosystem accounts? *Ecological Economics.* Corrected proof available online 10 January 2015.
Peter Bartelmus: peterbartelmus@gmail.com

http://www.sciencedirect.com/science/article/pii/S0921800915000129

In this paper the author provides a critical review of the usefulness of physical and monetary ecosystem accounts in general, and the Experimental Ecosystem Accounts (EEA) report in particular. The author points out that whilst the UN System of Environmental and Economic Accounts (SEEA) takes into account the depletion of natural resources, it does not account for environmental degradation (notably from pollution). In contrast, the EEA includes ecosystem degradation, but not natural asset depletion. The paper further provides a detailed description of several accounting systems—the UN Framework for the Development of Environment Statistics (FDES), the UN System of National Accounts (SNA), and the SEEA Central Framework (SEEA CF)—and the relationships between them. This is provided in the context of the question of whether the biophysical data of ecosystems should be presented in accounts of ecosystem assets and services, or in statistical tabulations of ecosystem characteristics. The author goes on to examine to what extent ecosystem accounts can connect ecosystem services to the economy and whether ecosystem assessments should be carried out at all by monetary accounts. He concludes that, with the exception of land use and land cover data, "loose statistical frameworks are more suitable for presenting ecosystem data than rigid accounting system". The final section contains a brief overview of TEEB, WAVES, and the Millennium Ecosystem Assessment of 2005, comparing them to the EEA and the SNA.

Helm, D. (2015) *Natural Capital: Valuing the Planet*. Yale University Press.
Dieter Helm: dieter.helm@new.ox.ac.uk

http://yalebooks.com/yupbooks/book.asp?isbn=9780300210989

In this book the author conveys the message that the solution to the apparent conflict between economic growth and environmental quality is to prevent declines of natural capital. A brief

history of the concept of natural capital is included. Particularly, the nineteenth century economist Thomas Robert Malthus made some famously bleak predictions as a result of the conflict between the exponentially growing human population and the fixed amount of farmland, meaning that food supplies could not keep up. However, historically, average living standards actually continued to rise whilst the environment mostly disappeared from economic thinking. The author brings Malthus' predictions back into focus by arguing that the current rate of economic growth, continually growing population, and rising demand for resources are increasing pressures on ecosystems and biodiversity. He points to evidence of the importance of ecosystem services such as clean water and the detriment to human well-being when these services are disturbed, and is a strong advocate for a new goal of economic policy being to keep natural capital from declining.

Heun, M. K. et al. (2015) *Beyond GDP: National Accounting in the Age of Resource Depletion*. Springer.
Matthew Heun: heunm@calvin.edu

http://www.springer.com/us/book/9783319128191

This book metaphorically equates the economy with "society's metabolism" to develop a framework for an improved system of national accounts which goes beyond the traditional measure of GDP. The authors suggest that data on natural capital should be routinely gathered, analysed, and disseminated from a centralised location to provide markets and policymakers with a better understanding of the biophysical economy. They argue that this will allow them to proceed along the new path of green national accounting. The book comprises nine chapters. The first chapter introduces the problem of "(Mis)measuring the Wealth of Nations" that has occurred as a result of excluding natural resources from national accounting. The next chapter presents a brief history of natural resource usage followed by some thoughts on the economy as 'society's metabolism'. The book then cover the stocks and flows of materials, direct energy, and embodied energy, as well as stocks and flows of economic values and energy intensity. The authors conclude by discussing the implications of their new framework developed in the previous chapters and suggest possible ways ahead.

Aronsson, T., and Löfgren, K. (eds.) (2013) *Handbook of Environmental Accounting*. Cheltenham: Edward Elgar Publishing.
Thomas Aronsson: thomas.aronsson@econ.umu.se

http://www.elgaronline.com/view/9781847203847.xml

This handbook is focused on the welfare-economic foundations of social accounting. It covers the following topics: the ways in which the system of national accounts should be modified to reflect the value of social activity; how green net national product should be measured; the principles for measuring welfare in a community at a given point in time; cost-benefit analysis for measuring welfare change; and the principles for measuring sustainability. The book comprises eleven chapters written by different authors, covering a broad range of theoretical and more practical issues aimed at researchers working on welfare and environmental economics.

Engelbrecht, H. (2012) Some empirics of the bivariate relationship between average subjective well-being and the sustainable wealth of nations. *Applied Economics*, 44 (5), 537-554.
Hans-Jürgen Engelbrecht: h.engelbrecht@massey.ac.nz

http://www.tandfonline.com/doi/abs/10.1080/00036846.2010.510464#.Ud7qC9JQFpV

This paper explores bivariate relationships between a widely reported measure of average Subjected Well-Being (SWB), or "happiness", and the Millennium Capital Assessment (MCA) wealth estimates, thereby contributing to the macro-empirical literature on correlates of SWB. The cross-cross country analysis of the bivariate macro-level relations show that amongst high-income countries, the correlation between SWB and total wealth per capita is greater than that between SWB and income. Furthermore, correlations between components of wealth per capita and GNI per capita versus SWB highlight that GNI per capita is closely correlated with physical capital accumulation, whereas SWB has its highest correlation with intangible capital. Finally, the study finds that when countries with the highest levels of natural capital are deleted as outliers, natural capital explains a large part of the variation in SWB, especially amongst high-income countries, despite accounting for only about 2% of their total wealth. Therefore, one may argue that the preservation of natural capital in rich countries provides a "happiness bonus", rather than requiring a "happiness sacrifice". The author finishes the paper by noting that a comprehensive theory of sustainable development that includes insights from happiness research is desirable, as well as more research on how to measure total wealth and its subcategories.

New Economics Foundation (2012) *The Happy Planet Index: 2012 Report: A global index of sustainable well-being.* London: New Economics Foundation.
Saamah Abdallah: saamah.abdallah@neweconomics.org

http://www.neweconomics.org/publications/entry/happy-planet-index-2012-report

The third global report published by the New Economics Foundation describes the state of nations

around the world in terms of the Happy Planet Index (HPI), one of the first global measures of sustainable well-being. The index uses global data on experienced well-being, life expectancy, and an indicator termed "Ecological Footprint" to gauge which countries are most effective in producing long, happy lives for their citizens, whilst ensuring sustainability for future generations. According to the report, the index calculates the number of Happy Life Years (life expectancy adjusted for experienced well-being) achieved per unit of resource use. The study finds that humans are still living on a relative unhappy planet, whereby no country has yet achieved high and sustainable well-being, and only nine countries are close to doing so. It highlights that eight out of those nine countries are in Latin America and the Caribbean and that the scores of many high-income countries were brought down by their poor ecological performance. The report recognises the need to consider other indicators alongside HPI, such those for economic performance and environmental pressure, to fully assess how societies are faring, but states that global pressure to find a new way of measuring progress in undeniable.

UNU-IHDP and UNEP (2012) *Inclusive Wealth Report 2012: Measuring progress towards sustainability*. Cambridge: Cambridge University Press.

http://www.unep.org/pdf/IWR_2012.pdf

This Inclusive Wealth Report (IWR) is produced by the UN University International Human Dimensions Programme (UNU-IHDP) and UNEP. This 2010 document is the first of a biennial series of reports on the sustainability of countries. Its primary objective is to "provide quantitative information and analysis presenting a long-term perspective on human well-being and measures of sustainability" (p. 2). It sets out, among other goals, to: provide national governments with a metric to assess transitions towards the "Green Economy"; to carry out a comprehensive analysis of the various components of wealth by country, highlighting in particular the importance of natural capital; to help countries formulate and stimulate policies based on the notion of asset portfolio management; and to highlight where extra research is needed to make the Inclusive Wealth Index (IWI) a useful tool for economic, environmental, and social planning. The report's key findings are that 14 out of 20 countries assessed as a pilot had positive IWI growth rates, indicating sustainable development. However, 19 out of the 20 countries experienced a decline in natural capital, while a quarter of the sample had a negative IWI even though they showed positive growth in both GDP and the Human Development Index (HDI). The six that experienced negative IWI growth rates were Colombia, Nigeria, Russia, Saudi Arabia, South Africa, and Venezuela. However, of the 14 countries with positive results, only China returned a growth rate above 2% over the past 19 years, Chile, France, and Germany grew more than 1%. The remaining ten had very low growth rates between of 0.1-1%. Thus, the report concludes, these low-growth

countries should be cautious so as not to swtich to an unsustainable trajectory.

Schepelmann, P. et al. (2010) Towards Sustainable Development: Alternatives to GDP for measuring progress. *Wuppertal Spezial No*. 42. Wuppertal: Wuppertal Institute for Climate, Environment and Energy.
Philipp Schepelmann: philipp.schepelmann@wupperinst.org

http://epub.wupperinst.org/frontdoor/index/index/docId/3486

The purpose of this study is to highlight the benefits and shortcomings of GDP, as well as to assess methods to improve this measure. Strengths of GDP include: it serves a crucial and helpful role in macroeconomic policy in terms of monetary and fiscal policies; it is unique in that it combines simplicity, linearity and universality; and it carries the objectivity of the observable market price as its guiding principle. Its major disadvantage lies in the fact that GDP growth is too often confused with sustainable welfare growth in people's and policymakers' minds. The paper uses SWAT analyses to assess several progress indicators that are divided into three categories: replacing, adjusting, and supplementing GDP. The authors suggest supplementing GDP, rather than replacing it, as the most realistic and acceptable option for going beyond GDP.

Slootweg, R. and Beukering, P. (2008) *Valuation of Ecosystem Services & Strategic Environmental Assessment - Lessons from Influential Cases.* Utrecht, Netherlands: Netherlands Commission for Environmental Assessment.
Arend Kolhoff: akolhoff@eia.nl

https://www.cbd.int/financial/values/several-valuations.pdf

Recognising the limited impact valuation of ecosystems has had on real-life policies, this report seeks to compile influential cases where the recognition, quantification, and valuation of ecosystem services have significantly contributed to strategic decision-making. The cases are from Egypt, Uzbekistan, South Africa, the UK, the Netherlands, the Netherlands Antilles, Costa Rica, Spain, and Alaska, USA. The report urges government officials at all levels, competent authorities, consultants, and environmental agencies, and ecologists and environmental economists in knowledge institutes and consultancies to use these successful and influential cases to further policymaking based on ecosystem valuation.

Nordhaus, W. (2006) Principles of National Accounting for Nonmarket Accounts. In: Jorgenson, D., Landefeld, J., and Nordhaus, W. (eds.) *A New Architecture for the US National Accounts,*

NBER Books: National Bureau of Economic Research, 143-160.
William Nordhaus: william.nordhaus@yale.edu

http://www.nber.org/CRIW/CRIWs04/nordhaus.pdf

This study outlines why in 2006 designs for the SEEA were not yet ready to be included into many national accounting systems. It primarily focuses on the difficulties of measuring non-market successes. Firstly, it describes the adjustments, additions, and subtractions that would be necessary to include non-market activities into an economic national measure. This involves: goods being treated as if they were produced and consumed as non-market activities, distinguishing near market goods as well as personal goods and services, and working out how to treat public goods differently from private goods. Secondly, it outlines some issues about where to draw the line on non-market activities measures and provides a few principles that may help to solve such disputes. The third section summarises some "thorny issues" with non-market accounts, including: a pervasive lack of data, the difficulties of the imputing process, the question of consumer surplus, the measurement of natural assets, and differing American and European views. Lastly, the authors devote a large section to the issues in the use of time data, which is the central difficulty in measuring non-market activities.

Hamilton, K. (2003) *Accounting for Sustainability.* World Bank Environment Department.
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http://www.oecd.org/std/2713847.doc

This paper argues that genuine savings calculations are key to sustainability. It finds that monetary and fiscal policies tend to reliably boost saving savings rates, while rent capture, public investments of resource revenues, resource tenure policies, and the reduction of pollution emissions to a socially optimal level are also relevant in determining the overall level of saving. In this regard, the analytical evidence suggests that even extractive economies can potentially achieve sustainability if resource rents are invested in other productive assets.

Neumayer, E. (2000) Resource Accounting in Measures of Unsustainability: Challenging the World Bank's Conclusions. *Environmental and Resource Economics*, 15 (3), 257-278.
Eric Neumayer: e.neumayer@lse.ac.uk

http://link.springer.com/article/10.1023/A:1008304812545

This paper challenges the results of a 1997 World Bank study of environmental and resource accounting covering 103 countries (World Bank, 1997a). The WB study concludes that many Sub-Saharan, Northern African, and Middle East countries have had negative genuine saving rates over the previous 20 years and therefore fail to pass the test of weak sustainability. Neumayer argues instead that the Bank's conclusions depend on a method of computing user costs from resource exploitation and that employing other superior methods yield different results. The paper re-computes resource rents using the El Serafy-method for 14 countries and the Sub-Saharan and Northern African and Middle East regions. The results show that both regions and almost all countries either stop exhibiting signs of unsustainability or their unsustainability can be explained without recourse to resource accounting. For Congo, Ecuador, Gabon, Nigeria, Mauritania, and Trinidad and Tobago Neumayer offers a warning: these countries did not adequately use the opportunities they were given through their natural resource endowments and should learn from their mistakes for the future depletion of their remaining environmental reserves.

Constanza, R. et al. (1997) The Value of the World's Ecosystem Services and Natural Capital. *Nature*, 387, 253-260.

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http://www.esd.ornl.gov/benefits_conference/nature_paper.pdf

This study attempts to quantify the value of ecosystem services to identify the contribution of natural stock to human welfare in real terms and to evaluate its importance in the policymaking process. The authors estimate the annual value of ecosystem services (including both goods and services from which human populations derive benefits) to be in the range of $16 trillion to $54 trillion (in 1994 US dollars), with an average value estimated at $33 trillion per year. The paper builds on earlier work in an attempt to synthesise the "marginal" value of the ecosystem. The authors first identify the importance of such valuation and then outline their valuation methods of 17 biomes. The authors conclude that this type of analysis, albeit imperfect, is important and necessary. Commodity prices that use ecosystem services, both directly and indirectly, would be very different if these services were paid for in terms of the actual value of their contribution. Additionally, world GDP would be different in terms of composition and magnitude if the value of ecosystem services were to be properly incorporated.

10. Data Portals and Other Resources

10. Data Portals and Other Resources

National Environmental Accounting Database (NEAD).

http://www.cep.ees.ufl.edu/nead/index.php

The National Environmental Accounting Database (NEAD)—a Center for Environmental Policy, University of Florida initiative—compiles detailed information for 169 countries about the full array of resources that underlie economies, including environmental flows (sunlight, rainfall), natural capital stocks (soil, water, forests, fish), mined materials (metals, fuels), and economically transformed goods and services (agricultural commodities, manufactured goods, services). Data for production, extraction, and trade flows are from the years 2000, 2004, and 2008, while long-term average data are used for climate and hydrology flows.

UNEP/UN Convention on Biological Diversity.

http://www.cbd.int/

In 1988, the United Nations Environment Programme (UNEP) convened the Ad Hoc Working Group of Experts on Biological Diversity to explore the need for an international convention on biological diversity. By February 1991, the Ad Hoc Working Group had become known as the Intergovernmental Negotiating Committee. Its work culminated on 22 May 1992 with the Nairobi Conference for the Adoption of the Agreed Text of the Convention on Biological Diversity (CBD). During the tenth meeting of the Conference of the Parties (COP), held from 18 to 29 October 2010, in Nagoya, Aichi Prefecture, Japan, parties adopted a revised and updated Strategic Plan for Biodiversity, including the Aichi Biodiversity Targets, for the 2011-2020 period. Parties agreed to translate this overarching international framework into revised and updated national biodiversity strategies and action plans and submit their fifth national reports by March 2014. A number of these reports are listed in this document under their respective countries and the full list of countries and reports can be found at http://www.cbd.int/reports/nr5/. Furthermore, the CBD website complies the countries that have assessed values of biodiversity, in accordance with the Convention. This list can be accessed at https://www.cbd.int/financial/values/.

UNEP Environmental Data Explorer.

http://geodata.grid.unep.ch/

The Environmental Data Explorer is the authoritative source for data sets used by UNEP and its partners in the Global Environment Outlook (GEO) report and other integrated environment assessments. Its online database holds more than 500 different variables as national, sub-regional, regional, and global statistics, or as geospatial data sets (maps), covering themes like freshwater, population, forests, emissions, climate, disasters, health, and GDP. Data is displayed as maps, graphs, and data tables and can be downloaded in different formats.

UNEP Global Environmental Goals (GEGs) Live Tracker.

http://geodata.grid.unep.ch/gegslive/

Global Environmental Goals (GEGs) represent the compendium of internationally-agreed environmental goals and objectives. These form the outcome documents of relevant United Nations summits and conferences, resolutions of the General Assembly, and decisions of other global intergovernmental conferences, multilateral environmental agreements, and their governing bodies. The purpose of the GEGs-Live website is to provide up-to-date information on the progress towards achieving the GEGs. In addition, it puts the information into the context of the currently elaborated Sustainable Development Goals (SDGs). The variables and data are mainly drawn from UNEP's Environmental Data Explorer. Users can access the information they are searching for either through the GEGs or the SDGs, as parallel points of entry. Based on the user's choice, the website shows the direct linkages between politically-agreed goals and targets and relevant data for monitoring these. Information can be explored on the following themes: air pollution and air quality, biodiversity, chemicals and waste, climate change, energy, environmental governance, forests, freshwater, land, and oceans and seas.

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