
AN INTRODUCTION TO ENVIRONMENTAL ASSESSMENT



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This report was written by Matthew A. Ling, Ludgarde Coppens, Monika MacDevette, and Abisha Mapendembe.

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UNEP World Conservation Monitoring Centre
(UNEP-WCMC)
219 Huntingdon Road,
Cambridge CB3 0DL, UK
Tel: +44 1223 277314
www.unep-wcmc.org

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1. What this guide is for

This brochure is intended for all audiences concerned with decision and policy making in regard to the environment and sustainable development. There are many different types of environmental assessment methods available to support decision making at global, regional, national and local levels. As such, this guide sets out to:

- introduce some of the types of environmental assessment frameworks that are available (with a specific emphasis on those commonly employed by the United Nations Environment Programme (UNEP)) and gives two examples of common assessment types which UNEP does not normally undertake*;
- assist the user to better understand where and when to consider using one assessment framework over another;
- introduce and explain some of the most commonly encountered terminology in the field of environmental assessments; and
- provide examples of where and when some of the assessment methods have been used, and refer to some of the key organisations and partners involved in developing and implementing the assessments.

After a short introduction on environmental assessments in Section 2, examples of key questions for stakeholders with an interest in using or conducting an environmental assessment are provided in section 3. This is followed by more detailed outlines of some environmental assessment methods in the factsheets set out in section 5, providing a short description of each method, some of its key points, notable examples, and details of potential support partners.

We hope this guide can serve as a useful, quick-reference source of information for many audiences, including assessment practitioners, representatives of government and non-governmental organisations, academics, students, media and experts from the private sector.

*N.B. UNEP does not undertake EIA's or SEA's under its current programmes of work (2014-2017).

2. Why conduct environmental assessments?

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UNEP¹ defines an assessment as being the entire social process of undertaking a critical, objective evaluation and analysis of data and information, designed to meet a user's needs, and to support decision making. It applies the judgement of experts to new and existing information and knowledge, to provide scientifically credible answers to policy-relevant questions, quantifying where possible, confidence levels.

Environmental assessment is the process by which the consequences and effects of natural processes and human activities upon the environment are estimated, evaluated or predicted¹. Assessments can include within their scope ways to minimise, mitigate or eliminate those effects, and even to compensate for their impact^{1,2}. Follow-up programmes to verify the accuracy of the environmental assessment and the effectiveness of the proposed mitigation measures can also be stipulated within the remit of an assessment². Box 1 lists some of the functions of an assessment.

Box 1: Roles and functions of environmental assessments

Some of the roles and functions fulfilled by conducting an environmental assessment include:

- bringing together diverse strands of knowledge in a way that is useful for decision making;
- strengthening the relationship between science and policy;
- providing the means through which science informs decision making;
- establishing the importance of the issue being assessed;
- providing an authoritative analysis of policy-relevant scientific questions;
- demonstrating the benefits of policy options;
- identifying new research directions;
- providing options for technical solutions;
- demonstrating the risks and costs of different policy options; and
- influencing the goals, interests, beliefs, strategies, resources, and actions of interested parties which can lead to institutional change and to changes in the discourse about the issue being assessed.

Source: UNEP (2008)³

Environmental assessments have become key tools in the environmental management landscape. Resolution 2997 of the 1972 United Nations (UN) Conference on The Human Environment, Stockholm, stated, in part, that UNEP “should keep the global environment under review”. It is perhaps as follow-on from this event, given the emphasis that was placed upon environmental assessment and reporting, that environmental assessment became a more common feature of environmental management as conducted today by various stakeholders, in meeting a wide range of objectives⁴.

Some key points regarding environmental assessment outlined at the 1972 UN Conference included that it should “facilitate the development of social and cultural indicators for the environment”, and that “periodic reports on regional or sub-regional situations and on the international situation”, to feed into national reports on the state of, and outlook for, the environment, should be carried out. As a result of this call-out, it is perhaps unsurprising that there are many different types of environmental assessment in use and in development. These include, but are not limited to, Integrated Environmental Assessment (IEA), Ecosystem



Assessment (EA) and Environmental Valuation Assessments. Throughout the wide range of environmental assessment processes available, all recognise that policy responses are needed for effective environmental management and/or sustainable use of the environment.

An environmental assessment is a planning and decision making tool⁵, and as such, the main purposes of carrying out an environmental assessment are two-fold⁵:

- the immediate aim is to facilitate sound decision making – those decisions that explicitly consider the environment;
- usually (but not universally) they are also directed toward achieving or supporting the ultimate goals of environmental protection and sustainable development. These reference or end goals are variously phrased and framed in environmental assessment legislation and policies, as are the specific objectives to be met by the process.



3. Key questions

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The following are examples of key questions to consider when setting out along the assessment pathway:

- What is the scale of the assessment?
 - i.e. global, regional, national or local
- What is the principal ecosystem, habitat, or landscape component to be assessed?
 - i.e. oceans, freshwater, dry-lands etc.
- What is the main reason for conducting an assessment? – i.e. a disaster (naturally occurring or induced by human behaviour), climate change, land-use change, a new construction or development project
- What potential impacts could result from ‘X’, and how will an assessment help in addressing these? – e.g. what will the impacts of climate change be and how will an assessment help in addressing these impacts?
- What is the timeframe in which the assessment needs to take place? – i.e. a rapid assessment is required in order to assess the consequences and implications following a natural disaster such as an earthquake; or if the assessment is forward-looking it includes scenarios about the future?
- Will the assessment need to be repeated?
- What is the legislative or regulatory requirement?
- Who will be the main user of the results, and what type of information will be most useful to this actor to inform decision making?
- What sort of policies and decisions will be informed by the assessment?
- What level of certainty is required/how can the uncertainty related to the assessment be communicated?

4. Assessment process and design

Environmental assessments vary not only in their content and coverage, but also in their design and process. Some assessments are designed as a one-off assessment, whereas others are a part of longer-term on-going processes, or assessments may be required in order to fulfil or satisfy planning policy. Some environmental assessments involve expertise from many disciplines, whilst others are based on contributions from selective groups of experts. The breadth of the desired target audience also varies considerably between assessments.

Global assessments of the nature of the Inter-governmental Panel on Climate Change (IPCC) are generally overseen by inter-governmental governance bodies, providing significant legitimacy for their findings amongst national governments. At national level, governance structures can include multi-stakeholder boards comprising governmental, non-governmental and private sector stakeholders. Strong governmental involvement in assessment governance acts to support the uptake of findings into policy.

Many of UNEP's assessments are designed with the intention of influencing decision-makers within the context of Multilateral Environmental Agreements (MEAs) or inter-governmental bodies such as the United Nations Environment Assembly (UNEA) of UNEP.

Global scale assessments can involve high numbers of individuals (1,000 – 2,500), moderate numbers (400 – 900 individuals), or low numbers (<60 individuals)⁶. This is dependent upon the overall scope of the assessment including geographical extent/coverage, timescale, underlying theme, and level of scientific sophistication and is often related to budgetary considerations. Assessment teams can involve a broad range of stakeholders, including scientific, social and technical experts, indigenous community leaders and policy-makers, representing a mix of those carrying out the assessment, those that will use it and those whom it will affect. Environmental assessments generally have very strong and credible scientific foundations as a result of the make-up of the assessment teams, and very often from the involvement of multi-stakeholder advisory groups or guidance teams⁶.



A variety of conceptual frameworks are used for assessment design and implementation. In many regional and national assessments, variations and derivatives of the Drivers-Pressures-State-Impacts-Responses (DPSIR) framework are used. The UNEP “IEA Community Platform” website (www.unep.org/ieacp) provides a useful resource for additional information.

The environmental assessment methods presented within this document cover an array of situations and circumstances, ranging from global to local, from the involvement of high numbers of people in the assessment to maybe just tens of people involved. This great range of variation within and between assessments is reflected in the variations in costs attached to the assessment process. At one end of the scale the average cost of a national State of the Environment Assessment with engagement of a moderate number of stakeholders over a 2-year timeframe may cost in the order of US \$100,000. On the other hand, global assessments such as UNEP’s GEO, the Global Mercury Assessment 2013, or the Millennium

Ecosystem Assessment (MA), have costs in the millions of US\$, typically engage several hundred participants/contributors, and take up to five years to produce⁷.

With many variables at play in environmental assessment processes, it is very important to tailor the assessment process to its objectives. Emphasis should be placed upon objective setting, broad inclusive stakeholder participation, peer-review, communications, and evaluation, thus maximising the potential for assessments that are credible, legitimate, and relevant to decision-makers’ needs.

Legend for assessment factsheets:



Global scale assessment



Regional scale assessment



National scale assessment



Local scale assessment



5. Environmental assessment factsheets

Assessment name	Integrated Environmental Assessment (IEA)	   
Introduction	<p>IEA analyses environment and human well-being trends and dynamics based on the drivers-pressures-state-impacts-responses (DPSIR) framework⁸ (see fig. 1).</p> <p>IEA is an interdisciplinary assessment that links knowledge and action in public policy/decision contexts. It aims to identify, analyse and appraise all relevant natural and human processes and their interactions which determine both the current and future state of environmental quality and resources on appropriate spatial and temporal scales^{3,9}.</p> <p>IEA integrates the three main pillars of sustainable development into its analysis: social, economic and environmental issues. IEA aims to highlight the cause-effect linkages of both human and natural actions upon the environment, and in turn, the changes in the state of the environment and human well-being. IEA should give policy-makers and other stakeholders clear guidance on how to better manage the environment⁴.</p>	
Key features	<ul style="list-style-type: none"> ✓ A participatory and structured approach to linking science to policy¹⁰. ✓ Explores, through scenarios, how current social, economic and environmental trends may unfold along divergent development paths in the future, and potential impacts for the environment, human well-being and development (Outlook). ✓ Aims to improve decision making capacity by giving policy-makers (and other stakeholders) clear guidance on how to better manage the environment. ✓ A way of analysing and communicating environment-society interactions⁹. 	
Key questions	<p><i>What is happening to the environment and why? What are the consequences for the environment and humanity? What is being done and how effective is it? Where are we heading? What actions could be taken for a more sustainable future?</i></p>	
Examples	<ul style="list-style-type: none"> – Global Environment Outlook (GEO) (http://www.unep.org/geo/) – Africa Environment Outlook 3 (AEO-3) (http://www.unep.org/pdf/aeo3.pdf) – GEO Panama (http://www.pnuma.org/deat1/pdf/GEO_Panama_2014.pdf) 	
Some resources	<ul style="list-style-type: none"> – United Nations Environment Programme (UNEP) IEA Community Platform (http://www.unep.org/ieacp/) – United Nations Environment Programme (UNEP) IEA Training Manual (http://unep.org/ieacp/iea/training/manual/) – GRID Arendal (http://www.grida.no/about/services.aspx) – International Institute for Sustainable Development (IISD) (https://www.iisd.org/measure/tools/assessment/capacity.asp) 	

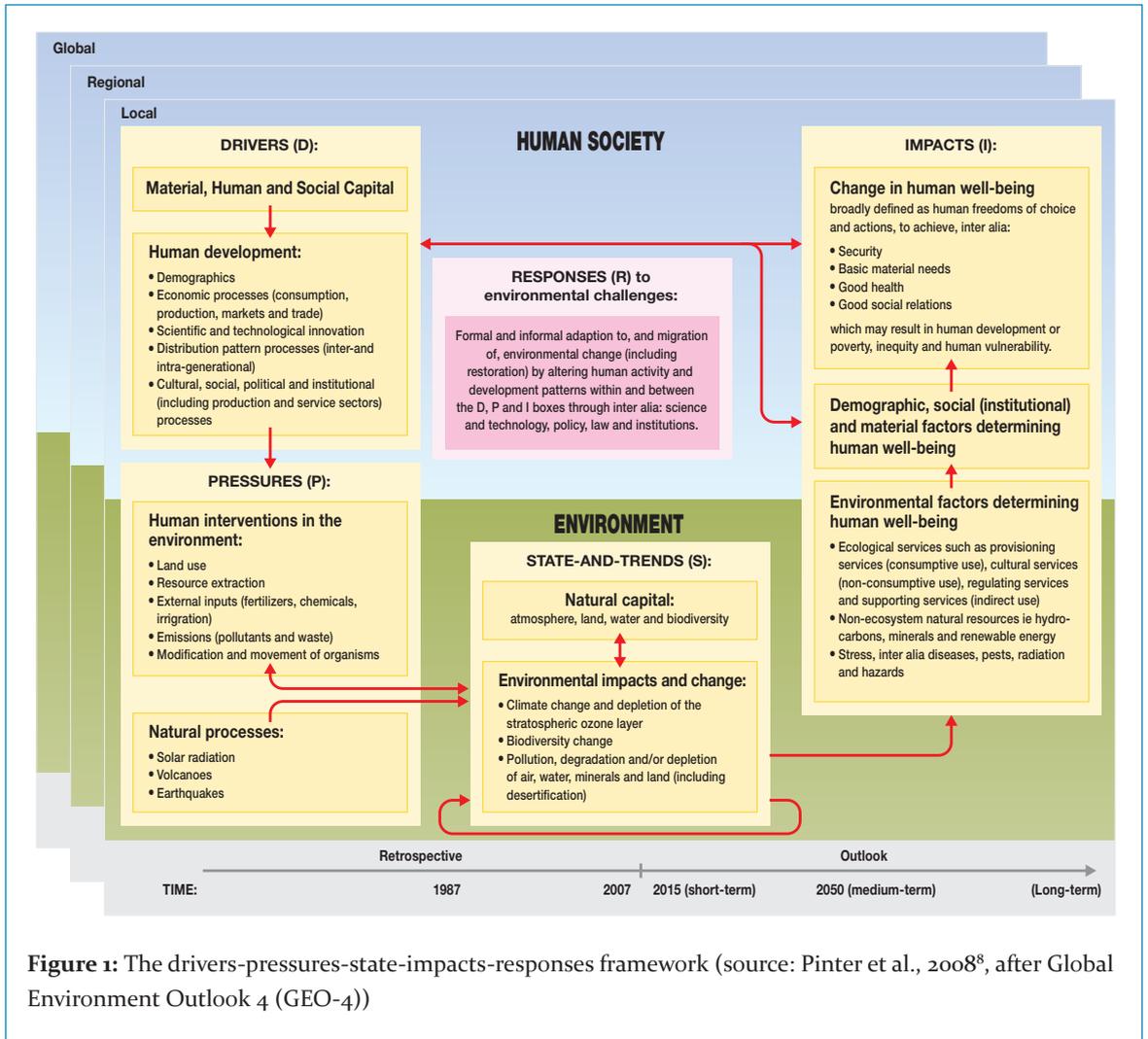


Figure 1: The drivers–pressures–state–impacts–responses framework (source: Pinter et al., 2008⁸, after Global Environment Outlook 4 (GEO-4))



Assessment name

Ecosystem Assessment (EA)



Introduction

An Ecosystem Assessment evaluates the consequences of ecosystem change on human well-being, which provides the scientific basis for actions needed to enhance the conservation and sustainable use of those systems and their contributions (ecosystem services) to human well-being¹¹. Assessments of ecosystem services need to “consider both the ecosystems from which the services are derived and the people who depend on, and are affected by changes in the supply of services”, thereby connecting environmental and development sectors¹².

Ecosystem Assessments play numerous roles to support decision making, including:

- responding to decision-makers’ needs for information;
- highlighting trade-offs between decision options;
- modelling future prospects to avoid unforeseen long-term consequences;
- providing critical judgment of options and outlining uncertainty; and
- synthesising and communicating complex information on relevant issues¹².

In addition, Ecosystem Assessments provide value by:

- engaging decision-makers in the process, providing information long before the final assessment products are available;
- allowing decision-makers to examine the extent to which achieving their goals depends on ecosystem services; and
- providing credible and robust information on the links between ecosystems and the attainment of economic and social goals¹².

Key features

- ✓ Provides the connection between environmental issues and people¹², specifically in relation to human well-being.
- ✓ Provides scientific information concerning the consequences of ecosystem change for human well-being, and options for responding to those changes¹³.
- ✓ Can identify trade-offs between ecosystem services; these trade-offs can be positive or negative.

Key questions

What are the current spatial extent and condition of ecosystems? What are the quality, quantity, and spatial distributions of services provided by the ecosystems? Who lives in the ecosystem and what ecosystem services do they use? What are the trends in ecosystem condition and their services in the recent (decades) and more distant past (centuries)? How does ecosystem condition, and in turn ecosystem services, respond to the drivers of change for each system?

Examples

- The Millennium Ecosystem Assessment (MA) (<http://www.millenniumassessment.org>)
- The UK National Ecosystem Assessment (NEA) (<http://uknea.unep-wcmc.org/>)

Some resources

- United Nations Environment Programme – World Conservation Monitoring Centre (UNEP-WCMC) (<http://www.unep-wcmc.org/expertise/We-help-strengthen/assessments-and-valuations#content>)
- The Intergovernmental science-policy Platform for Biodiversity and Ecosystem Services (IPBES) (www.ipbes.net)
- The Sub-Global Assessment (SGA) Network (<http://www.ecosystemassessments.net>)
- IPBES Catalogue of Assessments (<http://catalog.ipbes.net>)

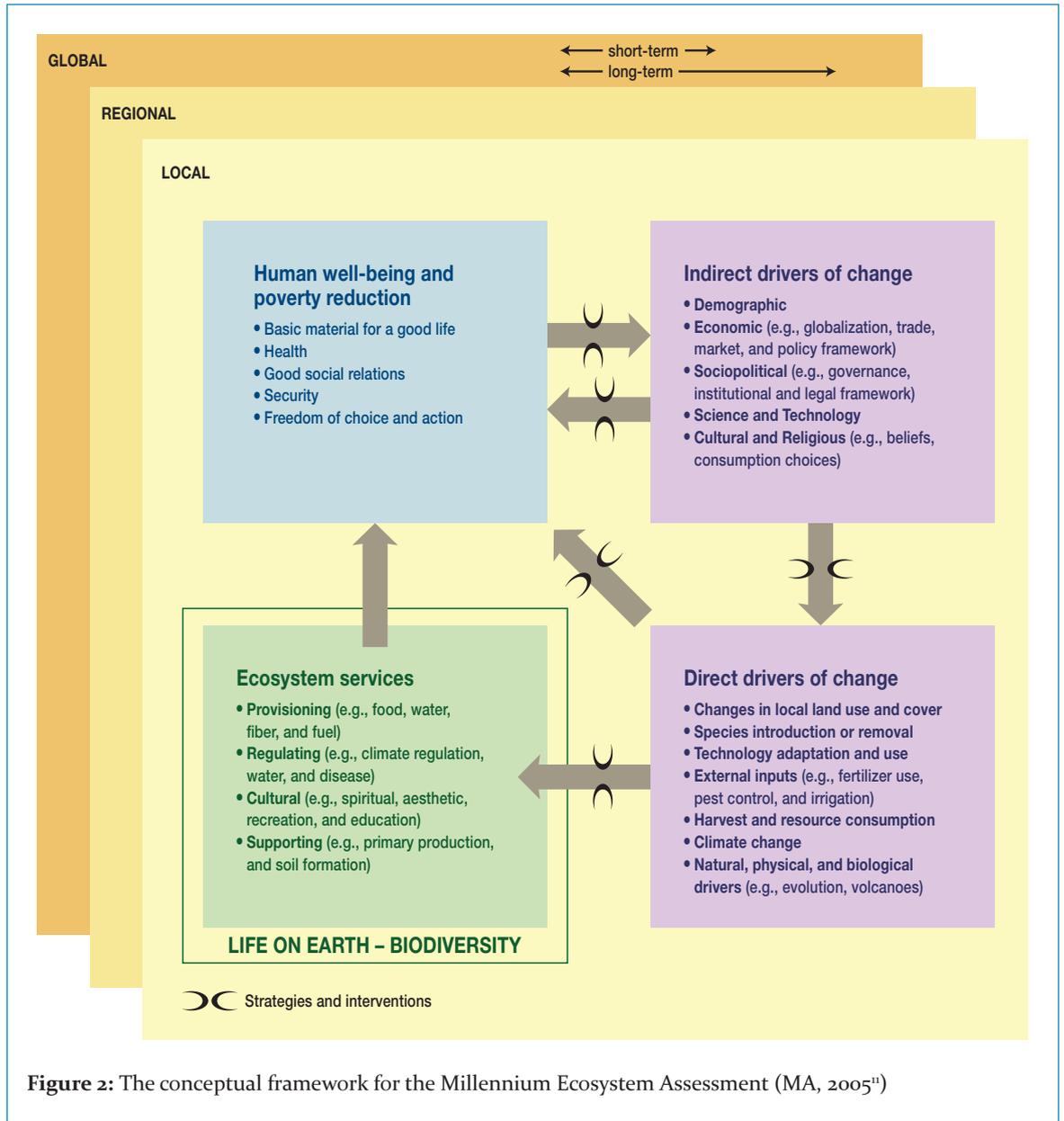
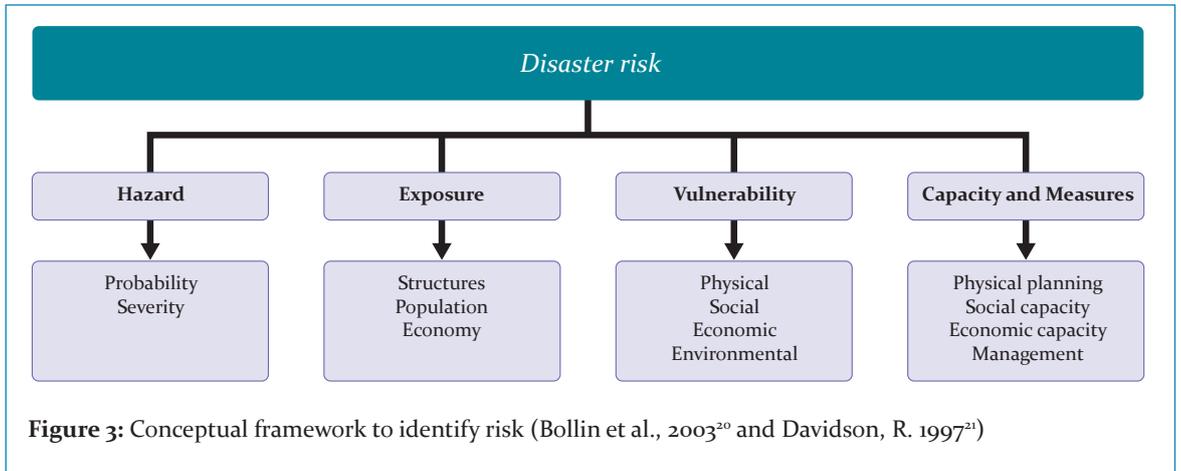


Figure 2: The conceptual framework for the Millennium Ecosystem Assessment (MA, 2005¹¹)



Assessment name	Risk Assessment    
Introduction	<p>“Risk assessment is a process intended to calculate or estimate the risk to a given target organism, system, or (sub-) population, including the identification of attendant uncertainties, following exposure to a particular agent, taking into account the inherent characteristics of the agent of concern as well as the characteristics of the specific target system.”¹⁴</p> <p>There are various forms of risk assessment, each focussing on a different subject area or risk agent; the above outline of risk assessments is applicable across the range of methods available. Sources of risk include that derived from climate change, risk associated with living modified organisms (LMOs), risk from chemical exposure, and risk from disaster scenarios.</p> <p>Risk assessment plays an integral part in decision and policy making processes. For example, once current and acceptable levels of disaster risk are determined, disaster risk reduction (DRR) plans and strategies can be revised or developed in order to reduce risk levels to within acceptable limits. The process of conducting a risk assessment first involves several steps to determine needs and gaps, hazards, vulnerability, loss/impact analysis, risk profiling and finally the formulation or revision of DRR strategies and action plans that can be incorporated into decision and policy making.¹⁵</p>
Key features	<ul style="list-style-type: none"> ✓ Seeks to ensure the safety and/or protection of human health, biodiversity and the environment. ✓ Can include risk prioritisation, risk evaluation, comparison of risk management scenarios, and risk quantification. ✓ Provides the necessary information to allow decision-makers to determine the acceptable level of risk, defined as the level of losses that are acceptable without destroying lives, national economy or personal finances¹⁵.
Key questions	<p><i>What are the risk sources we want to assess? Are we concerned with the production, use or disposal of the hazard? What/who do we not want to see harmed? What must be protected? How can decision-makers ensure that, in the event of a significant natural disaster (e.g. hurricane, earthquake, or tsunami) an effective management plan is in place to deal with the environmental and human consequences?</i></p>
Examples	<ul style="list-style-type: none"> – LMO Risk Assessments (http://bch.cbd.int/cpb_art15/training.shtml) – Integrated Risk Assessment (IRA) (e.g. the IRA of persistent organic pollutants (POPs) in humans and wildlife,¹⁶) – Disaster Risk Assessment (e.g. Participatory Disaster Risk Assessment (PDRA) and Planning Program¹⁷) – Environmental Risk Assessment (ERA) (e.g. ERA of medicines¹⁸, ERA of Perfluorooctane Sulphonate (PFOS)¹⁹)
Some resources	<ul style="list-style-type: none"> – The WHO International Programme on Chemical Safety (http://www.who.int/ipcs/) – United Nations Environment Programme (UNEP) Division of Technology, Industry and Economics (DTIE) - Chemicals Branch (http://www.chem.unep.ch/) – Biosafety Clearing House (http://bch.cbd.int/cpb_art15/training.shtml)



Assessment name

Vulnerability Assessment – climate change and disasters



Introduction

Vulnerability assessments focussed on climate change and disasters aim to understand the impacts, risks, and hazards associated with adverse effects brought about by climate change, natural hazards, and disasters, combined with economic, social, and environmental factors that increase or decrease vulnerability.

Vulnerability can be defined as “the characteristics of a person or group in terms of their capacity to anticipate, cope with, resist and recover from the impact of a natural or man-made hazard”²².

Vulnerability regarding climate change is defined as “the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes”; it is a “function of the character, magnitude and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity”²³.

Key features

- ✓ An investigative and analytical process to identify and evaluate sensitivity and potential threats to a system from negative or adverse actions resulting from natural processes.
- ✓ Provides better understanding of risks and hazards and allows informed decision making and management of systems.
- ✓ Provides a framework for developing risk reduction options and associated costs²⁴.

Key questions

What are the key exposures and sensitivities leading to vulnerability and how effective are the applied coping strategies? What are the key consequences of climate change impacts on the environment and human well-being? What are the adaptation responses that could address the estimated impacts of climate change while helping build resilience in natural and human systems? What are the types of policies, capacities and main steps needed to be undertaken to implement adaptations?

Examples

- Climate change vulnerability assessment (<http://www.climatevulnerability.org/>)
- The Risk and Vulnerability Assessment Methodology Development Project (RiVAMP) (<http://www.unep.org/disastersandconflicts/Introduction/DisasterRiskReduction/RiVamp/tabid/55004/Default.aspx>)
- Vulnerability and Impact assessments for Adaptation (VIA) to Climate Change (<http://www.unep.org/ieacp/climate/>)
- Vulnerability Assessment of Freshwater Resources to Environmental Change (http://www.unep.org/dewa/Portals/67/pdf/Freshwater_vulnerability_Report_HR.pdf)

Some resources

- Climate Change Knowledge Network (www.cckn.net)
- United Nations Environment Programme (UNEP) IEA Community Platform (<http://www.unep.org/ieacp/climate/>)
- PROVIA Guidance on Assessing Vulnerability, Impacts and Adaptation to Climate Change (<http://unep.org/provia/>)

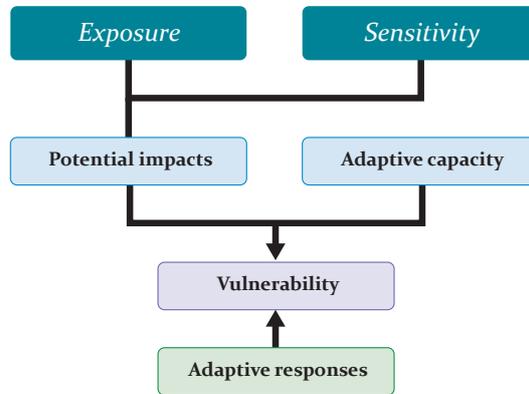


Figure 4: Components of vulnerability and climate change (Source: Allen Consulting, 2005²⁵)





Introduction	<p>Post-crisis environmental assessment aims to identify, evaluate, assess, prioritise and respond to critical environmental issues, such as damage to ecosystems and the environment and to identify urgent environmental risks, during or immediately following disaster or conflict situations^{3,26}. Effective implementation of post-crisis environmental assessment is central to effective disaster response, relief and recovery operations³.</p> <p>Some of the key information collected during a post-crisis environmental assessment includes: disaster related factors which may have an immediate impact on the environment; possible immediate environmental impacts of disaster agents; unmet basic needs of disaster survivors that could lead to adverse impacts on the environment; and potential negative environmental consequences of relief operations²⁶.</p> <p>Post-crisis environmental assessments can also provide valuable information on broad social and economic impacts associated with the use of natural resources in a disaster situation²⁷. In some post-crisis situations, especially in post-conflict situations, the assessment would include the current status of the institutions mandated to manage the environment and the associated legislative framework, as both may have become outdated during protracted conflicts.</p>
Key features	<ul style="list-style-type: none"> ✓ To ensure that the environment is fully integrated in the short-term response, subsequent reconstruction, and development agenda³. ✓ To improve the linkages between sustainable environmental management and disaster response²⁶. ✓ Provide input on environmental conditions in disaster situations in a way which is convenient for the fast moving, time-compressed operational situation faced in responding to a disaster²⁶.
Key questions	<p><i>What are the environmental, and related, impacts occurring in the post-disaster situation? How to ensure that environmental issues are taken into account from the earliest possible moment of planning for recovery? What are possible secondary environmental risks as part of the early recovery process that have the potential to unduly affect the recovery process at some point in the future?</i></p>
Examples	<ul style="list-style-type: none"> – Post-conflict environmental assessments (UNEP Post-conflict environmental assessment reports from Kosovo to the Democratic Republic of the Congo) (e.g. http://postconflict.unep.ch/publications/UNEP_Sudan.pdf) – Post-disaster environmental assessments (UNEP Post-disaster environmental assessment reports from 2004 Indian Ocean Tsunami and Tsunami in Japan) (http://postconflict.unep.ch/publications/dmb_maldives.pdf) – Rapid environmental assessment (REA) (e.g. REA of the Urban Community of Al-Fayha', Lebanon – http://unep.org/ieacp/_res/site/File/pdf/REA_AIFayhaaUrbanCommunityfinal.pdf) – Post-Conflict Needs Assessment (PCNA) (e.g. joint United Nations/World Bank PCNA's conducted in Iraq, Liberia, Haiti, Sudan, Somalia and Darfur) (http://pcna.undg.org/)
Some resources	<ul style="list-style-type: none"> – United Nations Environment Programme (UNEP) Post Conflict and Disaster Management Branch (PCDMB) (http://www.unep.org/disastersandconflicts/) – United Nations Environment Programme (UNEP) Office for the Coordination of Humanitarian Affairs (OCHA) (http://www.unocha.org/) – Disasters and conflicts: policy and field updates (http://www.unep.org/disastersandconflicts/portals/155/dnc/docs/qpr/BPR_Dec_14_full.pdf) – United Nations Environment Programme (UNEP) Post-Crisis Environmental Assessment pillar of the Disasters and Conflicts sub-programme (http://www.unep.org/disastersandconflicts/Introduction/PostCrisisEnvironmentalAssessment/tabid/54351/Default.aspx)

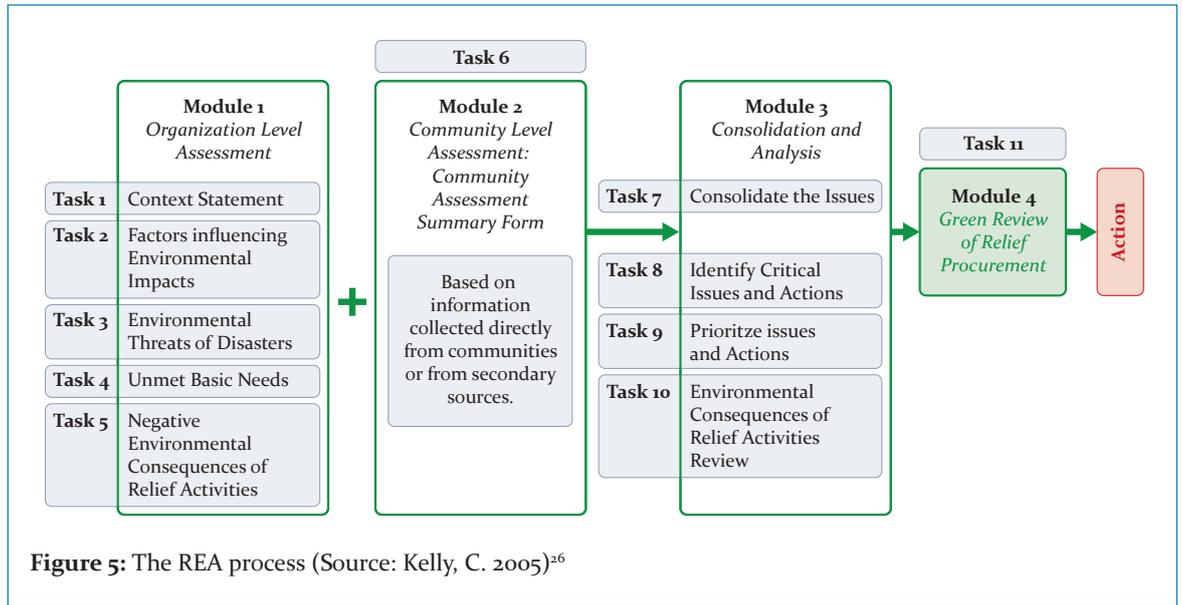


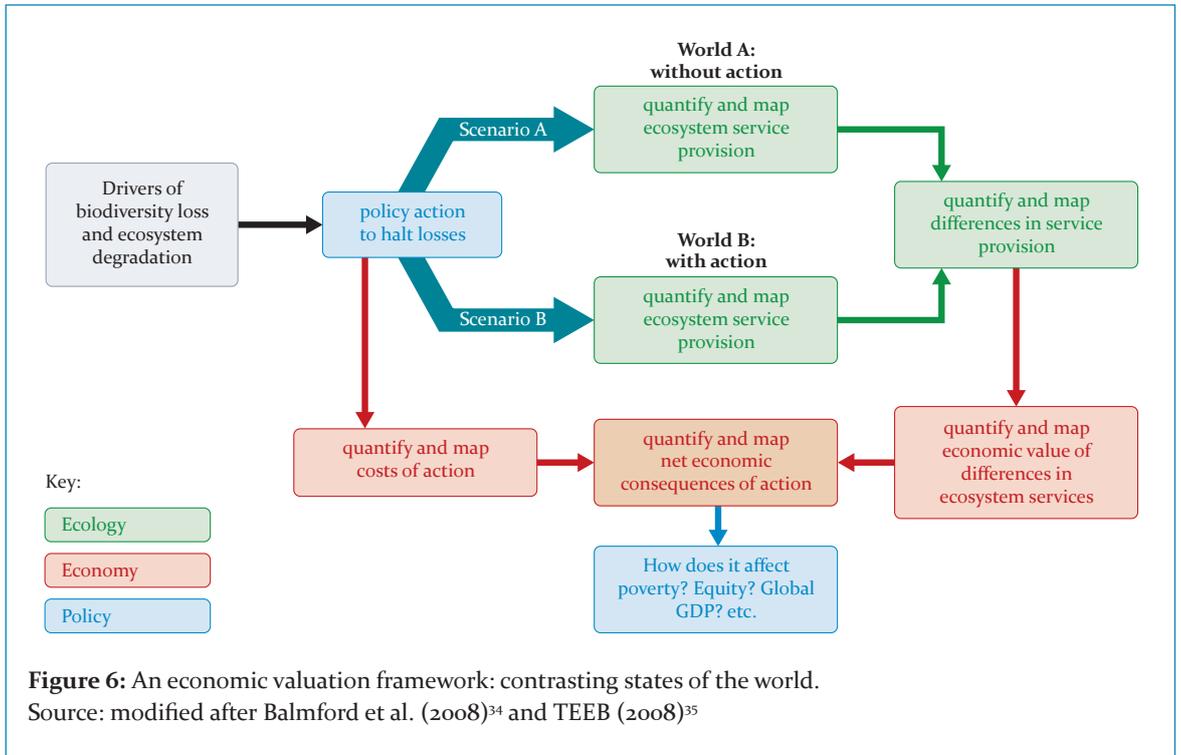
Figure 5: The REA process (Source: Kelly, C. 2005)²⁶



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Introduction	<p>Environmental-economic accounting (EEA) provides a conceptual framework for integrating statistics on the environment and the economy, and highlights the relationships between them^{28,29}. EEA considers the impacts of the economy on the environment and the contribution of the environment to the economy. EEA can contribute to the production of sets of indicators and descriptive statistics that can be used to “inform a wide range of policies, including, but not limited to, green economy/ green growth, natural resource management and sustainable development”³⁰.</p> <p>The System of National Accounts (SNA) is an international standard for compiling economic statistics and the main source of information for internationally comparable economic indicators and for economic analysis and modelling²⁸. It was recognised that national accounts should take account for the way the economy uses, and often has a negative impact on, the environment³¹, by organising environmental and economic information into a similar accounting framework. The system of integrated environmental and economic accounts (SEEA) was thus developed as a set of satellite accounts to the SNA^{28,30,32} that brings environmental and economic information together within a common framework²⁸.</p>
Key features	<ul style="list-style-type: none"> ✓ To develop monetary estimates for environmental assets within the scope of the SNA²⁹. ✓ To systematically monitor economic impacts of changes in the quality of the environment. ✓ Provides an information basis for improved regional planning and decision making³³, e.g. on the value and contribution of a strategic resource to national development.
Key questions	<p><i>What is the natural capital in the country and what is driving change? How do we measure and understand our natural capital? To what extent are the values of nature integrated in decision making? What are issues that need policy attention? What are the policy tools and decision options that offer solutions?</i></p>
Examples	<ul style="list-style-type: none"> – The Economics of Ecosystems and Biodiversity (TEEB) (http://www.teebweb.org/areas-of-work/advancing-natural-capital-accounting/) – The Green Economy report – Towards a Green Economy: Pathways to sustainable development and poverty eradication (http://www.unep.org/greeneconomy/) – The Wealth Accounting and the Valuation of Ecosystem Services (WAVES) partnership (http://www.wavespartnership.org/waves/) – The role and contribution of montane forests and related ecosystem services to the Kenyan economy (http://www.unep.org/pdf/Montane_Forests.pdf)
Some resources	<ul style="list-style-type: none"> – United Nations Environment Programme (UNEP) Division of Technology, Industry and Economics (DTIE) Economics and Trade Branch (http://www.unep.ch/etb/areas/valuationEnvAcc.php) – System of Environmental and Economic Accounting (SEEA) (https://unstats.un.org/unsd/envaccounting/seea.asp) – United Nations Committee of Experts on Environmental-Economic Accounting (UNCEEA) (http://unstats.un.org/unsd/envaccounting/ceea/) – Guidance Manual for TEEB country studies (http://www.teebweb.org/resources/guidance-manual-for-teeb-country-studies/)





Introduction

Thematic assessments may follow any of the above assessment frameworks, while focussing on a specific theme, e.g. water, air, biodiversity, cities, etc. They can be at the global, regional or national and city level.

The following are examples of thematic assessments that focus on a range of specific environmental issues, such as land degradation, and marine and freshwater resources.

Land Degradation Assessment in Drylands (LADA) – <http://www.fao.org/nr/lada/>

LADA, a four-year project funded by the Global Environment Facility (GEF), responds to the need for up-to-date and comparable land degradation information³⁶. The process assesses the causes and impacts of land degradation at global, national and local levels in order to detect hot spots and identify remedial measures. LADA aims to develop tools and methods for assessing and quantifying the nature, extent, severity and impacts of land degradation on dryland ecosystems, watersheds and river basins, carbon storage and biological diversity at a range of spatial and temporal scales³⁷.

Global Biodiversity Outlook (GBO-4) – <http://www.cbd.int/gbo4/>

The Global Biodiversity Outlook is the flagship publication of the Convention on Biological Diversity (CBD). The fourth edition of Global Biodiversity Outlook – GBO-4 – draws on a range of information sources, including National Reports, biodiversity indicators information, and scientific literature, in order to assess the progress towards the Aichi Biodiversity Targets. It summarises the latest data on status and trends of biodiversity and draws conclusions relevant to the further implementation of the Convention³⁸.

The role and contribution of montane forests to the Kenyan economy report – http://www.unep.org/pdf/Montane_Forests.pdf

The montane forests of Kenya, better known as Kenya's "Water Towers", produce direct economic value for its citizens. This value accrues not only from the production of various timber and non-timber forest products, but also from a range of regulating ecosystem services that provide an insurance value to several key economic sectors. This report shows that montane forests have consistently been undervalued in conventional national accounting³⁹.

Adaptation to Climate-change Induced Water Stress in the Nile Basin: A Vulnerability Assessment Report – http://www.unep.org/dewa/Portals/67/pdf/Nile_Basin.pdf

The Nile River Basin's rich ecological resources are vital to the 238 million people living in the region. The basin's natural environment is the ultimate source of its economic activities (production and consumption) and the sink for disposing of all its waste. At the same time, the Nile Basin's human resources are also crucial assets, providing the labour and markets for goods that drive the regional economy. The Nile Delta and the wider Mediterranean coast account for 30-40 per cent of Egypt's agricultural production and more than half of its tourism and industrial base. Water is central to all these activities and processes and must be available in sufficient quantities to meet environmental, consumption and social needs⁴⁰.

ECCO Metropolitan District of Quito – <http://www.pnuma.org/deat1/pdf/2011%20-%20ECCO%20Quito%20Summary%20%28web%29.pdf>

Quito Environment and Climate Change Outlook (ECCO), is the first comprehensive environmental assessment (physical, biotic and social) of the city. The proposals of the report aim to build a new model of city and society to ensure rights, economic, environmental, social and cultural welfare of the people in harmony with their natural and built environment⁴¹.

Key features	<ul style="list-style-type: none"> ✓ LADA: a scientifically-based approach to assessing and mapping land degradation at different spatial scales (small to large) and at various levels (local to global)⁴². ✓ GBO-4: outlook – provides projections of the impacts of continued biodiversity loss, some associated costs and how they might be avoided. ✓ The role and contribution of montane forests to the Kenyan economy report: Environmental valuation – estimates the economic values, by means of best international analytical practices and environmental and economic evidence from Kenya. ✓ Adaptation to Climate-change Induced Water Stress in the Nile Basin: vulnerability Assessment Report – illustrates the links between people, the economy and the environment. ✓ ECCO Metropolitan District of Quito: DPSIR – city-level – includes an analysis of vulnerability and adaptation to climate change and guides the proposals within the scope of <i>sumak kawsay</i>, or "good life".
Key questions	<ul style="list-style-type: none"> – LADA: <i>What is the most appropriate course of action(s) to overcome the degradation of local agricultural land?</i> – GBO-4: <i>What is the progress which has been made by the world community towards the 2020 Strategic Plan for Biodiversity?</i> – The role and contribution of montane forests to the Kenyan economy report: <i>What benefits do Kenya's five Water Towers provide to the economy of Kenya?</i> – Adaptation to Climate-change Induced Water Stress in the Nile Basin: <i>What is the effect and impact of Climate change on the people and environments of the Nile Basin and on water availability in the region? What are the most robust policies for adaptation to climate change in the Nile basin?</i> – ECCO Metropolitan District of Quito: <i>What is happening to the environment? Why is it happening? What is the impact? What action is being taken on environmental policies? What will happen if we do not act now? What can we do to reverse the present situation?</i>



Assessment name	Environmental Impact Assessment (EIA)  
Introduction	<p>EIA* is a systematic process that seeks to identify and evaluate the potential environmental consequences, impacts (and to a lesser extent the social and economic impacts also) and effects of a proposed project, such that information can be provided to decision-makers and other stakeholders in order to minimise, mitigate, or eliminate altogether, any adverse potential impacts arising from the proposed development project^{3,43-47}.</p> <p>EIA is often embedded in national planning policy and law, and is therefore a pre-requisite for some types of development proposals prior to development consent being granted. For example, in the UK the EIA process is driven by European law, and has a specific European Directive assigned to it; this is then integrated into UK legislation by further regulations^{48,49}.</p>
Key features	<ul style="list-style-type: none"> ✓ Ensure that projects are sustainable and do not detrimentally affect people's lives or the natural environment (using mitigation measures to achieve this where necessary). ✓ Aid the understanding of consequences or impacts of proposed projects on the environment – the outcome of an EIA is reported in an Environmental Statement (ES). ✓ Identify ways in which projects can be improved, for example, by minimising negative environmental impacts⁴³.
Key questions	<p><i>What impact will the proposed project have on the natural environment, local environment and local communities? What measures can be prescribed to avoid, reduce or compensate for environmental effects after implementation of the project?</i></p>
Examples	<ul style="list-style-type: none"> – The Mekong River Trans-boundary EIA⁵⁰ – Offshore drilling, the Falkland Islands (http://www.fogl.com/fogl/dlibrary/panda/eis_full.pdf) – Jebel Ali Power and Desalination Station M, Dubai, UAE (http://www.agaportal.de/pdf/nachhaltigkeit/eia/eia_dubai_kraftwerk.pdf)
Some resources	<ul style="list-style-type: none"> – African Development Bank Group (http://www.afdb.org/en/topics-and-sectors/sectors/environment/) – Asian Development Bank (http://www.adb.org/publications/environmental-impact-assessment-developing-countries-asia) – Inter-American Development Bank (http://www.iadb.org/en/about-us/environmental-impact-assessments-eias,6563.html) – International Association for Impact Assessment (IAIA) Affiliates (http://www.iaia.org/publications-resources/eia-index-of-websites.aspx)

*UNEP does not undertake EIAs under its current programmes of work (2014-2017)

Assessment name	Strategic Environmental Assessment (SEA)   	
Introduction	<p>SEA* is a systematic and comprehensive process which contributes to informed decision making related to both environmental protection and sustainable development by:</p> <ul style="list-style-type: none"> – Providing environmental foresight; – Considering the effects of proposed strategic actions (policy, programme and plan); – Identifying the best practicable environmental option; – Providing early warning of cumulative effects and large-scale changes; and – Contributing to integrated policy making and planning⁵¹. <p>These factors combine to influence and improve decision making in ways that enhance sustainability of the environment.</p> <p>Similar to the EIA process, SEA is also often governed by national planning policy and law. For example, the legal context for SEAs in Europe is the SEA Directive, which is then transposed into national legislation by various regulations⁵².</p>	
Key features	<ul style="list-style-type: none"> ✓ Helps decision-makers reach a better understanding of how environmental, social and economic considerations fit together⁵³. ✓ Helps achieve environmental protection and sustainable development by anticipating and preventing adverse effects at source⁵⁴. ✓ Requires an assessment of reasonable alternatives to the proposed plan or programme⁵². 	
Key questions	<p><i>What are the key linkages of the investment strategy to the environment and social issues? What are the key risks and opportunities? What are the implications for global environmental issues such as greenhouse gas emissions or biodiversity? What are the related social and economic effects likely to result from the investment strategy? What are the broader and cumulative effects that may affect the context for the strategy? Have potential trans-boundary effects been identified? If yes, has notification/ information exchange taken place prior to major strategic decisions for the investment?</i></p>	
Examples	<ul style="list-style-type: none"> – Honduras SEA on municipal development plans⁵⁵ – National strategy for growth and poverty reduction, Ghana⁵³ – SEA for water use, Mhlathuze catchment, South Africa⁵³ 	
Some resources	<ul style="list-style-type: none"> – International Institute for Environment and Development (http://pubs.iied.org/pdfs/G02193.pdf) – The World Bank (http://www.worldbank.org/en/topic/environment/brief/strategic-environmental-assessment) – Organisation for Economic Co-Operation and Development (OECD) Development Assistance Committee (DAC) (http://www.oecd.org/dac/environment-development/37353858.pdf) – Strategic Environmental Assessment Information Service (http://www.sea-info.net/) 	

*UNEP does not undertake SEAs under its current programmes of work (2014–2017)

6. Final Remarks

In setting out the above information on various types of environmental assessments, it is hoped that the differences and indeed overlaps which are frequent throughout these different methods have been highlighted. Some assessment types are defined by the framework which they follow (i.e. the DPSIR framework), some assessments are defined by their subject matter (i.e. thematic assessments), and some are driven by policy and/or legislative requirements (i.e. EIA and SEA). Each of the assessment types is also

likely to vary in its scope (thematic, integrated, with or without an outlook component) and scale (national, regional, global). Therefore, by using the range of information presented in the assessment factsheets contained within this brochure, it is hoped that policy- and decision-makers, assessment practitioners, and other interested stakeholders will be guided in their understanding of where and when to consider the use of these different assessment methods.





7. Abbreviations

ADB	Asian Development Bank
AEO	Africa Environmental Outlook
AfDB	African Development Bank
CBD	Convention on Biological Diversity
CCKN	Climate Change Knowledge Network
DAC	OECD Development Assistance Committee
DPSIR	Drivers-Pressures-State-Impacts-Responses (framework)
DRR	Disaster Risk Reduction
DTIE	UNEP Division of Technology, Industry and Economics
EA	Ecosystem Assessment
ECCO	Environment and Climate Change Outlook
EEA	Environmental-Economic Accounting
EIA	Environmental Impact Assessment
ERA	Environmental Risk Assessment
ES	Environmental Statement
GBO	Global Biodiversity Outlook
GEF	Global Environment Facility
GEO	Global Environment Outlook
IADB	Inter-American Development Bank
IAIA	International Association for Impact Assessment
IEA	Integrated Environmental Assessment
IISD	International Institute for Sustainable Development
IPBES	Intergovernmental Panel for Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IRA	Integrated Risk Assessment
LADA	Land Degradation Assessment in Drylands
LMOs	Living Modified Organisms
MA	Millennium Ecosystem Assessment
MEAs	Multilateral Environmental Agreements
OCHA	UNEP Office for the Coordination of Humanitarian Affairs
OECD	Organisation for Economic Co-Operation and Development
PCDMB	UNEP Post Conflict and Disaster Management Branch
PCNA	Post-Conflict Needs Assessment
PDRA	Participatory Disaster Risk Assessment
REA	Rapid Environmental Assessment
RiVAMP	The Risk and Vulnerability Assessment Methodology Development Project
SEA	Strategic Environmental Assessment
SEEA	System Environmental Economic Accounting
SGA	Sub-Global Assessment
SNA	System of National Accounts

TEEB	The Economics of Ecosystems and Biodiversity
UK	The United Kingdom of Great Britain and Northern Ireland
UN	United Nations
UNCEEA	United Nations Committee of Experts on Environmental-Economic Accounting
UNEA	United Nations Environment Assembly
UNEP	United Nations Environment Programme
UNEP-WCMC	United Nations Environment Programme – World Conservation Monitoring Centre
VIA	Vulnerability and Impact assessments for Adaptation to Climate Change
WAVES	Wealth Accounting and the Valuation of Ecosystem Services
WHO	The World Health Organization

8. Glossary

Assessment A critical objective evaluation and analysis of information for purposes of guiding decisions on a complex, public issue, to provide scientifically credible answers to policy-relevant questions to support decision making. The stakeholders, who are typically decision-makers, define the topic. Assessments are policy-relevant, but not prescriptive. Assessments are conducted by a credible group of experts with a broad range of disciplinary and geographical experience, in a balanced transparent way. Assessments reduce complexity by summarisation, synthesis and sorting what is known and widely accepted, from what is not known (or not agreed). Assessments relate to the situation at a particular time and in a geographical domain. While results from research and scientific knowledge predominate, assessments can supplement this with local, traditional or indigenous knowledge¹.

Ecological assessment The monitoring of current and changing conditions of ecological resources from which success or failure of the ecosystem can be judged without bias; understanding more fully the structure and function of ecosystems in order to develop improved management options; developing models to predict the response of ecosystems to changes resulting from human-induced stress from which possible ecosystem management strategies can be assessed, and assessing the ecological consequences of management actions so that decision-makers can best understand the outcomes of choosing a particular management strategy⁵⁶.

Environmental Assessment The entire process of undertaking an objective evaluation and analysis of information designed to support environmental decision making. It applies the judgement of experts to existing knowledge to provide scientifically credible answers to policy-relevant questions, quantifying where possible the level of confidence¹. It reduces complexity but adds value by summarising, synthesising and building scenarios, and identifies consensus by sorting out what is known and widely accepted from what is not known or not agreed. It sensitises the scientific community to policy needs and the policy community to the scientific basis for action¹.

Environmental Risk Assessment (ERA) The examination of risks resulting from natural events (flooding, extreme weather events, etc.), technology, practices, processes, products, agents (chemical, biological, radiological, etc.) and industrial activities that may pose threats to ecosystems, animals and people⁵⁷.

Health Impact Assessment (HIA) A means of assessing the health impacts of policies, plans and projects in diverse economic sectors using quantitative, qualitative and participatory techniques. It identifies actions that can enhance positive effects and reduce or eliminate negative effects. HIA helps decision-makers make choices about alternatives and improvements to prevent disease/injury and to actively promote health. WHO supports tools and initiatives in HIA to dynamically improve health and well-being across sectors⁵⁸.

Ecosystem A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit⁵⁹.

Ecosystem Services The benefits people obtain from ecosystems (sometimes called ecosystem goods and services). These include provisioning services, such as food and water, regulating services, such as flood and disease control, cultural services, such as spiritual, recreational and cultural benefits, and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth⁶¹.

Ecosystems-based Adaptation An emerging approach that helps people to adapt to the adverse impacts of climate change. It is the use of biodiversity and ecosystem services as part of an overall adaptation strategy. EBA uses sustainable management, conservation and restoration of ecosystems, taking into account anticipated climate change impact trends, to reduce the vulnerability and improve the resilience of ecosystems and people to climate change impacts. EBA also provides many other benefits to communities, for example, through the maintenance and enhancement of ecosystem services crucial for livelihoods and human well-being, such as clean water and food. Appropriately designed ecosystem management initiatives can also contribute to climate change mitigation by reducing emissions from ecosystem loss and degradation, and enhancing carbon sequestration⁶⁰.

Environment Statistics Statistics that describe state and trends in the environment, covering the media of the natural environment (air/climate, water, land/soil, the living organisms within the media, and human settlements)⁶¹.

Environmental Monitoring Regular, comparable measurements or time series of data on the environment.

Global Earth Observation System of Systems (GEOSS) A network aiming to link existing and planned Earth observing systems (e.g., satellites and networks of weather stations and ocean buoys) around the world, support the development of new systems where gaps currently exist, and promote common technical standards so that data from the thousands of different instruments can be combined into coherent datasets. It aims to provide decision support tools to policy-makers and other users in areas such as health, agriculture and disasters⁶².

Index A numerical scale used to compare variables with one another or with some reference number⁶³.

Indicator A quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor⁶⁴.

Integrated Assessment and Planning (IAP) for Sustainable Development In 2003, with funding from the Norwegian government, UNEP ETB launched an Integrated Assessment and Planning (IAP) initiative. The objective was to assist countries to use integrated assessment and planning as a tool for balancing environmental, social and economic objectives and relating them to poverty reduction and trade enhancement. Nine countries participated in this initiative: Brazil, Chile, Colombia, the Czech Republic, Indonesia, Kenya, Lebanon, Russia, and Uganda. The country-level implementation was characterised by inter-ministerial cooperation and stakeholder participation. IAP is a tool designed to provide a demand-driven, country-led approach to strengthening the substance and processes of national policy making and planning⁶⁵.

Intergovernmental Panel on Climate Change (IPCC) Established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) in 1988, the IPCC is a scientific, inter-governmental body established to review and assess the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change, to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts⁶⁶.

Intergovernmental Platform on Biodiversity & Ecosystem Services (IPBES) Established in April 2012, as an independent inter-governmental body open to all member countries of the United Nations. The members are committed to building IPBES as the leading inter-governmental body for assessing the state of the planet's biodiversity, its ecosystems and the essential services they provide to society. IPBES provides a mechanism recognised by both the scientific and policy communities to synthesise, review, assess and critically evaluate relevant information and knowledge generated worldwide by governments, academia, scientific organisations, non-governmental organisations and indigenous communities. This involves a credible group of experts in conducting assessments of such information and knowledge in a transparent way. IPBES is unique in that it will aim to strengthen capacity for the effective use of science in decision making at all levels. IPBES will also aim to address the needs of Multilateral Environmental Agreements that are related to biodiversity and ecosystem services, and build on existing processes ensuring synergy and complementarities in each other's work⁶⁷.

International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) Initiated in 2002 by the World Bank and the Food and Agriculture Organization of the United Nations (FAO) as a global consultative process to determine whether an international assessment of agricultural knowledge, science and technology (AKST) was needed. The IAASTD is a collaborative effort to assess the relevance, quality and effectiveness of AKST on hunger, poverty, nutrition, human health, and environmental and social sustainability in relation to both the past and the future. The activities carried out under this process are a global and five sub-global assessments. The five sub-global assessments are: central and west Asia and north Africa (CWANA) - Regional Institute: ICARDA (International Center for Agricultural Research in the Dry Areas), east and south Asia and the Pacific (ESAP) - Regional Institute: World Fish Center, Latin America and the Caribbean (LAC) - Regional Institute: IICA (Inter-American Institute for Cooperation on Agriculture), North America and Europe (NAE) and Sub-Saharan Africa (SSA)- Regional Institute: ACTS (African Centre for Technology Studies)⁶⁸.

Millennium Development Goals (MDGs) In September 2000, leaders from 189 nations agreed on a vision for the future: a world with less poverty, hunger and disease, greater survival prospects for mothers and their infants, better educated children, equal opportunities for women, and a healthier environment; a world in which developed and developing countries worked in partnership for the betterment of all. This vision took the shape of eight Millennium Development Goals, which provide a framework for development planning for countries around the world, and time-bound targets by which progress can be measured. The eight MDGs range from halving extreme poverty to halting the spread of HIV/AIDS and providing universal primary education, all by the target date of 2015⁶⁹.

Mitigation Can refer to using new technologies and renewable energies, making older equipment more energy efficient, or changing management practices or consumer behaviour. It can be as complex as a plan for a new city, or as simple as improvements to a cook-stove design. Protecting natural carbon sinks like forests and oceans, or creating new sinks through silviculture or green agriculture are also elements of mitigation. UNEP takes a multifaceted approach towards climate change mitigation in its efforts to help countries move towards a low-carbon society⁷⁰.

Multilateral Environmental Agreements (MEAs) Treaties, conventions, protocols and contracts between several states regarding specified environmental problems.

Policy Any form of intervention or societal response. This includes not only statements of intent, but also other forms of intervention, such as the use of economic instruments, market creation, subsidies, institutional reform, legal reform, decentralisation and institutional development. Policy can be seen as a tool for the exercise of governance. When such an intervention is enforced by the state, it is called public policy⁷¹.

Risk UNDP defines risk as the probability of harmful consequences — casualties, damaged property, lost livelihoods, disrupted economic activity, and damage to the environment — resulting from interactions between natural or human-induced hazards and vulnerable conditions⁵.

State of the Environment (SoE) Analysis of the state and trends in the environment of a particular place. This analysis can encompass aspects such as water quality, air quality, land-use, ecosystem health and function, along with social and cultural matters. SoE reports are designed to communicate credible, timely and accessible information about the condition of the environment to decision-makers and the community⁷².

Sustainability Appraisal (SA) A process designed to assess the overall environmental, economic and social impact of the objectives and policies of a plan. A form of strategic assessment that integrates environmental, social and economic parameters, compared with SEA which deals primarily with environment⁷³.

Sustainable Development Goals (SDGs) One of the main outcomes of the Rio+20 Conference in 2012 was the agreement by member States to launch a process to develop a set of Sustainable Development Goals (SDGs), which will build upon the Millennium Development Goals (See “Millennium Development Goals”).

Vulnerability The degree to which a systems is susceptible to, and unable to cope with injury, damage, or harm⁷⁴.

Vulnerability (climatic) The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity⁷⁵.

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United Nations Environment Programme
P.O. Box 30552 - 00100 Nairobi, Kenya
Tel.: +254 20 762 1234
Fax: +254 20 762 3927
e-mail: publications@unep.org
www.unep.org



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