Land Use and Land Management Practices in Environmental Perspective

INTOSAI
Working Group
on Environmental
Auditing

This publication was prepared by the INTOSAI Working Group on Environmental Auditing (WGEA). The WGEA aims to encourage the use of audit mandates and audit methods in the field of environmental protection and sustainable development by Supreme Audit Institutions (SAIs). The WGEA has the mandate to

- help SAIs gain a better understanding of environmental auditing issues,
- facilitate exchange of information and experiences among SAIs, and
- publish guidelines and other informative materials.

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FOREWORD & ACKNOWLEDGEMENTS

Increasingly, the world is experiencing severe environmental, social and economic problems that are challenging current production systems and the sustainability of all human activities. Indeed, the resources on which these activities depend are significantly imbalanced, land resources, in particular. This has severe consequences for all economic and social activities. The challenges presented by land degradation resulting from poor land management methods highlight the need for Supreme Audit Institutions (SAIs) to focus on this area. Thus, it is important for SAIs to implement an effective framework for auditing land use and land management. This focus needs to be both national and global.

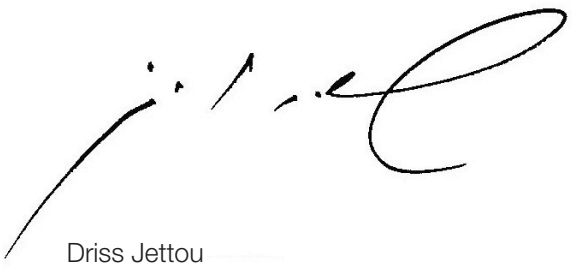
During the 12th Working group meeting of the WGEA in Guilin, Guangxi, China (June 2010), members of the International Organization of Supreme Audit Institutions Working Group on Environmental Auditing (INTOSAI WGEA) approved its 2011–13 work plan. The following projects were approved:

- Research study on land use and land management practices - SAI of Morocco,
- Research study on environmental data - SAI of USA and Canada,
- Research study on environmental issues associated with infrastructure - SAI of the United Kingdom,
- Guidance material on auditing water issues - SAI of USA,
- Guidance material on addressing fraud and corruption issues when auditing environment and natural resource management - SAI of Norway
- Research study on the impact of tourism on wildlife conservation - SAI of Lesotho and Tanzania, and
- Research study on environment and sustainability reporting - SAI of Finland.

The work on this document was led by the SAI of Morocco. In particular, we would like to acknowledge the efforts of the authors, Mohammed Diyer, Hassan Namrani and Abdelouahab Elkadiri. Also, we would like to acknowledge the contributions made by SAIs worldwide. Special thanks to the project sub-committee members and to the INTOSAI WGEA and its Steering Committee members for their valuable help in various stages of the project. Without them, this paper would not have been possible.

We hope you will find this research paper useful.

Alar Karis
Auditor General of Estonia
Chair of INTOSAI WGEA



Driss Jettou
First President of the Court of Accounts of Morocco
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ACRONYMS AND ABBREVIATIONS

AONB:	Areas of Outstanding Natural Beauty
BLM:	Bureau of Land Management
CBD:	Convention on Biological Diversity
CCRP:	Continuous Conservation Reserve Program
CFC:	Chlorofluorocarbon
CITES:	Convention on Trade of Endangered Species
CONANP:	Comision Nacional De Areas Naturales Protegidas
CWA:	Clean Water Act
DOT:	Department of Transportation
EIA:	Environmental Impact Assessment
EPA:	Environmental Protection Agency
FAO:	Food and Agriculture Organization
FAOSTAT:	Food and Agriculture Organization Corporate Statistical Database
GAO:	Government Accountability Office
GEF:	Global Environment Facility
GIS:	Geographical Information System
GPS:	Global Positioning System
HCEFLCD:	High Commissioner for Water, Forests and Combating Desertification
IISD:	International Institute for Sustainable Development
IPCC:	Intergovernmental Panel on Climate Change
INTOSAI:	International Organization of Supreme Audit Institutions
MEAs:	Multilateral Environmental Agreements
NAO:	National Audit Office
NAOF:	National Audit Office of Finland
NGOs:	Non Governmental Organizations
NRCS:	Natural Resources Conservation Service
NPA:	Natural Protected area
NVE:	Norwegian Water Resources and Energy Directorate
PANLCD:	National Action Program to Fight against Desertification
RCRA:	Resource Conservation and Recovery Act
RS:	Remote Sensing
OECD:	Organization for Economic Cooperation and Development
OAG:	Office of the Auditor General
RCRA:	Resource Conservation and Recovery Act
RMA:	Resource Management Act
SAI:	Supreme Audit Institution
SEMAR:	Secretaria De Medio Ambiente Y Recursos Naturales
SER:	Society for Ecological Restoration
SLM:	Sustainable Land Management
SSSI:	Sites of Specific Scientific Interest
UK:	United Kingdom
UN:	United Nation
UNEP:	United Nations Environment Programme
USA:	United States of America
USDA:	US Department of Agriculture
WGEA:	Working Group on Environmental Auditing
ZEE:	Economic Ecological Zoning

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EXECUTIVE SUMMARY

Throughout the world land is under intense pressure. In many countries, the human population is expanding fast and the demands on natural resources are increasing. Under this pressure, significant land degradation is taking place and land productivity is reducing. The situation in many countries is not sustainable, even though strenuous efforts have been made to halt degradation.

As a result, the economies of many countries that depend on their forests, croplands and pastures have suffered: land degradation is costing many billions of dollars every year. Countries around the world are trying to formulate national strategies and policies to stop the progress of land degradation.

Many SAIs (Supreme Audit Institutions) have already audited their governments' responses to the environmental issues caused by land use/land management. Through these audits, SAIs have a role to play in preserving land.

This research paper aims to develop SAIs' awareness about the importance of this issue and provide them with some data and information about land use/land management practices, in particular from an environmental perspective. In addition, it encourages SAIs to consider environmental perspectives when auditing programs and projects to do with land use and land management.

This paper is structured around four chapters:

Chapter I: Introduction and background
Chapter II: Environmental issues in land use
Chapter III: Governments' responses to the environmental issues of land use
Chapter IV: Auditing land use/land management issue(s)
Appendices

The first chapter gives an overview of definitions and concepts related to land, land use and land management, and outline the magnitude of the overall issues on these topics.

The second chapter presents the main environmental issues in land use. It explains the different types of land degradation (that are largely the result of transforming natural and semi-natural ecosystems by deforestation, cultivation, urbanization, intensification and mechanization of agricultural practices, overexploiting animal populations, global warming, desertification, and general pollution). This chapter also focuses on the impacts of land use, especially impacts on water and air quality.

Chapter three examines programs and policy tools used by governments to mitigate or prevent negative land-use impacts, and looks at who is responsible for implementing these tools.

For example, it considers the crucial role that governments play in implementing policies for using land wisely and with consideration for the environment. Governments regulate the exploitation of resources and they control land use. They have a variety of public policy tools at their disposal to authorize, finance and implement these actions (for example, international agreements, laws, programs and public education).

In addition, governments manage land use with more specific instruments. These include regulatory instruments (such as legislation, regulations, permits, licenses, bylaws, and ordinances), and economic instruments such as subsidies, incentives, taxes or grants.

In fact, there is no universal approach and no ready-made solutions that can be applied anywhere without modification. If the problems of land degradation are to be overcome, each country must develop its own conservation and rehabilitation policy; its strategy and programs need to be tailored to its own circumstances. Nevertheless, there are general principles for controlling land degradation that are common to all countries, and these are outlined in this chapter. These include policy instruments for conservation, prevention, protection, restoration, and mitigation.

Chapter four presents information about four different land use/ land management audit topics that have been conducted by the SAIs of several different countries. For each topic, auditors will find a summary of relevant case studies and best practices. These audits demonstrate that each SAI can play a major role in auditing their government's responses to the environmental issues in land use/land management.

The Appendices provide: background information on land use (Appendix 1); the importance of different types of land degradation in several INTOSAI countries; (Appendix 2); an overview of the consequences of deforestation (Appendix 3); a description of environmental impact assessment - as stated in the RIO declaration (Appendix 4); some case studies (on several topics) summarizing audits done by a number of SAIs (Appendix 5); and a list of links to other WEGA community case studies (Appendix 6).

1.

INTRODUCTION AND BACKGROUND

1.1. LAND AND LAND FUNCTIONS

Land is one of the most essential natural resources for the survival and prosperity of humankind, and it is the platform on which human activities take place. It is also the source of materials needed for these activities.

The literature offers several definitions of land and land resources, one of them comes from the Food and Agriculture Organization of the United Nations (FAO): "Land and Land Resources refer to a delineable area of the earth's terrestrial surface, encompassing all attributes of the biosphere immediately above or below this surface, including those of the near-surface, climate, the soil and terrain forms, the surface hydrology (including shallow lakes, rivers, marshes and swamps), the near-surface sedimentary layers and associated groundwater and geo-hydrological reserve, the plant and animal populations, the human settlement pattern and physical results of past and present human activity (terracing, water storage or drainage structures, roads, buildings, etc.)" (FAO/UNEP, 1997).

This definition highlights that land includes all material components needed for human activity. If land resources are to support and ensure continuity of human activity on a sustainable basis, these various components must be preserved and allowed to interact in a balanced way.

This implies that land has many functions that need to be taken into consideration when planning development, to ensure that an efficient and balanced allocation of land resources results. These functions are:

- **Productive:** land underpins many life support systems, through production of biomass that provides food, fodder, fiber, fuel, timber and other biotic materials for human use, either directly or through animal husbandry including aquaculture, and inland and coastal fisheries;

- **Biotic environmental:** land is the basis of terrestrial biodiversity – it provides the biological habitats and gene reserves for plants, animals and micro-organisms, above and below ground;

- **Climate regulation:** land and its use are a source and sink of greenhouse gases, and form a co-determinant of the global energy balance – along with reflection, absorption and transformation of the sun's radioactive energy, and the global hydrological cycle;

- **Hydrologic:** land regulates the storage and flow of surface and groundwater resources, and influences their quality;

- **Storage:** land is a storehouse of raw materials and minerals for human use;

- **Waste and pollution control:** land absorbs, filters, buffers and transforms many hazardous compounds;

- **Living space:** land provides the physical basis for human settlements and everything done from there - from industry to sports and recreation;

- **Archive or heritage:** land stores and protects the evidence of the cultural history of humankind; it is also a source of information on past climatic conditions and past land uses; and

- **Connective space:** land provides space for the transport of people, inputs and products, and for the movement of plants and animals between discrete areas of natural ecosystems (FAO, 1995).

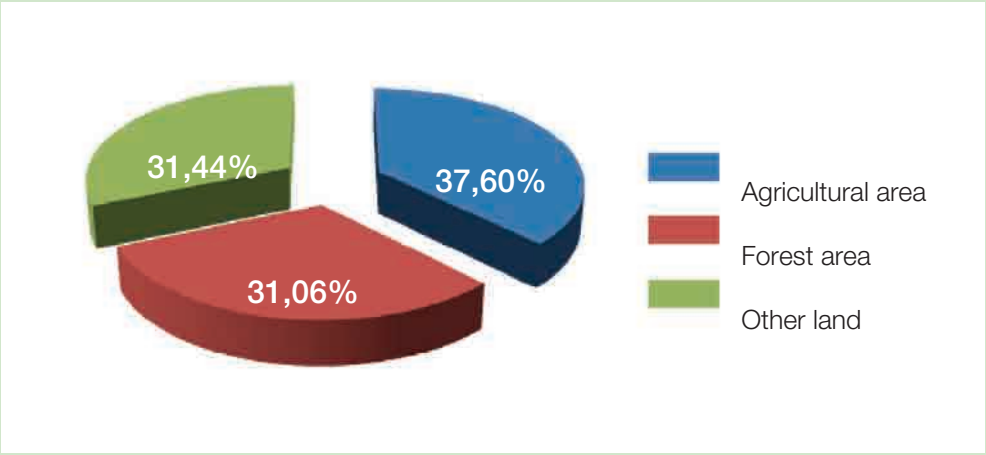
1.2. LAND USE: CONCEPT DEFINITION AND GLOBAL STATISTICS

Land allows for a variety of uses and can satisfy a diverse range of objectives. Land use is a basic element in human activity. Much of what we humans do requires land (Young, 1998).

Thus, the concept of land use refers to a series of activities done to generate one or more products or services. The same land use can occur on several different parcels of land, and reciprocally, the same land may have several uses. An activity-based definition of land use allows for a detailed quantitative analysis of both economic and environmental impacts, as well as enabling different land uses to be clearly distinguished (FAO, 1998b).

Globally[1], the available country area was 136,096,598 km^2 including 130,121,447 km^2 for land area and 5,975,151 km^2 for inland water. The land area is divided among different types of use. Agricultural land accounts for 49,322,388 km^2 (arable land accounts for 14,121,800 km^2 and permanent crops 1,426,704 km^2); forests: 39,394,070km^2; and other land [2] represents 41,404,989 km^2. Figure 1 shows these broad uses (2009 data).

Figure 1: Land use/world area in 2009 (1000 Ha)[3]



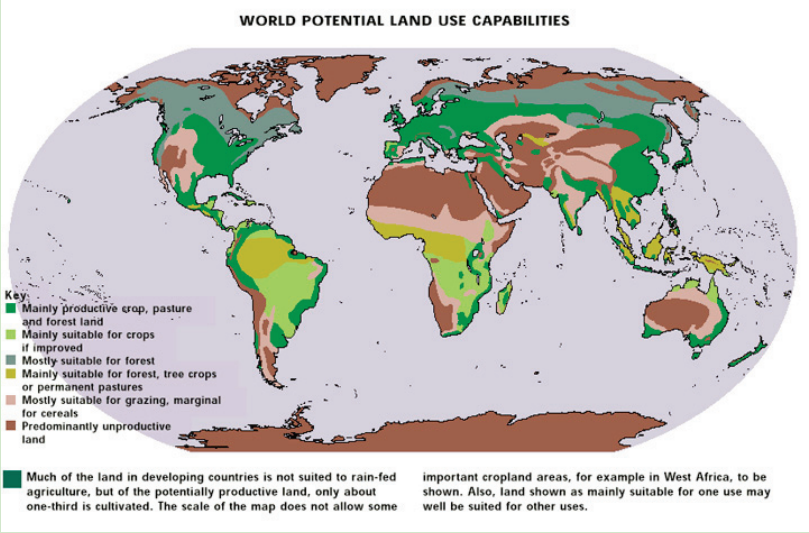
Source: FAOSTAT.

If land resources are to support continuing human activities in a sustainable way, then other functions of the land need to be kept in balance.

Land is highly sought for various human activities. Such activities (current or future) depend, to a greater or lesser degree, on the surface of the earth, its minerals, its water and its other renewable and non-renewable resources. Generally, the same parcel of land cannot be used for more than one object simultaneously; this generates competition between different land-use activities for a piece of land (Young, 1998). Figure 2 illustrates the potential uses for land in different parts of the world.

1 Worldstat info website: http://en.worldstat.info/World/Land
2 Other land: Land used for aquaculture, land occupied by buildings, parks and ornamental gardens.
3 Appendix 1 provides detailed statistics for each geographic region.

Figure 2: World potential land use capabilities. Large regions of the north, tropical Africa and Asia, central Australia, the western Americas and Antarctica are "predominantly unproductive land". http://www.fao.org/wfs/wfsbook/e/ffa01-e.htm



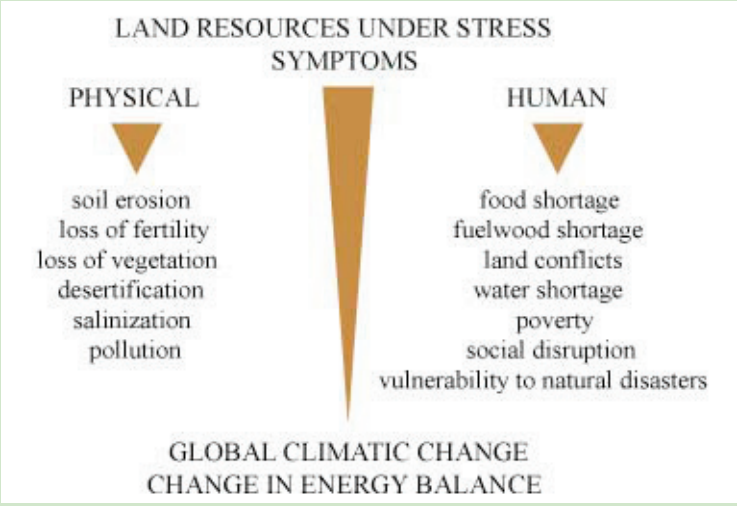
1.3. LAND DEGRADATION: WHAT IT IS, AND THE SIZE OF THE ISSUE

Land is a limited resource with increasing substantial demands placed on it. As a result of increasingly heavy pressure on land resources, agricultural production declines, the quantity and quality of land deteriorates, and there is increasing competition for access to land (FAO/UNEP, 1999).

The world's population is still increasing. It was 2.5 billion in 1950, is now 7 billion, and could reach 9 billion by 2050[4] - all of which increases the pressures on land.

This pressure on land and the overexploitation of land resources have resulted in many forms of degradation such as desertification, loss of biodiversity, deforestation, land degradation, water degradation, etc. Figure 3 illustrates the different kinds of symptoms of land under pressure – be they physical or human related.

Figure 3: Symptoms of the problem of pressure on land and resources



Source: (FAO/UNEP, 1999).

[4] World population clock website: http://www.populationmondiale.com/

Land degradation is defined as “the reduction or loss of the biological or economic productivity and complexity of rain-fed cropland, irrigated cropland, or range, pasture, forest or woodlands resulting from natural processes, land uses or other human activities and habitation patterns such as land contamination, soil erosion and the destruction of the vegetation cover” (UN, 1997).

Land degradation is occurring globally. It is estimated to effect over 2 billion hectares worldwide and threatens the livelihoods of over one billion people.
According to the latest FAO report on the status of land resources and water for food and agriculture in the world, the degradation of land resources has reached worrying levels. The proportion of degraded land has reached 25%; the part of land moderately degraded is 8% (FAO, 2011). By comparison, the proportion of degraded land was only 16% in 1997 (FAO/UNEP 1997). In some parts of the world entire systems are being threatened.

Deforestation and soil degradation are two devastating effects of unsustainable farming practices that emit large quantities of carbon into the atmosphere. Changes in land use are, by themselves, causing about 20% of global emissions of carbon dioxide each year (IISD, 2009).

1.4. FROM LAND MANAGEMENT TO SUSTAINABLE LAND MANAGEMENT: CONCEPTS AND DEFINITIONS

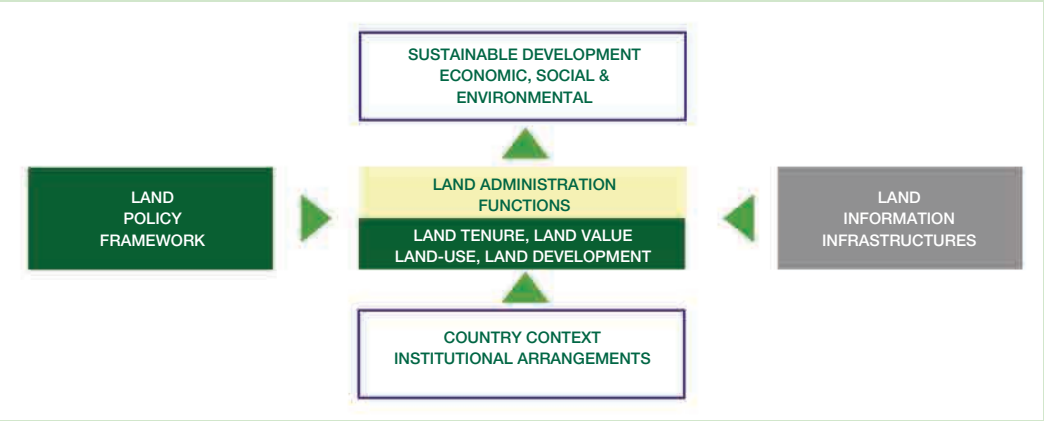
Land resources management is defined as “the actual practice of the use(s) of the land by the local human population, which should be sustainable” (FAO/Netherlands, 1991). Land resources management has many components, including land-use planning, as agreed between stakeholders; legal, administrative and institutional oversight; clearly defining the land areas in question; inspection and control of compliance with the decisions; resolving land tenure issues; settling of water rights; issuing of concessions for plant and animal extraction (timber, fuelwood, charcoal and peat, non-wood products, hunting); promoting the role of women and [other] disadvantaged groups in agriculture and rural development; and safeguarding the traditional rights of indigenous peoples (FAO, 1995).

Many current land planning and land management policies and models are based on the overexploitation of resources and on methods that have little concern for ecological balances. The policies and models do not factor in the realities of land degradation. These policies and models are not sustainable. Therefore, sustainable land use must be based on the proper management of all the land’s attributes and components.

Actions can be taken to address many of these issues. It is quite possible to monitor and address land degradation or even reverse the trends: if land is used efficiently, if all functions are taken into account, and if the long-term interest of the entire population is stronger than the short-term interests of certain privileged groups at global, national and local levels (UN, 2005).

Issues relating to land use are often complex and require a high degree of understanding of the ecological balance (EPA, 1974). The structure of political decision-making should be organized to facilitate an integrated approach to land use management. This can only come about if there is a good understanding of how various land-related rights, restrictions and responsibilities work together to form a coherent “land paradigm” (see Figure 4 below).

Figure 4: Land management paradigm



Source: (Enemark, 2007).

Therefore, sustainable management of land resources requires policies and planning to be based on a good knowledge of the extent and nature of these land resources, how the land has been allocated for use, and on how the land will respond to these uses.

Box 1: The World Bank definition of Sustainable Land Management (SLM)

Sustainable Land Management (SLM) is defined as a knowledge-based procedure that helps integrate land, water, biodiversity, and environmental management (including input and output externalities) to meet rising food and fiber demands while sustaining ecosystem services and livelihoods. SLM is necessary to meet the requirements of a growing population. Improper land management can lead to land degradation and a significant reduction in the productive and service functions.

SLM involves:

- Preserving and enhancing the productive capabilities of land in cropped and grazed areas - that is, upland areas, downslope areas, and flat and bottom lands; sustaining productive forest areas and potentially commercial and non-commercial forest reserves; and maintaining the integrity of the watershed for water supply and hydropower generation needs and water conservation zones and the capability of aquifers to serve the needs of farm and other productive activities.

- Actions to stop and reverse degradation - or at least to mitigate the adverse effects of earlier misuse - which is increasingly important in uplands and watersheds, especially those where pressure from the resident populations are severe and where the destructive consequences of upland degradation are being felt in far more densely populated areas “downstream.” (World Bank, 2006).

In this regard, land use planning, which is “the systematic assessment of land and water potential, alternative patterns of land use and other physical, social and economic conditions, for the purpose of selecting and adopting land-use options which are most beneficial to land users without degrading the resources or the environment, together with the selection of measures most likely to encourage such land uses” (FAO, 1999-b) (FAO, 1993), must be a decision process that “facilitates allocation of land to the uses that provide the greatest sustainable benefits and to promote the transition to a sustainable and integrated management of land resources” Agenda 21, para 10.5).
Land use is one of the key areas for action to improve performance in global sustainable development. Through their audits, SAIs can make important contributions to enhancing sustainable development.

2.

ENVIRONMENTAL ISSUES IN LAND USE

Environmental issues in land use are related to a combination of many complex natural and human-induced phenomena. The transformation of natural and semi-natural ecosystems by deforestation, cultivation, urbanization, intensification and mechanization of agricultural practices, overexploitation of animal populations, global warming, desertification and general pollution are all direct and indirect causes of accelerated environmental degradation. Appendix 2 shows how different types of land degradation issue are prevalent in several countries within the INTOSAI community.

2.1. TYPES OF LAND DEGRADATION

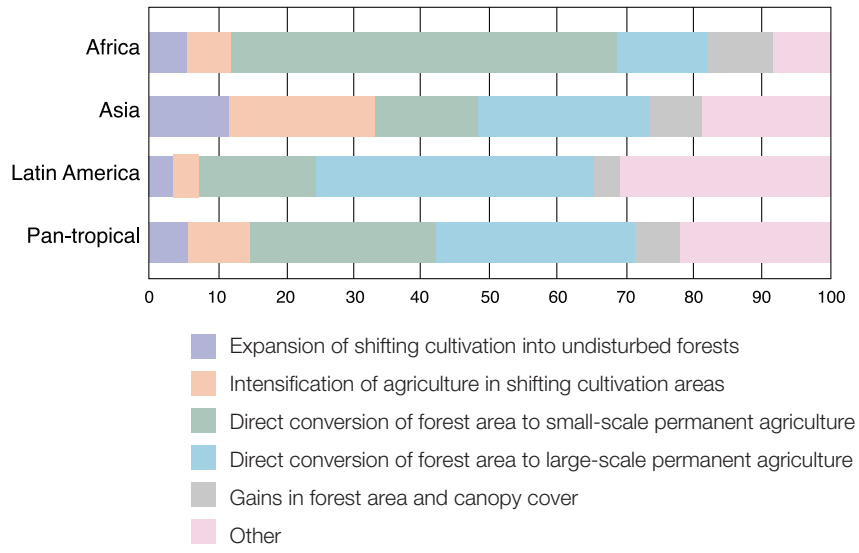
2.1.1 DEFORESTATION

Forests cover slightly more than 4 billion ha (31% of the world's total land area) and correspond to an average of 0.6 ha per inhabitant.

Each year during the past decade, about 13 million ha of forests were converted to other uses or disappeared as a result of natural phenomena (FAO, 2010).

Most deforestation is due to using forested land for non-forest purposes, because of bad practices and processes resulting from social, economic and ecological pressures. These pressures include expanding cultivation, overgrazing, collecting wood for energy, drought, and fires. Figure 5 shows the various causes of changing land use in different parts of the word from 1980 to 2000, and Appendix 3 is an overview of the main consequences of deforestation.

Figure 5: Percentage of total area change due to different causes, 1980–2000



Source: Based on FAO, 2001.

Since the early 1980s, there has been considerable concern that deforestation and forest degradation are bringing huge costs to society, in the form of: lost economic rents, inefficient allocation of resources, degradation of renewable resources (such as soil and forests), disruption of watershed services, social distress and conflict, massive loss of biodiversity, and emission of greenhouse gases (WGEA, 2010).

About 54 percent of SAIs surveyed as part of our research said that deforestation is one of the most important forms of land degradation in their countries (see Appendix 2).

The WGEA has developed a guide for auditing forests (see Box 2 below) that provides for, amongst other things, information about the threats to forests.

Box 2: Auditing Forests: Guidance for Supreme Audit Institutions

This guide is a resource for audit practitioners developed by the WGEA in 2010. It provides guidance focused on the forestry sector and covers a range of management and public policy tools used by governments. It describes what forests are, why they are important, what the threats to forests are, and what action governments are taking. It suggests also a process for choosing and designing forest audits, and practical guidance, information, and case studies related to audits on forests.

Figure 6: Illegal logging in Madagascar. http://en.wikipedia.org/wiki/Deforestation

2.1.2 DEGRADATION OF BIODIVERSITY

Biodiversity includes plants, animals and other organisms. It is defined in the Convention on Biological Diversity (CBD) as the variability among organisms from all sources, including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part. It includes diversity within species, between species and of, and between, ecosystems.

It is an important source of natural resources and economic wealth internationally and locally. Economic benefits of biodiversity can be direct (direct exploitation/monetary gain), indirect (resources generated by other resources), available for future use, or philosophical/spiritual (subjective and moral value for humanity).

However, the consequences of various human activities (e.g., intensive agriculture, overgrazing, uncontrolled industry, unplanned urbanization), often act against preservation of biodiversity and sustainable natural resources management. Human activities may even lead to irreparable loss of animal and plant species.

About 40 percent of SAIs surveyed for this research consider the loss of biodiversity to be one of the most prevalent signs of land degradation in their country.

The vast majority of species currently in existence (of which only 1.4 million have been described so far out of an estimated total of between 5 and 30 million) have evolved from species that are now extinct. However, these natural extinctions occur at a rate that has little effect on overall biodiversity. Now, however, human activities have brought about an alarming loss of the world's biodiversity.

Although extinction is a natural phenomenon, it occurs at a natural "background" rate of about one to five species per year. Scientists estimate we are now losing species at 1,000 to 10,000 times the background rate, with literally dozens going extinct every day.[5]

Since 2007, the WGEA has developed guidance on auditing biodiversity (see Box 3 below) that provides information and practical advice for understanding the elements relating to the audit of this topic.

Box 3: Auditing Biodiversity: Guidance for Supreme Audit Institutions

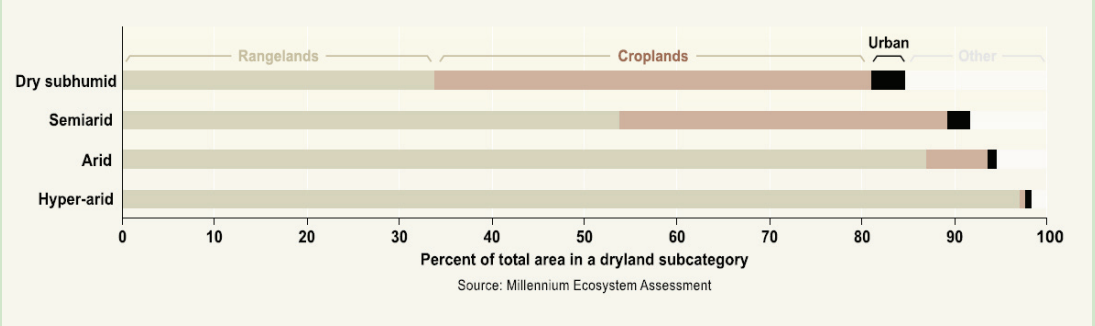
This a paper developed by the WGEA in the 2005–07 work plan period. It is an indispensable resource for audit practitioners, describing: what biodiversity means, why it is important, what threatens it, and what action governments are taking; a suggested process for choosing and designing audits of biodiversity; and practical guidance, information, and case studies related to biodiversity audits.

2.1.3 DESERTIFICATION AND SOIL EROSION

Desertification is land degradation in arid, semi-arid and dry areas. It involves progressive loss of soil productivity and depletion of plant cover due to human activities and climatic variations.

Land use often directly influences desertification. Land overuse, poor management of grazing areas and livestock, mechanized agriculture, bad irrigation practices, inadequate nutrient input back into the soil, deforestation, inadequate systems, and land use policies all contribute to desertification. Additionally, natural factors (for example, aridity over several years, uneven rainfall and recurrent drought) also influence the process of land degradation.

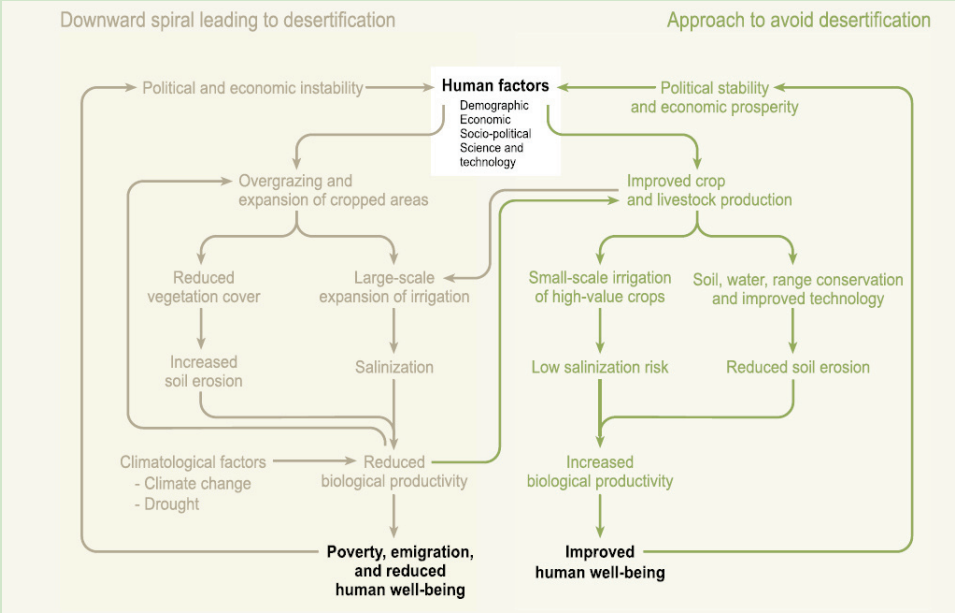
Figure 7: Land use in dry lands



[5] Chivian, E. and A. Bernstein (eds.) 2008. *Sustaining life: How human health depends on biodiversity.* Center for Health and the Global Environment. Oxford University Press, New York.

Desertification is one of the major concerns of SAIs surveyed. Indeed, at least 31 percent of SAIs consider desertification and soil erosion to be the most prevalent land use degradation in their country. Desertification threatens one-third of the total land area of the globe, more than 4 billion hectares. It also threatens the livelihood of about one billion people in over 100 countries. Those affected are mostly people who depend on the land for physical and economic survival, and who are often some of the poorest people in the world. Then, the effects of physical land degradation are made worse for people by other factors such as rapidly rising populations, socioeconomic pressures and international exchange rate variations (which may mean people get less money for their products). As a consequence, millions of people are finding themselves in a downward spiral towards poverty and deprivation.

Figure 8: Schematic description of model development in arid areas



Source: Millennium Ecosystem Assessment

Figure 9: A shepherd guiding his sheep through the high desert outside of Marrakech, Morocco.

2.2. IMPACTS OF LAND USE

2.2.1 DEGRADATION OF WATER QUALITY

Poor land use decisions (e.g., about the sorts and intensity of development that will be allowed on a piece of land) can result in big changes to natural land watersheds and water quality. Low-intensity uses include open spaces including woodlands, shrubs, grassland, farmland, and managed green spaces, whereas high-intensity uses include the likes of residential, commercial and industrial land use.

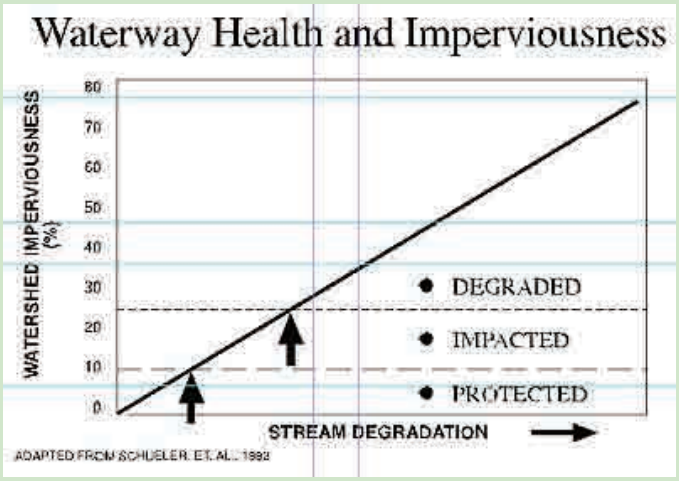
Box 4: What is aquatic pollution?

We talk about aquatic pollution when the balance has been altered permanently by the intake of excessive amounts of either more or less toxic substances, related to natural or human activities, as well by excessive hot water (e.g., from industrial processes). These actions can cause various types of pollution: increasing mortality of some animal or plant species, sometimes to the point of extinction; alterations to their physiological capacity; and deteriorating water quality - to the point of making it unsuitable for certain uses, such as human consumption. There are various forms of water pollution including pollution of surface water by industrial and municipal wastes, and by agricultural practices, over-pumping of groundwater, dumping of household and industrial waste, as well as bad sewerage practices.

When development occurs, the new land use changes how water is transported and stored. The combination of constraints related to impervious surfaces (driveways, roads, sidewalks, roofs, etc.) and compacted land creates a barrier to water infiltration coming from rainfall and snowmelt. This causes, for example, reduced water quality, increased volume and velocity of runoff, increased frequency and severity of floods, and the loss of storage capacity and runoff water in natural vegetation.

Numerous studies have established a direct relationship between intensity of development in an area - indicated by the size of impervious surfaces - and the level of water pollution. These studies suggest that water quality begins to be degraded at levels of imperviousness from 12% to 15% (or even lower levels for particularly sensitive streams).

Figure 10: Relationship between imperviousness cover and stream quality, http://ohioline.osu.edu/aex-fact/0443.html



Since 1996, the WGEA has adopted issues related to water as a central theme, in order to emphasize ongoing concerns about the quantity and quality of water resources (see Box 5 below).

Box 5: Auditing Water Issues: The Experiences of Supreme Audit Institutions

This 2004 document examines issues related to water, and summarizes the collective information and experience of SAIs around the world, acquired from more than 350 audits. This document was updated in 2013.

Figure 11: Untreated effluent flows from the Assalaya sugar factory to the White Nile.
http://postconflict.unep.ch/sudanreport/sudan_website/doccatcher/data/Photographs%20Figures%20and%20Captions%20by%20Chapter/Ch7/Chapter%20photos/7.4c%20Untreated%20Assalaya%20%20DSC_0046.JPG

2.2.2 DEGRADATION OF AIR AND ATMOSPHERE AND GLOBAL WARMING

Deforestation, urban sprawl, agriculture, and other human influences alter and fragment the natural landscape. This disturbance of land causes changes (large and small) in the atmospheric concentration of some chemicals and compounds (e.g., carbon dioxide, CFCs etc.). This in turn can alter energy flows to and from the surface of the earth.

Moreover, degradation of air quality, a direct cause of global warming, represents one of the biggest threats to the Earth. The Intergovernmental Panel on Climate Change (IPCC) says that global warming is unequivocally the cause of increased ocean temperatures, generalized melting of snow and ice, and rising mean sea level. The IPCC also states that it is very likely that global warming is caused by human activity, and that mitigation and adaptation efforts are needed by all countries to fight climate change.

Over 25 percent of SAIs surveyed reported that air degradation is among the most important environmental threats in their countries.

The WGEA approached this subject in 2010 by developing an audit guide (see Box 6).

Box 6: Auditing the Government Response to Climate Change: Guidance for Supreme Audit Institutions[6]

This document was prepared by the Working Group on Environmental Auditing in 2010. The guide contains background information such as a description of the sources of greenhouse gases, international environmental agreements and national programs aiming to mitigate emissions of greenhouse gases, adaptation to climate change impacts, and the extent of verification and reporting.

[6] Note: this guide deals only with greenhouse gas emissions

2.3. OTHER CAUSES OF LAND DEGRADATION

2.3.1 CONTAMINATION FROM WASTE

The United Nations Environment Programme (UNEP) considers that contamination from waste is an extremely important global issue. Poor waste management presents enormous risks for the environment, the health and welfare of humans and animals, and limits how the land can be used.

For example, the presence of garbage dumps in urban and suburban areas hinders the development of economic and tourist activities and reduces the quality of living. Poorly managed and badly located dumps and landfills are unsightly, smelly and can contaminate soil, groundwater and streams. Waste incineration contributes to air pollution. Insufficient collection of solid waste clogs wastewater and stormwater with sewerage and generates a lot of nuisance.

Untreated or poorly treated toxic, hospital and hazardous wastes are a significant danger to the environment and to public health. Radioactive waste is potentially lethal and can pollute large areas for centuries to come. Medical wastes may help spread diseases.

More than 40 percent of SAIs surveyed stated that waste contamination is one of the major land degradation threats faced by their country.

In 2003, INTOSAI WGEA developed an audit guide for waste management (see box 7).

Box 7: Towards Auditing Waste Management

This paper was developed by the WGEA in 2003. It gives an overview of waste management issues and provides Supreme Audit Institutions (SAIs) with the information they need to conduct audits in this area.

2.3.2 IMPACTS OF MINING

The extraction and processing of minerals and metals can have dramatic consequences for the environment and land use. The most serious impacts of mining are:

Impacts on water resources: Acidic mine drainage and leaching of contaminants associated with mining metals can have devastating impacts on aquatic life, rivers and streams. It can cause huge negative impacts on water quality.
Toxic substances can leach under settling ponds and stored mine tailings, then filter through the soil and contaminate groundwater, particularly if these facilities are not equipped with a waterproof coating. Actively pumping water from mines and unplanned water discharges from mine shafts can contaminate domestic supply wells and cause problems in both the quality and quantity of groundwater.

Impacts on air quality: Air emissions occur at each stage of mining, especially during the exploration, development, construction and operations. Mining operations shift huge amounts of materials. Waste batteries containing small but potentially dangerous particles are easily dispersed by wind.

Impacts on wildlife: Mining can cause problems for the local environment and biota by removing soil and vegetation, releasing pollutants, and generating excessive noise.

Impacts on soil quality: Soil erosion can release large amounts of sediment into surface water and drainage channels. Spills and leaks of hazardous chemicals and contaminated dust blown by the wind can lead to soil contamination.

In 2010, INTOSAI WGEA developed a guide for auditing mining (see Box 8 below).

Box 8: Auditing Mining: Guidance for Supreme Audit Institutions

The main objective of this 2010 guide is to increase SAIs' knowledge and awareness about mining audits by surveying different approaches to the problem. It is hoped the guide will lead to more mining audits. This guide will help SAIs audit mining activities by:

- educating auditors about the nature of mining activities and their potential impacts on the environment;
- describing the major role SAIs can play in auditing the actions of their governments and reminding them of their commitments;
- providing a four-step approach to help auditors to plan and conduct an audit of mining in their country; and
- presenting case studies that will help SAIs learn how others have approached this audit topic.

2.3.3 ENVIRONMENTAL RISKS RELATED TO THE MANAGEMENT OF LOCAL PUBLIC SERVICES

Management of public services by municipalities and local authorities has direct and indirect impacts on the local environment and sustainable local land use. These impacts are much more visible to people because the services (potable water, liquid waste disposal, domestic waste and assimilated waste from hospitals, transportation, energy, telecommunications, etc.) are usually close to people and often used by them. SAIs and public managers should note that their remit extends to environmental performance audits of public operators when they have delegated responsibilities for public services.

Transport is a good example of how local public services can impact on the environment. How well transport is managed has a significant impact on air pollution (through emissions of greenhouse gases), surface water pollution and noise pollution. It also affects the use of urban and rural areas, which in turn influences people's health, safety, citizen's mobility and access to economic activities.

Through its collection, treatment and disposal, the management of sanitation and solid waste directly affects the lives of people in existing and future neighborhoods. It also influences the quality of the environment and public health (for better or worse). Positive effects can come from waste being recycled and reused in agriculture or open spaces; negative effects for people, animals and plants could come from being exposed to dangerous downstream discharges.

The quality of management of public services largely determines the likelihood of efficiently implementing of local services, especially public transport, green spaces, installation of potable water, electricity, energy, telecommunications, etc. An urban community wishing to establish such services in accordance with the principles of sustainable development should promote urban development focused on effective service, with forms of urban development well designed in terms of the density of land use, the configuration of the streets, etc.

About 23 percent of SAIs surveyed said that environmental risks associated with the management of local public services are among the major causes of land degradation in their countries.

Figure 12: Roads on Ljubljansko polje, http://www.life-income.si/effects

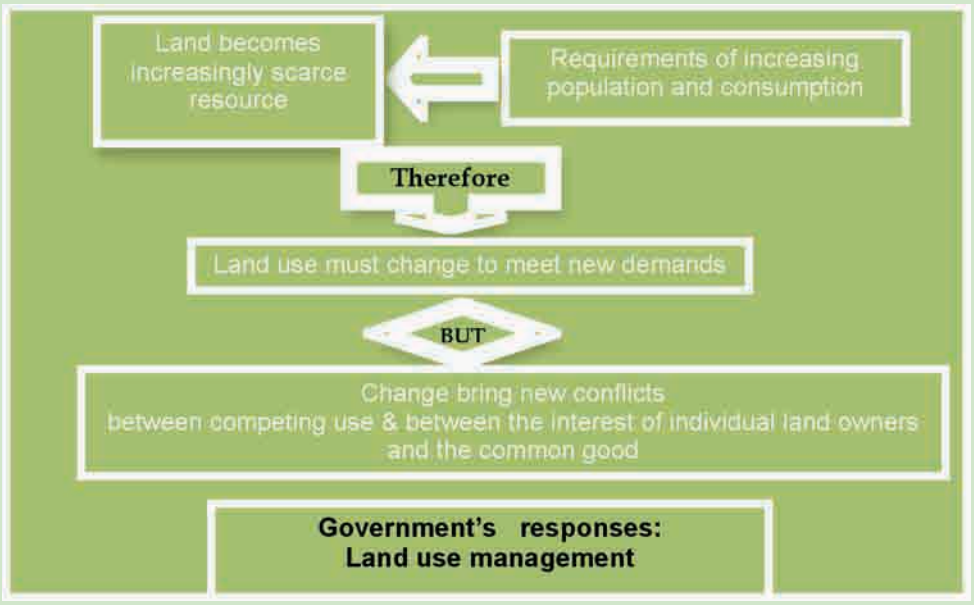
3.

GOVERNMENTS' RESPONSES TO THE ENVIRONMENTAL ISSUES RELATED TO LAND USE

This chapter discusses the programs and policy tools used by governments to mitigate or prevent environmental problems related to land use. It also discusses who is responsible for implementing these programs and policy tools.

Governments play a crucial role in implementing policies for wise (in the environmental sense) use of land. Governments regulate the exploitation of resources and they control land use. They can and do use a variety of public policy tools to authorize, finance, and implement these actions. Public policy tools include international agreements, laws, programs, and public education.
The importance of land use management is illustrated in Figure 13.

Figure 13: The importance of land use management



Governments manage land use through a variety of instruments. These include regulatory instruments - such as legislation, regulations, permits, licenses, bylaws, and ordinances, and economic instruments - such as subsidies, incentives, taxes, or grants. The following are descriptions of most used environmental policy tools.

3.1. INTERNATIONAL CONVENTIONS

The alarming state of land degradation, especially alongside increased competition for natural resources and climate change, presents a major global challenge for the international community regarding how to best manage these resources. Therefore, international cooperation in this area is becoming increasingly necessary. Various bilateral, regional, and international environmental agreements have been signed by national governments to conserve natural resources.

International cooperation in the field of sustainable land and water management is now a priority for many countries because of concerns about food security, poverty, protection of the environment, and climate change. Various international agreements invoke the principles of conservation of natural resources - especially land and water - but these principles have rarely been translated into actions. No general agreement on sustainable land and water management - accompanied by a framework for action - has yet emerged (FAO, 2011).

The United Nations Conference on Human Environment in Stockholm in 1972 and the Rio Conference in 1992 have resulted in increased cooperation, especially in terms of global initiatives to do with environmental governance.

International cooperation for land use management requires a supportive approach, especially from governments. The key elements for implementing international cooperation in this area include: an inventory of supply and demand of land resources, a toolkit of approaches for sustainable management of these resources, a shared vision (which is especially important), a strategy and an implementation framework for investment, all which supported by strong monitoring and evaluation (FAO, 2011).

Several organizations and programs including the Global Environment Facility (GEF) have done much to raise awareness of issues around sustainable land and water management. They have made strong calls for practical remedial measures to be taken. Some organizations have strengthened institutions and governance. However, different organizations working in the same area often take a limited, sector-specifc approach rather than an integrated approach. This leads to scattered efforts and limited results (FAO, 2011).

One of the key advantages of international cooperation is that it enables countries to call on resources (financial, technological and knowledge-based) of other countries. Sharing knowledge and experience reduces the uncertainty and burden for individual countries facing major land and water management issues. As a result of this cooperation, individual nations are more likely to be empowered to implement their own sustainable land and water programs (OECD, 2008).

In addition to international cooperation efforts, several regional programs have been developed, especially for Sub-Saharan Africa. Cooperation at regional and river basin level has generally been more active (FAO, 2011).

In 2009, the United Nations Environment Programme identified more than 280 agreements and multilateral environmental agreements (MEAs) that are fully dedicated to environmental protection. Almost all of these agreements affect land use, and the following are the principal MEAs (UNEP/WGEA, 2010):

- The Ramsar Convention on Wetlands;
- Convention on Trade of Endangered Species (CITES);
- Convention on the Conservation of Migratory Species of Wild Animals;
- Convention on Biological Diversity;
- International Tropical Timber Agreement;
- Convention to Combat Desertification in Countries Experiencing Serious Drought; and/or Desertification, Particularly in Africa;
- Convention Concerning the Protection of the World Cultural and Natural Heritage;
- Inter-American Convention for the Protection and Conservation of Sea Turtles;
- International Plant Protection Convention;
- International Treaty on Plant Genetic Resources for Food and Agriculture; and

To learn more about Multilateral Environmental Agreements (MEAs), see:

Auditing the Implementation of Multilateral Environmental Agreements (MEAs): A Primer for Auditor developed by UNEP in cooperation with INTOSAI-WGEA, 2010.
Available at www.environmental-auditing.org

3.2. LEGISLATION AND REGULATIONS

Governments have a variety of legal powers they can use to address environmental issues related to land use. Legal powers include legislation (Acts of Parliament or Congress), regulations, permits, licenses, bylaws, and ordinances.

Usually, national laws are required to give effect to international agreements. For example, if a country has ratified an agreement, the government has to introduce corresponding national legislation.

Some examples of regulation frameworks can be seen in Box 9.

Box 9: Morocco

In Morocco, the laws were formed gradually in response to multiple violations and to ensure the protection of the environment from, for example, marine pollution, deforestation and coastal erosion. Criminal law is being updated to take into account such issues as water management and waste. Punishment under the law varies with the seriousness of the offence – punishment may even extend to the death penalty. These are laws:

Law No. 10-95 of August 16, 1995 on "water" with its Chapter XIII deals with the "water police".

Law No. 11-03 of May 12, 2003, on "the protection and enhancement of the environment," with chapters 5 and 6 provide a number of punitive measures (Articles 76-79); plus the provisions governing the special regime of civil liability (Articles 63 to 68), the rehabilitation of the environment (Articles 69 to 72), and financial and tax incentives aimed at encouraging investment and funding projects for protecting and enhancing the environment (Articles 58 and 59).

Law No. 12-03 of May 12, 2003, concerning "environmental impact assessment", which devotes its Chapter IV, the detection of offenses and the right to sue.

Law No. 28-00 on "waste management and disposal", which devotes its Title VIII, "control, offenses and penalties."

Norway

Norwegian regulations on land use are characterized by an overall framework law which mostly deals with the regulation of processes. The Planning and Building Act encompasses all sectors, and it is the principal policy instrument for achieving sustainable land-use planning (see box 11 for more details about this Act).

In addition, there are special sector laws:
The Land Act (Ministry of Agriculture): This Act provides suitable conditions to ensure that the land areas in the country including forests and mountains and everything pertaining thereto (land resources) may be used in the manner that is most beneficial to society and to those working in the agricultural sector.

The Forestry Act: This Act promotes sustainable management of forest resources in Norway with a view to promoting local and national economic development, and securing biological diversity, consideration for the landscape, outdoor recreation and the cultural values associated with the forest.

Cultural Heritage Act: The purpose of this Act is to protect archeological and architectural monuments and sites, and cultural environments in all their variety and detail, both as part of Norway's cultural heritage and identity and as an element in the overall environment and resource management.

The Nature Diversity Act: The purpose of this Act is to protect biological, geological and landscape diversity and ecological processes through conservation and sustainable use. This is to be done in such a way that the environment provides a basis for human activity, culture, health and well-being, now and in the future, including a basis for Sami culture.

In addition to regulating the protection of species, the Act also regulates the management of protected areas such as national parks, habitats and nature reserves and marine protected areas, but also the management of so-called selected habitat types.

The purpose of national regulation is to restrict human activities so that the land can be used without inflicting adverse effects on the environment and good environmental conditions can be maintained. In addition, there needs to be monitoring of the regulatory system, to ensure that it is working as intended. As an example, the United States' SAI, the Government Accountability Office (GAO) produced the following two reports on aspects of their regulatory system (illustrated in Box 10 below).

Box 10: United States

A) Land Use Issues: A GAO Perspective/Study by the staff of the US-GAO

One of the most significant Bills that the Congress passed affecting land use was the Alaska National Interest Lands Conservation Act (Public Law 96-4871, December 2, 1980). This, Act more than doubled the size of the country's National Park and Wildlife Refuge Systems and nearly tripled the amount of land in the country designated as wilderness. The Act set aside over 100 million acres into conservation units that imposed varying degrees of restrictions when exploring for oil, minerals, and timber.
Also, the Act clarified policy and procedures for conveying lands to the State mandated by the Alaska Statehood Act and for transferring some 44 million acres of land due to Alaska Natives under the 1971 Alaska Native Claims Settlement Act (Public Law 92-203).

See more about this report at http://www.gao.gov/products/GAO-02-12 (accessed 27 March 2013)

B) GAO-12-335: Report to Congressional Requesters NONPOINT SOURCE WATER POLLUTION Greater Oversight and Additional Data Needed for Key EPA Water Program, May 2012

Land use substantially affects the type and extent of non-point source pollution of water bodies. For example, soil erodes naturally from undisturbed land, but the amount of erosion can increase many fold when trees are cut or the land is farmed. In addition, when land is used for housing or urban development, erosion from land clearing and excavation during construction can increase tremendously. Moreover, land use activities can also produce toxic pollution. For example, pesticide use in farming has resulted in toxic runoff, and mining has produced leaching of heavy metals and acid mine drainage.

For nearly 40 years, the Clean Water Act (CWA) has played a critical role in reducing water pollution and improving the health of the nation's waters, including rivers, lakes, and streams.
The purpose of the law is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Passed by Congress in 1972, the Act marked a shift in clean water policy, establishing a significant federal role in controlling point sources of water pollution. Throughout the 1980s, the Environmental protection Agency (EPA) issued a series of reports, including a key 1984 report to Congress, finding that in the decade following passage of the Act, control of point sources had resulted in significant achievements toward water quality goals but that these point source reductions had illuminated the non-point source contribution to water quality problems.

See more about GAO-12-335 at http://www.gao.gov/products/GAO-12-335 (accessed 27 March 2013)

Laws are also tools for determining how land is used, and by whom. In instances of multiple land use, laws set out priority uses for particular parcels of land. The most important is zoning.

Zoning laws are important in wildlife management or land use planning because they direct the manner in which important areas are to be used. Zoning laws therefore have the potential to ensure that resources are sustainably managed. In general, land use planning laws fall into two categories: those dealing with urban land, and those dealing with rural land. In addition to these, there are laws on wildlife and forest conservation, which prescribe rules specifically for these uses. A Norwegian example illustrates the use of regulations as tool for land use planning (Box 11 below).

Box 11: Norway

The main tool for land use planning: the Planning and Building Act

The Planning and Building Act, which encompasses all sectors, is the principal policy instrument for achieving sustainable land-use planning. The Act gives municipalities the authority to draw up legally binding land-use plans that govern land use in each municipality. According to this Act, plans must be compiled for the use and protection of resources and for physical development, so that land use and building activity will be to the greatest possible benefit to the individual and the community.

The Act enables the identification of zones requiring special consideration, which may also be applied in the interest of soil conservation. Municipal master plans may identify and describe zones requiring special consideration for agriculture, reindeer husbandry, outdoor recreation, green structures, landscape or the protection of the natural or cultural environment. This enables municipalities to stipulate guidelines that adequately safeguard particularly valuable agricultural land or cultural landscapes.

In terms of urban planning, regulatory instruments are created from laws relating to land and urban planning. Urban plans fulfill three functions: planning, programming, and regulation. For regulation, rules define permitted or prohibited land-use activities and state which rules are compulsory for administrative authorities and citizens. The stakeholders involved in managing land use can be numerous and can have both converging and diverging interests. Each stakeholder has a specific role, activities, and scope of influence. Their legal status is variable, ranging from the State itself, agencies/public offices, private organizations with delegated public service functions through public/private partnerships, and non-governmental organizations (NGOs). Stakeholders may include government departments and agencies at the national (federal), provincial, state, or local (municipal) levels.

Sometimes, the environmental governance efforts relating to land use are fragmented between various Acts that either directly or indirectly influence land-use issues. The administration of these Acts can also be fragmented among the various spheres of government. An example from South Africa is illustrated in Box 12 below.

Box 12: South Africa

Environmental governance/implementation fragmented among many laws and organizations
Land use (excluding environmental issues) is currently regulated by various separate, yet interrelated Acts, including the Physical Planning Act 125 of 1991, the Conservation of Agricultural Resources Act 43 of 1983, the Mountain Catchments Areas Act 63 of 1970, the Development Facilitation Act 15 of 1994, the Local Government Transition Act 209 of 1993, the Local Government Municipal Structures Act 117 of 1998, the Communal Property Associations Act 28 of 1996, and the Restitution of Land Rights Act 22 of 1994. Apart from these various national Acts, land use and planning are furthermore regulated by a vast number of provincial ordinances and laws. Environmental issues are referred to in only some of the post-1994 legislation.
It is clear that, for South Africa, environmental governance efforts relating to land use are fragmented among various Acts that either directly or indirectly influence land use issues. Consequently, the administration of these Acts is also fragmented among the various spheres of government, with different functionaries in each sphere who are responsible for implementing environmental governance mandates and responsibilities for these Acts. This fragmented land-use management regime may not sufficiently assist in addressing issues such as poverty alleviation, economic growth, environmental protection, and infrastructural development in a sustainable fashion.[7]

[7] Kotze, L.J. (online publication date, August 2009). "Strategies for Integrated Environmental Governance in South Africa: Toward a More Sustainable Environmental Governance and Land Use Regime." Chapter 12 in: "Land use law for sustainable development." Cambridge University Press. Retrieved from http://ebooks.cambridge.org/chapter.jsf?bid=CBO9780511511400&cid=CBO9780511511400A027

In terms of planning land use, several stakeholders operate at several levels. Figure 14 illustrates the relationships between these stakeholders.

Figure 14: Land use planning process

As an example, decision-making under the Resource Management Act (RMA) in New Zealand is devolved to the local and regional level. A more detailed explanation of this case is given in the Box 13 below.

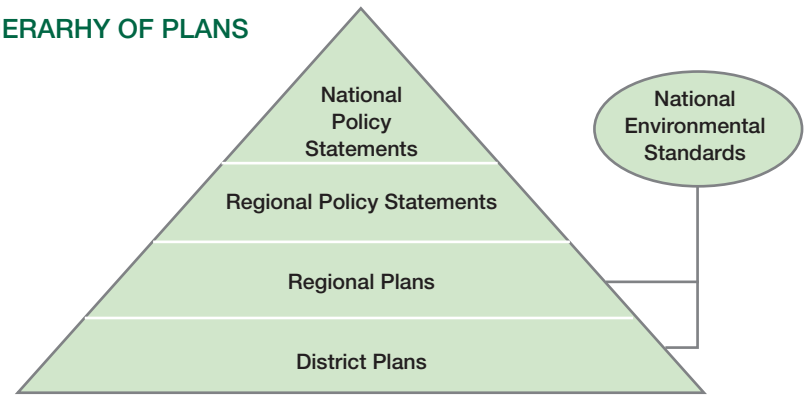
Box 13: New Zealand

The Resource Management Act (RMA): based on the effects of activities and on devolved responsibilities.

Land use is administered under the framework of the Resource Management Act (RMA) 1991
The RMA focuses on regulating the effects of activities rather than the activities themselves. This was a move away from a more prescriptive planning approach that existed under the Town and Country Planning Act 1977. That Act sought to manage the location of activities and to separate incompatible activities in a more conventional manner. By contrast, the RMA is an enabling Act, which seeks to intervene where activities are likely to result in unacceptable environmental impacts. It also provides a framework for the drafting of National Policy Statements, Regional Policy Statements and Plans, and District Plans. This creates an integrated hierarchy of nested plans.

Decision-making under the RMA is devolved to the local and regional level. This is based on the principle that decision-making is best carried out by those closest to the resources affected. Land-use decisions are predominately carried out by the territorial authorities (also known as District Councils) and decisions about air, fresh water, soil conservation and the marine area is carried out by Regional Councils. There are mechanisms for central government intervention, one of which is the "call-in" procedure used for matters of national significance for consideration by the Environmental Protection Authority.

HIERARHY OF PLANS



Source: EDS, http://www.rmaguide.org.nz/rma/introduction/approach.cfm

[8] Some additional resources on the Resource Management Act 1991:
- The RMA quality planning resource. Homepage: http://www.qualityplanning.org.nz/
- The Resource Management Act (RMA). In the NZ Legislation Website. Retrieved from http://www.legislation.govt.nz/act/public/1991/0069/latest/DLM230265.html
- Environmental Defence Society website. "Resource management Act for the Community". Retrieved from http://www.rmaguide.org.nz/index.cfm

3.3. ECONOMIC TOOLS AND INCENTIVES

With increasing recognition of the need for orderly planning of land use to conserve valuable resources, protect the environment, and limit uncontrolled growth, governments use other types of policy tools, including grants, loans, subsidies, taxes, user charges, and service fees. Sometimes, the use of these types of tool is grounded in financial or environmental legislation.

Economic tools and incentives can play an important role in influencing land use. But they do require new approaches in tax or incentive policies, approaches that try to raise revenues and promote particular land-use objectives.

As an example, the US Government Accountability Office (GAO) has conducted a study on "Federal Incentives Could Help Promote Land Use That Protects Air and Water Quality". A more detailed explanation of this can be found in Box 14.

Box 14: USA

Incentives to encourage consideration of land management practices and development strategies.
The following federal and state legislative tools were suggested as ways that sustainable use of land and water could be encouraged.

- Impose fees, charges, and requirements on developers that cover the cost of both new infrastructure and services to achieve water-quality protection. For example, (1) levy impact fees based on projected development impacts (e.g. impervious cover generated); (2) build infrastructure and environmental mitigation costs into charges for construction permits; or (3) require new greenfields development to cover the full cost of extending new water and sewer lines, roads, and other services.

- Revise State Revolving Fund requirements so localities can address a broader set of water quality issues. For example, provide funding on a cost/share basis to states and localities that actively monitor watersheds, have targeted those watersheds that need continuous improvement, and implement BMPs and other land use management practices that reduce or eliminate urban non point source pollution.

- Use tax policies as incentives to implement land use practices that are protective of water quality. For example, (1) increase an entity's property tax rate if the amount of non-point source pollution it contributes exceeds a community's standard, (2) employ split rate taxation or provide developers with tax relief to encourage urban rather than Greenfields development, (3) establish storm water utilities and base charges on projected water quality impacts, and (4) provide property tax relief for property owners willing to permanently conserve land.

GAO-02-12: ENVIRONMENTAL PROTECTION: Federal Incentives Could Help Promote Land Use That Protects Air and Water Quality, GAO, October 2001. URL is http://www.gao.gov/products/GAO-02-12 (accessed 27 March 2013)

3.4. POLICIES AND PROGRAMS

Governments are gradually formulating multiple policies and programs to regulate the exploitation of different forms of land use and to preserve specific elements of biodiversity. These policies aim to reconcile conservation of natural resources with economic development.

Successful implementation of programs requires that they have sufficient monetary resources, skilled people, clearly defined goals, and are backed up by adequate legal powers. Government should set performance measurements regarding the implementation of their policies or programs.

The following section deals with the main kinds of policy instruments. In general, these instruments are to do with conservation, prevention, protection, restoration, and mitigation. Figure15 illustrates the main factors that have an impact on land use and the main responses from governments.

Figure 15: Government's land-use management: influences and responses

3.4.1 CONSERVATION INSTRUMENTS

Conservation policies are aimed at protecting natural and built resources, including built heritage, by limited access or by prohibiting access outright. These policies usually lead to the creation of conservation areas and spaces. Conservation area is a term that can have a range of meanings as illustrated in Box 15 below.

Box 15: What conservation area means? African Convention on the Conservation of Nature and Natural Resources

Article V. USE OF TERMS

6. **"Conservation area"** means: a) any protected area designated and managed mainly or wholly for one of the following purposes:

i) science or wilderness protection (Strict Nature Reserve/Wilderness Areas);
ii) ecosystem protection and recreation (National Parks);
iii) conservation of specific natural features (National Monuments);
iv) conservation through management interventions (Habitat/Species Management Areas);
v) landscape/seascape conservation and recreation (Protected Landscapes/Seascapes); and
vi) the sustainable use of natural ecosystems (Managed Resource Protected Areas).

In respect of instruments for dealing with different forms of land use, governments have a range of options at their disposal. The following sections discuss some of the ways governments act to preserve different kinds of land and water resources.

a) Conservation of land and soil

Policy instruments adopt land-use plans based on scientific research as their foundation, as well as local knowledge and experience, and capacity classifications of land use. In this context, agricultural policies and land reforms are essentially aimed at:

- Improving soil conservation - including the introduction of farming methods and sustainable forestry to ensure long-term land productivity;
- Fighting against erosion caused by the misuse and mismanagement of land that can cause a loss of soils and surface vegetation; and
- Fighting against pollution caused by agricultural activities, including aquaculture and animal husbandry.

Conservation policies relating to non-agricultural forms of land use (relating to public works, mining, waste disposal, etc.) are not too dissimilar to policies that relate to agricultural uses - in that they aim to establish standards and practices for preventing or mitigating erosion, pollution and other forms of land degradation.

b) Conservation of water resources

These policies include the rational management (that is, based on science) of water resources to ensure:

- Maintaining essential ecological processes and protecting human health against pollutants and waterborne diseases;
- Preventing the discharge of pollutants that may have harmful effects on human health or natural resources;
- Preventing excessive water extraction (that is, the taking of water from any source, either temporarily or permanently), so that downstream communities will benefit;
- Implementing planning policies for the conservation, management, use and development of groundwater and surface water, as well as the collection and use of rainwater, to ensure that people get a sufficient and continuous supply of suitable water; and
- Water conservation is undertaken in such a way that greater food security is ensured and agricultural productivity is maintained.

An example from New Zealand of an approach to developing land and water policy options can be seen in Box 16.

Box 16: New Zealand

Collaborative processes: Land and Water Forum. The New Zealand Government has been investigating new ways of making-decisions on scare resources. One of the most prominent initiatives is the Land and Water Forum. Funded by the Government, this is a collaborative approach comprising a diverse range of primary industry representatives (e.g., farming organizations), environmental and recreational NGOs, Kiwi groups (representing indigenous people) and other organizations with an interest in freshwater and land management. These are joined by local and central government observers.

In 2009, the Forum was asked by the Government to conduct a stakeholder-led collaborative process to recommend reform of New Zealand's freshwater management. In September 2010, the Forum reported back to Ministers identifying shared outcomes and goals, and options to achieve them. It then undertook public consultation on its recommendations throughout New Zealand and in April 2011 provided Ministers with its findings, recommendations and thoughts.

In response, the Government launched a package of water policy initiatives in May 2011 in line with the Forum's recommendations, to improve the way water is managed. These included the National Policy Statement for Freshwater Management (which provides central government direction to regional councils), a $35 million Irrigation Acceleration Fund, and the $15 million Fresh Water Clean-up Fund. The Government also asked the Forum to continue its role as a consensus builder among water stakeholders and provide further, more detailed, recommendations on the remaining policy issues in 2012.

The Forum's work for 2012 was split into two reports. The first report gave advice on setting limits for water quality and quantity, and improvements to decision-making. The second report, provides advice on how to manage to limits, including allocation of freshwater resources, and additional tools to manage the effects of land use on water. In early 2013, the Government began a further consultation process on options identified by the Forum.

You can find out more about the Land and Water Forum and its work at http://www.landandwater.org.nz/ (accessed 27 March 2013)

c) Conservation of plant cover

These policies use scientifically established plans as their basis. The plans themselves need to balance the sometimes competing needs of maintaining vegetation cover (e.g., for maintaining water balance in an area), and the need to support the economic and social aspirations of human users of the land. A good understanding of the use and management of forests, woodlands, grasslands, wetlands, and other vegetation types is required. In addition, a good understanding of traditional ways of using the land is also required (especially if these traditional land uses are sustainably based). Other policies may be developed to control fires, forest exploitation, land clearing, grazing by domestic animals and wildlife, and invasive species; and to create forest reserves and implement reforestation programs where they are needed.

d) Conservation of species and genetic diversity

Implementation of conservation policies relating to genetic diversity are made under land-use plans and sustainable development. In particular, these policies focus on the conservation of species and their habitats that have a social, economic, scientific and environmental value, or those found only in particular areas.

e) Preservation of productive cultivated land and cultural landscape

The preservation of productive cultivated land and cultural landscapes has long been a priority of land-use and environmental policies. For example, in Norway an investigation showed that there is some uncertainty attached to national reporting of the extent to which agricultural land is being physically developed. Regional analyses in this investigation showed a steady increase in the number of buildings constructed on cultivated land. The investigation also revealed that the registration of Norway's most important cultural landscapes is not standardized, and that large regional differences made it difficult to use mapping at an aggregated level. The physical development of cultivated land is nonetheless an indication that the cultural landscape is also being reduced. These facts provided grounds to question whether cultivated land and cultural landscape are being safeguarded in a satisfactory manner[9].

Several governments have adopted strict laws regulating all forms of collection, including hunting, trapping and fishing and the collection of plants or plant parts and the regulation of trade, possession and transport of specimens and products.

[9] The Office of the Auditor General's investigation of sustainable land-use planning and land use in Norway Document no. 3:11 (2006–2007). Retrieved from : http://www.eurosaiwgea.org/Environmental%20audits/Other%20issues/Documents/2007-Norway-The%20Office%20of%20the%20Auditor%20General%E2%80%99s%20investigation%20of%20sustainable%20land-use%20planning%20and%20land%20use.pdf

Some examples of conservation instruments can be seen in Box 17.

Box 17: UK

Areas of Outstanding Natural Beauty (AONBs) in England, Wales and Northern Ireland

The primary purpose of the AONB designation is to conserve natural beauty – which by statute includes wildlife, physiographic features and cultural heritage, as well as the more conventional concepts of landscape and scenery. Account is taken of the need to safeguard agriculture, forestry and other rural industries and the economic and social needs of local communities. AONBs have equivalent status to National Parks as far as conservation is concerned.
AONBs are designated under the National Parks and Access to the Countryside Act 1949, amended in the Environment Act 1995. The Countryside and Rights of Way Act 2000 clarifies the procedure and purpose of designating AONBs.

National Parks

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them.

The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales. In addition, the Environment Act 1995 requires relevant authorities to have regard for nature conservation. Special Acts of Parliament may be used to establish statutory authorities for their management (e.g., the Broads Authority was set up through the Norfolk and Suffolk Broads Act 1988).

The National Parks (Scotland) Act 2000 enabled the establishment of National Parks in Scotland. In addition to the two purposes described above, National Parks in Scotland are designated to promote the sustainable use of an area's natural resources and the sustainable social and economic development of its communities. These purposes have equal weight and are to be pursued collectively unless conservation interests are threatened.

Further information on other relevant designations are available here can be found at http://jncc.defra.gov.uk/page-1527 (accessed 27 March 2013)

The Government published a "White Paper" in June 2011 on the Natural Environment, which aims to improve the quality of the natural environment across England, halt the decline in habitats and species, and strengthen the connection between people and nature. Key measures in the White Paper include:

- Creating new Nature Improvement Areas (NIAs), transforming rural and urban areas, and providing bigger, connected sites for wildlife to live in and adapt to climate change.
- Working with the horticulture industry to phase out peat use, which will help to protect and restore peatlands, which are valuable carbon sinks, habitats and part of the nation's ecological network.
- Creating Green Areas Designation that will give local people an opportunity to protect green spaces that have significant importance to their local communities.
- Providing better urban green spaces for the benefit of cities and towns. Support for parks, gardens, and tree planting which benefit people and nature alike.

In New Zealand, the Conservation Act 1987 established the Department of Conservation to bring together a number of conservation functions under one agency. The Act is intended to promote the conservation of New Zealand's natural and historic resources and to establish an agency with functions and powers to serve that purpose. The functions of the Department also extend to other Acts including the Wildlife Act 1953, Marine Mammals Act Protection Act 1978, Marine Reserves Act 1971, Reserves Act 1977, National Parks Act 1977, and the Wild Animal Control Act 1977. These Acts provide a "toolbox" of mechanisms to support conservation aims. Some examples are described below:

Conservation Areas – land that is held or set aside for conservation purposes. They are managed through conservation management strategies and plans that implement general policies and establish detailed objectives for management. No activity can occur in a conservation area without a concession granted by the Department.

National Parks – The National Parks Act 1980 provides for the protection of areas that "contain scenery of such distinctive quality, ecological systems, or natural features so beautiful, unique, or scientifically important that their preservation is in the national interest". It affords the highest level of protection that can only be revoked by an Act of Parliament. It balances preservation with public access and enjoyment, but with greater weighting on preservation. Sensitive areas can be given greater exclusion. National Parks have been established to protect areas that are scenically spectacular, but also representative of the range of New Zealand ecosystems.

Reserves – provide for preservation and management of areas with special values or features.

Figure 16: The Citadel of Kastellet, Copenhagen, that has been converted into a park, showing multiple examples of suburban land use.

3.4.2 RESTORATION OR REHABILITATION

The US-based Society for Ecological Restoration (SER) defines ecological restoration as: the process of assisting the recovery of ecosystems that have been degraded, damaged or destroyed.[10] It is an intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity, sustainability, and its physical capacity to support all living organisms and its connectivity with the surrounding landscape.

This requires a good knowledge of the functional and evolutionary ecology of targeted ecosystems, the history of human-made degradation and, finally, the choice of a reference ecosystem to guide planning, implementation, monitoring and evaluation of the restoration project.

Like restoration, ecological rehabilitation uses historical or pre-existing ecosystems as models or references, but the two approaches differ in their goals and their strategies. Rehabilitation emphasizes the repair and recovery processes and, therefore, their effect on productivity and ecosystem services. In contrast, the primary aim of restoration is to restore the pre-existing biotic integrity in terms of species composition and ecological community structure.

Restoration and rehabilitation policies aim to limit and control access to space and resources in order to allow natural processes to restore an ecological balance that has been lost. They also focus on proactive practices to accelerate the process of restoring the balance of nature (such as watershed management, setting of dunes and fighting against desertification, building dams, urban forestry, capture of ground carbon, etc.).

One example of a restoration or rehabilitation instrument is a program from Morocco that illustrates how this country has developed a strategy to fight against desertification. It is shown in Box 18 below.

[10] Society for Ecological Restoration (2004). SER International Primer on Ecological Restoration. URL: https://www.ser.org/resources/resources-detail-view/ser-international-primer-on-ecological-restoration#3 (accessed on 8 March 2013)

Box 18: National Action Program to fight against desertification Kingdom of Morocco

Established in 2001, the National Action Program to Fight against Desertification (PANLCD) was created to overcome desertification, which threatens 90% of the country. It was designed to promote a strong link and synergy between sectoral programs through actions driven upstream or downstream in the following areas:

- Support and complement the process of fighting against desertification by strengthening the political, legislative and institutional capacities as well as stakeholders;
- Support initiatives to generate income by testing new models of participatory development and the development of micro credit to finance local investment;
- Support measures to fight against desertification and mitigate the effects of drought by integrating development of pilot forest areas, creating village forests and windbreaks curtains, and promoting rainwater harvesting and renewable energy;
- Increase knowledge and monitoring systems by compiling an inventory of natural resources, strengthening the network of ecological monitoring, establishing an observatory of drought, and monitoring; and
- Evaluation of program impacts.

Within the framework of this program, 579,000 ha of watershed have been equipped, 36,000 ha for reforestation and dune stabilization. This program has also allowed the creation of 10 national parks, 24 natural and biological reserves, 3 biosphere reserves, and the construction of 130 dams.

3.4.3 PROTECTION AND PREVENTION INSTRUMENTS

These policies aim to minimize or mitigate the impacts of development on land use, and to limit or eliminate the negative impact of human activities on the environment. Most governments are developing strategies and actions for protecting the environment, and most of these strategies and actions have the following in common:

- Integration of regional and sectoral environmental policies (industry, energy, transport, agriculture, tourism, urban planning, health, etc.);
- Implementation of development strategies in environmental fields and regenerative and non-regenerative resources;
- Strengthening institutional capacity in terms of dealing with environment issues. This is to ensure that funds for environmental protection are allocated transparently - through national programs and international plans for protecting the environment;
- Aim to improve the quality of environmental factors in urban and rural areas by having policies that focus on:
  - Air quality (atmosphere protection, monitoring systems, inventory system of pollutant emissions);
  - Implementing integrated waste management programs (selective systems to reduce, reuse and recycle waste, properly handle hazardous waste, and adopt legal provisions concerning hazardous waste in the industry, worn out vehicles, electrical and electronic equipment, etc.);
  - Managing water resources in ways consistent with national and international agreements, protocols and conventions (collection systems and treatment plants for wastewater); and
  - Controlling industrial pollution, including: setting up pollutant registers at national and local levels, putting in place legislation to limit organic emissions during major accidents involving dangerous substances, and introducing management systems and environmental self-monitoring of emissions.

The environmental impact assessment (EIA) is the primary tool for environmental protection. It has been adopted by many countries, although each country uses EIA in its own way for its own objectives. However, the EIA has the same benefits and its definition is the same wherever it is used. Moreover, it occurs in a pattern that is essentially identical in all countries. It includes all procedures and documents for a project or facility - from the design through to final operations. It enables an assessment to be made of the environmental impact of the project and its compatibility with requirements of environmental protection (ecosystem protection, forest conservation, landscape protection, water, hunting, fishing etc.).

Generally, for projects that require impact assessments, any authorization for that project will require there to be properly prepared planning documents relating to the area designated for the project.

Prevention takes many forms because all the instruments of environmental protection, without exception, have preventive effects. The prevention principle was formalized by the Rio Conference, in its Principle 2 (Appendix 4 describes EIA, as stated in the Rio declaration on environment and development.). It also extends to instruments that were originally aimed at having a redistributive function. Such is the case of strict liability regimes and environmental taxation.

Prevention policies are generally proactive. They act in several ways, including prohibitions, controlling harmful activities, information provision, and financial or other incentives.

Prohibition

This is the most extreme way to translate the principle of prevention. Prohibition may include:
- Prohibiting a particular substance or product from being placed on the market; and
- Prohibiting the implementation or operation of certain activities.

Prohibition can be used when setting up and operating a technical landfill, or a factory with radioactive effects, or when accommodating particular waste etc.

Control of the harmful activity

This is a more conciliatory approach for addressing conflicting interests. For example, some activities are allowed for economic and social reasons, but those activities will be controlled (e.g., by the choice of location for a processing plant wastewater, a dump etc.).

This control is based on the self-purification capacity of ecosystems. Some consider that the solution to pollution is dilution, and that it is not necessary to translate the discharge of pollutants to zero. However, for this approach to operate, the control level needs to be set at an equivalent level to the capacity of environment to absorb it. This has led to the imposition of standards that can be general, sectoral (e.g., standard of wastewater discharge per sector), or specific (e.g., specific regulation of a product). The use of mechanisms often means that any standards operating will need to include punishment for non-compliance.

Information

There is a need for better information about environmental impacts. This is increasingly being recognized, and evaluations and studies of risk are becoming widespread, especially in relation to sensitive areas (such as GMOs or soil pollution). Investigations may also take place afterwards, through monitoring activity by an auditing system, supervisory control etc.

Incentives

The prevention principle is introduced in the policies of environmental protection through mechanisms that encourage the potential polluter to take preventive measures. Direct incentives usually take the form of public support for a prevention policy. Sometimes the incentives are financial. Indirect incentives include, for example, mechanisms such as strict liability. This usually encourages pollutes to undertake prevention (in part to avoid public condemnation, and also because of the threat of legal and financial penalties).

Box 19: Prevention policies United Kingdom

Agri-environment schemes have been set up to pay farmers to implement and maintain environmental land management measures (such as hedgerow management, low fertilizer treatment for grassland, and woodland management).
There is legislation for protecting designated **Sites of Specific Scientific Interest (SSSI)**. Natural England, a non-departmental public body, now has responsibility for identifying and protecting the SSSIs in England under the Wildlife and Countryside Act 1981.
The SSSI notification package includes a list of operations requiring Natural England's consent (formerly known as operations likely to damage the special interest). None of the listed operations can be carried out without Natural England's consent, or the consent of another public body (provided the other body has formally consulted Natural England).
If an SSSI is suffering as a result of a lack of positive management or from neglect, and Natural England cannot reach a voluntary agreement with the owner, they may pursue more formal legal methods, such as serving management schemes and management notices. In the most extreme cases, powers of compulsory purchase may be used.
It is an offence for any person to intentionally or recklessly damage or destroy any of the features of special interest of an SSSI, or to disturb wildlife for which the site was notified.
A standard of sustainable forest management certification covers 45% of the UK woodland (comprising of all state forests and 22% of other forests).

3.4.4 MITIGATION INSTRUMENTS

Mitigation means the lessening or limitation of the adverse impacts of hazards and related disasters. The adverse impacts of hazards often cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. Mitigation measures encompass engineering techniques and hazard-resistant construction as well as improved environmental policies and public awareness.

Mitigation policies are aimed at reducing the intensity of certain hazards and vulnerability issues to ensure that the costs of damage associated with the occurrence of geological or climate phenomena are bearable. They are specific to the prevention of major natural hazards. They push state and local governments to involve institutions and individuals who must act to reduce the vulnerability of resources.

Mitigation policies may result in experimental, innovative solutions to meet environmental concerns. Landscape transformation is not uncommon (green belts, green plans agglomeration, urban forests, facilities pollution control, control of wind, pollution dispersion, etc.). They also reflect the ability of individuals, organizations and systems, to cope with and manage difficult conditions and emergencies caused by natural disasters.

An example of mitigation instruments from the USA is illustrated in Box 20 below.

Box 20: Mitigation instruments: USA

Most states and localities do not comprehensively assess the impacts of land use on air and water quality and develop ways to mitigate any adverse effects, according to survey results. Transportation officials in areas with poor air quality were more likely to estimate whether different land uses would reduce the amount of vehicle emissions from their transportation plans, but this is because the law requires them to ensure that their plans do not worsen air quality. Assessing air quality impacts is important because land use that increases reliance on cars can increase emissions containing carbon monoxide and other pollutants in certain geographic areas, such as developed areas that already have air quality problems. These emissions can cause respiratory, cardiovascular, and other illnesses. Assessing water quality impacts is important because land use that increases paved surfaces increases polluted storm water runoff, endangering water quality and public health.

Survey respondents said the federal government could help and provide:

- Financial incentives for transportation, environmental, and land use officials to collaborate on more protective land-use strategies;
- Technical assistance to assess and mitigate land-use impacts; and
- Public education on the environmental impacts of land use and transportation decisions.

The Environmental Protection Agency (EPA) and the Department of Transportation (DOT) have initiatives that provide some of this support, but others are limited in scope and not part of a coordinated strategy. The Congress is also considering ways to remove federal barriers and provide states and localities with additional assistance.
GAO-02-12: ENVIRONMENTAL PROTECTION: Federal Incentives Could Help Promote Land Use That Protects Air and Water Quality, GAO, October 2001. More about this is at http://www.gao.gov/products/GAO-02-12 (accessed 27 March 2013)

Mitigation measures are often used in areas prone to floods and landslides. This is an example of a mitigation measure being used as a tool for dealing with the effects of climate change. An example from Norway is illustrated in Box 21 below.

Box 21: Examples of instruments targeting rivers and hazard areas related to flood and landslides Norway

The Norwegian Planning and Building Act states that development is not allowed unless safety is at an "acceptable level", with local municipalities responsible for ensuring that this is the case. Norwegian Water Resources and Energy Directorate (NVE) offers guidance to local municipalities in the form of flood inundation maps, maps showing areas at risk of quick clay landslides, and gives expert advice to municipal land-use authorities.

NVE has also developed a national guideline defining acceptable safety levels with respect to floods and other hazards related to rivers. The safety levels are differentiated according to hazard type and type of asset. A step-by-step procedure for assessing hazards has been designed to fit in with the existing planning process and levels typical for a local municipality. The following procedure is recommended:

- Municipal plan: potential hazard should be identified;
- Zoning plan: the actual hazard should be described and risk quantified; and
- Building case: a satisfactory level of safety must be documented.

This procedure ensures that areas with a potential hazard are identified at an early stage in the planning process. Municipalities have more reliable and predictable land-use plans as a result.

NVE can object to a land-use plan if due consideration to a flood or landslide hazard has not been taken into account. Areas that are especially exposed to danger of flooding, erosion, landslides and ice flows may be set aside as a "danger zone."
For more information about the flood and landslide see: http://www.nve.no/en/Floods-and-landslides/Flood-inundation-maps/
For more information about the databases that contains the geo-data that produces the maps see: http:// www.nve.no/en/Water/NVEs-geographic-databases/

3.5. PLANNING AND ZONING, USE OF SPATIAL TECHNOLOGIES

Computer-based Geographical Information System (GIS) can map and analyze geographical spatial data and integrate what appears on a map with, for instance, data from geological analysis and general database operations. GIS technology has developed quickly, and has been widely applied in the land resource administrations.

For land planning, the new technical possibilities of mapping - with satellite positioning systems and remote sensing - are powerful tools for planning. These new technologies help tackle problems related to land use.

In this regard, governments are more and more interested in remote sensing as a land-management and knowledge tool. Satellite images are becoming a major tool for developing territory and resource knowledge, initially because of the outstanding overviews they offered but also because they provide the means for regularly viewing the less accessible areas in any vast territory. The satellite images therefore provide the means for following up the situation and delivering an up-to-date portrait of land change.

Examples of using spatial technology to manage land are set out in Box 22.

Box 22: Using spatial technology to manage land

New Zealand

Local authorities, central government agencies, and Crown research institutes all use spatial technology to identify, manage and protect ecosystems on land and water.
Mapping and spatial technologies are used in regional and district plans. The protection of outstanding natural features and landscapes from inappropriate subdivision, use and development is a matter of National Importance under section 6b of the Resource Management Act 1991. The process of identifying these areas at a district and regional level falls to the respective local authorities, as does the development of methods for their sustainable management.
Increasingly GIS is being used to identify hazard areas/zones, and predict the effects of climate change on sea level rise.

Some very useful information on how Landcare Research (a CRI – Crown Research Institute) is using remote sensing to map ecosystem services is available at: http://www.landcareresearch.co.nz/science/soils-and-landscapes/ecosystem-services (accessed 27 March 2013)

UK

The Department for Environment, Food and Rural Affairs relies on Geographic Information Systems (GIS) to make informed decisions about policy and legislation where these decisions depend on capabilities in disciplines such as land surveying, farm and wildlife management, emergency management, impact assessment and overall environmental governance. Many of the Department's responsibilities are discharged through arm's-length bodies and since 2000 the Department has coordinated the use of GIS across its arm's length bodies, through negotiating bulk buying of software, licenses and data sets.

Specific uses of GIS by the Department and it's bodies are broad and includes data analysis and modelling (e.g. identifying optimum location for reforesting), contingency and emergency response (e.g. the UK experienced floods in summer 2007 – GIS was used to map the most affected areas in real-time to protect key infrastructure), asset and resource management (e.g. to monitor natural assets and resources that change over time, such as Natural England's monitoring of Sites of Special Scientific Interest), and citizen engagement (e.g. GIS systems are used to keep the population informed about flood risks through a public facing website).

More information in GIS report "Department for Environment, Food and Rural Affairs: Geographic information strategy", 2011.

Increasingly, governments use remote sensing in various applications related to many land and resource management projects such as:

- In forestry - to map major forest fires and the progression of deforestation;
- In agriculture - to demarcate major crops and different cultivars;
- In the environmental field - to demarcate ecological units or support the setting up of conservation parks;
- In urban studies - to estimate the extent of urbanization;
- In geology - to plan field surveys and compile structural information; and
- In cartography - to update maps.

By undertaking many remote sensing projects, governments have developed expertise and acquired know-how in using satellite data to help manage land, resources, and the environment.
For auditors, GIS can be used also in both planning and conducting the audit. GIS-derived information can be used to precisely identify the area of the land that will be used for field observations, to locate any deforestation, to investigate illegal logging, and to assess illegal land use and land degradation.

In a land-use audit, GPS precisely locates the area of the land that is to be audited. An example of the use of GIS and GPS in a land-use audit (Forest audit) can be seen in Appendix 2 of the WGEA publication Auditing Forests: Guidance for Supreme Audit Institutions.

GIS can be gathered and used as audit evidence. GPS is very effective when it comes to auditing environmental degradation and loss of biodiversity (as was done during an audit on wildlife in protected areas conducted by SAI of Paraguay). GIS and GPS were used in the planning, executing, and reporting phase of a compliance audit done by the SAI of Indonesia on the Government's forest planning and management. A better quality audit resulted from the use of these tools.[11]

Another example is when the National Audit Office of China trialed GIS technology for its 2011 land resources, audit Box 23 below sets out more information about that audit.

Box 23: Using GIS technology when auditing land use The National Audit Office of China

The National Audit Office of China trialed GIS technology for its 2011 national land resources audit project. The "Geological Information Aid Audit System" developed on the basis of GIS technology and ArcGIS (a product developed by ESRI – a major supplier of GIS technology) were used for trial audits in the fields of land supply, use and land treatment, etc. Useful information and knowledge was gained from these trial audits. Using GIS resulted in greatly improved audit efficiency for aspects such as land area checking and land category analysis.
In the national land resource audit project of 2011, on the basis of audit practices, 6 GIS-based land audit methods were trialed; these methods were included in the "Directory of Computer-Aid Audit Methods" prepared by the National Audit Office of China; one is rated as an excellent method, making GIS a good supplement to conventional auditing methods.

Figure 17: Using spatial technologies to manage land. http://www.plumb-surveying.com/new/wp-content/uploads/2012/04/GeoEye-2_r-1024x787-300x230.jpg

[11] Auditing Forests: Guidance for Supreme Audit Institutions, 2010, WGEA-INTOSAI.
http://www.plumb-surveying.com/new/wp-content/uploads/2012/04/GeoEye-2_r-1024x787-300x230.jpg

4.

AUDITING LAND USE/LAND MANAGEMENT ISSUE(S)

Land use and land management issues are a great concern for SAIs around the world. The significant number of audits conducted in this field shows it. An examination of the audit reports database at the WGEA website has identified more than 98 audit cases dealing with land use and land management issues. In addition, a questionnaire addressed to the INTOSAI community about this theme (within WGEA's Seventh Survey) showed the importance of these issues; of the 36 countries that responded to the questionnaire, 23 (64%) indicated that they had conducted audits on land use and land management.

In this chapter, we identify the foremost aspects emerging from audits highlighted in SAI responses to the questionnaire. This allows us to define a hierarchy of topics to audit. This hierarchy rates recurring land use and land management issues that were treated in the audit operations. Four main audit topics have been identified.[12]

TOPIC 1: GOVERNMENT POLICY ON LAND USE AND LAND MANAGEMENT

The existence of a national policy on land use and land management and environmental policies focused on the protection and sustainable use of land resources are prerequisites of any land management review at the country level. Based on the responses to the questionnaire on this project, it appears that most countries have diverse policies that incorporate sustainable land use and management (see Chapter 2 and 3).

International agreements may require governments and stakeholders to take measures that sometimes require the development of national policy. Thus, a national policy, consistent with the objectives of sustainable land resources and international agreements, may be subject to an audit.
By analyzing SAI cases and case summaries on the WGEA site, we identified 5 examples that directly address this issue.

- SAI of Estonia (2008): Government activities relating to unreformed land;
- SAI of Finland: The state's role in increasing the supply of lots and creating a more compact urban structure;
- SAI of New Zealand (2006): Department of Conservation: Planning for and managing publicly owned land;
- SAI of USA (1990): Management of the public lands by the Bureau of Land Management and the U.S. Forest Service; and
- SAI of USA (2012): Unconventional oil and gas development, key environmental and public health requirements.

TOPIC 2: EFFECTIVENESS OF PLANNING TOOLS FOR LAND USE

Land use and land management is an issue involving many stakeholders, and with an impact on all economic and social sectors as well as the environment. Consequently, effective planning and management is needed to reconcile all stakeholders' objectives and to bring them all together in a way that results in sustainable land use. The efficiency and effectiveness of land-use tools can be a subject of audit by an SAI. Two examples are:

- SAI of Brazil (2009): Potential effectiveness of economic ecological zoning (ZEE) as a planning tool of the state; and
- SAI of Norway (2007): Sustainable land-use planning and land use.

[12] See appendix 5 for the detail of examples identified among each topic.

TOPIC 3: SUSTAINABLE USE OF LAND RESOURCES

Land management policies lead to socio-economic projects involving several sectors (e.g., agriculture, industry, infrastructure, urban planning etc.). The implementation of these projects involves the use of land according to well-defined guidelines. A valid topic for auditing is how well specific socio-economic projects do, in fact, meet established criteria for sustainable use of that land. Three case studies are identified:

- SAI of Estonia (2005): Exploitation of peat resources;
- SAI of Poland (2010): Protection of forest and agricultural areas in the urbanization process in Lower Silesia in the years 2006-2009; and
- SAI of UK (2010): Defra's organic agri-environment scheme;
- SAI of UK (2007): Reducing the reliance on landfill from England; and
- SAI of USA (2002): Agricultural conservation, State Advisory Committees' views on How USDA programs could better address environmental concerns.

TOPIC 4: PROTECTION, REGENERATION AND REHABILITATION OF LAND RESOURCES

Socio-economic activities have many effects on land resources (see Chapter 2). To what extent a particular response to an environmental issue makes use of protection, regeneration, or land rehabilitation measures will vary on a case-by-case basis. There is no Ðone size fits allÐ approach. However, the effectiveness and efficiency of these measures can be a legitimate topic for an audit by an SAI. Five examples are identified:

- SAI of Mexico (2007): Management assessment of Protected Natural Areas;
- SAI of Morocco (2008): Audit of the High Commissioner for Water, Forests and Combating Desertification (HCEFLCD);
- SAI of New Zealand (2006): Department of Conservation: Planning for and managing publicly owned land;
- SAI of UK (2008): Natural England's role in improving Sites of Special Scientific Interest;
- SAI of USA (2011): Restoration effort needs common federal and state goals and assessment approach; and
- SAI of USA (2003): USDA needs to better ensure protection of highly erodible cropland and wetlands.

APPENDIX I:

GLOBAL LAND USE AREA/REGION IN 2009 (1000 Ha)

Region	Agricultural area	Country area	Land area	Forest area	Other land	Inland water
Africa (Total)	**1 161 062,10**	**3 031 568,60**	**2 964 678,60**	**677 898,08**	**1 138 040,62**	**66 890,00**
Eastern Africa	305 094,10	636 166,60	605 628,60	182 666,49	127 763,41	30 538,00
Middle Africa	160 732,00	661 266,00	649 682,00	313 514,20	176 808,80	11 584,00
Northern Africa	242 143,00	852 470,00	838 039,00	78 558,80	517 337,20	14 431,00
Southern Africa	167 449,00	267 283,00	265 205,00	28 795,40	69 021,20	2 078,00
Western Africa	285 644,00	614 383,00	606 124,00	74 363,19	247 110,01	8 259,00
Americas + (Total)	**1 193 648,04**	**4 075 051,00**	**3 889 231,20**	**1 573 315,40**	**1 122 267,76**	**185 819,80**
Northern America + (Total)	471 289,74	2 022 692,00	1 865 166,00	613 777,34	780 098,92	157 526,00
Central America + (Total)	121 290,00	248 666,00	245 227,00	84 715,00	39 222,00	3 439,00
Caribbean + (Total)	11 862,40	23 412,40	22 599,00	6 890,66	3 845,94	813,40
South America + (Total)	589 205,90	1 780 280,60	1 756 239,20	867 932,40	299 100,90	24 041,40
Asia + (Total)	**1 638 836,30**	**3 196 501,15**	**3 093 556,55**	**590 819,33**	**863 901,32**	**102 944,60**
Central Asia + (Total)	283 108,30	400 289,90	392 679,00	12 067,90	97 502,80	7 610,90
Eastern Asia + (Total)	649 489,00	1 176 250,75	1 146 305,95	252 068,66	244 748,29	29 944,80
Southern Asia + (Total)	309 192,00	687 622,40	639 977,40	92 638,30	238 147,10	47 645,00
South-Eastern Asia + (Total)	124 215,60	449 532,10	434 093,00	215 150,70	94 727,10	15 439,10
Western Asia + (Total)	272 831,40	482 806,00	480 501,20	18 893,77	188 776,03	2 304,80
Europe + (Total)	**472 631,47**	**2 299 858,90**	**2 207 347,00**	**1 004 230,41**	**730 485,12**	**92 512,90**
Eastern Europe + (Total)	314 860,00	1 882 625,00	1 805 059,00	854 007,20	636 191,80	77 566,00
Northern Europe + (Total)	38 325,38	174 973,00	164 261,50	72 246,76	53 689,36	10 711,50
Southern Europe + (Total)	65 181,79	131 632,00	129 480,00	44 741,64	19 556,57	2 153,00
Western Europe + (Total)	54 264,30	110 628,90	108 546,50	33 234,81	21 047,39	2 082,40
Oceania + (Total)	**422 870,30**	**856 143,70**	**848 654,70**	**192 456,24**	**233 354,65**	**7 489,00**
Australia and New Zealand + (Total)	420 520,00	800 897,00	794 565,00	158 501,86	215 543,14	6 332,00
Melanesia + (Total)	2 090,00	54 078,00	52 959,00	33 376,52	17 492,48	1 119,00
Micronesia + (Total)	96,40	317,00	317,00	185,55	58,79	
Polynesia + (Total)	163,90	851,70	813,70	392,31	260,24	38,00

APPENDIX II:

THE IMPORTANCE OF LAND DEGRADATION IN THE INTOSAI COMMUNITY

The table below ranks land-use issues according to their importance for the countries that responded to our survey. The scale ranges from "1" – most important issue to "7" – least important issue.

Scale Threats	1	2	3	4	5	6	7
Deforestation	China, Azerbaijan, Trinidad-Tobago, Papua New Guinea, Latvia, Albania, Ukraine, Zimbabwe, Honduras, Brazil, Canada, Madagascar, Bangladesh	Netherlands, Morocco, Paraguay, Bulgaria, Botswana, Mexico	Cyprus	Estonia, Saudi Arabia, Bhutan	South Korea	New Zealand	Poland, Hungary, France, Czech Republic
Degradation of biodiversity	Azerbaijan, Netherlands, Paraguay, Estonia, Norway, Kuwait; Finland	China, Trinidad-Tobago, Brazil, Bangladesh, Saudi Arabia, New Zealand, Czech Republic	Albania, Canada, Botswana	Honduras, Madagascar, Mexico, France	Papua New Guinea, Latvia, Ukraine, Zimbabwe; Bulgaria, Cyprus, Hungary	South Korea, Poland	Morocco, Bhutan
Desertification and soil erosion	Kuwait, China, Botswana, Mexico, Cyprus, Morocco	Azerbaijan, Netherlands, Norway, Trinidad-Tobago	New Zealand, Madagascar, Bulgaria	Paraguay, Brazil, Albania, Ukraine, Zimbabwe	Saudi Arabia, Honduras, Poland	Czech-Republic, Canada, France, Papua New Guinea, Latvia, Hungary, Bhutan	South Korea
Environmental risks related to the management of local public services	Netherlands, Poland, Norway	China, Azerbaijan, Kuwait, Trinidad-Tobago, Estonia	Hungary, France, Papua New Guinea, Latvia	South Korea, Morocco	-	Albania, Paraguay	Bulgaria, Saudi Arabia, Bhutan, Ukraine, Zimbabwe, Honduras, Brazil, New Zealand, Cyprus, Botswana, Canada, Madagascar, Mexico, Czech-Republic
Degradation of water quality	Kuwait, Netherlands, China, Trinidad-Tobago, South Korea, Hungary, New Zealand	Azerbaijan, Canada, Madagascar, Cyprus, Honduras, Papua New Guinea, Finland	Norway, Poland, Mexico, Morocco, Paraguay, Bhutan, Ukraine, Zimbabwe, Estonia	Bulgaria, Czech-Republic	France, Botswana, Brazil	Saudi Arabia, Albania	Latvia
Contamination from waste	Netherlands, China, Azerbaijan, Bulgaria, Saudi Arabia	Kuwait, Trinidad-Tobago, Hungary, Poland, Bhutan, Ukraine, Zimbabwe, France, Albania	South Korea, Honduras, Norway, Czech-Republic, Brazil	New Zealand, Cyprus, Papua New Guinea, Finland, Botswana, Latvia, Morocco	Canada, Estonia,	Madagascar, Mexico	
Degradation of air and atmospheric	Kuwait, Azerbaijan, Netherlands, Norway, France	China, Trinidad-Tobago, Latvia, South Korea	Saudi Arabia	Poland, Canada, Hungary	Mexico, Morocco, New Zealand, Madagascar, Paraguay, Bhutan	Botswana, Cyprus, Bulgaria, Brazil, Ukraine, Zimbabwe, Honduras, Estonia	Albania, Papua New Guinea, Czech Republic

APPENDIX III:

CONSEQUENCES OF DEFORESTATION

Deforestation has direct and indirect consequences on the soil, climate, environment and biodiversity:

Impact on soil stability

The roots of forest trees are vital for soil conservation, as protection against avalanches and landslides, for stabilization of sand dunes, and for protecting coastal areas.

Impact on global climate and pollution

Vegetation is a vital purifier of air and water. Forests contribute about 80% to the exchange of carbon between vegetation, soil and atmosphere. Forests permanently absorb and release CO_2. CO_2 is the main greenhouse gas emitted by forests, especially in case of fire. Forest fires also emit methane (10% of all methane linked to human activities comes from the burning of forest biomass) and nitrous oxide (N_2O). These two gases are significant greenhouse gases.

Greenhouse gas emissions are known to cause global warming of the planet that currently leads to extremely important climate changes. Greenhouse gases are a major contributor to global warming.

Because of their weight, their density and scale, forests represent a considerable biomass (carbon stocks): they contain about half of the carbon in terrestrial vegetation. How to manage them has a real impact on the amount of greenhouse gases emitted into the atmosphere.

Impact on biodiversity

Primary forests account for 80% of land biodiversity.

Impact on erosion and local climate change

Deforestation causes excessive water runoff. Forests slow water movement: the leaves and other organic matter found on the forest floor absorb water from heavy rains, releasing it slowly into the soil. Deforestation can lead to catastrophic flooding, as water runoff is no longer constrained by the plant roots. Without these tree roots, landslides are likely to occur.

Overgrazing and intensive farming destroy humus and vegetation that protect soil against erosion. Eroded soil can absorb a lot of water. This makes the soil more likely to slip. In addition, the natural flow of water into streams can be interrupted.

Loss of soil fertility

Without tree cover, soils are exposed to wind, sun and rain. Topsoil is quickly replaced by a hard, unproductive crust.

Shifting patterns of cultivation, such as coffee, have left behind millions of acres that could not be used only for less demanding crops.

Impact on health

The destruction of forest habitats for many species facilitates the transmission of infectious diseases to humans through contact with mosquitoes, monkeys, virus- and bacteria -carrying rodents that are potentially hazardous to humans.

APPENDIX IV:

ENVIRONMENTAL IMPACT ASSESSMENT IN THE RIO DECLARATION ON ENVIRONMENT AND DEVELOPMENT

Principle 17 (see http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm)

Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.

United Nations Framework Convention on Climate Change

(see http://unfccc.int/resource/docs/convkp/conveng.pdf)

Article 4: 1. All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, shall:

(f) Take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example **impact assessments,** formulated and determined nationally, with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment, of projects or measures undertaken by them to mitigate or adapt to climate Change

Convention on Biological Diversity

Article 14: Impact Assessment and Minimizing Adverse Impacts. 1. Each Contracting Party, as far as possible and as appropriate, shall:

(a) Introduce appropriate procedures requiring **environmental impact assessment** of its proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimizing such effects and, where appropriate, allow for public participation in such procedures;

(b) Introduce appropriate arrangements to ensure that the environmental consequences of its programs and policies that are likely to have significant adverse impacts on biological diversity are duly taken into account;

(c) Promote, on the basis of reciprocity, notification, exchange of information and consultation on activities under their jurisdiction or control which are likely to significantly affect adversely the biological diversity of other States or areas beyond the limits of national jurisdiction, by encouraging the conclusion of bilateral, regional or multilateral arrangements, as appropriate;

(d) In the case of imminent or grave danger or damage, originating under its jurisdiction or control, to biological diversity within the area under jurisdiction of other States or in areas beyond the limits of national jurisdiction, notify immediately the potentially affected States of such danger or damage, as well as initiate action to prevent or minimize such danger or damage; and

(e) Promote national arrangements for emergency responses to activities or events, whether caused naturally or otherwise, which present a grave and imminent danger to biological diversity and encourage international cooperation to supplement such national efforts and, where appropriate and agreed by the States or regional economic integration organizations concerned, to establish joint contingency plans. (see http://www.cbd.int/convention/articles/default.shtml?a=cbd-14)

APPENDIX V:

SAIs CASE STUDIES

TOPIC 1: GOVERNMENT POLICY ON LAND USE AND LAND MANAGEMENT

2008: SAI of Estonia: Government activities relating to unreformed land

Audit objectives:

In its action plan for 2007-2011, the Government of the Republic had set itself the goal of disposing of unreformed lands that were not needed by the state, under uniform and transparent criteria, no later than by 2011. The Government planned to spend EEK 682 million to this end. The report analysed the extent to which Government objectives had been complied with. Furthermore, it addressed the set of problems relating to the municipalisation of land and assessed the Government's capacity to manage the real rights established with regard to state land.

Audit findings:

The goals of land reform in relation to the restitution and privatization of land have been mostly accomplished. The NAO (National Audit Office) believes that the key to completing the land reform lies in forming a state land reserve, determining the land needs of local governments, and making commercial use of the unreformed land not needed by the state.
The land reserve includes extensive areas, but it is not known which lands the Government needs in the future and which lands will be subject to municipalisation.
The NAO lacks assurance that the unreformed land can be entered in the land cadastre (a database consisting of the land register with cadastral maps and the cadastral archives), and that the land not needed by the state can be disposed of by the time limit set by the Government of the Republic – i.e. 2011. Given how the formalities relating to land are currently being completed, the process of entering vacant lands in the land cadastre and putting the land into commercial use is likely to be much longer and more expensive.

The Government's further operations with unreformed land need an in-depth analysis. According to the principles approved by the Government, unreformed lands are registered as state-owned and included in the state land reserve – later, unneeded land in that reserve will be disposed of under the Government Property Act. The principles were adopted without analysing the costs of acquiring the land, and less time- and cost-intensive alternatives were not analysed.

The need for state land reserve and the principles of its formation need to be reviewed. The land reserve has been formed without due regard to the state's future land needs, and the land reserve includes a lot of land the state does not need. Since the character of the land reserve and the principles of its maintenance are not laid down by law, it is not clear which lands will be subject to disposal and which will remain in the land reserve.

Many local governments lack the detailed plans and development strategies for determining the land needed for local development. The local governments would like to have more than three times as much commercial, production and residential land as they have today. However, the lack of their development strategies and general plans limits the central government's ability to determine the land needs of local governments.

The local governments lack motivation to municipalise the land necessary for the performance of their tasks. In several instances, the local governments have not applied for the municipalisation of the land under the buildings and roads they own or the green areas located in densely populated areas. According to local governments, the applications have not been lodged because the preparations for applying for municipalisation are too expensive.

Unreformed lands are not maintained and the corresponding forest lands have not has necessary work done. Since the legislation puts the responsibility for managing unreformed lands on the central government, and the performance of these tasks is usually the duty of County Governors, funds for maintenance have not been allocated over the years. Therefore, unreformed lands and the forests there have been neglected and have become favourite sites to illegally dispose of garbage.

The monitoring of rights and obligations imposed on state land is inadequate. There is still no functioning and comprehensive system for managing the contracts and financial claims related to the establishment of building rights, usufruct (the right to use and enjoy the profits and advantages of something belonging to another as long as the property is not damaged or altered in any way), and mortgages. The government authorities are in disagreement regarding the establishment of a single database and are in disagreement over who will be responsible for its management.

Recommendations:

As the legislation did not provide for uniform principles for managing unreformed lands and forming the state land reserve, the NAO recommended that the Government initiate a broad Parliamentary discussion on the completion of the land reform to determine the future direction of the national land policy. To conduct further operations with unreformed land it is essential to: (i) introduce uniform principles setting out whether, over what timeframe, and how the unreformed land not needed by the state will be disposed of; (ii) appoint a specific authority for disposing of the land not needed by the state; (iii) have legally defined objectives of forming the state land reserve and the arrangements for managing that reserve; (iv) establish uniform principles for disposing of production, commercial and residential land not needed by the state which would take into account the balanced spatial development needs of local governments and promote the land use envisaged in general plans; and (v) establish a single information system in order to get an overview of the real rights imposed on state land and the financial claims relating to the disposal of state land.

Full report is available at:
http://www.riigikontroll.ee/tabid/206/Audit/2042/Area/15/language/en-US/Default.aspx (accessed 27 March 2013)

2010: Finland: Regulation of urban sprawl (Audit: the state's role in increasing the supply of lots and creating a more compact urban structure)

In Finland, a compact urban structure is one of the objectives in land-use planning and lately also in climate policy. In spite of this, migration has continued to growth centers' neighboring municipalities, where new construction is predominantly low-rise housing scattered outside the planned area. Urban sprawl increases the need for private motoring and makes it difficult to organize proper public transport. Increased traffic raises climate costs and acts in a way that runs counter to other environmental objectives, such as reducing pollution or noise. In the longer perspective, it is not simple to make a sprawled structure denser later on. Consequently, development threatens to tie these regions into a carbon-intensive structure for decades to come.

In addition to environmental problems, a scattered building structure increases costs related to building and maintaining infrastructure, and providing welfare services (such as school transportation or home-care for the elderly). The NAOF found that there is not enough information about these costs. Furthermore, there are some support systems that make commuting from the outskirts of cities profitable. For instance, a tax deduction for commuting costs is meant to increase the mobility of labor. The NAOF pointed out the negative impacts from a climate perspective and recommended a proper and transparent analysis of the impacts of tax deductions and their economic consequences, including climate costs.

In Finland, municipalities have the main responsibility for land-use planning. In principle, local authorities have the means to control urban sprawl. The NAOF found that in spite of this, regulation has failed. The main reason for this is traditionally extensive building rights in a country with a relatively low population density. Another problem has been the lack of coordination between municipalities. Nor has regional land-use planning been able to solve the problem. The situation is worsened by some state support systems that are handled by sectors with no direct responsibility for land-use planning. The NAOF called for a coordinated approach and better cooperation between different sectors, as well as between municipalities and the state.

Summary of the report is available at:
http://www.vtv.fi/files/2300/2082010_The_states_role_in_increasing_the_supply_of_lots.pdf
(accessed 27 March 2013)

2006: SAI of New Zealand: Department of Conservation: Planning for and managing publicly owned land

Objectives of audit:

The New Zealand Department of Conservation is responsible for managing 8.5 million hectares of publicly owned land, including national parks and other conservation land. The objective of the performance audit was to examine the Department's strategic approach for managing the land, and the adequacy of its management and information systems to implement that planning.

Audit findings:

Overall, the Department met, or partially met, most expectations. The Department had policies and objectives for land within its statutory planning documents, and comprehensive management and information systems. However, the Department's strategic planning, management systems, and information systems were not always well connected.
The SAI said that the Department needs a national strategic plan for land, and stronger central oversight within its land management and land information systems, particularly for land transactions, so there is more clarity and consistency in managing publicly owned land for conservation purposes.

Strategic planning for land:

Strategic planning involves setting long-term objectives and goals. OAG expected the Department to have comprehensive national strategic planning for the publicly owned land it manages. OAG expected this planning to be in writing, and be coherent, clear, and accessible. To assess whether the Department met these expectations, OAG examined the Department's statements of general policy, conservation management strategies, management plans for national parks, and strategic plans.
The Department had policies and objectives for land within its statutory planning documents. In OAG's view, a clear and comprehensive national strategic plan for land would provide for co-ordinated and consistent implementation of these policies and objectives throughout the Department. A national strategic plan for land would also enable effective co-ordination of the Department's management and information systems to achieve long-term objectives for land.

The effectiveness of the Department's strategic planning would be improved if it finished all the planning documents required by law (as they contain long-term objectives for land), and if it also ensured that the management objectives within and between conservation management strategies were clear and consistent.

Land management systems

Management systems involve processes and procedures to ensure that long-term objectives and goals are achieved.

The OAG expected the Department's priorities and resource allocation for carrying out plans to manage publicly owned land to be clear at both a national level and conservancy level. We expected roles and responsibilities for land management to be clearly defined, and we expected the Department to have guidance in place to ensure that different parts of the organisation followed the same set of procedures when undertaking any land management work. The OAG also expected any acquisition, disposal, transfer, or reclassification of land to be consistent with such guidance.

The OAG examined the Department's Statement of Intent 2005-2008, its annual business planning process, standard operating procedures for land management, delegations framework, and accountability systems. The OAG examined the Northland, East Coast Hawke's Bay, and West Coast Tai Poutini Conservancies' approaches to setting priorities and undertaking land transactions. The OAG also undertook 2 case studies on land transactions undertaken by the Department.

The Department had comprehensive land management systems, which included many of the processes and procedures that we expected. However, in OAG's view, these systems need to provide guidance for conservancies in setting priorities for land that are linked clearly to statutory policies and objectives. The Department also needs stronger and more centralised compliance monitoring, including reviewing all land transactions undertaken by the Department through the Land Acquisition Fund and by conservancies.

Land information systems

OAG expected the Department to gather appropriate information about the land it manages, and expected the Department to have comprehensive information systems that would store such information consistently and accessibly for staff who need it for their work.

The Department was also expected to use the land information for making decisions and checking progress against relevant planning objectives and priorities.

The OAG examined the Department's National Land Register and procedures for its maintenance and use, property documentation for 28 individual properties in the Northland, East Coast Hawke's Bay, and West Coast Tai Poutini Conservancies, and the Department's reporting systems and processes. The Department had detailed land information systems, which included much of the information we expected. However, OAG identified some ways to make the systems more effective.

Storing land transaction information consistently would help the Department to check that land transactions comply with standard operating procedures, and ensure that the Department has a clearer overview of the land it manages.

Storing information about conservation values of land consistently would ensure that the information is accessible to staff who need it to do their work. Gathering information about the origin of individual properties would help the Department to do certain types of work.

The Department uses land information to inform business plans and programmes, and to report on the legal protection of different land types. It is setting up systems to use land information for measuring, evaluating, and reviewing its performance in protecting natural and historic heritage areas.

The Department could also use the information it holds to systematically check whether land classifications appropriately protect the land they apply to.

Recommendations:

OAG recommended that the Department of Conservation:

1. Give priority to finishing conservation management strategies and national park management plans that it has not prepared or reviewed within statutory timeframes;
2. Prepare a national strategic plan for all the land it manages;
3. Prepare guidance for conservancies in setting priorities within business plans that are clearly linked to statutory policies and objectives for land;
4. Formally monitor compliance with relevant standard operating procedures of all land transactions undertaken by conservancies;
5. Review recent land transactions undertaken through the Land Acquisition Fund, and by all conservancies, to identify any common deficiencies and to ensure that the standard operating procedures are followed;
6. Consider the usefulness of gathering information on the origin of all the individual properties it manages;
7. Review its systems to record land transactions, to gain oversight of the number and type of land transactions occurring within individual conservancies and throughout the country;
8. Include on its Land Register (or though links from its Land Register) references to relevant conservation management strategies, reports, inventories, and surveys relating to properties it manages; and
9. Use land conservation value information as part of a programme to ensure that land classifications appropriately protect the land they apply to.

Full report available at: http://www.oag.govt.nz/2006/doc-landholdings/docs/doc-land.pdf (accessed 27 March 2013)

1990: SAI of USA: Management of the Public Lands by the Bureau of Land Management and the U.S. Forest Service

GAO discussed the Bureau of Land Management's (BLM) and Forest Service's management of public lands. GAO found that: (1) Congress required BLM to manage federal lands using multiple-use and sustained-yield principles to ensure perpetual maintenance of the land's productive capacity and balanced land management to benefit all uses; (2) BLM historical deference to special interests led to management actions that were inconsistent with those principles; (3) BLM progress in implementing an effective wildlife management plan was hampered by inadequate resources and its willingness to allow competing interests to routinely take precedence over wildlife interests when conflicts arose; (4) more than 13 years after legislation required land use plans, BLM had completed less than half of the required plans; (5) BLM rarely used strong penalties to enforce grazing trespass regulations and often made key oil and gas lease decisions without adequate information on potential environmental impacts; and (6) although BLM has made aggressive improvement efforts, it has met much resistance from those that benefited from its historical management practices.

GAO also found that: (1) inadequate funding and staffing contributed to the Forest Service's backlog of trail maintenance and reconstruction; and (2) the Forest Service did not know the full extent of resource deterioration in some wilderness areas and it could not develop, operate and maintain many of its special recreation areas because of funding shortfalls.

Full report available at: http://www.gao.gov/products/T-RCED-90-24 (accessed 27 March 2013)

2012: SAI of USA: Unconventional Oil and Gas Development, Key Environmental and Public Health Requirements

Objectives:

GAO was asked to review environmental and public health requirements for unconventional oil and gas development and: (1) describe federal requirements; (2) describe state requirements; (3) describe additional requirements that apply on federal lands; and (4) identify challenges, if any, that federal and state agencies reported facing in regulating oil and gas development from unconventional reservoirs. GAO identified and analyzed federal laws, state laws in six selected states (Colorado, North Dakota, Ohio, Pennsylvania, Texas, and Wyoming), and interviewed federal and state officials and representatives from industry, environmental, and public health organizations.

Audit findings:

As with conventional oil and gas development, requirements from eight federal environmental and public health laws apply to unconventional oil and gas development. For example, the Clean Water Act (CWA) regulates discharges of pollutants into surface waters. Among other things, CWA requires oil and gas well site operators to obtain permits for discharges of produced water - which includes fluids used for hydraulic fracturing, as well as water that occurs naturally in oil- or gas-bearing formations - to surface waters. In addition, the Resource Conservation and Recovery Act (RCRA) governs the management and disposal of hazardous wastes, among other things.

However, key exemptions or limitations in regulatory coverage affect the applicability of six of these environmental and public health laws. For example, CWA also generally regulates stormwater discharges by requiring that facilities associated with industrial and construction activities get permits, but the law and its regulations largely exempt oil and gas well sites. In addition, oil and gas exploration and production wastes are exempt from RCRA hazardous waste requirements based on a regulatory determination made by the Environmental Protection Agency (EPA) in 1988. EPA generally retains its authorities under federal environmental and public health laws to respond to environmental contamination.

All six states in GAO's review implement additional requirements governing activities associated with oil and gas development and have updated some aspects of their requirements in recent years. For example, all six states have requirements related to how wells are to be drilled and how casing - steel pipe within the well - is to be installed and cemented in place, though the specifics of their requirements vary. The states also have requirements related to well site selection and preparation, which may include baseline testing of water wells before drilling or stormwater management.

Oil and gas development on federal lands must comply with applicable federal environmental and state laws, as well as additional requirements. These requirements are the same for conventional and unconventional oil and gas development. The Bureau of Land Management (BLM) oversees oil and gas development on approximately 700 million subsurface acres. BLM regulations for leases and permits govern similar types of activities as state requirements, such as requirements for how operators drill the well and install casing. BLM recently proposed new regulations for hydraulic fracturing of wells on public lands.

Federal and state agencies reported several challenges in regulating oil and gas development from unconventional reservoirs. EPA officials reported that conducting inspection and enforcement activities and having limited legal authorities are challenges. For example, conducting inspection and enforcement activities is challenging due to limited information, such as data on groundwater quality prior to drilling. EPA officials also said that the exclusion of exploration and production waste from hazardous waste regulations under RCRA significantly limits EPA's role in regulating these wastes. In addition, BLM and state officials reported that hiring and retaining staff and educating the public are challenges. For example, officials from several states and BLM said that retaining employees is difficult because qualified staff are frequently offered more money for private sector positions within the oil and gas industry.

GAO is not making recommendations. In commenting on the report, agencies provided information on recent regulatory activities and technical comments.

Full report available at: http://www.gao.gov/products/GAO-12-874 (accessed 27 March 2013)

TOPIC 2: EFFECTIVENESS OF PLANNING TOOLS FOR LAND USE

2009: SAI of Brazil: Potential Effectiveness of Economic Ecological Zoning (ZEE) as a planning tool of the state

Objectives of audit:

Evaluate conditions needed for Federal Government to implement ZEE as a state planning tool.

Audit findings (including audit evidence):

1. The role of ZEE as a tool for environmental policy is more important than its function as a state planning component, especially in the scope of the Federal Government;
2. Investigate the possibility of using guidelines to create public policies and indications of productive activities as a decisive criterion to grant environmental licenses, and not only as qualifying or conditioning factors of such analysis;
3. Lack of legal provisions regarding integration of zonings with budget cycles;
4. State planning for indigenous land and conservation units is dissociated from the state planning as expressed in the ZEE;
5. The zoning process does not take into consideration the influence of interdependent areas in different states;
6. Lack of coordination in the ZEE Coordinating Committee – CCZEE;
7. The structure of the decision-making process does not allow appropriate assessment of the state ZEEs by several CCZEE members; and
8. Lack of legislation dealing with the ZEE review process.

Recommendations:

1) Enable ZEE to become a planning tool, and give the Planning Ministry a special role in the zoning process.

2) Indicate a content model for ZEE:

   • Suggestions: economic activities to be developed by the State, whose environmental licensing process can be simplified, or recommendation for the creation of a protection zone with the pertinent activities. The suggestion itself does not bind the private parties, but it is binding for the state. Thus, the state must create guidelines for public policies.

   • Environmental licensing criteria created in the ZEE: Conditions or clauses that the enterprise – whether or not it is indicated – must observe in the activities project. They can be restrictions or mitigation and compensation measures instituted by ZEE.

   • Existing environmental licensing criteria that have been spatialized in the ZEE: Conditions or clauses which the enterprise – whether or not it is indicated – must observe in the activities project. They can be restrictions or mitigation and compensation measures, originated in provisions of a specific norm.

   • Guidelines: Premises for formulation of public policies (binds the State, including as a criterion or budget planning and execution regarding spatializing activities) aimed at developing indications and which are able to adjust the diagnosis according to the scenario, such as bank promotion lines for regularization and production, incentives for environmental protection, establishment of an adequate infrastructure, technical assistance and rural extension geared toward the indicated activities, as well as policies for reallocation of activities carried out in inappropriate areas, as per article 3, sole paragraph, of Decree n 4.297/2002. In these circumstances attention should be given to the hypotheses that the State has an obligation to compensate the private party.

3) Indication of a model of collegiate and cyclic review of the ZEE;

4) Within ZEE, a determination to carry out appropriate diagnosis of (analyzing the current situation), and prognosis for (working out future scenarios), special areas in terms of indigenous and environmental protection. Note: such areas are not currently dealt with in the ZEE;

5) Suggest how the Zoning Committee (CCZEE), made up of several Ministries, can monitor the expansion of state zonings, in order to approve national zoning. The following stages are suggested:

   • Validation of the diagnosis by the ZEE Brasil Consortium (CCZEE technical team), in order to approve the studies carried out for insertion in the National Infrastructure for Special Data

   • INDE;

   • Validation of alternative scenarios by CCZEE;

   • Validation of prognosis by CCZEE;

   • Examination of the final product, along with the suggestions coming from public consultation, and examination of the respective draft bill to be submitted to the State Assembly (the ZEE must be the object of a State Law in order to be acknowledge by the Federal Government).

6) Recommend to the Planning Ministry that it include in the next draft bill of budget guidelines (LDO) a provision regulating the integration of the ZEE results into the planning/budget cycle.

Full report is available only in Portuguese at: http://portal2.tcu.gov.br/portal/page/portal/TCU/comunidades/programas_governo/areas_atuacao/meio_ambiente/ZEE%20-%20Relat%C3%B3rio%20de%20Auditoria.pdf (accessed 27 March 2013)

2007: SAI of Norway: Audit on sustainable land-use planning and land use

Objectives of audit:

The objective of the investigation of the Office of the Auditor General (OAG) has been to clarify the extent to which the Ministry of the Environment fulfils its national responsibility for ensuring sustainable land-use planning and land use pursuant to the Planning and Building Act.

Audit findings:

Land-use status and land-use planning

The investigation shows that current land-use management is contributing to downscaling areas and assets that must be preserved: the coastal zone, zones adjoining watercourses, mountain regions above the tree line, and large continuous areas of natural environment. Physical development has consequences for important assets such as outdoor recreation, cultural monuments and sites, cultural environments, productive cultivated land, and biological diversity. Even though key principles for sustainable urban development have been emphasized by the Storting (Norway's Parliament) over a considerable time, the analyses also indicate that certain parts of the land-use planning do not sufficiently contribute to an eco-friendly use of space in towns and urban settlements. As a whole the investigation shows that in several areas land- use status and land-use planning in Norway are not protecting the assets and principles that the Storting has prioritized to ensure sustainable land use.

The Ministry of the Environment questions whether land-use analyses that focus on physical development and encroachments into the natural environment can adequately determine if such development is moving in a sustainable direction. The OAG is fully aware that economic and social sustainability is a key prerequisite for achieving the objective concerning sustainable development, and (according to Planning and Building Act land-use plans and planning processes) are intended to contribute to achieving sustainable development in a broad sense. Moreover, there is also agreement on the fact that not all development in the areas that the Storting has prioritized is necessarily in conflict with the objectives. However, the OAG would like to point out that a substantial downscaling of land areas is being carried out and that building is increasingly being conducted in vulnerable areas. There are therefore grounds to question whether the level and pace of physical development is in line with the precautionary principle, and whether land-use management is adequate over the long-term.

The Ministry of the Environment has also expressed the view that the investigation should have assessed what is an acceptable level for physical development. In the opinion of the OAG, a specification of the prime objectives and an assessment of an acceptable development level should constitute a prioritized task for the Ministry of the Environment. In this connection the OAG notes that the Ministry has made few evaluations to detect whether vulnerable areas are being preserved appropriately and according to general long-term considerations.

Municipal land-use planning as a policy instrument

The investigation reveals that the current challenges in municipal planning primarily relate to municipal and regional planning participants' application of the planning system. The general plans that are drawn up are not designed well enough to ensure integrated and long-term development in line with the national objectives. Even though the main part of the development in the municipalities takes place according to the land-use part of the municipal master plan, the investigation shows that land use is to a great extent at variance with the general planning. This entails zoning plans being approved and dispensations being granted that are in conflict with the land-use part of the municipal master plan.

The OAG is aware that the Planning and Building Act is based on discretionary judgment and allows decisions that are not in accordance with general plans. However, the OAG wishes to emphasize that zoning plans are primarily intended to be drawn up in line with general plans and that dispensations can only be granted as exceptions – a principle that is necessary to ensure that the administration is sufficiently general and long term.

Central government and regional authorities have access to effective policy instruments to ensure that land-use planning is in line with national objectives – such as through the use of objections to planning matters. However, the OAG questions whether the Ministry of the Environment's handling of objection cases can undermine the use of objections as a policy instrument, and whether the Ministry's decisions and communication of decisions to regional level adequately contribute to ensuring that national considerations and interests are protected in land-use planning.

The Ministry of the Environment's national responsibilities for management and coordination

The OAG has noted that the Directorate for Nature Management has had its capacity in the land-use planning area strengthened, and that the planning department in the Ministry of the Environment fulfils the directorate function related to the development and monitoring of the planning system. The OAG regards it as positive that capacity in the land-use planning area has been strengthened, but stresses that there are still challenges regarding coordination within the Ministry and with the directorates involved as well as regarding cooperation among all the environmental directorates.

According to the Planning and Building Act, land-use planning is intended to be a comprehensive policy instrument that encompasses all the various sectors. The investigation shows that overall sector planning is a challenge that can cause conflicts on goals. The various sectors follow different practices when they handle cases in accordance with both the Planning and Building Act and their own specific sector legislation. In the opinion of the OAG, goal conflicts and the use of policy instruments should be clarified at national level to ensure the provision of clearer and simpler frameworks that are easier for regional and local administration to understand and use.

The OAG has noted that the Ministry of the Environment regards guidance and follow-up at county and municipal level as a comprehensive and resource-demanding task. However, the investigation shows that the Ministry has not placed sufficient emphasis on updating and consolidating the existing guidelines and guidance material, and that the national guidelines for use in the planning system are ambiguous. The Ministry's use of national policy guidelines does not appear to have an integrated and systematic approach. The OAG therefore wishes to stress that the Ministry has the main responsibility for ensuring that those working at county and municipal levels are capable of performing their tasks in accordance with the Planning and Building Act and national objectives.

The OAG has also noted that the Ministry of the Environment is of the view that planning must be based on local and regional mapping in addition to national surveys. However, the investigation shows that in general local, regional and national surveys do not meet the need for knowledge in the planning processes. The OAG wishes to point out that local and regional mapping is often not standardised, which makes it difficult to use this type of data to analyse land-use development at national level.

The OAG has noted that the Ministry of the Environment is making efforts to gather and make available information on land-use status, land-use development and planning status for use in both planning and management in the area. The Ministry of the Environment points out that not all municipalities have adequate systems and the competence required to make use of such information. The OAG wishes to point out that the Ministry of the Environment also has the prime responsibility for ensuring that the necessary information is gathered and made available.

Recommendations:

The OAG agrees with the Ministry of the Environment that economic and social sustainability is a key prerequisite for attaining the objective of sustainable land use. In the opinion of the OAG, the objectives concerning economic and social sustainable development cannot be attained in the long term unless sufficient consideration is also given to ecological sustainability.

The OAG is aware that other objectives which the Storting has also supported affect the possibility of achieving the goal of sustainable land use. However, the OAG emphasizes that the Ministry of the Environment has the prime responsibility for coordinating the Government's work, by establishing and monitoring the environmental policy goals at all levels and for the various sectors. In this connection the OAG has noted that no common understanding has been developed among the ministries concerning the Planning and Building Act's role as comprehensive legislation for sustainable land-use management. The Ministry of the Environment has said that the new planning component of this Act can provide a better basis for the Ministry's coordination role and that the Ministry's work will be directed towards strengthening coordination between sectors and ministries. The OAG assumes that this work will be assigned priority, and also emphasises the importance of coordination within the Ministry and with the directorates involved, as well as cooperation among all the environmental directorates.

The Ministry of the Environment agrees that specifying the primary sustainable objectives and assessing an acceptable development level should be a priority task for the Ministry, and refers to the fact that measures have been implemented to specify the frameworks for sustainable local land-use planning – for instance through strengthening the work on county master plans. However, the investigation shows that county master plans and county sub-plans have not, so far, functioned satisfactorily as policy instruments for the coordination of national interests. The OAG wishes to emphasise the importance of clarification at national level so that national frameworks will be clearer and simpler to deal with in regional and local administration.

The investigation also shows that some municipalities do not draw up general plans and that several of the general plans are at variance with national objectives. Plans are also made and dispensations granted that are in conflict with the general municipal plans. Even though the municipalities have the opportunity to approve zoning plans and dispensations that deviate from the municipal master plan, it is a general principle that zoning plans must primarily be drawn up in agreement with the municipal master plan and that dispensations are only granted as exceptions. All plans and approvals must be within national frameworks. This is necessary to achieve adequate general and long-term administration.

To ensure that the use of objections leads to sustainable land use, the OAG would like to stress the importance of the Ministry acquiring better knowledge of how objections are used by regional and public bodies. In this connection the OAG has noted that according to the Ministry of the Environment, decisions on objection cases that have been taken under the present government have consistently followed the national guidelines for land-use policy.

The Ministry of the Environment refers to the fact that there is broad political agreement that the municipalities must retain a key role in land-use planning and land-use management, and that in many instances there will be a need for regional coordination of land-use issues across municipal boundaries. The OAG wishes to point out that the Ministry of the Environment has the prime responsibility for ensuring that the county authorities and the municipalities are capable of performing their duties – for example, by specifying the objectives involved and providing guidance in the planning work. The investigation reveals that the municipalities have a great need for assistance, and the OAG has noted that the Ministry of the Environment has initiated measures to enhance municipal competence and to increase understanding of sustainable land-use management.

The OAG has also noted that the Ministry of the Environment has implemented and planned a number of measures aimed at gathering and making available information on land-use status, land-use development and the planning status for use in both the planning and management of this area. The Ministry points out that this work demands considerable resources. The OAG assumes that the Ministry of the Environment will assign high priority to the work of establishing and further developing systems for identifying and handling risk.

The Ministry of the Environment agrees that strong governmental efforts are required to ensure that municipal and regional planning contribute to long-term sustainable land-use planning and land use. According to the Ministry, it is particularly important to encourage planning that helps to reduce the emissions of greenhouse gases, to improve the urban environment, to safeguard the coastal zone and watercourses, to maintain a uniform mountain policy, and to increase value creation based on the preservation of the natural environment and of cultural and landscape assets.

The OAG assumes that the Ministry of the Environment will implement adequate policy instruments so that land-use planning is in accordance with the Storting's objective concerning sustainable land use. The OAG also wishes to emphasise that the level and pace of physical development must be in line with the precautionary principle, and that land-use management must be sufficiently long term if sustainable development is to be attained – including for the long-term.

The full report is available at: http://www.riksrevisjonen.no/en/Reports/Pages/Dokumentbase_Eng_Doc_3_11_2006_2007.aspx (accessed 27 March 2013)

TOPIC 3: SUSTAINABLE USE OF LAND RESOURCES

2005: SAI of Estonia: Exploitation of peat resources

Objectives of audit:

To assess whether the State ensures a sustainable use of peat reserves (from planning of the use of peat resources until managing their extraction).

Audit findings:

Among other audit findings, the problem of abandoned peat excavations was discussed in the audit report.

In Estonia, there were approximately 8,000 to 15,000 ha of abandoned areas that had been used for peat extraction and which had not been rehabilitated after production. In general, peat moss does not begin to grow spontaneously in drained and extracted areas, and as a consequence, no incremental laying down of peat deposits occurs. The degraded peatlands are also a source of permanent environmental pollution and represent a significant fire risk.
Most of the abandoned production areas are owned by the State. Although the landowner must rehabilitate the abandoned areas, the State did not have an overview of the residual supply of peat in these areas and of environmental impacts - whether or not these areas had to be reopened for completing the extraction or rehabilitated. The State had not assigned finances to rehabilitate abandoned areas.

As the abandoned areas have been drained, the remaining peat starts to decompose. During the first 10 years after draining about 15 to 20 tons of peat per ha will decompose annually. At the same time, the decomposing peat releases CO2, which is a significant factor in global climate warming.
Upon approving the Long-term Public Fuel and Energy Sector Development Plan the Parliament had decided that the draining of new peatlands should be stopped until 2025, and only the peat of already-drained production areas should be used until that date. But this position had not been fixed in laws and preparations for taking new peatlands into use had not been stopped.

Recommendations:

Main recommendations regarding land use issues:

- In instances of mechanized extraction of peat, to always require an environmental impact assessment before issuing a new extraction permit, regardless of the size of the production area. To that end, initiate amendments to the Environmental Impact Assessment and Environmental Management System Act.
- To initiate amendments to the Earth's Crust Act to provide authorities issuing extraction permits with a right to change terms in the permits, i.e. to re-establish the procedure that was in force in the Earth's Crust Act until 31 March 2005. And thereafter, to ensure the establishment of environmental requirements and the purpose of rehabilitation of degraded peatlands in all peat extraction permits.
- An order to direct peat extraction to abandoned, non-exhausted production areas; and to suspend (until 2025), the issuing of new extraction permits for peatlands and parts of peatlands, which have not been affected by extraction. This should be done on the basis of the objectives set up in the Long-term Public Fuel and Energy Sector Development Plan. Finally, to initiate necessary amendments to legal acts, including the Earth's Crust Act, in order to attain objectives of the development plan.
- To initiate rehabilitation of these degraded State-owned peatlands whose re-exploitation is not feasible.
- To develop a financing scheme to cover costs of rehabilitation in case a company becomes insolvent, e.g., by establishing a state guarantee fund or a sub-fund under some financial institution or requiring rehabilitation of the deposit from a company before issuing an extraction permit.

Full report is available at:
http://www.riigikontroll.ee/tabid/206/Audit/1850/Area/15/language/en-US/Default.aspx (accessed 27 March 2013)

2010: SAI of Poland: Protection of forest and agricultural areas in the urbanisation process in Lower Silesia in the years 2006-2009

Objectives of audit:

Assessment of the implementation of statutory responsibilities of the government and local administration bodies of the Lower Silesia province, in regards to protecting agricultural and forest lands during the process of urbanization (particularly when buildings are constructed), so that negative environmental impacts as lessened as much as possible. Audit findings (including audit evidence):

- Irregularities were found in particular stages of the spatial development and local development plans – these are some of the core documents regulating the protection of agricultural and forest lands. Only the area of two (out of 8 examined) communities was entirely included in the local spatial development plans, and the remaining six were incompletely included (up to 52.1%). The indisposition of the local development plans for the entire area indicated an acceptance of the decision-making, authorizing the exclusion of agricultural and forest land from production.
- Decisions concerning the location of a public investment and decisions relating to establishing the conditions for development (which are compulsory in the absence of local development plans) have sometimes been issued without observing the statutory procedures; leading to a considerable delay of up to 7 months.
- Several sorts of irregularities were found in the administrative proceedings relating to the issuing decisions allowing the exemption of agricultural or forestry lands from production.
- There was inappropriate collaboration between the organizational units responsible for preparing the decision to exclude land from agricultural production and forestry and for keeping the land register. A land register was conducted unreliably - changes in use for agricultural and forestry lands were disclosed only after long delays. Delays were also encountered in transferring notices land registration change to municipalities; this resulted in underestimation of the tax value deducted from the land property tax.
- There has been insufficient execution of fees and charges for illegal exclusion of land from agricultural production or forestry.

  These findings led to an overall view from the SAI that the law on protection of agricultural and forestry lands imprecisely governs the procedure for exclusion of land from agricultural production and forestry, and does not form a coherent system with other land protection regulations. This situation impedes the implementation of procedures related to the allocation of land for non agricultural and non-forest purposes.

Recommendations:

Recommendations addressed to the audited entities included, amongst others:

- Better organization of the spatial development area within the territory of municipalities (finalizing and updating the study of conditions and directions of spatial development of the municipality, as well as fixing irregularities in local spatial development plans);
- Ensure compliance with the rules for determining fees and charges for excluding land from agricultural and forestry production, and how those rules are implemented after the actual exclusion of land; and
- Take into account the obligation to notify change in the land records in decisions of exclusion of land from production.

  Recommendations addressed to the Minister of Agriculture and Rural Development and the Minister of Internal Affairs and Administration to amend or supplement the existing legal status included, amongst others:
- In the official regulations of events, precisely identify the moment of exclusion of land from agricultural production and forestry and the start of other form of land use;
- Link the billing terms with the event recognized in the regulations as the moment of exclusion of land from agriculture or forestry use;
- Have a list of key documents needed for a decision on excluding land from agricultural production or forestry (this list should be available to, and used by, all relevant agencies);
- Introducing possible control measures of the investor after issuing a decision to exclude land from gricultural and forestry production have control measures in place for the investor (to ensure investors fulfil their obligation to notify, within a specified time, any change included in the land records.

Full report is available at: http://www.nik.gov.pl/kontrole/wyniki-kontroli-nik/kontrole,6885.html (accessed 27 March 2013)

2002: SAI of USA: Agricultural Conservation, State Advisory Committees' Views on How USDA Programs Could Better Address Environmental Concerns

Private landowners own more than two-thirds of the continental United States' 1.9 billion acres. Recognizing the critical role that private landowners play in managing soil, water, and wildlife habitat, Congress directed the U.S. Department of Agriculture (USDA) to improve stewardship practices on these lands. USDA currently has more than 70 million acres of privately-owned land enrolled in programs that offer landowners financial incentives to implement conservation practices to protect or improve soil and water quality and wildlife habitat. USDA's conservation efforts address specific environmental concerns, target funding toward state and local environmental priority areas, and promote partnerships with state or local entities to leverage limited funding.

State technical committee members indicated that although USDA's conservation programs are generally effective, some targeted programs are more effective than others. Committee members cited several elements of the current programs that hinder achievement of environmental objectives and indicated a preference for more flexibility in new or existing programs. More than two-thirds of members considered program provisions that prohibit landowners from receiving compensation for maintaining previously implemented landowner-financed conservation practices to be a hindrance. Members would like to be able to tailor new or existing programs to the farming practices of producers in their states as well as increase emphasis on programs that keep lands in production.

Recommendation:

As USDA modifies or develops implementing regulations for conservation programs reauthorized or created by the Omnibus Farm Bill, which is expected to become law in 2002, the Secretary of Agriculture should consider state technical committee members' views on: (1) increasing emphasis on the Continuous Conservation Reserve Program (CCRP) and the Conservation Reserve Enhancement Program, both of which target specific environmental concerns; (2) modifying programs to make them more accessible to all regions and types of agricultural operations; and (3) revising elements in all programs that hinder achievement of environmental objectives. If USDA finds that revising the program regulations to incorporate these views would require legislative action, the Secretary should submit such proposals to Congress.

Comments:

This recommendation is closed based on discussion and documentation provided by the agency.

Full report is available at: http://www.gao.gov/products/GAO-02-295 (accessed 27 March 2013)

TOPIC 4: PROTECTION, REGENERATION AND REHABILITATION OF LAND RESOURCES

2007: SAI of Mexico: Management Assessment of Natural Protected Areas

Audit Objectives:

Evaluate the compliance with the objectives and targets related to the conservation, preservation and restoration of natural protected areas (NPAs); in order to achieve its sustainable use and exploitation; verify the processes in place to carry out its proper administration, and verify the implementation of budgetary resources in these actions.

Findings of the audit

In 2006, out of the 158 NPAs, 68.4% (108) did not have the management program described in Article 65 of the General Law of Ecological Balance and Environmental Protection; and 76 NPAs (48.1%) did not have annual operating programs. This meant it was not possible to assess the compliance of actions taken for conservation, protection, preservation and restoration provided for in Articles 5, Section I of the Rules of the General Law of Ecological Balance and Environmental Protection in the Field of Natural Protected Areas. It was also not possible to assess NPAs for their compliance under Article 145, section V, of the Internal Regulation of the Ministry of Environment and Natural Resources.

For the preservation of the 158 NPA, in 2006 the CONANP (Comision Nacional De Areas Naturales Protegidas) fulfilled 100.0% in the goal to make four conservation projects for as species listed as priority, 5.2% of the 77 species endangered or threatened. Of these 77 species, monitored 40.3% (31 species), so they turned on the programmed goal 103.3% (30 species). They also developed conservation actions and projects for 20 species identified in any of the risk categories, 26.0% of 77, which limited coverage pursuant to Article 45, section II, of the General Law of Ecological Balance and Environmental Protection , to preserve endangered, threatened , endemic and rare species, as well as which are subject to special protection.

To protect the NPAs, in 2006, under Article 5, Section I, paragraph c, of the Rules of the General Law of Ecological Balance and Environmental Protection in the Field of Natural Protected Areas, PROFEPA inspected, on average, 50.0% (12) of the 24 prioritized NPAs. This was 38.9% less than the 88.9% inspection recorded in 2001. This was due to a drop in inspection numbers. For their part, SEMAR (Secretaria De Medio Ambiente Y Recursos Naturales) made 14,753 trips to monitor the marine environment, in accordance with Article 30, Section XXV of the Organic Law of Federal Public Administration.

In terms of restoration, CONANP did not define the targets and indicators needed to assess the provisions of Article 1, paragraph a, of the General Law of Ecological Balance and Environmental Protection, and Article 5, Section I, paragraph a, of its regulations “Area of Protected Natural Areas”. In order to preserve the NPAs, CONANP produced 12 studies designed to measure the alteration of ecosystems (processing rate). These programs showed that in 11 NPAs there was ecosystem deterioration (between 0.740 and 0.027). This deterioration was mainly the result of clearing and deforestation. Consequently, the preservation actions taken were insufficient to achieve sustainable use and development and preservation of ecosystems, in accordance with the provisions of Article 45, Sections I and III of the General Law of Ecological Balance and Environmental Protection.
In 2006, investment per hectare of NPA was 12.7 pesos, 3.2% more on average per year, compared to 2001 (3.4 pesos per hectare). By comparison, in Costa Rica, the cost per hectare was 1.1 pesos, whereas in and Spain it was 42.6 pesos per hectare.

In 2006, the SEMAR (Secretaria De Medio Ambiente Y Recursos Naturales) and CONANP did not undertake coordination activities to identify areas of competence of SEMAR that would have resulted in efficient and effective monitoring; and the SEMAR and PROFEPA did not established surveillance coverage targets for NPAs (as set out in Article 3, paragraph b, of the Planning Act). Secondly, the CONANP did not procedure manuals to regulate commercial and tourism activities in NPA - in violation of Article 19 of the Organic Law on the Federal Public Administration. Finally, PROFEPA did not have controls in place to ensure collection of fines, and the SEMAR lacks records in surveillance activities.

Recommendations:

A total of 41 observations were issued by the SAI as a consequence of the review; these generated 43 actions: 20 recommendations, 1 Request for Clarification-Recovery, 1 Statement of Observations, and 21 performance recommendations. These actions were aimed primarily at: promoting full compliance with the rules and legislation; ensuring the reliability of budgetary and accounting records; encouraging deployment and use of performance measurement systems; strengthening operating mechanisms (in terms of effectiveness, efficiency and economy); and promoting the development, updating or simplification of legislation to recover funds to the federal public finances and strengthen the operation and control mechanisms.

Report available at: http://www.asf.gob.mx/Section/58_Informes_de_auditoria (accessed 27 March 2013)

2008: SAI of Morocco: Audit of the High Commissioner for Water, Forests and Combating Desertification (HCEFLCD)

Objectives of audit:

- Evaluate strategy in reforestation and protecting forest ecosystems.
- Evaluate programs and plans to protect forests and fight desertification.
- Evaluate human and material resources to achieve HCEFLCD missions.
- Evaluate if the management of the office meet the standards of efficiency, economy and efficiency.

Audit findings (including audit evidence):

• The annual cost of forest and ecosystems degradation is estimated at 2.9 billion dirhams, not to mention the loss of biodiversity and other environmental health indicators.

• The objectives of the national reforestation plan were only partially completed. This plan was adopted in 1970, and was intended to reforest 662,000 ha per year. However, the achievement of these objectives has fluctuated. These objectives were reinforced by other reforestation plans (1989-1991), changing the annual rate of reforestation to up to 20,000 ha per year.

• Delay in achieving the objectives. Despite the reforestation of more than 500,000 hectares since 1970, the success rate did not exceed 60%.

• Launch of a second scheme since 1997, extending over 30 years: by adopting a participatory approach, in order to plant 1,500,000 hectares. However, the objective of planting 500,000 hectares during the first 10 years (1998-2009) was only partially completed.

• Morocco does not produce enough wood for its needs; this is because the HCEFLCD is unable to plant 23,000 ha dedicated to industrial exploitation.

• The level of reforestation remains inadequate: this is because the forest area is estimated at 8% of the area of Morocco. This is not enough to achieve ecological and environmental balance (this would require 15-20% of Morocco to be forested).

• The forest management program is a sustainable management plan, designed to identify and to ensure ecological, economic, and social development. In order to achieve these aims, the office has tried to organize the population living near forests into cooperatives and associations. However, this program has not achieved this objective.

• Inadequate procedures for monitoring the health of the forest, which increases the spread of diseases and reduces productivity and biodiversity.

• Some forest species are threatened with extinction, as is the case of the Argan tree and Cedar Tree.

• Non-allocation of part of forest incomes recovered by local government to reforestation.

• In spite of not having enough legal staff, the high frequency of forest offenses highlights the level of forest degradation. An average of 25,000 to 30,000 reports are drawn up annually by the Forest officers. However, only 10% of final judgments against violators are executed.

Recommendations:

- Establish a reliable information system for updating the status and the rate of degradation of each forest ecosystem, in order to better target and steer programs.

- Accelerate the progress of forest management plans.

- Integrate into forest management programs the economic and social dimensions of forest areas and populations.

- Give more importance to the regeneration of Cedars and Argan trees

- Give more importance to species diversification, reforestation and regeneration programs, and intensify
natural essences;

- Establish an internal system of control covering the whole process of raising plants in nurseries.

- Adopt laws and regulations in order to protect Argan forests and its ecosystems.

- Implement appropriate measures (watering, fencing, etc.) for successful regeneration programs of the
Argan trees.

- Establishing a system for evaluating the performance of managers in charge of reforestation programs.

- Achieve an annual census of livestock in forests and suburban forest.

- Enhance quality and quantity of actual units specialized in monitoring the state of forest health.

- Increase the number of legal staff.

Full report available at: http://www.courdescomptes.ma/index.php?id=52&no_cache=1

2006: SAI of New Zealand: Department of Conservation: Planning for and managing publicly owned land

See the audit discussed under Topic 1: Government policy on land use and land management

Full report available at: http://www.oag.govt.nz/2006/doc-landholdings/docs/doc-land.pdf (accessed 27 March 2013)

2011: SAI of USA: Restoration Effort Needs Common Federal and State Goals and Assessment Approach

Chesapeake Bay, with its watershed in parts of six states and the District of Columbia (watershed states), is an important economic and natural resource that has been in decline. Over decades, federal agencies and watershed states have entered into several agreements to restore the bay, but its health remains impaired. In May 2009, Executive Order 13508 established a Federal Leadership Committee, led by the Environmental Protection Agency (EPA), and directed the committee to issue a strategy by May 2010 to protect and restore the Chesapeake Bay (the Strategy).

GAO was directed by the explanatory statement of the Consolidated Appropriations Act, 2008, to conduct performance assessments of progress made on bay restoration, and this first assessment examines: (1) the extent to which the Strategy includes measurable goals for restoring the bay that are shared by stakeholders, and actions to attain these goals; (2) the key factors, if any, federal and state officials identified that may reduce the likelihood of achieving Strategy goals and actions; and (3) agency plans for assessing progress made in implementing the Strategy and restoring bay health. GAO reviewed the Strategy, surveyed federal officials, and interviewed watershed state officials and subject matter experts.

The Strategy for Protecting and Restoring the Chesapeake Bay Watershed includes 4 broad goals, 12 specific measurable goals with deadlines, and 116 actions to restore the bay by 2025. To achieve the broad and measurable goals, federal agencies, often in collaboration with the watershed states and other entities, are responsible for accomplishing the actions. However, not all stakeholders are working toward achieving the Strategy goals.

The watershed states are critical partners in the effort to restore the bay, but state officials told GAO that they are not working toward the Strategy goals, in part because they view the Strategy as a federal document. Instead, most state bay restoration work is conducted according to state commitments made in a previous bay restoration agreement, the Chesapeake 2000 Agreement. Even though the Strategy and Chesapeake 2000 Agreement goals are similar to some degree, they also differ in some ways. For example, both call for managing fish species, but the Strategy identifies brook trout as a key species for restoration while the Chesapeake 2000 Agreement does not. Federal and state officials said it is critical that all stakeholders work toward the same goals.

The Federal Leadership Committee and the Chesapeake Bay Program - a restoration group established in 1983 that includes federal agencies and watershed states - created an action team in June 2010 to work toward aligning bay restoration goals. Officials from the 11 agencies responsible for the Strategy that GAO surveyed identified three key factors that may reduce the likelihood of achieving Strategy goals and actions: a potential lack of collaboration among stakeholders; funding constraints; and external phenomena, such as climate change. State officials and subject matter experts that GAO interviewed raised similar concerns. Federal officials reported that some form of collaboration is needed to accomplish the Strategy's measurable goals and the vast majority of its actions. In particular, federal-state collaboration is crucial, with federal officials indicating that collaboration with at least one state is necessary to accomplish 96 of the 116 actions in the 12 measurable goals. Federal officials also reported that funding constraints could reduce the likelihood of accomplishing 69 of the actions in 11 of the measurable goals. Furthermore, federal officials reported that external phenomena could reduce the likelihood that 8 of the measurable goals will be achieved.

The federal agencies have plans for assessing progress made in implementing the Strategy and restoring bay health, but these plans are limited or not fully developed, and it is unclear what indicators will be used to assess bay health. Per the Strategy, the agencies plan to create 2-year milestones for measuring progress made toward the measurable goals, with the first milestones covering 2012 and 2013. However, establishing milestones for an entire effort can improve the chances the effort can be accomplished efficiently and on time. Also, the Strategy states that the Federal Leadership Committee will develop a process for implementing adaptive management - in which agencies evaluate the impacts of restoration efforts and use the results to adjust future actions - but agency officials told GAO they are still developing this process. Moreover, there are now two groups that plan to assess bay health.

The Strategy calls for the Federal Leadership Committee to coordinate with the watershed states to align these assessments. However, the status of this alignment is unclear, and if these groups use different indicators to assess bay health, confusion could result about the overall message of progress made. GAO recommends that EPA work with federal and state stakeholders to develop common goals and clarify plans for assessing progress.

Recommendations for Executive Action:

(i) To improve the likelihood that bay restoration is attained, the Administrator of EPA should work collaboratively with federal and state bay restoration stakeholders to develop an adaptive management process that will allow restoration stakeholders to evaluate progress made in restoring the bay and adjust actions as needed.

(ii) To improve the likelihood that bay restoration is attained, the Administrator of EPA should work collaboratively with federal and state bay restoration stakeholders to establish milestones for gauging progress toward measurable goals for the entire restoration effort.

(iii) To improve the likelihood that bay restoration is attained, the Administrator of EPA should work collaboratively with federal and state bay restoration stakeholders to develop common bay restoration goals to help ensure that federal and state restoration stakeholders are working toward the same goals.

(iv) To improve the likelihood that bay restoration is attained, the Administrator of EPA should work collaboratively with federal and state bay restoration stakeholders to identify the indicators that will be used for assessing progress made in improving bay health and clarify how the entities responsible for assessing this progress will coordinate their efforts.

Full report available at: http://www.gao.gov/products/GAO-11-802 (accessed 27 March 2013)

2003: SAI of USA: USDA Needs to Better Ensure Protection of Highly Erodible Cropland and Wetlands

Annually, over a billion tons of soil erodes from the nation's cropland, and thousands of other acres, including wetlands, are converted to new cropland. Soil erosion reduces the land's productivity and impairs water quality; drained wetlands reduce flood control. Under the 1985 Food Security Act, farmers risk losing federal farm payments if they do not apply conservation practices to reduce erosion or if they drain wetlands. Concerns about soil erosion and wetlands conversions continue, however, as do concerns about the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service's implementation of these provisions. GAO reviewed field offices' and headquarters' implementation and enforcement of the 1985 Act's conservation compliance provisions.

USDA's Natural Resources Conservation Service (NRCS) has not consistently implemented the 1985 Food Security Act's conservation provisions. Inconsistent implementation increases the possibility that some farmers receive federal farm payments although their soil erodes at higher rates than allowed or they convert wetlands to cropland. According to GAO's nationwide survey (refer to GAO-03-492SP), almost half of the Conservation Service's field offices do not implement the conservation provisions as required because they lack staff, management does not emphasize these provisions, or they are uncomfortable with their enforcement role. For example, field offices do not always find a farmer in violation for failing to implement an important practice, such as crop rotation, and do not always see whether a farmer has corrected the problem; they also do not always check for wetlands violations.

The Conservation Service's weak oversight of its field offices further impairs implementation of the provisions. In the process of selecting samples of cropland tracts to assess farmers' compliance, the Conservation Service disproportionately emphasizes tracts with little potential for noncompliance, such as permanent rangelands. This selection process leads to inflated compliance rates. The Conservation Service also has no automated system to promptly inform its field offices of the tracts selected for compliance reviews or to enable the offices to efficiently report their review results. Therefore, the field offices cannot conduct timely reviews - during critical erosion periods - and provide headquarters with up-to-date information.

Finally, the Farm Service Agency - the USDA agency responsible for withholding benefits for violations identified by the Conservation Service - often waives these noncompliance determinations without adequate justification. Without support from the Farm Service Agency, the Conservation Service's field staff have less incentive to issue violations.

Recommendations for Executive Action:

(i) To improve USDA's implementation of the conservation compliance provisions of the Food Security Act of 1985, as amended, and to better protect the highly erodible croplands and wetlands covered by those provisions, the Secretary of Agriculture should direct the Chief of NRCS to develop a nationwide, automated system, such as a web-based system, for efficiently managing information needed to conduct compliance reviews and report results.

(ii) To improve USDA's implementation of the conservation compliance provisions of the Food Security Act of 1985, as amended, and to better protect the highly erodible croplands and wetlands covered by those provisions, the Secretary of Agriculture should direct the Chief of NRCS to establish and maintain a consistent methodology for collecting, analyzing, and summarizing data to identify patterns and trends in enforcement across regions and states and over time.

(iii) To improve USDA's implementation of the conservation compliance provisions of the Food Security Act of 1985, as amended, and to better protect the highly erodible croplands and wetlands covered by those provisions, the Secretary of Agriculture should direct the Chief of NRCS to develop a more representative sample of tracts selected for compliance reviews that excludes land that is not subject to the compliance provisions.

(iv) To improve USDA's implementation of the conservation compliance provisions of the Food Security Act of 1985, as amended, and to better protect the highly erodible croplands and wetlands covered by those provisions, the Secretary of Agriculture should direct the Chief of NRCS to periodically provide training for field office staff on how compliance reviews should be conducted.

(v) To improve USDA's implementation of the conservation compliance provisions of the Food Security Act of 1985, as amended, and to better protect the highly erodible croplands and wetlands covered by those provisions, the Secretary of Agriculture should direct the Chief of the NRCS to increase oversight of field offices' conduct of compliance reviews, to improve the accuracy and completeness of the reviews.

(vi) In addition, the Secretary of Agriculture should direct the Administrator of the Farm Service Agency to ensure that decisions by the Farm Service Agency's field offices to waive NRCS's findings of noncompliance are justified and documented.

Full report available at: http://www.gao.gov/products/GAO-03-418

APPENDIX VI:

LINKS TO OTHER WGEA COMMUNITY CASE STUDIES

Canada: Auditor General of Canada

1. Auditor General of Canada (2009). Report of the Auditor General of Canada to the House of Commons. Chapter 6: Land Management and Environmental Protection on Reserves – Fall Report http://www oag-bvg.gc.ca/internet/docs/parl_oag_200911_06_e.pdf (English). Accessed 8 March 2013

2. Auditor general of Canada (2010). Report of the Auditor General of Canada to the House of Commons. Chapter 4: Sustaining Development in the Northwest Territories – Spring Report http://www.oag-bvg.gc.ca/internet/docs/parl_oag_201004_04_e.pdf (English). Accessed 8 March 2013.

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The state's role in increasing the supply of lots and creating more compact urban structure (2010). Published in Finnish, abstract in English: http://www.vtv.fi/files/2300/2082010_The_states_role_in_increasing_the_supply_of_lots.pdf (Accessed 8 March 2013)

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Paraguay: La Contraloría General de la República

Type: Performance Auditing to the Rural Welfare Institute and Ministry of Agriculture and Livestock about environmental status of the Department of Alto Paraguay.
Year: 1997
Language: Spanish

Type: Special Exam for the management of the Direction of Environmental Zoning dependent of the Secretary of Environment and the Direction of General of Planning of the Ministry of Agriculture and Livestock, to assess the environmental situation of the lands affected the Department of Ñeembucú by DERMASUR Project.
Year: 2000
Language: Spanish

Type: Special Exam to the National Forest Service of the Ministry of Agriculture and Livestock and the Secretary of Environmental, to evaluate the legal, administrative and environmental resolutions applied for approval of plans for Land Use in restricted areas of forest use reserved, according to the Laws 816/96 and 1848/01.
Year: 2004
Language: Spanish

Type: Especial Exam to the Ministry of Agriculture and Livestock, to the Secretary of Environment, the National Institute of Rural and Land Development, to the Governance of the Municipalities of the Department of Alto Paraguay, to verify the fulfillment of the existing environmental laws and regulations of rural development in the territory.
Year: 2005
Language: Spanish
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United Kingdom: National Audit Office

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