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The State of Natural Resource Management in Latin America and the Caribbean

Opportunities for Sustainable Practices and Prioritisation of Resources

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Acronyms

CBD	Convention on Biological Diversity
CIAT	Centro Internacional de Agricultura Tropical
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
FAO	Food and Agriculture Organization
GESRE	Strengthening Capacities on Sustainable Resource Management Project (from its acronym in Spanish: Gestión Sostenible de Recursos)
IFPRI	International Food Policy Research Institute
ILO	International Labour Organization
IUCN	International Union for Conservation of Nature
LAC	Latin America and the Caribbean
LCA	Life cycle assessment
MDGs	Millennium Development Goals
SRM	Sustainable Resource Management
UN-REDD	United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USGS	United States Geological Survey

Preface

Nature has been quite generous with Latin America and the Caribbean, a region with abundant renewable and non-renewable resources. This area of the planet is one of the main sources of resources for the world market.

This natural wealth should not simply be considered a gift, but rather a great opportunity and equally great responsibility. It is therefore essential to strengthen the practices and policies for sustainable resource management in the region, which will generate significant benefits, not only for the people of Latin America and the Caribbean, but also for the rest of the world.

However, exercising this responsibility is not a simple task. The region faces several challenges, including vulnerability to climate change, the struggle to overcome weak institutions, population growth with high poverty rates and limited economic resources. This is coupled with insufficient investment in human capital and the lack of sufficient experience and knowledge about this subject, both in the scientific community and the governments of the region.

Fortunately, there are many opportunities to enhance sustainable resource management: increasing awareness and empowerment of human resources; producing reliable and accessible information on the use of resources and its economic and environmental implications; increasing co-ordination between key actors and policies; creating alliances and promoting regional co-operation; and defining and strengthening national public policies focused on resource efficiency.

This report is the result of the project "Strengthening capacities on sustainable resource management", which was designed to pinpoint the needs of the region for the sustainable management of natural resources, improve the capacity of key actors in the scientific community and governments, and implement national action plans.

The present study is based on the valuable initial findings included in the UNEP report *Resource Efficiency in Latin America; Economics and Outlook. Case studies: Mercosur, Chile and Mexico* and describes the process undertaken to initiate the collection of information on sustainable resource management practices and policies in the region, identifying and analysing the current status of six critical natural resources: water, fertile land, forests, fishing resources, natural landscapes and metals and minerals.

The study supports the implementation of the recommendations of the International Resource Panel reports, such as the need to decouple natural resource use and environmental impacts from economic growth, and confirms the importance of the life cycle approach promoted by UNEP and the Society of Environmental Toxicology and Chemistry (SETAC) Life Cycle Initiative.

In this report you will find an optimistic outlook regarding the potential role of sustainable resource management in Latin America and the Caribbean, showing how stronger awareness and increased understanding on these concepts and practices among regional stakeholders, along with the use of effective tools, can contribute to sustainable development in the region.

Additionally, the improvement of data availability on the state of natural resources would improve understanding on how to protect these resources and their dependent communities, strengthen national and regional economies, and increase co-operation and experience exchange among the countries of the region on these matters.

We have considerable work ahead, and there is much that our region, guardian of an important part of the planet's resources, can achieve and bring to the world. It depends on us that future generations can enjoy the natural resources.

Margarita Astrálaga
Regional Director
UNEP Regional Office for Latin America
and the Caribbean (ROLAC)

Executive summary

Sustainable resource management (SRM) in Latin America and the Caribbean (LAC) is imperative, as national, regional and global economies depend to a high degree on their availability and productivity.

The current report is the outcome of the project "Strengthening Capacities on Sustainable Resource Management" (GESRE)[1], which aims at (1) assessing the needs of the region for sustainable management of natural resources; (2) increasing the coordination and understanding of SRM among key stakeholders in the scientific community and government administrations; (3) improving the skills of those key stakeholders on these topics providing them with tools to enhance coordination and develop consistent cross-cutting policies for SRM; and (4) launching national action plans and identify opportunities for SRM in the LAC region. This project shows the advantages of a life cycle approach in formulating SRM policies and approaches and encourages activities that foster education and empowerment of key stakeholders in LAC. Pilot projects in selected countries were conducted to introduce sustainable, more equitable and fair management procedures.

This report provides (1) an overall context of SRM in the LAC region; (2) a proposed definition of critical resources as perceived by regional stakeholders; (3) an analysis of the current status of the critical natural resources identified; and (4) conclusions and future outlook.

Due to the limited data availability, the analysis combined information obtained from two approaches: (a) analyzing existing information and statistical data and (b) carrying out an expert survey. The results of the analyses provide baseline information for the identification of critical resources in the region, using a semi-quantitative evaluation scheme.

The LAC region includes 33 countries speaking four official languages: Spanish, Portuguese, English and French. Its surface covers more than 21 million km^2 (around 50% of the American continent) and it is home to almost 600 million people (8% of the world's population). (See Map 1, p. 24)

According to the United Nations Development Programme (UNDP), for the period 2000-2007, agriculture contributed to LAC's gross domestic product (GDP) an average of 9.6% and exports of agricultural commodities accounted for 44% of total export value in 2007. For the same year, in countries such as Panama, Paraguay and Nicaragua, agricultural exports represented over 80% of total commodity exports. The sector provides employment to about 9% of LAC's population (UNDP, 2010).

In 2004, each of the countries Chile, Mexico, Colombia and Brazil received over US$2 billion from fisheries and Venezuela, Panama, Argentina, Guyana and Peru over US$100 million (Catarci, 2004, in UNDP, 2010). In at least 10 countries in the region, fisheries contribute to more than 1% of GDP (UNDP, 2010).

Tourism in the Caribbean would not be as high as 20% of GDP without its coral reefs, which attract tourists from all over the world. The tourism industry employs 5–19% of the workforce (Table 2). In several South American countries, the contribution to GDP from tourism is 2% (UNDP, 2010).

This region, which includes six mega-biodiverse countries, provides specialised niches for tropical species (Felton et al., 2009). As resources become scarce, planning the use and conservation of resources in areas with a high concentration of biodiversity (Peters et al., 2005) is crucial to halt its decline.

Concerning minerals and metals, in 2006 Brazil's material resources production had the largest economic value, followed by those of Peru, Chile and Jamaica. Scarcity of resources is attracting the attention of planners and policy-makers, as they provide stable incomes in LAC mining countries. Among the top ten resources identified

1 http://gesrelac.wordpress.com/

with the lowest reserve life values, the LAC region is a leading supplier of four metals: strontium, tin, silver and copper (over 20% of global production, combined). While the total GDP of the LAC region was 3,120 billion USD (in 2006 prices), the metallic resources' share of 260 billion makes it about 8% of the total GDP of the region. As a comparison, the LAC region's total fishery export in 2007 was about 11 billion, and that of hardwood in 2008 was 0.24 billion.

The assessment has identified six critical resources because of their socio-economic, environmental, scarcity and cultural significance for the region: water, fertile land, forests, fishing resources, natural landscapes and metals and minerals. The latter three resources are directly linked to the following sectors: fisheries, tourism and mining. Moreover, water and fertile land are resources used in a cross-cutting way in a number of sectors, according to the UNEP report, *Resource Efficiency: Economics and Outlook for Latin America. Case studies Mercosur, Chile and Mexico* (UNEP, 2011b).

Scarcity of natural resources in LAC poses several challenges when considering population growth, globalisation and competitiveness, technological advances and the threat of climate change. Certain resources, including fishing resources, forests, fertile land and landscape, face greater risks than others. A high percentage of the population relies directly on the availability of these resources, which constitute the fundamental elements for food security at the national and even global level.

Despite the relatively high availability of natural resources in the LAC region, at a global level natural resources are gaining increasing attention as the scarcity results in higher prices, limited supply and over-exploitation, leading to a decline in quality.

Most countries still do not consider sustainable management of natural resources as the basis of their economies. The sustainable use of these resources is still marginal in the Latin American and Caribbean economies, as described in Chapter 5.

There is a growing acknowledgement by countries of the importance of conserving their natural resources, even if some of them do not produce direct economic benefits (e.g. water and the natural landscape). This is evident from the experts' perceptions captured by the survey and a number of stakeholder consultations facilitated by UNEP in 2010 and 2011 in Panama, Florianopolis (Brazil) and Santa Fe (Argentina). However, it remains uncertain to what extent these perceptions are shared by other stakeholders and how these insights can influence policies, promote methodologies, approaches or programs, due to the heterogeneity and limited sample of stakeholders in the survey.

The sustainable management of natural resources can serve as a vehicle to move toward sustainable development and, thus:

- reduce poverty and inequality, in accordance with the spirit and objectives of the UN Conference on Sustainable Development 2012 (Rio+20);
- share the benefits and costs of conserving, maintaining and ensuring the provision of resources and ecosystem services among all actors along the value chain;
- safeguard the resources for the needs of future generations; and
- protect some of the most varied and richest ecosystems of the world.

The life cycle approach is a cornerstone in developing approaches and policies for SRM. This comprehensive analysis considers all process stages in the life cycle of a product and can assist in forecasting impacts that could not be foreseen otherwise. This enables the assessment/identification of alternatives to current processes which might lead to changing national strategies and even shifting policy approaches to protect/preserve ecosystem services on which economic activities rely.

The GESRE project aims to make Life Cycle Assessments (LCA) results available to sectors with high environmental impact, while unfolding new management methods and analysis tools in order to reduce impacts throughout the life cycle of a process or a product. Moreover, the identification of hotspots along the life cycle of critical resources allows the prioritisation of technological solutions, policy interventions and capacity-building approaches with the highest potential for success while preventing the region from being the recipient of obsolete technologies, which are currently banned in more developed countries.

Each of the six prioritised resources — fishing resources, metals and minerals, natural landscapes, water, forests and fertile land — might require a specific management approach. However, when treating the resources separately, there is an imminent risk of disregarding the nexus that exist between resources. For instance, natural areas are linked to landscape and fertile land. In the case of water, which is the basis of agriculture, or forestry and fisheries, it cannot be isolated when addressing these related sectors. The sustainable management of resources comprises of cross-sectoral guidelines, methodologies and tools adapted to countries' needs, development level and economic activities resulting in socio-economic, environmental and economic benefits for the communities.

The pilot projects conducted under the GESRE approach present a broad range of management options, turning isolated approaches into a toolkit to guide the learning process and exchange of knowledge for those countries seeking to adopt SRM practices. They demonstrate that SRM approaches have the potential to enhance competitiveness, as well as environmental and economic sustainability of resources. The involvement of governments strengthens the political will to improve current resource management, as it becomes clearer that economic goals cannot be achieved when disregarding that they are based upon ecosystem services. Still, it remains a challenge to attain a concerted effort toward SRM across all critical sectors in LAC.

Through the proposed SRM framework, this report supports the implementation of the recommendations of the International Resource Panel reports (e.g., decoupling natural resource use and environmental impacts from economic growth) and confirms the importance of the life cycle guiding principles promoted by the UNEP/SETAC Life Cycle Initiative.

This document reveals that more and better data on the situation of natural resources contribute to a better understanding of policy requirements to protect natural resources and their dependent communities, strengthening national and regional economies and increasing regional co-operation among LAC countries to halt unsustainable exploitation patterns.

It cannot be ignored that LAC faces several challenges that hinder appropriate decisions in the SRM realm. These include the vulnerability of the region to climate change (with the devastating consequences of droughts, floods and climate alterations), the struggle to overcome its weak institutionalism (Agrast et al., 2011), a growing demographic density distribution (see Map 2, p. 25) with still considerable poverty rates and limited industrial capacities. For those reasons, a stronger awareness as well as the use of effective tools to address SRM challenges, are an opportunity for the region to handle its natural resources in a sustainable way, allowing current and future generations to benefit from them and their services. Therefore, SRM should not be seen as a barrier to the development of a country, but rather as a means to development and growth at the national and regional levels.

The present report acknowledges the direct interlinkages between SRM practices and the subsequent effects on poverty alleviation reduction in the LAC region, where close to a quarter of the population lives on less than US$2 a day. (In rural areas, 55% of the population has no access to improved water sources (Bovarnick et al., 2010).) The poorer members of society — those unable to afford substitutes during times of crisis or degradation — rely most heavily on biodiversity, forests, agricultural land, fishing resources, water availability, landscape and mining and minerals as priority natural resources. An unsustainable use of these resources prevents the ability, particularly among low-income groups, to cope with environmental change, thereby pushing them further into poverty. An effective poverty alleviation strategy can only be achieved through the promotion of sustainable resource use and management strategies. Socio-economic impacts will cover the creation of jobs and other economic opportunities associated with the resources managed. Finally, the involvement of stakeholders, beneficiaries and other local actors is also an important element of SRM, which offers poorer and marginalised groups better information, access to decision-making and more empowerment in general, as the circle of participants is widened (e.g. indigenous peoples and other minorities, women and youth).

Synthèse

La Gestion Durable des Ressources naturelles (GDR) dans la région Amérique Latine et Caraibes (ALC) est essentielle, tant les économies nationales, régionales et mondiales dépendent de la disponibilité et de la productivité de ces ressources.

Le présent rapport a été établi dans le cadre du projet intitulé « Renforcement des capacités pour la Gestion Durable des Ressources » (GESRE)[2], dont les buts sont les suivants : (1) identifier les besoins de la région; (2) renforcer la coordination et la compréhension de la GDR par les principaux acteurs au sein de la communauté scientifique et de l'administration publique; (3) améliorer leurs compétences dans ce domaine, en leur fournissant les outils nécessaires au renforcement de la coordination et au développement de politiques transversales cohérentes pour la Gestion Durable des Ressources; et (4) lancer des plans d'action nationaux, et identifier les débouchés pour la Gestion Durable des Ressources dans la région Amérique Latine et Caraibes. Ce projet met l'accent sur le recours à l'approche du cycle de vie dans la GDR et encourage les activités qui promeuvent la formation, l'implication et la responsabilisation des acteurs-clés de ce domaine dans la région Amérique Latine et Caraibes, et ce, par le biais de projets pilotes visant à faire connaitre les procédures de gestion durable, équitables et justes.

Ce rapport vise plus précisément à fournir : (1) le cadre général de la GDR dans la région Amérique Latine et Caraibes; (2) une définition des ressources essentielles par les intervenants régionaux; (3) une analyse du statut actuel des ressources naturelles essentielles identifiées; et (4) les conclusions et perspectives envisagées.

La région ALC comprend 33 pays parlant quatre langues officielles : l'Espagnol, le Portugais, l'Anglais et le Français. Recouvrant un territoire de plus de 21 millions de km^2 (environ 50% du continent américain), près de 600 millions de personnes y vivent (8% de la population mondiale) (voir carte 1).

En raison du nombre limité de données, la présente analyse combine les informations obtenues au moyen de deux démarches distinctes : (a) l'analyse des informations et données statistiques existantes et (b) la réalisation d'une enquête approfondie. Les résultats de ces analyses ont fourni des informations de base pour l'identification des ressources essentielles dans la région, en utilisant un système d'évaluation semi-quantitative.

Selon les chiffres du Programme des Nations Unies pour le Développement (PNUD), pour la période 2000-2007, l'agriculture représentait en moyenne 9,6% du Produit Intérieur Brut (PIB) de la région Amérique Latine et Caraibes; les exportations des matières premières agricoles constituaient, en 2007, 44% des exportations totales de la région. Pour la même année, les exportations agricoles représentaient 80% des exportations totales de matières premières, au Panama, au Paraguay ainsi qu'au Nicaragua. Le secteur agricole emploie de fait environ 9% de la population active de la région (PNUD, 2010).

En 2004, le Chili, le Mexique, la Colombie et le Brésil recevaient chacun plus de 2 milliards de dollars (américains) de la pêche, alors que le Venezuela, le Panama, l'Argentine, la Guyane et le Pérou recevaient chacun pour leur part plus de 100 millions de dollars (américains) (Catarci, 2004, dans PNUD, 2010). Le secteur de la pêche représente plus de 1% du PIB dans au moins dix pays de la région (PNUD, 2010).

Grâce à ses récifs coralliens qui attirent de nombreux touristes de par le monde, le secteur du tourisme représente 20% du PIB des Caraibes et emploie entre 5 et 19% de la population active (Tableau 2). Pour plusieurs pays d'Amérique du Sud, la part du tourisme dans le PIB est d'environ 2% (PNUD, 2010).

Comprenant six pays à la biodiversité importante, la région Amérique Latine et Caraibes

2 http://gesrelac.wordpress.com/

fournit des niches spécifiques pour les espèces tropicales (Felton et al., 2009). Alors que les ressources naturelles se raréfient, la planification de la protection ainsi que la hiérarchisation de l'usage des ressources naturelles dans les régions riches en biodiversité (Peters et al., 2005) sont cruciales pour stopper leur déclin.

Dans le secteur minier, la production du Brésil représentait en 2006 la plus grande valeur économique, suivie par celles du Pérou, du Chili et de la Jamaïque. Assurant des revenus stables dans le secteur minier de la région ALC, la raréfaction des ressources attire l'attention de plus en plus de stratégistes et décideurs. La région Amérique Latine et Caraibes est leader dans la production des quatre métaux suivants : le strontium, l'étain, l'argent et le cuivre (plus de 20% de la production mondiale, combinée). Alors que le PIB total de la région était de 3,120 milliards de dollars américains (prix constants de 2006), la part des ressources minières était alors de 260 milliards de dollars, représentant ainsi 8% du PIB total de la région. À titre de comparaison, les exportations issues de la pêche en 2007 étaient de 11 milliards de dollars, alors que celles du bois dur représentaient 0,24 milliard en 2008.

La présente analyse identifie six ressources essentielles de par leur importance socio-économique, environnementale, et culturelle ainsi que leur rareté dans la région : l'eau, les terres fertiles, les forêts, les ressources issues de la pêche, les paysage naturels, les métaux et minéraux. Ces trois dernières ressources ont un lien direct avec les secteurs suivants : la pêche, le tourisme et l'industrie minière. De plus, comme le montre le rapport du Programme des Nations Unies pour l'Environnement (PNUE) intitulé « *Resource Efficiency: Economics and Outlook for Latin America. Case studies Mercosur, Chile and Mexico* » (PNUE, 2011b), l'eau et les terres fertiles sont des ressources utilisées de manière transversale dans nombre de secteurs.

La rareté des ressources naturelles dans la région pose de nombreux défis si l'on considère notamment l'accroissement de la population, la mondialisation et la compétitivité qui en découle, les avancées technologiques ainsi que le changement climatique. Pour un certain nombre de ressources, dont celles issues de la pêche, les forêts, les terres fertiles ou encore les paysages naturels, les risques sont encore plus élevés. En effet, une grande partie de la population dépend directement de la disponibilité de ces ressources indispensables à la sécurité alimentaire, tant à l'échelle nationale que régionale.

Les ressources naturelles font ainsi l'objet d'une attention accrue sur le plan régional et international : en effet, leur raréfaction entraîne une augmentation des prix, réduit les quantités offertes, et provoque une surexploitation de ces ressources, ayant alors pour conséquence un appauvrissement de leur qualité.

Malheureusement, pour la plupart des pays, la croissance économique se construit en grande partie, encore aujourd'hui, par la surexploitation des ressources naturelles et non sur la gestion durable des ressources et le développement durable. L'utilisation durable des ressources naturelles demeure encore marginale dans les économies d'Amérique Latine, comme le montre le Chapitre 5.

Cependant, l'importance donnée à la protection des ressources naturelles est grandissante dans bien des pays de la région. Même si certaines de ces ressources naturelles n'ont pas de retombées économiques directes (c'est le cas de l'eau mais aussi des paysages naturels), les points de vue des experts reflétés dans l'enquête ainsi que les consultations conduites auprès d'un certain nombre de parties prenantes par le PNUE en 2010 et 2011 au Panama, à Florianopolis (Brésil) et à Santa Fe (Argentine), montrent que ce phénomène est bien réel. Il est toutefois difficile (du fait du faible nombre et de l'hétérogénéité des personnes interrogées sur le sujet) d'évaluer l'adhésion des autres parties prenantes à ce point de vue et, par le fait même, d'évaluer l'influence qu'elles pourraient avoir sur les

politiques, la promotion des méthodologies, approches ou programmes.

La gestion durable des ressources naturelles peut être un moyen d'évoluer vers le développement durable, et ainsi, aider à :

- réduire la pauvreté et les inégalités, en conformité avec les principes et objectifs de la Conférence des Nations Unies pour le Développement Durable de 2012 (Rio+20) ;
- partager les coûts et bénéfices de la protection, de la conservation et de la mise à disposition des ressources naturelles et des services écosystémiques entre tous les acteurs de la chaine ;
- assurer la protection des ressources naturelles pour les besoins des générations futures ; et
- protéger plusieurs écosystèmes parmi les plus variés et les plus riches du monde.

L'approche du cycle de vie constitue la pierre angulaire de la GDR. Cette étude complète analyse toutes les étapes du processus et peut aider à prévoir les impacts qui n'auraient pas pu être anticipés autrement, permettant ainsi l'évaluation/identification des options alternatives, des stratégies nationales évolutives, et même des approches politiques aléatoires, en vue de protéger/conserver les services écosystémiques sur lesquels reposent les activités économiques.

Le GESRE a pour but de mettre les Analyses du Cycle de Vie (ACV) à la disposition des secteurs d'activité ayant des incidences environnementales élevées, tout en déployant de nouveaux programmes de gestion et outils d'analyse dont l'objectif final est de réduire les impacts tout au long du cycle de vie d'un procédé ou d'un produit. De plus, l'identification de « points chauds » tout au long du cycle de vie des ressources essentielles permet de hiérarchiser et choisir des solutions technologiques, des interventions politiques ainsi que des stratégies de renforcement des capacités ayant de plus fortes chances de réussite pour la région, tout en évitant le développement de technologies obsolètes, actuellement interdites dans les pays plus développés.

Une gestion spécifique pourrait être requise pour chacune des six ressources considérées comme prioritaires – ressources issues de la pêche, métaux et minéraux, paysage naturel, eau, forêts et terres fertiles. Cependant, en ne traitant en priorité que les ressources dans leur individualité, il existe un risque important de passer outre les liens entre les différentes ressources – liens auxquels peu de mesures ont été consacrées. À titre d'exemple, les zones naturelles ont un lien direct avec les terres fertiles et les paysages. Dans l'exemple de l'eau, qui est la pierre angulaire du secteur agricole, ou encore des forêts ou des ressources issues de la pêche, les ressources essentielles ne devraient pas être prises de manière indépendante, alors que l'attention est portée sur des secteurs reliés entre eux.

La gestion durable des ressources regroupe des directives, des principes méthodologiques et des outils transversaux dont la mise en œuvre requiert un certain niveau d'adaptation aux besoins des pays concernés, à leur niveau de développement ainsi qu'à leurs activités économiques afin d'obtenir des résultats socio-économiques, environnementaux et économiques bénéfiques aux communautés locales.

Les projets pilotes menés dans le cadre du GESRE offrent des options de gestion variées, regroupant des démarches indépendantes en un ensemble d'outils facilitant le processus d'apprentissage et les échanges d'expérience pour les pays désirant adopter des pratiques de gestion durable des ressources. Les projets pilotes prouvent par la même occasion que les approches en terme de GDR permettent de renforcer la compétitivité, mais aussi la durabilité économique et environnementale des ressources naturelles. Alors qu'il devient évident que les objectifs économiques ne peuvent être atteints sans tenir compte de la résilience environnementale, l'engagement des gouvernements renforce la volonté politique affichée d'améliorer la gestion

des ressources naturelles. Il est cependant encore difficile d'aboutir à un effort concerté en matière de gestion durable des ressources, et ce, à travers tous les secteurs essentiels de la région Amérique Latine et Caraibes.

Au travers du cadre de GDR proposé, le présent rapport encourage la mise en œuvre des recommandations des rapports du Panel International des Ressources (par exemple, le « découplage » de l'utilisation des ressources naturelles et des impacts environnementaux découlant de la croissance économique) et confirme l'importance des principes directeurs de l'approche du cycle de vie promus par « l'Initiative sur le cycle de vie PNUE-SETAC » (Société de Technologie et Chimie de l'Environnement).

Ce document démontre que des données plus importantes et approfondies sur l'état des ressources naturelles permettent une meilleure compréhension des politiques requises pour la protection de ces ressources naturelles et des communautés qui en dépendent; ceci renforce ainsi les économies nationales et régionales et la coopération entre les pays de la région afin de freiner les tendances à l'exploitation non durable des ressources.

On ne peut ignorer les défis auxquels sont exposés les pays de la région, et qui font obstacle à la prise de décisions appropriées dans le domaine de la GDR. Parmi ces défis figurent notamment la vulnérabilité de la région au changement climatique (ayant des conséquences dévastatrices telles que les sécheresses, les inondations ou les modifications significatives du climat), la difficulté à pallier la faiblesse de ses institutions (Agrast et al., 2011), une densité démographique en augmentation (voir Carte 2, p. 25) accompagnée de taux de pauvreté élevés et de ressources économiques limitées. En conséquence, une plus forte sensibilisation ainsi que l'utilisation des outils nécessaires aux défis de la GDR, sont autant d'opportunités permettant à la région de gérer ses ressources naturelles de manière durable et aux générations actuelles et futures d'en bénéficier. C'est pourquoi la GDR ne doit pas être perçue comme un obstacle au développement économique d'un pays, mais bien comme un moyen nécessaire au développement et à la croissance, tant à l'échelle nationale que régionale.

Ce rapport met en lumière les liens directs entre la GDR et ses répercussions sur la réduction de la pauvreté dans la région ALC, ou près d'un quart de la population vit avec moins de deux dollars par jour (dans les régions rurales, 55% de la population n'a pas accès à des sources d'approvisionnement en eau potable améliorée (Bovarnick et al., 2010)). En outre, ce sont les populations les plus pauvres – incapables de se procurer des produits de substitution en temps de crise ou d'instabilité – qui dépendent le plus et en priorité des ressources naturelles telles que la biodiversité, les forêts, les terres agricoles, les ressources issues de la pêche, l'accès à l'eau, les paysages, ainsi que les ressources minières et minérales. Un usage non durable des ressources naturelles entrave la capacité des populations, notamment celles à faible revenus, à surmonter les changements environnementaux, les entrainant un peu plus dans la pauvreté. Une stratégie efficace en matière de réduction de la pauvreté ne peut être réalisée que par la promotion de l'usage durable des ressources naturelles et des stratégies de gestion de celles-ci. Les impacts socio-économiques de telles stratégies conduiront à la création d'emplois et autres opportunités économiques associées à la gestion des ressources. Enfin, la participation des différents acteurs, des bénéficiaires et autres intervenants locaux est essentielle pour le processus de GDR, car ce dernier offre aux populations les plus pauvres et les plus marginalisées, une meilleure information, un accès au processus décisionnel, et de façon générale, plus d'autonomisation, grâce à un élargissement du cercle des participants (telles que les populations autochtones et les autres minorités dont les femmes et les jeunes).

Resumen ejecutivo

La gestión sostenible de los recursos (GESRE) en América Latina y el Caribe (ALC) es imprescindible, ya que las economías nacionales, regionales y mundial dependen en gran medida de su disponibilidad y productividad.

El presente informe es el resultado del proyecto "Desarrollo de capacidades para la gestión sostenible de los recursos" (GESRE)[3] el cual pretende (1) identificar las necesidades de la región para la gestión sostenible de los recursos naturales; (2) incrementar la coordinación y entendimiento de la GESRE entre las partes interesadas clave en la comunidad científica y la administración pública; (3) mejorar las habilidades de las partes interesadas en estos temas, proporcionándoles las herramientas para mejorar la coordinación y desarrollo de políticas transversales para la gestión sostenible; y (4) poner en marcha planes de acción nacionales e identificar oportunidades de GESRE en la región ALC. Este proyecto muestra las ventajas de un enfoque de ciclo de vida en la formulación de políticas y enfoques GESRE e impulsa actividades que fomenten la educación y el empoderamiento de los actores clave en ALC. Los proyectos piloto se llevaron a cabo en determinados países para introducir procedimientos de gestión sostenibles y más justos y equitativos.

Este informe pretende proporcionar (1) un contexto global de la GESRE en la región ALC; (2) una propuesta de definición de recursos críticos tal y como los perciben las partes interesadas de la región; (3) un análisis del estado actual de los recursos naturales críticos identificados; y (4) conclusiones y perspectivas de futuro.

Debido a la limitada disponibilidad de datos, el análisis combinó información obtenida por medio de dos métodos: (a) analizando la información y datos estadísticos existentes y (b) llevando a cabo una encuesta a expertos. Los resultados de los análisis proporcionan una información de referencia para la identificación de los recursos críticos en la región, utilizando un esquema de evaluación semi-cuantitativa.

La región ALC incluye 33 países, que hablan 4 idiomas oficiales: español, portugués, inglés y francés. Su superficie abarca más de 21 millones de km^2 (alrededor del 50% del continente americano) y es el hogar de casi 600 millones de personas (8% de la población mundial). (Véase el Mapa 1).

De acuerdo con el Programa de las Naciones Unidas para el Desarrollo (PNUD), para el período 2000-2007, la agricultura contribuyó al Producto Interno Bruto (PIB) de ALC en un promedio de 9,6% y las exportaciones de productos agrícolas representaron el 44% del valor total de las exportaciones en 2007. Para el mismo año, en países como Panamá, Paraguay y Nicaragua, las exportaciones agrícolas representaron más del 80% de las exportaciones totales de productos básicos. El sector proporciona empleo a cerca del 9% de la población en la región ALC (UNDP, 2010).

En 2004, cada uno de los países, Chile, México, Colombia y Brasil recibieron de la pesca, cerca de dos mil millones de dólares (US$) cada país, mientras Venezuela, Panamá, Argentina, Guyana y Perú cerca de 100 millones de dólares (US$) cada país (Catarci, 2004, en UNDP, 2010). En al menos 10 países de la región, la pesca contribuyó en más del 1% del PIB (UNDP, 2010).

El turismo en el Caribe no sería tan alto como el 20% del PIB sin sus arrecifes de coral, que atraen a turistas de todo el mundo y emplea al 5-19% de la población activa (Cuadro 12). En varios países sudamericanos, la contribución del turismo al PIB es del 2% (UNDP, 2010).

Esta región, que incluye seis países megabiodiversos, proporciona nichos especializados para las especies tropicales (Felton et al., 2009). Cuando los recursos escasean, la planificación de la conservación y la priorización del uso de recursos para la conservación en áreas con alta concentración de biodiversidad

3 http://gesrelac.wordpress.com/

son cruciales para frenar su declive (Peters et al., 2005).

En cuanto a los minerales y metales, en 2006 la producción de recursos materiales en Brasil tuvo el mayor valor económico, seguido por Perú, Chile y Jamaica. La escasez de los recursos está llamando la atención de los planificadores y responsables políticos, ya que proporcionan ingresos estables en los países mineros de ALC. Entre los diez principales recursos identificados con menor valor de vida de reserva, la región de ALC es el proveedor líder de cuatro metales: estroncio, estaño, plata y cobre (combinados más del 20% de la producción mundial).

Mientras que el PIB total de la región de ALC fue de 3.120 millones de dólares (US$) (en precios del 2006), la porción de recursos metálicos de 260 mil millones de dólares (US$) corresponde a cerca del 8% del PIB total de la región. De nuevo para efectos comparativos, la exportación pesquera total de la región de ALC en 2007 fue de aproximadamente 11 millones de dólares, y la de madera en 2008 fue de 0,24 millones de dólares (US$).

La evaluación ha identificado seis recursos críticos por su significancia socio-económica, ambiental, de escasez y cultural para la región: el agua, el suelo fértil, los bosques, los recursos pesqueros, el paisaje natural y los metales y minerales. Los últimos tres recursos están directamente ligados a los siguientes sectores: pesca, turismo y minería. Adicionalmente, el agua y el suelo fértil son recursos utilizados de manera transversal en numerosos sectores, de acuerdo al informe del PNUMA, *Eficiencia en el uso de los recursos en América Latina: Perspectivas e implicaciones económicas. Estudios de caso Mercosur, Chile y México* (UNEP, 2011b).

La escasez de recursos naturales en ALC presenta varios retos al considerar el crecimiento demográfico, la globalización y la competitividad, los avances tecnológicos y la amenaza del cambio climático. Ciertos recursos, incluyendo los recursos pesqueros, los bosques, los suelos fértiles y el paisaje, se enfrentan a mayores riesgos que otros. Un alto porcentaje de la población depende directamente de la disponibilidad de estos recursos, que constituyen elementos fundamentales para la seguridad alimentaria a nivel nacional, e incluso global.

A pesar de la relativamente alta disponibilidad de recursos naturales en la región de ALC, a nivel mundial, los recursos naturales están ganando mayor atención ya que su escasez resulta en el aumento de los precios, la oferta limitada y sobrexplotación, lo que lleva al detrimento de la calidad.

La mayoría de los países aún no consideran la gestión sostenible de los recursos naturales como base de sus economías. El uso sostenible de estos recursos aún es marginal en las economías de América Latina, tal como se describe en el Capítulo 5.

Existe un aumento en la conciencia de los países reconociendo la importancia de la conservación de sus recursos naturales, aún si algunos de los recursos no producen beneficios económicos directos (ej. el agua y los paisajes naturales). Esto resulta evidente según la percepción de los expertos expresada a través de una encuesta y de un número de consultas realizadas a las partes interesadas por el PNUMA en 2010 y 2011 en Panamá, Florianópolis (Brasil) y Santa Fe (Argentina). Sin embargo, debido a la heterogeneidad y limitación de la muestra de las partes interesadas encuestadas, continúa siendo incierto hasta qué punto estas percepciones son compartidas por otras partes interesadas y como pueden estas ideas influir en las políticas, promover metodologías, enfoques o programas.

La gestión sostenible de los recursos naturales puede servir como un vehículo para avanzar hacia el desarrollo sostenible y, por lo tanto, ayudar a:

- La reducción de la pobreza y desigualdad, de acuerdo con el espíritu y los objetivos de la Conferencia de las NU sobre Desarrollo Sostenible 2012 (Río +20);

- Compartir los beneficios y costos de conservación, mantenimiento y aseguramiento de la provisión de los recursos y los servicios de los ecosistemas entre todos los actores a lo largo de toda la cadena de valor;
- Salvaguardar los recursos para las necesidades de las generaciones futuras; y
- Proteger algunos de los ecosistemas más diversos y ricos del mundo.

El enfoque de ciclo de vida es una piedra angular en el desarrollo de enfoques y políticas para la GESRE. Este análisis exhaustivo considera todas las etapas en el ciclo de vida de un producto y puede ayudar en el pronóstico de impactos que, de otra forma no podrían ser previstos. Esto facilita la evaluación / identificación de alternativas a los actuales procesos que puede dar lugar a la evolución de las estrategias nacionales e incluso al cambio de los enfoques de las políticas para proteger y preservar los servicios de los ecosistemas de los que dependen las actividades económicas.

El proyecto GESRE tiene como objetivo hacer disponibles los resultados de los Análisis de Ciclo de Vida (ACV) a los sectores con alto impacto ambiental, a la vez que ofrece un nuevo método de gestión y herramientas de análisis con el fin de reducir los impactos a través del ciclo de vida de un proceso o producto. Adicionalmente, la identificación de puntos críticos a lo largo del ciclo de vida de los recursos críticos permite la priorización de soluciones tecnológicas, de políticas de intervención y de enfoques para el desarrollo de capacidades con el más alto potencial de éxito a la vez que se evita que la región se convierta en receptor de tecnologías obsoletas, las cuales actualmente están prohibidas en muchos de los países desarrollados.

Cada uno de los seis recursos prioritarios – recursos pesqueros, metales y minerales, paisajes naturales, agua, bosques y suelos fértiles – requiere un enfoque de gestión específico. Sin embargo, cuando se tratan los recursos de manera individual, existe un riesgo inminente de desatender los nexos que existen entre los recursos. Por ejemplo, las áreas naturales están interrelacionadas tanto con paisaje como con suelo fértil. En el caso del agua, que es la base de la agricultura, la silvicultura y la pesca, no debe ser considerada de manera aislada cuando se trata de abordar los sectores relacionados. La gestión sostenible de los recursos agrupa guías, metodologías y herramientas transversales adaptadas a las necesidades de los países, al nivel de desarrollo y a las actividades económicas, resultando en beneficios socio-económicos, ambientales y económicos para las comunidades.

Los proyectos piloto realizados bajo el enfoque GESRE presentan amplias opciones de gestión, transformando los enfoques aislados en un conjunto de herramientas para guiar el proceso de aprendizaje e intercambio de conocimientos para aquellos países que deseen adoptar prácticas de GESRE. Estos demuestran que el enfoque de la GESRE tiene el potencial de mejorar la competitividad, así como la sostenibilidad ambiental y económica de los recursos. La participación de los gobiernos fortalece la voluntad política para mejorar la gestión actual de los recursos, ya que esclarece que los objetivos económicos no pueden ser alcanzados sin tener en cuenta que se basan en los servicios de los ecosistemas. Aún así, continúa siendo un reto lograr un esfuerzo concertado hacia la GESRE en todos los sectores críticos en ALC.

A través del marco de la GESRE propuesto, este informe apoya la implementación de las recomendaciones de los informes del Panel Internacional de Recursos (ej. Desacoplar el uso de los recursos naturales y los impactos ambientales del crecimiento económico) y confirma la importancia de la guía de ciclo de vida promovida por la Iniciativa de Ciclo de Vida UNEP/SETAC.

Este documento revela que mayor y mejor información sobre la situación de los recursos naturales, contribuye a un mejor entendimiento de los requerimientos de políticas para proteger los recursos naturales y las comunidades que dependen de éstos; al fortalecimiento de las economías nacionales y regionales y al incremento de la cooperación regional entre los países de ALC para detener patrones de explotación insostenibles.

No se puede pasar por alto que la región de ALC enfrenta varios retos que dificultan la toma de decisiones apropiadas en el ámbito de la GESRE. Estos incluyen la vulnerabilidad de la región al cambio climático (con las consecuencias devastadoras de las sequías, inundaciones y alteraciones climáticas), la lucha para superar su débil institucionalismo (Agrast et al., 2011), una creciente distribución de la densidad demográfica (véase el Mapa 2) con tasas de pobreza todavía considerables y capacidades industriales limitadas. Por estas razones, una mayor conciencia, así como el uso de herramientas efectivas para hacer frente a los retos de la GESRE, son una oportunidad para la región de gestionar sus recursos naturales de manera sostenible, permitiendo a las generaciones actuales y futuras, beneficiarse de ellos y de sus servicios. Por lo tanto, la GESRE no debe ser vista como un obstáculo para el desarrollo de un país, sino más bien como un medio para el desarrollo y crecimiento tanto a nivel nacional como regional.

El presente informe reconoce la interrelación directa entre las prácticas de gestión sostenible de los recursos y los efectos posteriores sobre la reducción de la mitigación de la pobreza en la región ALC, donde cerca de una cuarta parte de la población vive con menos de 2 dólares (US$) al día. (En áreas rurales, el 55% de la población no tiene acceso a fuentes de agua mejoradas (Bovarnick et al., 2010).) Son los miembros más pobres de la sociedad — aquellos imposibilitados de acceder a reemplazos durante tiempos de crisis o degradación — quienes dependen con mayor intensidad de la biodiversidad, los bosques, la tierra cultivable, los recursos pesqueros, la disponibilidad de agua, el paisaje y la minería y los minerales como recursos naturales prioritarios. Un uso no sostenible de estos recursos dificulta la capacidad, especialmente, entre los grupos de bajos ingresos, de hacer frente a los cambios ambientales, lo que les lleva hacia una pobreza más profunda. Una estrategia eficaz de lucha contra la pobreza sólo se puede lograr a través de la promoción de estrategias de uso y gestión sostenible de los recursos. Los impactos socio-económicos abarcarán la creación de empleos y otras oportunidades económicas asociadas a los recursos gestionados. Finalmente, la participación de las partes interesadas, beneficiarios y otros actores locales también es un elemento importante de la gestión sostenible de los recursos, la cual ofrece mejor información a los grupos más pobres y marginados, acceso a la toma de decisiones y empoderamiento de manera generalizada en la medida en que el círculo de participantes se amplía (ej. para incluir pueblos indígenas y otras minorías, mujeres y jóvenes).

Sumário executivo

A Gestão Sustentável de Recursos (GSR) na América Latina e Caribe (ALC) é essencial, uma vez que as economias nacionais, regionais e globais são altamente dependentes da disponibilidade e produtividade destes recursos.

O presente relatório é o resultado do projeto no âmbito do projeto "Fortalecendo as Capacidades em Gestão de Recursos Sustentáveis" (GESRE)[4], com o objetivo de (1) identificar as necessidades da região para gestão sustentável de recursos naturais; (2) aumentar a coordenação e o entendimento da GSR entre as partes interessadas da comunidade científica e das entidades governamentais; (3) melhorar as capacitações das partes interessadas nestes tópicos, fornecendo ferramentas para melhorar a coordenação e desenvolver políticas transversais consistentes de GSR; e (4) lançar planos de ação nacionais e identificar oportunidades de GSR na região da ALC. Este projeto mostra as vantagens do uso da abordagem de ciclo de vida na formulação de políticas GSR e encoraja atividades que promovam a educação, inclusão e fortalecimento das principais partes envolvidas na GSR na ALC. Para tanto, foram conduzidos projetos-piloto em países selecionados para introduzir meios de gestão sustentáveis mais equilibrados e justos.

Este relatório fornece (1) uma visão global da GSR na região da ALC; (2) uma proposta de definição de recursos críticos, na ótica dos agentes regionais; (3) uma análise da situação atual dos recursos naturais críticos identificados; e (4) conclusões e perspectivas futuras.

Face à escassa disponibilidade de dados, a análise concilia informação obtida de duas formas: (a) análise da informação e dados estatísticos existentes e (b) realização de uma exaustiva pesquisa. Os resultados das análises fornecem informação básica, que permite identificar os recursos críticos da região, com uso de um esquema de avaliação semi-quantitativa.

4 http://gesrelac.wordpress.com/

A região da ALC inclui 33 países com quatro línguas oficiais: espanhol, português, inglês e francês. Abrange uma superfície de mais de 21 milhões de km^2 (cerca de 50% do continente americano) e é habitado por quase 600 milhões de pessoas (8% da população mundial) (vd. Mapa 1).

De acordo com o Programa das Nações Unidas para o Desenvolvimento (PNUD), no período 2000-2007, a agricultura contribuiu, em média, 9,6% do Produto Interno Bruto (PIB) da ALC e a exportação dos produtos agrícolas corresponderam a 44% do total das exportações em 2007. No mesmo ano, países como o Panamá, Paraguai e Nicarágua, as exportações agrícolas representaram mais de 80% do total das exportações de mercadorias. O setor emprega cerca de 9% da população da ALC (PNUD, 2010).

Em 2004, o Chile, o México, a Colômbia e o Brasil receberam, cada um, 2 bilhões de dólares da pesca e a Venezuela, o Panamá, a Argentina, a Guiana e o Peru mais de 100 milhões cada (Catarci, 2004, PNUD, 2010). Em pelo menos 10 países, as pescas contribuíram com mais de 1% do PIB (PNUD, 2010).

O turismo no Caribe não seria mais do que 20% do PIB sem os recifes de corais, que atraem turistas de todo o mundo e emprega entre 5 e 19% da força de trabalho (Quadro 2). Em vários países sul-americanos, a contribuição do turismo no PIB é de 2% (PNUD, 2010).

Esta região, que inclui 6 países megabiodiversos, proporciona nichos específicos a espécies tropicais (Felton et al., 2009). À medida que os recursos tornam escassos, planejar o uso e a conservação de recursos em áreas de alta concentração de biodiversidade (Peter et al., 2005) são fundamentais para travar o seu declínio.

No que diz respeito aos minerais e metais, em 2006, a produção de recursos materiais no Brasil obteve o maior valor econômico, seguido pelo Peru, Chile e Jamaica. A

escassez de recursos está atraindo a atenção de planejadores e tomadores de decisão políticos, pois proporcionam rendimentos estáveis nos países mineiros da ALC. Entre os dez principais recursos identificados com os menores valores de reserva, a região da ALC lidera no fornecimento de 4 metais: estrôncio, estanho, prata e cobre (combinados, representam mais de 20% da produção global). Enquanto o PIB total da ALC era de 3,12 bilhões de dólares (preços de 2006), a participação de 260 bilhões dos recursos metálicos representam cerca de 8% do PIB da região. Comparativamente, a exportação de pescados da ALC, em 2007, foi de aproximadamente 11 bilhões e a exportação de madeira, de 240 milhões.

A avaliação identificou seis recursos críticos pela importância sócio-econômica, ambiental e significância cultural e na escassez para a região: água, terras férteis, florestas, recursos pesqueiros, paisagens naturais e metais e minerais. Os três últimos recursos estão diretamente ligados aos setores das pesca, turismo e mineração. Além disso, a água e os terras férteis são recursos usados transversalmente em diferentes setores, de acordo com o relatório do PNUMA, *Resource Efficiency: Economics and Outlook for Latin America. Case studies Mercosur, Chile and Mexico* [Eficiência de Recursos: Economia e Perspetivas para a América Latina. Estudos de caso Mercosul, Chile e México] (UNEP, 2011b).

A escassez de recursos naturais na ALC coloca vários desafios ao considerar o crescimento da população, a globalização e competitividade, os avanços tecnológicos e a ameaça das mudanças climáticas. Alguns recursos, incluindo os pesqueiros, florestais, terras férteis e paisagens enfrentam maiores riscos que outros. Uma porcentagem elevada da população depende diretamente da disponibilidade destes recursos, que constituem elementos fundamentais na segurança alimentar em nível nacional.

Apesar da relativa alta disponibilidade dos recursos naturais na região ALC, em nível global, os recursos naturais estão ganhando cada vez mais atenção, tendo em vista que a escassez resulta em preços mais elevados, limitação da oferta e sobre-exploração, levando a uma queda da qualidade.

A maioria dos países não considera a gestão sustentável dos recursos naturais como base da economia. O uso sustentável destes recursos ainda é marginal nas economias da América Latina e do Caribe, como está descrito no Capítulo 5.

Há um reconhecimento crescente pelos países da importância de conservarem os próprios recursos naturais, ainda que alguns não produzam benefícios econômicos diretos (ex., água e paisagem natural). Isto é evidente nas percepções de expecialistas pela pesquisa e consulta às partes interessadas, facilitada pelo PNUMA em 2010 e 2011, no Panamá, Florianópolis (Brasil) e Santa Fé (Argentina). No entanto, permanece incerto em que extensão essas percepções são partilhadas por outras partes e o quanto pode influenciar políticas, promover metodologias, abordagens ou programas, dada à heterogeneidade e à amostra limitada de partes interessadas questionadas.

A gestão sustentável dos recursos naturais pode servir como veículo para avançar em direção ao desenvolvimento sustentável e, por conseguinte, ajudar a:

- reduzir a pobreza e desigualdade, de acordo com o espírito e objetivos da Conferência das Nações Unidas sobre o Desenvolvimento Sustentável 2012 (Rio+20);
- compartilhar os benefícios e custos para conservar, manter e garantir o fornecimento de recursos e serviços do ecossistema entre todos os atores da cadeia de valor;
- salvaguardar recursos para as necessidades das futuras gerações; e
- proteger alguns dos ecossistemas mais ricos e variados do mundo.

A abordagem do ciclo de vida é uma pedra angular no desenvolvimento de abordagens e políticas para a GSR. Esta completa análise considera todos os estágios do ciclo de vida de um produto e pode auxiliar a prognosticar impactos que não poderiam ser previstos de outra maneira, permitindo avaliar/identificar alternativas aos processos atuais que podem levar a mudar estratégias nacionais, e até mesmo alterar abordagens políticas de modo a proteger e preservar serviços do ecossistema dos quais as atividades económicas dependem.

O projeto GESRE pretende disponibilizar os resultados das Avaliações de Ciclo de Vida (ACV) aos setores com grande impacto ambiental e, ao mesmo tempo, desdobrar novos métodos de gestão e ferramentas de análise, no sentido de reduzir os impactos ao longo do ciclo de vida de um processo ou produto. Além disso, a identificação de pontos focais ao longo do ciclo de vida de recursos críticos permite priorizar soluções tecnológicas, intervenções políticas e abordagens de capacitação com elevado potencial de sucesso, prevenindo a região de ser o destinatário de tecnologias obsoletas, atualmente banidas na maioria dos países desenvolvidos.

Cada um dos seis recursos priorizados – pescas, metais e minerais, paisagens naturais, água, florestas e terras férteis – pode requerer uma abordagem de gestão específica, contudo, ao lidar com cada recurso separadamente, há um risco iminente de desconsiderar as conexões existentes entre os recursos. Por exemplo, as áreas naturais estão conectadas à paisagem e ao terreno fértil. No caso da água, base da agricultura, das florestas ou das pescas, não pode ser isolada ao abordar estes setores relacionados. A gestão sustentável de recursos inclui diretrizes intersetoriais, metodologias e ferramentas adaptada às necessidades dos países, ao nível de desenvolvimento e atividades econômicas, que resultem em benefícios socioeconômicos, ambientais e econômicos para as comunidades.

Os projetos-piloto conduzidos a partir da abordagem GESRE apresentam um amplo leque de opções de gestão, transformando abordagens isoladas em um conjunto de ferramentas de orientação do processo de aprendizagem e de troca de experiências para países que pretendam adotar práticas de GSR. Os projetos-piloto demonstram que as abordagens de GSR têm potencial para aumentar a competitividade, assim como a sustentabilidade de recursos ambientais e econômicos. O envolvimento dos governos fortalece a vontade política de melhorar a atual gestão dos recursos, à medida que clareia que os objetivos econômicos não podem ser alcançados quando não se considerada que são a base para os serviços do ecossistema. Ainda assim, continua um desafio chegar a um esforço concertado em direção à GSR em todos os setores críticos na ALC.

Por meio do GSR proposto, este relatório apoia a implementação das recomendações dos relatórios do Painel Internacional de Recursos (ex., dissocia o uso de recursos naturais e impactos ambientais do crescimento econômico) e confirma a importância dos princípios orientadores do ciclo de vida promovidos pela Iniciativa de Ciclo de Vida do PNUMA/SETAC.

Este documento revela que mais e melhores dados da situação dos recursos naturais contribuem para um melhor entendimento da necessidade políticas para proteger os recursos naturais e as comunidades que dependem deles, fortalecer as economias nacionais e regionais e aumentar a cooperação regional entre os países da ALC, de modo a travar os padrões de exploração insustentáveis.

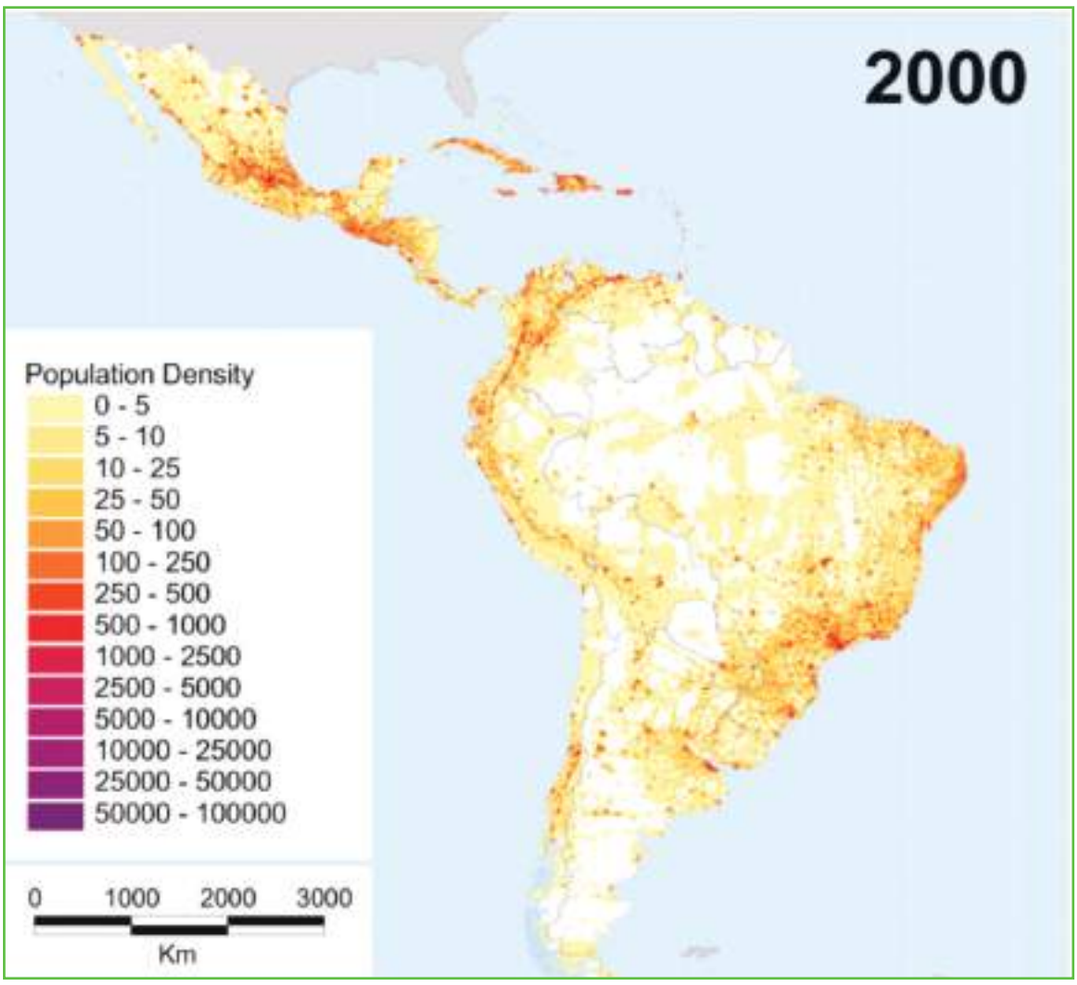
Não se pode ignorar que a ALC enfrenta diversos desafios que dificultam decisões apropriadas no campo da GSR, que incluem a vulnerabilidade da região às mudanças climáticas (com as consequências devastadoras das secas, inundações e alterações do clima), a luta para superar o fraca institucionalismo (Agraste et al., 2011), o aumento da densidade demográfica (vd. Mapa 2), com elevadas taxas de pobreza e capacidade industrial limitada. Por estas razões, uma maior conscientização, tal como o uso de ferramentas eficazes para enfrentar os desafios da GSR, são uma oportunidade para a região lidar com os seus recursos naturais de forma sustentável, permitindo que as gerações atuais e futuras beneficiem deles e dos seus serviços. Portanto, a GSR não deve ser vista como uma barreira ao desenvolvimento de um país, mas sim como um meio de desenvolvimento e de crescimento do país e da região.

O presente relatório reconhece as interligações diretas entre as práticas de GSR e os efeitos subsequentes na redução da pobreza na região da ALC, onde cerca de um quarto da população vive com menos de 2 dólares por dia (Nos meios rurais, 55% da população não tem acesso a fontes de água melhorada (Bovarnick et al., 2010)). Os membros mais pobres da sociedade – que não conseguem pagar substitutos durante os tempos de crise ou degradação – dependem muito mais da biodiversidade, das florestas, dos terrenos agrícolas, recursos pesqueiros, disponibilidade de água, paisagem e mineração e minério, como recursos naturais prioritários. Um uso insustentável destes recursos dificulta a habilidade, particularmente nos grupos de baixa renda, em lidar com as mudanças ambientais, e portanto, empurrando-os, assim, ainda mais para a pobreza. Uma estratégia eficaz de redução da pobreza só pode ser alcançada por meio da promoção do uso sustentável de recursos e de estratégias de gestão. Os impactos socioeconômicos irão cobrir a criação de emprego e outras oportunidades econômicas associadas aos recursos geridos. Por último, o envolvimento das partes interessadas, beneficiários e outros agentes locais é um elemento igualmente importante da GSR, que proporciona aos grupos pobres e marginalizados melhor informação, acesso à tomada de decisões e fortalecimento em geral, pois o âmbito de participantes é ampliado (ex., povos nativos e outras minorias, mulheres e jovens).

Map 1. Pilot projects in Latin America and the Caribbean
Carte 1. Des projets pilotes en Amérique Latine et Caraïbes
Mapa 1. Proyectos Piloto en países de América Latina y el Caribe
Mapa 1. Projetos-piloto na América Latina e Caribe

Map 2. Latin America and the Caribbean: population density distribution, 2000
Carte 2. Amérique Latine et Caraibes: distribution de la densité démographique, 2000
Mapa 2. América Latina y el Caribe: Distribución de la densidad de la población, 2000.
Mapa 2. América Latina e no Caribe: Distribuição da densidade populacional, 2000

(CIAT et al., 2005).



1. Introduction

1.1 Scope and objectives of this report

The objective of the current report is to present the framework of analysis for prioritising natural resources in Latin America and the Caribbean (LAC) and for sustainable resource management (SRM), identify priority resources and provide SRM examples from the region.

More specifically, this report seeks to provide (1) the overall context of SRM in the LAC region, (2) identification of critical natural resources for future case studies, (3) an analysis of the current status of critical natural resources identified in the region and (4) conclusions and next steps.

Due to the limited data availability in the LAC region for analysing the status of natural resources, the analysis was performed in two ways: (a) by analysing existing information and data, and (b) by carrying out an expert survey. The results of the analyses provided baseline information for identifying critical resources in the region, using a semi-quantitative evaluation scheme.

1.2 The International Context: the UN Millennium Ecosystem Assessment, the UN Millenium Development Goals, International Resource Panel and the UNEP/ SETAC Life Cycle Initiative

This section provides an overview of relevant international initiatives and, hence, context for the present report.

The Millennium Development Goals (MDGs)

Based on the 2000 Millennium Declaration signed by 189 countries, the Millenium Development Goals (MDGs) consist of eight international goals and 18 concrete targets for development to be achieved by 2015 (UN, 2000). These include reducing extreme poverty, reducing child mortality rates, fighting disease epidemics and developing a global partnership for development.

Designed to help meet the needs of the world's poorest countries, the MDGs bring together developed and developing countries "to create an environment — at the national and global levels alike — which is conducive to development and the elimination of poverty."

By facilitating more SRM in the LAC region, the current project helps to achieve Goal 7 — "ensuring environmental sustainability" — through the improvement of the indicators corresponding to targets 7.a and 7.b[5]:

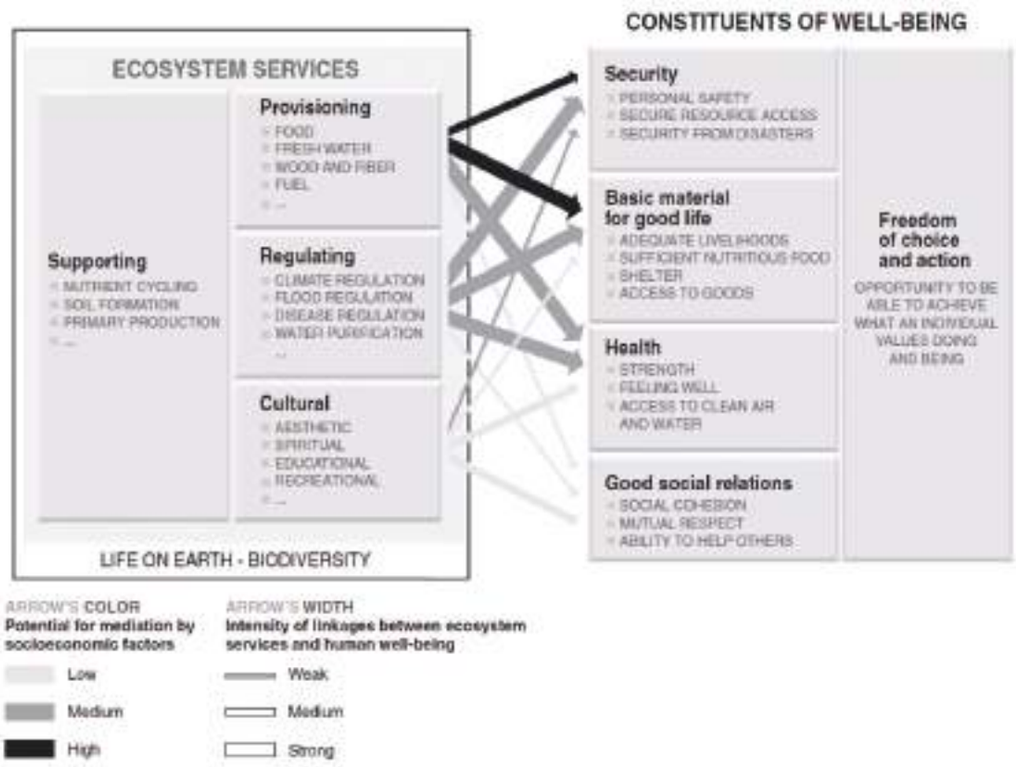
- Sustainable forest management (SFM) has been widely accepted as an approach that addresses environmental, economic and social benefits from forests.

On this indicator, although notable progress has been done in the dissemination of sustainable forest management practices in the region, it can not be affirmed that they are widely acknowledged according to Nassi et al. (2011). They conclude that "several economic, governance, and technical issues impede rapid advance towards SFM in Latin America. In the economic realm, the key factors are often the high opportunity costs of maintaining forests and the limited economic benefits, if any, from improved versus conventional logging practices when there are few other incentives for promoting sound forest management. In the governance realm, while forest governance has improved through forest tenure reform and changes in forestry regulations, land tenure problems persist in forested landscapes, and failure to enforce forestry regulations still limits a wider adoption of SFM. Finally, the lack of trained staff and inappropriate wage systems, together with inefficiencies and waste along the production and market chain, constitute the main technical impediments for adopting improved management practices".

- Proportion of area covered by forest (natural forests and forests plantations) and of protected areas as a percentage of total area.

5 Target 7.A: Integrate the principles of sustainable development into country policies and programmes, and reverse the loss of environmental resources. Target 7.B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss.

Figure 1. Linkages between ecosystem services and human well-being
(MEA, 2005)



A number of databases and national initiatives have emerged during the last decade in support of the measurement and monitoring of this indicator. Few of them can be found here: the World Database on Protected Areas[6] and the IUCN/UNEP World Database on Protected Areas[7]. A comprehensive report based on the FAOSTAT database for LAC on socio-economic trends and implications for the forestry sector to 2020 estimates, however, that based on the 2000 value an average decrease of 9% of forest areas will be observed in 2020 (Velarde, 2004).

Millennium Ecosystem Assessment (MEA)

The Millennium Ecosystem Assessment (MEA, 2005) was one of the largest global efforts to assess the current state and possible future consequences of the ecosystem and their implications on human well-being[8]. Started in 2001, the initiative has drawn over 1360 experts worldwide and produced five technical and six synthesis reports, which portrayed the current and future ecosystem conditions and their services based on state-of-the-art science.

These reports recognise that human well-being relies on essential services that ecosystems provide (Figure 1): provision of food, materials and energy, and regulation of climate and hydrological cycles. In turn, humans directly and indirectly affect the conditions of ecosystems, which eventually affect the capacity of ecosystems to provide such services for human well-being.

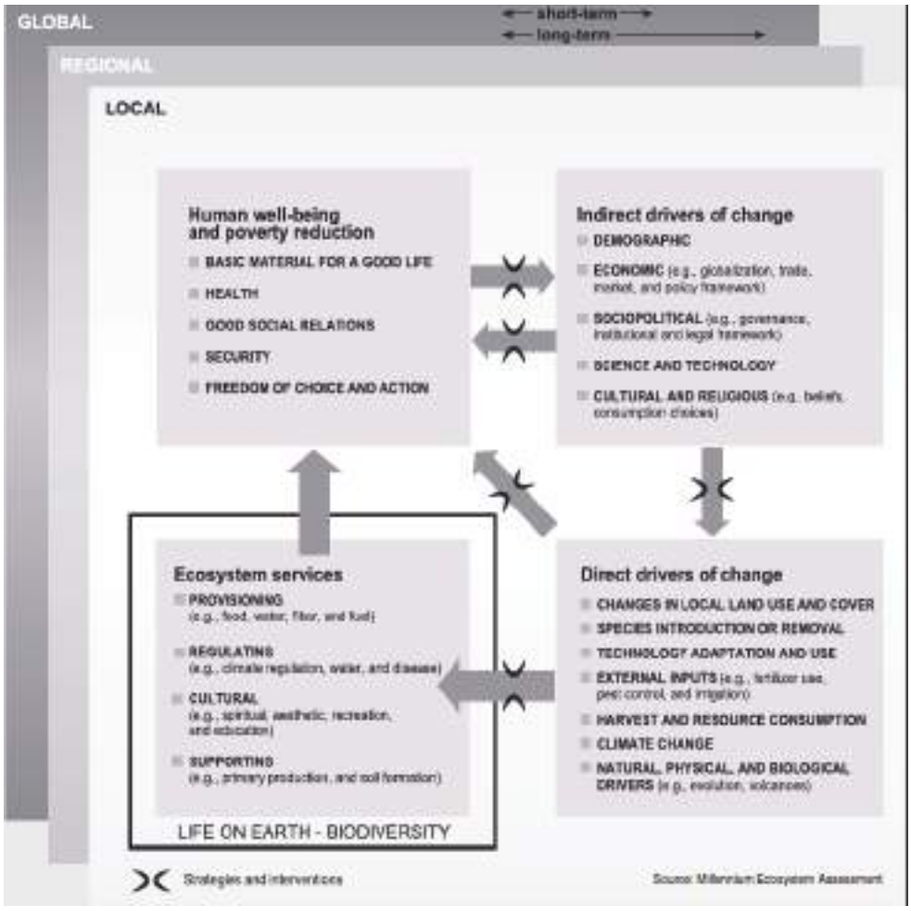
6 http://www.wdpa.org/.
7 http://data.iucn.org/dbtw-wpd/edocs/PAPS-016.pdf.
8 http://www.millenniumassessment.org/

The interactions between humans and the ecosystems at various spatial scales form the basic conceptual framework of the MEA (Figure 2). In the conceptual framework, human well-being and poverty reduction rely on ecosystem services, and humans affect the ecosystems´condition through indirect drivers such as demographic, economic and socio-political changes as well as through direct drivers such as land use and cover, and technological and climatic changes. The conceptual framework also indicates the policy interfaces that can regulate the dynamics of such interactions.

The MEA considers the environment as a source of goods and ecosystem services. As an example, trees may be considered not only goods in that they are used for lumber, but also service providers in that they store carbon. Policies in countries are slowly beginning to reflect this view. More precisely, the MEA frames the environment in terms of "supporting services" such as nutrient cycling, soil formation, pollination, biomass production and wildlife habitat; "regulating services," including air and water purification, flood mitigation, disease control and climate regulation; and "cultural services" that supply spiritual, recreational, aesthetic and educational opportunities. Natural resources — the focus of the current report — are considered in all clusters. For example, fertile land falls under "supporting services," water under "regulating services" and natural landscapes under "cultural services."

Figure 2. Conceptual framework of Millennium Ecosystem Assessment

(MEA, 2005)



Resource efficiency and sustainable consumption and production

The MEA and other relevant studies, such as the Global Environmental Outlook (UNEP, 2010f) and the 4th Assessment Report of the Inter-governmental Panel on Climate Change (Magrin et al., 2007), make it increasingly evident that the world cannot achieve sustainable economic growth without significant innovation in both the supply (production) and demand (consumption) sides of the market.

The United Nations Environment Programme (UNEP) works to promote resource efficiency as well as sustainable consumption and production in both developed and developing countries. The focus of UNEP's work is on achieving increased understanding and implementation, by public and private decision–makers, of policies and actions that lead to more resource efficiency and sustainable consumption and production.

Decoupling economic growth from environmental impact and resource use, and creating the "space" for the poor to meet their basic needs will require producers to change design, production, marketing and, eventually, pricing activities. Consumers will also need to provide for environmental and social concerns — in addition to price, convenience and quality — in their consumption decisions. Decoupling is at the core of innovation strategies for sustainable consumption and production.

For the purposes of this study, the authors understand that concern over the consumption of natural resources might be relevant from a life cycle perspective. However, due to the focus of this study on natural resources management, the authors explicitly delimited its scope and recommend additional research on the consumption cluster in the future.

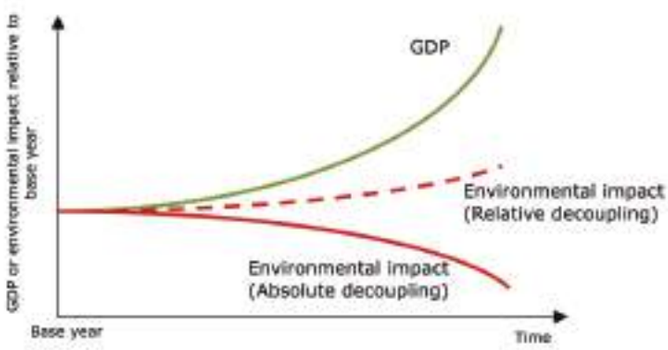
International Resource Panel

As the MEA primarily focused on ecosystem and its services, other types of resources such as abiotic resources were not covered in the assessment. Metals and minerals and natural landscapes, for example, provide economic, social and cultural value to humanity, and human actions can irreversibly affect the capacity of these resources to provide services to current and future generations.

Recognising the growing challenges of managing a broad range of resources, the International Resource Panel was launched in 2007[9] and seeks to (1) provide independent, coherent and authoritative scientific assessments of policy relevance on the sustainable use of natural resources and their environmental impacts over the full life cycle; and (2) contribute to a better understanding of how to decouple economic growth from environmental degradation. The Panel's current areas of work include decoupling, metals, biofuels, environmental impacts, water and soil.

Among these areas of work, the concept of decoupling forms the conceptual basis of the International Resource Panel's activity. While the same term is widely used differently in various fields, "decoupling" here refers to freeing economic prosperity from environmental degradation (UNEP, 2011a) (Figure 3). Depending on the context, the concept can be applied to human well-being and resource use as well.

Figure 3. Concept of decoupling
(UNEP, 2011a)



9 http://www.unep.org/resourcepanel/

Two types of decoupling are commonly distinguished: absolute and relative. Absolute decoupling is achieved if economic prosperity or human well-being can be improved while reducing environmental impacts or resource use. Relative decoupling is achieved when environmental impact or resource use is reduced per GDP unit, but not in absolute terms.

In 2004, the UN Economic Commission for Latin America and the Caribbean (ECLAC) introduced the "non-material economic growth" approach, essentially decoupling economic growth from resource consumption (UNEP, 2011a). Since decoupling can potentially also enhance equity among nations, drawing on the concept of "metabolic rates" (resources used per capita or resource

Figure 4. The global inter-relation between resource use and income (175 countries in the year 2000)

(UNEP, 2011a)

consumption intensity) as an objective means of comparing resource consumption rates of different countries, it is enlightening to understand the reasons for the notable differences of metabolic rates between countries, particularly in LAC, since it is the focus region of this study. The global average metabolic rate has doubled, from 4.6 tonnes/capita in 1900 to 8–9 tonnes/capita at the beginning of the 21st century. In the case of LAC, while Chile presented the highest metabolic rate, with almost 40 tonnes/capita/year, the remaining countries were far behind, with 20 tonnes/capita/year or less. The lowest metabolic rate was estimated in Haiti, with less than 4 tonnes/capita/year. Central American countries such as El Salvador, Honduras and Panama belong to the group with the second-lowest metabolic rates, of between 4 to 8 tonnes/capita/year. Brazil and Mexico evidenced relative low metabolic rates, with 13 and 8 tonnes/capita/year, respectively. See Figure 4 (UNEP, 2011a).

The high resource consumption intensity in Chile can be explained through the high quantity of mineral and metal resources that are extracted and exported. With respect to resource use, undesirable environmental impacts can be reduced basically to two strategies: (a) changing the mix of resources used through substitution of more harmful with less harmful resources, and (b) using resources in an environmentally-sound way throughout the life cycle of the products and services they provide.

To promote decoupling, there is an evident necessity to work at different levels: from spreading the concept and the strategies to reduce the impacts through the construction and application of methodologies that enhance efficiency in the production of goods and services, as well as the communication tools for better decision-making, to the measurement and supervision of the different national and regional efforts.

Furthermore, through the current report and the illustrated SRM cases, the decoupling principles and recommendations drawn by the International Resource Panel (UNEP, 2011a) are fully endorsed and provide valuable guidance for the final recommendations.

UNEP/SETAC Life Cycle Initiative

The life cycle principles, methodologies and data required for the authoritative assessments developed by the International Resource Panel and UNEP's activities on sustainable consumption and production rely on the contribution of the UNEP/SETAC Life Cycle Initiative and its global community.

The UNEP and the Society of Environmental Toxicology and Chemistry (SETAC), aware of this need to promote life cycle approaches in industrialised and non-industrialised countries, began to work jointly on the articulation of existing efforts around life cycle approaches, resulting in the launch of the UNEP/SETAC Life Cycle Initiative in 2002 (http://www.lifecycleinitiative.org). Both entities have partnered to work to enhance life cycle methodologies and collect data that comply with ISO 14040 standards, promoting the application of sound life cycle approaches and supporting the development of capabilities worldwide. The way the life cycle community understands the "life cycle thinking" is expressed below:

Life Cycle Thinking is about widening views by expanding the traditional focus on the production site and manufacturing processes in order to incorporate various aspects associated with a product over its entire life cycle.

Life cycle approaches include a range of life cycle methodologies from qualitative to quantitative tools based on life cycle thinking and include life cycle management. The quantitative LCA (following the ISO 14040 standards) is included in the life cycle approaches, but life cycle approaches are broader and more inclusive.

The objectives of the UNEP/SETAC Life Cycle Initiative are:

- Enhance the global consensus and relevance of existing and emerging

life cycle methodologies and data management;
- Expand capability worldwide to apply and to improve life cycle approaches; making them operational for organisations; and
- Communicate current life cycle knowledge and be the global voice of the Life Cycle community to influence and partner with stakeholders.

The UNEP/SETAC Life Cycle Initiative develops consented life cycle based impact assessment methodologies (e.g. water and land use) and indicators (e.g. water and carbon footprints) on relevant topics, a social life cycle impact assessment framework (see UNEP/SETAC, 2009) as well as a global guidance for life cycle assessment databases. In addition to this, the UNEP/SETAC Life Cycle Initiative also offers support to implement these approaches in developing countries and emerging economies. These contribute to the measurement and monitoring process of SRM practices and hence to better informed decisions when dealing with critical natural resources. They have been proven to be robust and complete tools for the implementation of SRM practices in developing countries.

1.3 Sustainable Resources Management and its importance

Definition

Following two stakeholder consultations within LAC led by UNEP DTIE and the Regional Office for Latin America and the Caribbean (ROLAC)[10], a definition and approach that better fit the regional needs and expectations were elaborated.

Sustainable Resource Management (SRM) is defined as "coordinated actions that aim to accommodate sustained provision of resources to meet the need of the present without compromising the capacity to meet the need of the future generations." Therefore, SRM avoids the transfer of impacts of a productive chain to another, of a category of impact to another, and from one region to another. SRM consists of an integrated approach for resource management that takes into account the economic, social and environmental impacts along the life cycle of material resources.

While resources can be broadly defined to embrace all abiotic and biotic entities of the Earth system that contribute to human well-being, following the priorities identified by LAC stakeholders, emphasis in this report was made on six natural critical resources: water resources, fertile lands, forests, fishing resources, natural landscapes and metals and minerals.

Given the number of comprehensive international studies produced on energy issues and climate change issues, and in order to focus on less-researched areas, energy resources were deliberately excluded from the scope of this report.

Importance of SRM

Humanity depends on the services that natural resources provide. Particularly, material resources shape goods, infrastructure and housing for human use, which fulfill essential needs for human well-being.

Although the history of anthropogenic use of material resources is as old as the history of humanity, it was the unprecedented population and economic growth since the industrial revolution that dramatically increased the global demand on material resources. Paradoxically, such increases in demand did not make material resources scarcer. On the contrary, material resources in general have become more available and cheaper over the last two hundred years. Figure 5 shows a trend of raw material prices (in real prices) over the last two centuries. Although there are short-term fluctuations around the World Wars and the oil embargo in the last century, raw material prices have generally followed

10 The first one was done on-line, with the participation of about 80 stakeholders. The second consultation took place in Panama City, Panama on 13 April 2010, in conjunction with the Regional Strategic Approach to International Chemicals Management (SAICM) Mercury Meeting, and had 31 participants from 25 countries.

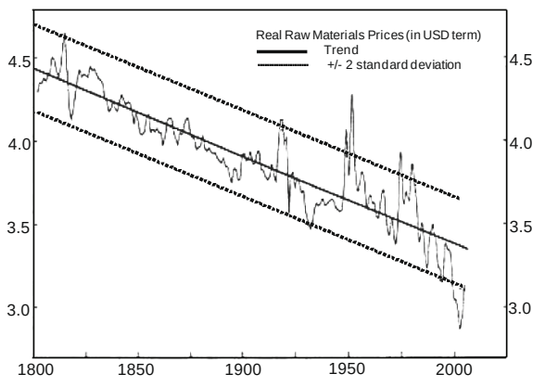
a declining trend for the last two centuries. Such a trend can be attributed to technological innovations in exploration, mining and refining of material resources, which have reduced the cost of extraction while increasing the amount of material resources that could be economically extracted.

While the low raw material prices, until recent years, contributed to an enormous improvement in materials availability, it did not promote a more efficient use of material resources. That is also why material resources management was barely discussed as a top policy within the public agenda over the last two centuries.

From 2002, however, a new trend emerged. Raw material prices started to increase consistently throughout the market. The price of indium, for example, has nearly doubled every year since 2000. The prices of major ferrous and non-ferrous metals, as well as precious metals and Rare Earth Elements (REMs), also began to increase.

The rising trend of the price of raw materials left an important lesson: global production growth depends on the availability of affordable material resources. For example, from Liquid Crystal Display (LCD) televisions to automobiles, material resources play vital roles in our daily lives; as a result, sustainable management of material resources is the way to ensure inter-generational equity, as the right to enjoy the services that material resources provide without shifting the problem to others.

Figure 5. Declining trend of raw material prices (in real prices)



Source: the Bank Credit Analyst (2004)

Figure 6. New trend of raw material prices (IMF Primary commodity prices)

(IMF, 2012)

Furthermore, extraction, processing and use of resources significantly affect not only the availability of resources for future use, but also the environmental quality of local and regional societies. For many developing economies, resources extraction and primary processing are one of the main sources of employment and income. In Brazil, for example, the mining and primary materials processing sectors generated, in 2000, 7.3% of total compensation to employees nation-wide.[11]

The importance of SRM relies on the fact that it can help address the following issues that are closely connected to the provision of human well-being: preserving resources with high scarcity, reducing the impact on the environment and improving the socio-economic benefits that the use of these resources generates.

1.4 Importance of Latin America and the Caribbean in supplying natural resources and supporting local economy

Since the 1980s, the region's economies have been directed toward foreign markets, especially those in developed countries and in new Asian economic powers such as China and India. In developing countries, international trade has become a growth engine. Technological improvements have reduced transport times between countries to unprecedented levels, while the opening up of financial markets has spread speculative activity in the capital markets and increased their vulnerability as they expand.

The prevailing development model in LAC focuses on economic growth based on natural resources and natural patrimony; increasing the production levels as a central objective; production directed at external markets; and the request for investments in productive sectors with high demand of natural resources as the focus of macro-economic policy. In this context, differences between countries in the region are not caused by alternative development models, but rather by the role they play in the international market, as well as the role public administrations play as economic regulators. Redistributors and producers conduct any relevant questioning of the structural foundations or the role that natural resources plays in the economic process (UNEP, 2010f).

Globalisation is also seen in other dimensions, such as integration of knowledge through the exchange of information, culture and technology. It is also recognised that environmental issues and globalisation are intrinsically linked. Resources are fuelling economic growth and trade. Solutions to environmental crises like a demand for more coordinated climate change action, cross border claims against mining international companies and a greater globalisation of governance (UNEP, 2007) are other examples of this.

International trade

The commercial success of LAC has become a determining factor in explaining current pressures on natural resources in areas ranging from mining, hydrocarbons and water use to the expansion of the agricultural frontier and deforestation.

As LAC has specialised its productive base in exporting natural resources (concentrated on a few products) and importing manufactured goods, the result is a heavy dependence on international markets. So, increases in international prices of minerals such as copper or grains such as soybeans trigger an increase in production within the region. Chile serves as a classic example of this dependency. It provides the global market with copper to produce the goods it will later import for internal consumption (Figure 7).

In turn, economic and technological development, as well as population growth, signifies an even closer relationship between trade and environment. The technological development of telecommunications and transportation has laid the groundwork for trade expansion, which demands more intensive use of natural

11 Calculated using OECD Input-Output table of 2000.

resources and puts huge pressure on them. The lack of adequate policy and institutional frameworks results in predatory behaviour by operators seeking to maximise profits, with devastating consequences for ecosystems and the environment and, in general, for sustainable development.

The role of LAC in world trade

While the region plays a modest role in world trade (the value of its exports has remained around 10–12% of the global total), in recent years a small rally has been reported, although this is due to the increased value of commodities (Figure 7). This role in world trade explains a related tension: on the one hand, international trade has critical effects on land use and ownership of natural resources in LAC; on the other, the region lacks the instruments or sufficient economic weight to decisively influence global trade. Indeed, the determination of the main products to be traded is made in places and by stakeholders from outside the region (for example, the Chicago Stock Exchange).

Nature of exports: demand for raw materials

The confluence between the current dynamics of globalisation and the development styles followed on the continent means that, in LAC, natural resources play a key role in supporting their exports (Table 1 - next page). Indeed, natural resources are seen to account for over half of total exports in the LAC region. These are mineral, hydrocarbon (notably natural gas and oil), agricultural, livestock, forestry and fishery products, with little or no processing.

Approximately 54% of exports are raw materials. A dependence on a few products is also observed. It is remarkable to note that primary mining and agricultural goods are placed as top export products of most countries in the region.

Exporting natural resources and goods with little or no processing has enabled the region to become a partner in international trade. Primary goods account for 73% of exports. In recent years, increased trade between the region and Asian countries, especially China and India, boosted agribusiness and the raw materials needed for biofuel production. This

Figure 7. Latin America and the Caribbean: participation in the value of world exports (percentages)
UNEP (2010f)

Table 1. Latin America: exports composition and geographical distribution in 2006 (percentage of total exports in monetary terms)

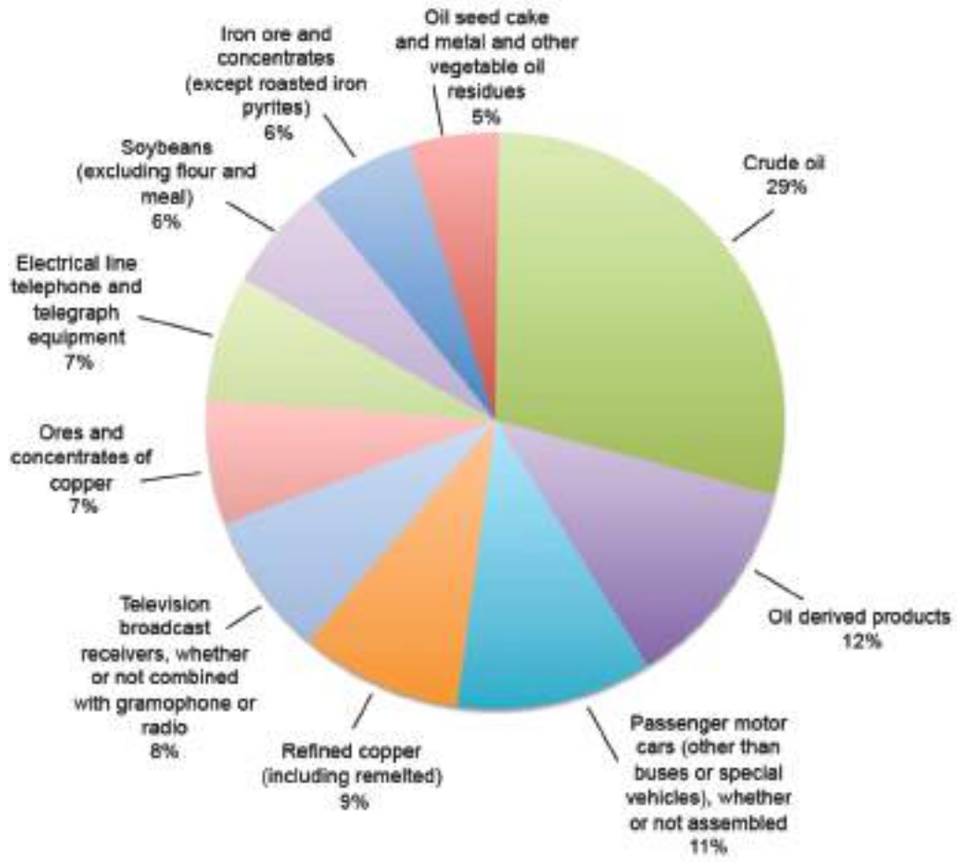
	Total exports composition (% of total)	Geographical distribution to	
		Developed countries	Emerging economies
Latin America			
Primary goods	54.2	57.9	42.1
Manufacturers	44.6	71.5	28.5
Total	98.9	63.6	36.4
Latin America excluding Mexico			
Primary goods	72.9	51.1	48.9
Manufacturers	25.7	35.8	64.2
Total	98.6	46.5	53.5

Source: ECLAC, 2007. *Panorama of the International Insertion of Latin America and the Caribbean. Trend 2008*

Note: Because Mexico is an OECD country, it is not considered in a number of official statistics for developing countries.

Figure 8. Latin America and the Caribbean: exports of the 10 principal products, according to percentage participation, 2008

(UNEP (2010f))



has had an impact on land use changes, pollution and intensive use of water resources, among others. Foreign direct investment, which reached a record in 2008, plays an important role in exploiting natural resources for export and in shaping production patterns (UNEP, 2010f).

According to available data, assumption for the twenty-first century in LAC shows a current economic model that leads simultaneously to economic growth, social disintegration and environmental degradation, with more income concentration and a less equitable share of the fruits of growth. In this context, social movements demanding more equity and greater citizen participation tend to become new types of political movements that voice majority demands for structural changes and to allow societies to develop with more integration among themselves and in their natural environment.

LAC faces the challenge of achieving fairer and more equitable economic development that requires making an effective shift toward sustainable development without decreasing the countries' natural capital. It is needed to go beyond international recognition of no contradiction between a healthy environment and the production of material goods. Natural and social capital must be preserved and this must be clearly expressed in public policies, both those explicitly and specifically directed at environmental problems and those that cover other areas. As long as environmental policies are not transversal, persistent contradictions will continue to arise between them and production and trade policies, along with the high social costs that have been evident over the years.

1.5 Resource efficiency: economics and outlook for Latin America

The report *Resource Efficiency: Economics and Outlook for Latin America* was produced by UNEP (UNEP, 2011b), in collaboration with the Mercosur Economic Research Network. According to the report, the main challenges for an efficient use of resources in Latin America are:

- Public-private co-operation at the local, sub-national and national levels.
- Territorial planning and effective implementation of land-use regulations.
- Promotion of regional co-operation strategies in areas such as climate change, environmental impact assessment in the primary sector and water regulations.
- Information access and availability — generating and synthesising reliable information on the use of resources and its economic and environmental implications.

The study focused on three thematic areas based on their importance in Latin America (land use changes, energy and climate change, and water use) and six countries (Argentina, Brazil, Chile, Mexico, Paraguay and Uruguay), all of which were subject to an in-depth analysis. According to the report, the primarisation of the economies of some of the Mercosur countries, as well as Chile and Mexico, has exerted growing pressure on essential resources, especially on fertile land and water.

The lack of initiatives, policies and programmes aiming at preventing environmental impacts caused by production development has led to discouraging environmental improvement. The latter implies potential negative environmental impacts, decreasing quality of life and reducing business opportunities of SRM. In the middle and long term, this can result in negative economic consequences for the countries and local comunities.

According to Achim Steiner, good policy making in Latin America requires "robustly measuring and minimising environmental impacts of sectors ranging from agriculture, fisheries, livestock and manufacturing to the fate of agrochemicals and how natural resources are being managed in the first place" (UNEP, 2011b).

The report presents four possible scenarios in terms of sustainability and resource efficiency between 2010 and 2030. Three of these scenarios, "Efficiency without Sustainability", "Status Quo: Neither Sustainability nor Efficiency" and "Sustainability without Efficiency" imply some advances, but do not represent significant improvements in resource efficiency in the long term.

The fourth scenario, titled "Efficiency, Sustainability and Governance for Inclusion", represents the most desirable situation, where efficiency improves along with sustainability. This scenario implies a virtuous circle where the use of resources improves along with the quality of public management, thus increasing sustainability and the participation of all actors involved. This scenario promotes a more inclusive development model aimed at inequality reduction and can contribute to a transition toward a green economy.

In the framework of these four possible scenarios, the report includes a series of public policy recommendations at national and regional levels. It also highlights that resource efficiency increases savings and competitiveness, and generates economic benefits not only for productive sectors with an intensive use of resources, but also for society as a whole.

This analysis is designed to complement UNEP's Global Environment Outlook (GEO) reports for Latin America, adding a regional vision on resource efficiency and its economic implications.

The project on "Strengthening Capabilities on Sustainable Resources Management in the LAC region" (see 1.5 and next chapters) is a response to the urgency of improved resource efficiency and decoupling of resource consumption and negative environmental impacts from economic development.

2. Sustainable Resources Management and policy

2.1 Identification of critical resources in the LAC region

From the two stakeholder consultations mentioned in 1.3 led by UNEP DTIE and ROLAC six natural resources were identified as critical:

- water
- fertile land
- forests
- fishing resources
- natural landscapes
- metals and minerals

This report will focus on these resources. Given the number of comprehensive international studies produced on energy issues, this resource were deliberately excluded from the scope of this report.

2.2 The role of the project on "Strengthening Capabilities on Sustainable Resources Management in the LAC region"

The project

The project "*Strengthening National Capacities for Sustainable Resource Management*" (GESRE) is being implemented by UNEP in collaboration with the United Nations Department of Economic and Social Affairs (UN DESA) and ECLAC. It is intended to contribute to the identification of needs of the LAC region and to improve the coordination and understanding of the sustainable management of material resources within the participating countries.

With this new knowledge, governments, businesses and interested participants will have the necessary tools to improve coordination and to develop policies for SRM.

Expected accomplishments

- Establish networks of relevant stakeholders with increased awareness, knowledge and with the necessary skills for SRM, including access to tools, models of product prioritisation and productive sectors, and policy design.
- Identify opportunities and recommend national action plans for SRM in two selected countries in the LAC region.
- Two national pilot projects on SRM in the LAC region.

The process

After identifying stakeholders from government, the private sector and academia, public consultations took place on the critical resources for the LAC region.

Two pilot projects in different countries around identified critical resources are the central activity. The political will of the countries is a key criterion for the selection of the countries for each pilot project.

Training activities are developed within the pilot projects, with a decentralisation focus for which the participation of local actors, including local governments, is very important.

Once the pilot projects are completed, courses of action can be incorporated in the policies of the central or local governments, based on the projects' findings.

Results and agreements related to this project have been made public through the UNEP web-based platform, raised in collaboration with the countries of the region, as well as a permanent mechanism of coordination of the experts and implementers of SRM in LAC.

2.3 Conceptual framework for Sustainable Resources Management

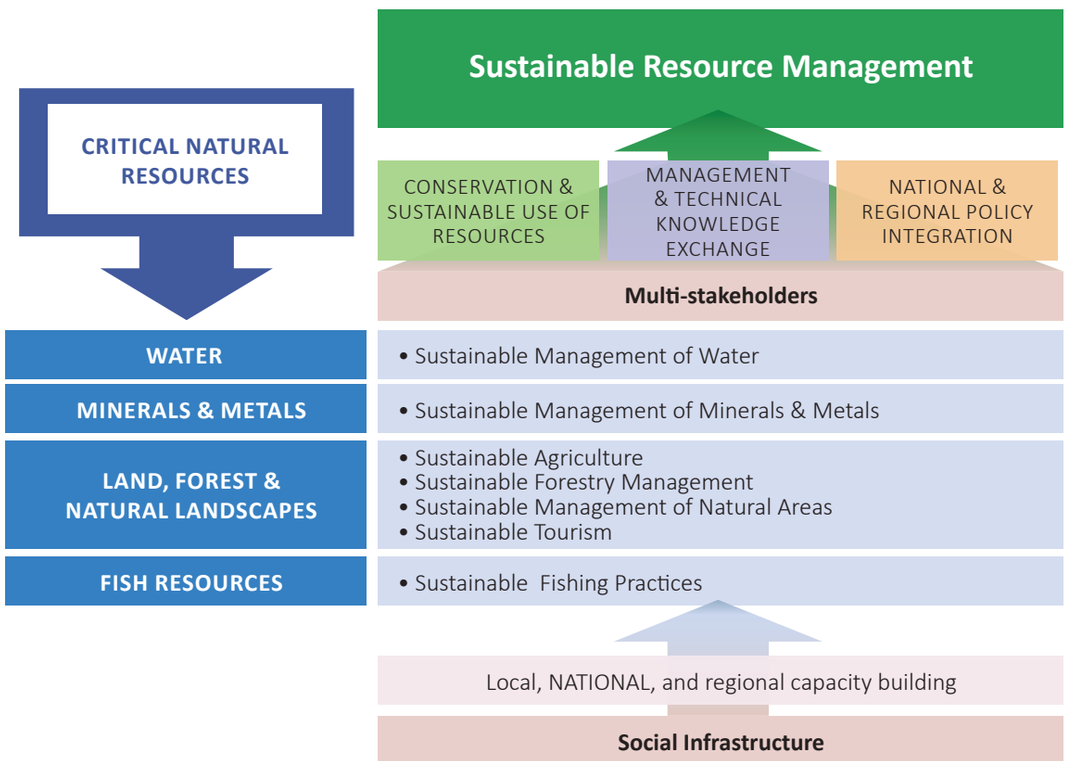
Just like ecosystems, material resources provide essential goods and services that enable human well-being; however, extracting and processing them generates environmental and social impacts. In addition, humans affect the conditions of material resources such as their availability (scarcity) and their economic value, through direct and indirect drivers of change. The relationship between humans and material resources can therefore be drawn as a parallel to that between humans and ecosystems. Given such similarities, the conceptual framework of SRM can be drawn following the MEA.

For implementation purposes of the GESRE project, a SRM framework has been designed to interlink critical natural resources with relevant strategies that help improve current and future resources management practices and, hence, the well-being of society.

The foundation of the SRM framework relies on the development of local and regional capabilities as a prerequisite to enable and implement the additional layers of the approach. Through improved capabilities at local and national governments levels, a better understanding of the inter-relationships between human interventions and impacts of unsustainable resource management is achieved. The next step is to develop plans, policies, strategies, regulations and environmental impact assessments for SRM, in co-operation with the different actors of those supply chains that deploy critical resources, with key support of local experts.

If the aim is to develop a sustainable water management system, since it is a cross-cutting resource used by society as a whole, a comprehensive system is the only consistent way to address this resource, including the product and productive sectors that directly and indirectly exhaust it. A slightly different approach is the one applied for fishing or mineral resources, which are closely linked to the sectors of fisheries and mining. Therefore, more specialised measures and sustainable management systems can be successfully implemented. More recently, the consideration of natural landscapes as a critical resource has been brought up by LAC countries with a strong economic tourism sector; hence, within the scope of this project, landscape is directly linked to the tourism sector. Fertile land is related to the agricultural sector and forest resources to the wood extraction sector. The spirit of this report is not to promote the wood extraction sector, but

Figure 9. Sustainable Resource Management (SRM) approach
(Suh, Valdivia, Aldaya, Sandoval, Tonda, 2013)



to keep the reader aware about this growing industry, which frequently runs up against laws and authorities; and, for this reason, demands innovative strategies to achieve a truly SRM.

Mechanisms proposed in this SRM framework to enable an improved resource management of critical resources in LAC are:

- Technical knowledge exchange between stakeholders and countries,
- Resource conservation and sustainable resource use management practices, and
- National policies and regional strategies.

Applications of the described framework (Figure 9) are presented in Chapter 5.

Nevertheless it is very clear to the authors that, for the purposes of encouraging implementation of best practices by governments and private companies among supply chains, a broad discussion is still pending, focused on institutional, legal and economic mechanisms devised to handle better public policies on these issues. This report does not cover all the details of potential mechanisms to promote SRM practices, and therefore readers are invited to consult additional relevant literature such as the UNEP report *Resource Efficiency: Economics and Outlook for Latin America. Case studies Mercosur, Chile and Mexico* (UNEP, 2011b).

3. Status of resources in the LAC region: analysis of available data

The need to manage the environment in a sustainable manner is imperative, as the regional (and global) economy depends highly on the availability of natural and mineral resources. For example, the forestry industry contributed up to USD 40 billion in 2009 to the region´s GDP (FAO, 2010c), injects on average of 2% to the GDP and provided employment to 1.5 million inhabitants of LAC in 2006 (UNDP, 2010). Even with the strong reliance that LAC has on natural resources for economic development, the World Bank bans financing commercial logging that could contribute to the conversion or degradation of critical forest areas including "areas with high suitability for biodiversity conservation, as evaluated by species richness, degree of endemism, species vulnerability, representativeness and integrity of ecosystem processes" (The World Bank Group, 2002a, Annex I in Hajjar and Innes, 2009, 29).

Tourism in the Caribbean would not be as high as 20% of GDP without its coral reefs, which attract tourists from all over the world and employ 5% to 19% of the workforce (Table 2). In several South American countries, the contribution to GDP from tourism is 2% (UNDP, 2010).

The economy of LAC depends highly on the region's natural resource base and its productivity. According to a recent UNDP report, agriculture contributed to LAC's GDP for the period 2000-2007 an average of 9.6% and exports of agricultural commodities accounted for 44% of total export value in 2007. For the same year, in countries such as Panama, Paraguay and Nicaragua, agricultural exports represented over 80% of total commodity exports. This sector provides employment to approximately 9% of LAC's population (UNDP, 2010).

Table 2. Potential value of lost economic services of coral reefs, circa 2040-60 in 2008, USD million (Assuming 50% of corals in the Caribbean are lost)

(World Bank, 2009

	Low estimates	High estimates
Coastal protection	438	1,378
Tourism	541	1,313
Fisheries	195	319
Biodiversity	14	19
Pharmaceuticaluses	3,651	3,651
Total	4,838	6,678

In 2004, Chile, Mexico, Colombia and Brazil each received over US$2 billion from fisheries, and Venezuela, Panama, Argentina, Guyana and Peru over US$100 million each (Catarci, 2004, in UNDP, 2010). In at least 10 countries, fisheries contribute more than 1% of GDP (UNDP, 2010).

However, this region has great areas of biodiversity, which offer specialised niches for tropical species (Felton et al., 2009); and, because resources in many areas are scarce, planing the use and conservation of resources in areas with a high concentration of biodiversity (Peters et al., 2005) is crucial to halt the decline of biodiversity in LAC.

3.1 Cross-cutting environmental aspects of a critical resource in Latin America

3.1.1 Water

In LAC more water is used in agriculture than in other sectors, accounting for about 73% of freshwater use (FAO, 2011a). However, even though water resources are unevenly distributed and, in some regions, precipitation and drought conditions are increasing, the crisis relates more to water governance rather than water scarcity. The countries of the region face the task of designing and implementing effective strategies for sustainable water use. The challenges involved in accomplishing this include: wide differences in climate within the region; different levels of economic development between and within countries; vast social inequalities; lack of adequate baselines; and deficiencies in public administration and institutions that makes implementing policies difficult. In this context, implementing a consistent

water accounting process (ISO 14046, in press) would help make water allocation decisions and ultimately achieve a more sustainable, equitable and efficient use of water (IRP, 2012). For this, there needs to be improvement in the way that local, national and regional institutions manage and monitor water resources and productivity.

This section presents the state-of-the-art of water resource use and management in LAC. For this purpose, it provides the general framework on water availability and use, with a particular focus on water use in agriculture as the primary water-consuming sector. Urban water supply issues are subsequently addressed. Finally, we provide a summary of challenges and opportunities for enhanced water efficiency and management across the region.

Water availability and use

The wide range of climatic conditions present in the region generates a wide spatial variety of hydrological regimes. As a result, the region shows a very uneven distribution in precipitation, water resource availability and water use conditions. These differences also generate strong inter-seasonal and inter-annual variations in water resource availability (Bates et al., 2008). Meteorological phenomena such as El Niño or tropical storms and hurricanes in the Antilles, Central America or Mexico alternate with lengthy drought periods, not only in the arid or semi-arid areas, but also in humid zones. Overall, the region has relatively abundant water resources. For an area representing 15% of the world's total land surface, it receives 30% of precipitation and produces 33% of the world's water resources (FAO, 2011a). Bearing in mind that this region hosts around 10% of the world's population, the amount of water resources is around 28,000 m^3/capita/year, constituting a much higher figure than the world´s average, which is close to 7,000.

In terms of global water resources availability, the region is shared amongst several countries, more than one third of the total (UNEP, 2007).

As shown in Table 3, in the LAC region agriculture is the main water-consuming activity, accounting for 73% of total use. This is

Table 3. Regional distribution of water use. IRWR: Internal Renewable Water Resources. TRWR: Total Renewable Water Resources

(FAO, 2011a)

Sub-region	Annual water use by sector									
	Agriculture		Domestic		Industrial		Total use			
	km^3	% of total	km^3	% of total	km^3	% of total	km^3	% of LAC	m^3 per inhab.	in % of IRWR
Mexico	60.30	78.0	13.40	17.0	3.90	5.0	77.80	30.0	825.00	19.0
Central America	9.40	77.0	1.80	15.0	0.90	8.0	12.20	5.0	428.00	1.7
Greater Antilles	11.70	75.0	3.60	24.0	0.10	1.0	15.40	6.0	531.00	18.9
Lesser Antilles	-	-	-	-	-	-	-	-	-	-
Guyana Sub-region	1.80	96.0	0.00	2.0	0.00	2.0	1.90	0.0	1,117.00	0.6
Andean Sub-region	36.50	73.0	10.50	21.0	3.10	6.0	50.20	19.0	483.00	1.0
Brazil	33.40	61.0	11.60	21.0	9.90	18.0	54.90	21.0	335.00	1.0
Southern Sub-region	39.40	91.0	5.70	6.0	4.70	3.0	50.00	19.0	852.00	3.8
LA & C	192.70	73.0	47.00	19.0	22.90	9.0	262.80	100.0	519.00	2.0
World	2,310.50	71.0	290.60	9.0	652.20	20.0	3,253.30	-	564.00	8.0
LA & C as % of world	8.30		16.00		3.50		8.10			

followed by domestic water use, contributing 19%, followed by industrial water withdrawal at 9% (FAO, 2011a).

Water use is expressed as a percentage of Total Renewable Water Resources (TRWR), including the Internal Renewable Water Resources (IRWR) and external flow, which is a good indicator of the pressure on water resources. Renewable water resources are natural resources that, after exploitation, can return to their previous stock levels by natural processes of replenishment.

In general, it can be said that pressure on water resources is high when the value is above 25%, as in the case of the Dominican Republic (39.7%) and some islands of the Lesser Antilles. This percentage is also relatively important in Antigua and Barbuda (9.6%), Cuba (13.7%), Haiti (7.0%), Jamaica (9.6%) and Mexico (17.0%). Industrial water use is especially important in Brazil (18.0%), Chile (11.0%), El Salvador (20.0%), Guatemala (17.0%) and Venezuela (7.0%) (FAO, 2011a).

In general, the high demand for water use, especially in urban zones, gives rise to conflicts among the different sectors involved. Competition is usually detrimental to the agricultural sector, from which water is diverted to the domestic or industrial sectors (FAO, 2011a).

Figures for produced and treated wastewater are available only for some countries in the region. In most countries, only a marginal percentage of the wastewater is treated. In Mexico, 1,600 million m^3 (treated or untreated) is reused for agricultural purposes. Untreated wastewater is also used in other countries, but figures regarding the annual volumes are not available. Notwithstanding, some trials on the use of treated wastewater are being initiated on a large scale in the arid regions of Argentina and Chile (FAO, 2011a).

In regard to desalination of seawater or brackish water, its presence is anecdotal, Antigua and Barbuda (Lesser Antilles) being the only country offering information on desalination plants, with a production of 3.3 million m^3/yr.

It is known that contamination due to domestic wastewater, industrial wastewater, mining residues and diffused agricultural pollution (biocides, fertilizers, etc) is a regional problem, especially within areas suffering major water resource pressures (FAO, 2011a). The general lack of integrated water resource management constitutes a further impediment to solving these problems.

In relation to the virtual water trade in the region, Table 4 shows that most of the water

Table 4. Virtual water flows in Argentina, Brazil, Chile, Mexico and Peru related to international trade of crop, livestock and industrial products in the period 1996-2005 (m^3/year)

Source: Mekonnen and Hoekstra (2011)

Country	Virtual water import					Virtual water export					Total virtual water flows		
	Related to crop products		Related to animal products		Related to industrial products	Related to crop products		Related to animal products		Related to industrial products	Net virtual water import		
	Green	Blue	Green	Blue	Blue	Green	Blue	Green	Blue	Blue	Green	Blue	Total
Argentina	3,764	147	521	46	73	88,569	1,333	4,739	496	34	-89,022	-1,597	-90,619
Brazil	27,821	2,088	1,654	94	186	89,474	858	15,953	934	152	-75,952	424	-75,528
Chile	3,954	299	765	15	55	1,243	438	297	74	87	3,180	-230	2,950
Mexico	51,487	12,581	13,919	1,016	571	10,947	8,410	2,181	168	292	52,279	5,298	57,577
Peru	6,675	480	307	22	24	2,437	518	62	8	34	4,484	-34	4,450

used in Argentina and Brazil is utilised on the production and exportation of agricultural products (Mekonnen and Hoekstra, 2011). Exporting natural resources and goods with little or no processing has enabled the region to become a partner in international trade. Primary goods account for 73% of exports. In recent years, increased trade between the region and Asian countries, especially China and India, boosted agribusiness and raw materials extraction.

The total water consumption by the population of Argentina, Brazil, Chile, Mexico and Peru ranges from 950 m^3/capita/year in Chile to 1875 m^3/capita/year in Brazil (Table 5). These figures can be compared with the global average of 1240 m^3/capita/year (Mekonnen and Hoekstra, 2011), which corresponds to a food supply need of 3000 kcal/person/day out of which 20% are animal products (Kuylenstierna et al., 2008).

When looking at water use for production, Table 6 shows the important role of rainfed agriculture in the region: 87% in Latin America. Low yields today are an opportunity for the future. Agricultural productivity

Table 5. Water consumption by the population of Argentina, Brazil, Chile, Mexico and Peru during the period 1996-2005 (m^3/year/capita)

Source: Mekonnen and Hoekstra (2011)

Country	Population (10^6)	Water consumption of agricultural products				Water consumption of industrial products		Domestic water consumption	Total national water consumption						
		Internal		External		Internal	External		Internal		External		Total		
		Green	Blue	Green	Blue	Blue	Blue	Blue	Green	Blue	Green	Blue	Green	Blue	Total
Argentina	37	1,288	88	35	4	3	2	13	1,288	104	35	6	1,323	110	1,433
Brazil	175	1,645	48	160	12	2	1	7	1,645	58	160	13	1,804	70	1,875
Chile	15	451	136	327	18	6	2	9	451	151	327	20	779	171	950
Mexico	100	840	87	661	85	1	4	14	840	102	661	89	1,501	190	1,691
Peru	26	502	126	308	15	3	1	6	502	135	308	16	810	152	962

* The total water consumption by the population of a country is calculated as the total use of domestic water resources plus the gross virtual water import minus the gross virtual-water export. It includes two components: the part that falls inside the country (internal) and the part that presses on other countries in the world (external). The distinction refers to the appropriation of domestic water resources versus the appropriation of foreign water resources.

Table 6. Water consumption of national production in Argentina, Brazil, Chile, Mexico and Peru during the period 1996-2005 (Mm^3/year)

Source: Mekonnen and Hoekstra (2011).

Country	Water consumption of crop production*		Water consumption of grazing	Water consumption of animal water supply	Water consumption of industrial production	Domestic water consumption	Total water consumption		
	Green	Blue	Green	Blue	Blue	Blue	Green	Blue	Total
Argentina	157,605	4,306	18,589	773	138	491	176,194	5,708	181,902
Brazil	303,743	8,934	132,223	3,158	532	1,202	435,966	13,826	449,792
Chile	6,510	2,374	2,633	123	158	142	9,143	2,797	11,940
Mexico	83,105	13,885	25,916	995	214	1,359	109,021	16,453	125,474
Peru	11,399	4,096	6,641	188	101	168	18,040	4,553	22,593

improvements are needed in parts of Latin America (Comprehensive Assessment of Water Management in Agriculture, 2007).

Table 7 illustrates the status of national watershed management plans. At the policy level, two countries in the region have national watershed programmes and seven have national priority watershed plans. By 2004, five countries had prepared national water resource plans and six had national sectoral plans on issues related to water management. Two countries are currently preparing national watershed plans and several have expressed the intention of doing so in the near future.

Agriculture

Agriculture is the main water-consuming sector in LAC, reaching 73% (FAO, 2011a) of water withdrawal. In the majority of countries in the region, irrigation is seen as an important means to increment productivity and intensify and foment crop diversification.

Surface irrigation is by far the most widespread irrigation technique in the region. Table 8 presents information on irrigation

Table 7. National watershed management plans
(FAO, 2004a)

Country	Type of plan				
	National Watershed Plan	National water resources plan	National priority watershed plan	Sectoral plans: Forests, soils, environment	National watershed plan in process
Argentina		X		X	
Bolivia	X				
Brazil		X			
Chile			X	X	
Colombia		X		X	
Costa Rica			X		
Cuba					
Ecuador		X	X		
El Salvador					
Guatemala			X		
Honduras			X	X	
Mexico					
Nicaragua					
Panama				X	
Paraguay				X	
Peru			X		
Dominican Republic					
Uruguay			X		
Venezuela	X	X			

techniques by sub-region, for the countries in which information was available. Remarkable is the importance of the intensive presence of irrigation in the Lesser Antilles, where water scarcity and farm characteristics have induced an extensive utilisation of localised irrigation, as is done in Brazil (6.1%). Sprinkler irrigation covers an important area in Cuba (51%), Brazil (35%), Panama (24%), Jamaica (17%) and Venezuela (16%) (FAO, 2011a).

Surface water resources are the major source of irrigation in the region, with the exception of Nicaragua and Cuba, where groundwater is the source for 77% and 50%, respectively, of the area under irrigation.

Cereals, including rice, average 59% of the total irrigated area. Wheat and maize are mostly produced in Argentina, Chile, Mexico and Peru. The areas dedicated to rice are important in all sub-regions, except in Mexico. In this respect, it is worth mentioning the rice cultivation increment in Uruguay from 80 000 ha in 1990, to 170 000 ha in 1998; the high percentage of land under irrigation dedicated to vegetable/fruit crops and vineyards in the Southern sub-region (56%, especially in Argentina and Chile); and the importance of irrigated pasture in Central America and the Greater Antilles (Table 9).

In most of the region, drainage is closely linked to the evacuation of excess water by rainfall in areas susceptible to waterlogging (FAO, 2011a). This is the case, for example, in Brazil and Mexico.

As for salinisation, this is a serious constraint in Argentina, Cuba, Mexico, Peru and, to a lesser extent, in the arid regions of the north-east of Brazil, north and centre of Chile and some small areas of Central America (FAO, 2011a).

Water pollution due to irrigation is closely linked to production intensity. Therefore, a high intensity in the use of inputs, such as biocides or fertilizers, produces an increase in their concentration on irrigation return. These problems have been reported in Barbados, Mexico, Nicaragua, Panama, Peru, Dominican Republic and Venezuela, but are probably more widespread in other

Table 8. Irrigation techniques by sub-region
(FAO, 2011a)

Sub-region	Irrigation techniques					
	Surface		Sprinkler		Localised	
	ha	%	ha	%	ha	%
Mexico	5,802,182	92.7	310,800	5.0	143,050	2.3
Central America	418,638	93.0	17,171	3.8	14,272	3.2
Greater Antilles	856,894	63.6	407,075	34.6	21,256	1.8
Lesser Antilles	2,890	53.8	761	14.2	1,725	32.1
Guyana Sub-region	201,314	100.0	0	0.0	0	0.0
Andean Sub-region	3,379,637	95.6	122,364	3.5	34,536	1.0
Brazil	1,688,485	58.8	1,005,606	35.0	176,113	6.1
South Sub-region	3,445,068	95.6	95,730	2.7	62,153	1.7
LA & C	15,672,050	86.7	1,960,365	10.8	453,105	2.5

Note: The information on 'irrigation techniques' refers to 98.3% of the total area under irrigation.

Table 9. Harvested and irrigated area[1], by crops (percentage)

(FAO, 2011a)

Sub-region	Rice (%)	Other cereals (%)	Vegetables (%)	Fruits, vineyards and citrus (%)	Industrial crops (%)	Pastures and fodder (%)	Total (ha)
Mexico	1.0	70.0	9.0	0.0	14.0	6.0	3,430,365
Central America	25.0	0.0	10.0	4.0	11.0	50.0	278,606
Greater Antilles	18.0	0.0	20.0	9.0	0.0	53.0	846,606
Lesser Antilles	-	-	-	-	-	-	-
Guyana Region	74.0	0.0	0.0	0.0	26.0	0.0	224,664
Andean Region	25.0	35.0	25.0	2.0	3.0	9.0	953,732
Brazil[2]	79.0	-	21.0	-	-	-	1,228,420
South Region	12.0	15.0	24.0	32.0	7.0	11.0	2,483,991
Total (%)	22.2	36.4	19.4	10.5	3.3	8.2	100.0
Total (ha)	1,884,414	3,096,853	1,647,501	892,649	281,566	698,287	8,501,270

1.On a total surface with cultivation data of 8.5 million ha.

2. Percentages calculated based upon the data available. Although there is no quantitative data for all irrigated crops, the percentage of fruit trees, citrus, industrial crops and soybean irrigated is significant.

countries. In Argentina, further and deeper studies have been recommended (CONICET, 2009). Additionally, in some specific areas (Venezuela, Dominican Republic and the Antilles), problems of marine intrusion into aquifers due to over-exploitation are reported (FAO, 2011a).

The private sector, in general, is composed of small-scale irrigation and large farms of high-yielding crops. In countries such as Argentina, Colombia, Brazil and Peru, there is a net increase in the private irrigation area, which is expected to continue in the coming years. Peru has just initiated a programme for the sale of public lands with irrigation infrastructure.

There is a trend toward rehabilitation and modernisation of existing irrigation systems, rather than the use of new land for irrigation (Argentina, Mexico and Chile), where it is expected that the net increment in irrigation will be slower than it was during the second half of the last century.

In most arid and semi-arid zones (Argentina, Chile and the coast of Peru and Ecuador), increases in irrigated land will require efficiency improvement in conveyance, distribution and application of irrigation water, as well as more efficient use. This will be achieved through improvement in design, rehabilitation and modernisation of irrigation schemes, adoption of pressurised irrigation techniques and the improvement of operation and maintenance, essentially through larger participation of users' associations. In regard to irrigation techniques, there is a trend towards the use of improved technology, and an increase is expected in the extent of pressurised irrigation (sprinkler or localised), irrigation equipment automation, fertigation, improvement in pumping stations and so forth. This is particularly true of Argentina, Mexico and Cuba. The re-use of sewage for irrigating high economic value crops, lagging throughout the region, is a key option for efficient water management (UNEP, 2007).

An increase in areas under irrigation is foreseen for more humid zones where irrigation constitutes production support once many countries have reached their limits due to water resources scarcity. In tropical and some humid climate areas (Pampas region in Argentina, Lesser Antilles, Central America, Colombia and the Amazonian basins of the Andean countries), programmes are being carried out for supplementary irrigation on high-yielding crops with the objective of stabilising production during dry periods.

Changes are also likely to occur in the production models, with a shift toward crops with a high economic return like fruit trees, citrus, horticultural and industrial crops. In some countries, this process is a result of better accessibility to external markets. The change toward crop diversification and intensification in irrigation is mentioned in the medium- and long-term policies of most countries of the region, as is the case of Argentina, Bolivia, Colombia, El Salvador, Guatemala, Paraguay, Santa Lucia and Uruguay (FAO, 2011a).

Water scarcity in certain regions is, in general, a source of conflict among sectors. As a result, there is a tendency toward promoting the concepts of integrated watershed management: creating a development plan and a management institution representing the public sector and main users' groups, granting water concessions, planning and implementation of large hydraulic works, pollution control, flood protection, estimation of the ecological flow, etc. This is the case in Argentina, Bolivia, Brazil, Chile, Guatemala, Honduras, Mexico and the Dominican Republic.

There is also a trend toward better integration of surface water and groundwater management in countries like Argentina, Ecuador, Dominican Republic and Venezuela. Several hydrological studies have been carried out in the 1990s in the countries of the region to determine the groundwater safe yield. These studies are mainly local and still cover a minor percentage of the territory. It should be noted that water basin transfers have been reported in Peru, Ecuador and the Dominican Republic, and are being studied in Jamaica.

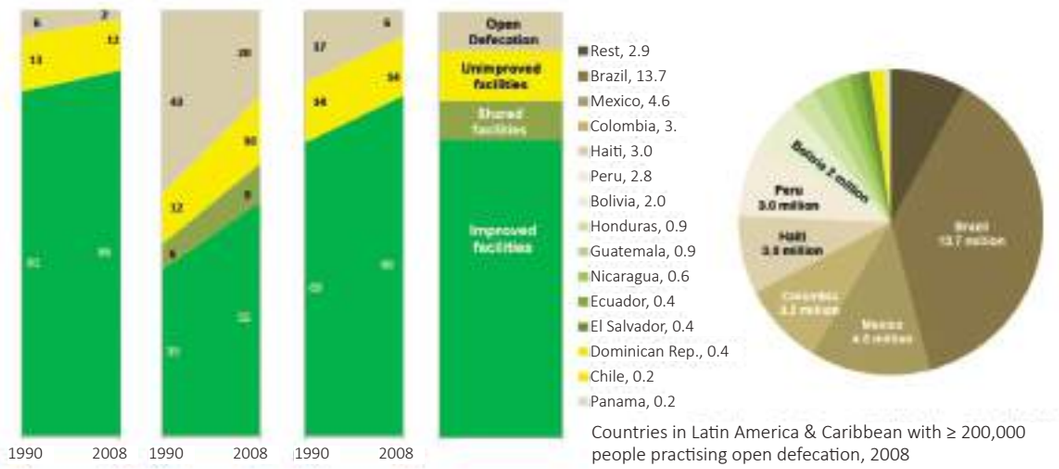
LAC is a region where natural disasters are common, among them, El Niño, earthquakes, tropical storms and hurricanes. A relatively recent and harmful hurricane occurred in Central America (Hurricane Mitch, 1998), causing more than 19.000 deaths and USD 6 billion in damages mainly within Guatemala, Honduras and Nicaragua. Reconstruction and rehabilitation of areas affected by natural disasters constitute a very important part of national programmes, including agriculture and irrigation development.

On the institutional side, several countries report actions toward the establishment of a water resource authority (Antigua and Barbuda, Belize, El Salvador, Panama and Santa Lucia) to coordinate the different activities of decentralised institutions (watershed authorities or user associations). These changes usually require a solid legal framework, as well as a great operational capacity. Water laws are therefore being revised to fit the needs of the new institutional frameworks. This is the case of Bolivia, Chile, El Salvador, Honduras, Panama, the Dominican Republic and Costa Rica.

Urban water supply

According to the last progress report about achievement of the MDGs, the LAC region is on track to meet the target of halving the proportion of people without access to safe drinking water and basic sanitation between 1990 and 2015 (WHO, UNICEF, 2010) (Figures 10, 11 and 12). This contributes not only to

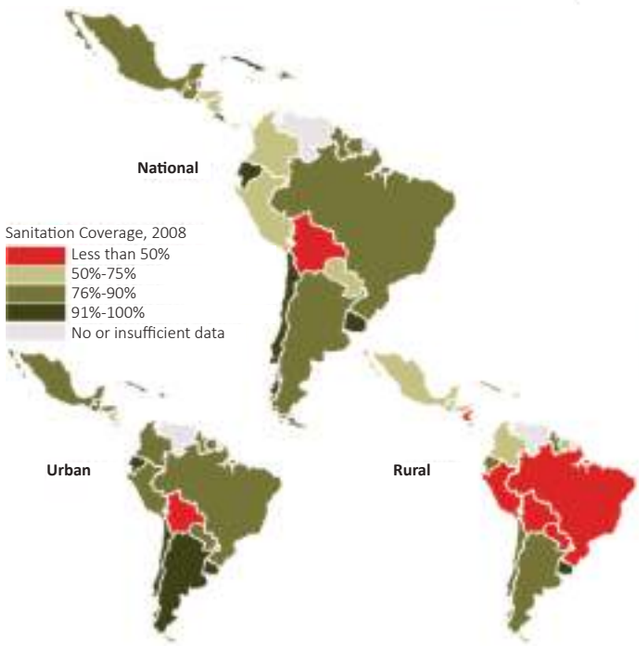
Figure 10. Sanitation coverage trends, Latin America and the Caribbean, 1990-2008
(WHO, UNICEF, 2010)



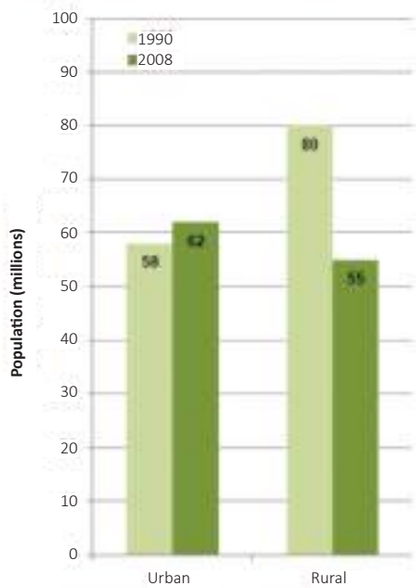
Due to insufficient data on the proportion of the population using shared facilities in urban areas, the proportion of users of improved facilities in urban and total includes users of improved and shared facilities

Figure 11. Use of improved sanitation facilities in Latin America and the Caribbean
(WHO, UNICEF, 2010).

Significant inequity in use of improved sanitation facilities between urban and rural areas in Latin-America & Caribbean



Since 1990, the population without an improved sanitation facility decreased by 21 million



Urban/rural disparities in the population without improved sanitation, Latin-America & Caribbean, 1990 and 2008 (millions)

realising a human right, but it also plays a role in population and environmental health. In total, 154 million people in LAC have gained access to improved sanitation facilities since 1990 and 162 million people to an improved drinking water source. However, in 2008, 117 million people did not use an improved sanitation facility and 38 million people did not use an improved drinking water source. Despite high sanitation coverage, disparities in the use of improved sanitation facilities between urban and rural areas are particularly apparent in the region, and there are still 36 million people who practise open defecation.

Many cities in Latin America and the Caribbean have a significant impact on water bodies and are experiencing problems as sources become exhausted or degraded. In most large cities, over 50% of the water supply is lost through infrastructure leakages. Some cities loose almost 90% through leaking pipes. Some of the largest cities depend on aquifers and are mining these resources. For instance, Mexico City now depends on aquifers for 70% of its water and is mining these underground sources up to 80 times faster than they are naturally replenished. Meanwhile, São Paulo is threatening residents with water rationing. The city is relying on sources farther away, hiking the cost of delivery beyond many peoples' ability to pay for it (Barlow and Clarke, 2004).

Concluding remarks

Although the region is moving toward meeting the MDGs, poor farming practices, unregulated or poorly-implemented or -monitored existing regulations on human activity, including industrial development and urban poverty, have negatively affected LAC's water resources. There are many opportunities to enhance water efficiency and management in the region.

Figure 12. Progress toward the MDG target in Latin America and the Caribbean
(WHO, UNICEF, 2010)

Latin America is blessed with an abundance of fresh water. Paradoxically, access to water and sanitation remains insufficient, particularly in rural areas and by the poor. This appears to be rooted in political decisions, poverty and inequality.

Booming, concentrated populations in Latin America's mega-cities are exhausting and contaminating their water supplies, forcing governments to seek out increasingly distant sources. In most large cities, over 50% of the water supply is lost through infrastructure leakages. Some of the largest cities depend on aquifers and are mining these resources (e.g. Mexico City).

Throughout the region, water basins and aquatic habitats serve as routine dumpsites for garbage, mining effluents, and industrial and agricultural waste.

Rampant poverty is an important factor. After years of structural adjustment imposed by the World Bank and International Monetary Fund, LAC has the most inequitable income distribution in the world. Mirroring this is a pattern of tremendously unequal access to water. More than 130 million people have no safe drinking water in their homes, and only an estimated one out of every six persons enjoys adequate sanitation service. The situation worsens as policies privileging industrial agriculture drive millions of subsistence farmers into the cities' overpopulated slums every year (Barlow and Clarke, 2004).

Water scarcity in certain regions is, in general, a source of conflict among sectors. As a result, there is a tendency toward promoting the concepts of integrated watershed management: creating a development plan and a management institution representing the public sector and main users' groups, granting water concessions, planning and implementation of large hydraulic works, pollution control, flood protection, estimation of the ecological flow, etc. This is the case in Argentina, Bolivia, Brazil, Chile, Guatemala, Honduras, Mexico and the Dominican Republic.

A consistent water accounting system, together with the application of economic instruments and mechanisms, can help foster sustainable water use, enhance efficient use and allocation of water resources, give priority to the satisfaction of basic human needs as well as balance the requirements of preserving ecosystems and their functions. Desirable policy options include water tariffs, water pricing based on use type and volume or pollution charges. Many businesses are developing water accounting and stewardship schemes in the region. There needs to be a parallel improvement in the way that local, national and regional governmental institutions manage and monitor water resources and productivity.

In LAC there is enough fresh water to produce the goods and services for the population now and in the future. However, leaders must take action right now by embracing transparency, removing harmful subsidies and making trade agreements fairer. Over the last few years, the scale and speed of response from the public and private sector in LAC has been striking. There is still great potential to explore the power of public-private partnerships and public participation to address water linkages with economy better and achieve high efficiency standards for such a valuable resource.

3.1.2 Biodiversity

Biological diversity, or biodiversity, is the variety of life on Earth. It includes all organisms, species and populations, their genetic variations and their complex assemblages of communities and ecosystems (UNEP, 2010c; UN, 2012).

Latin America has the world's largest major tropical wilderness (Ceballos et al., 2009), specifically the Amazon Region, where Brazil and Peru rank among the top 10 countries with the largest forest area (Ceballos et al., 2009), with an immense species diversity per ha of forest, e.g. 300 or more tree species/10 ha (Primack, 2004). The LAC region occupies 14% of the Earth´s land area and has 22%

of the world´s forest cover — almost 860 million ha — of which 831.5 million or 97% are in South America, 22.41 million in Central America and 5.97 million in the Caribbean (FAO, 2010c). (See Annex 3)

The current section of biodiversity in LAC starts with an overview of it and describes the eight hotspots in the region. The study offers a variety of causes that are responsible for biodiversity loss and were identified in different assessments, with the common finding that the fight against climate change is of increasing importance for biodiversity conservation. Likewise, the review examines biodiversity and forest loss, and briefly illustrates the importance of the former for society and for the LAC economy. Based on the information presented in this section, the document provides insight into some of the challenges that add to the alarming rates of biodiversity loss in LAC. Finally, this overview provides conclusions to support biodiversity conservation and, more generally, biodiversity management in the LAC region.

Biodiversity hotspots

Worldwide, Conservation International (CI) has identified 25 biodiversity hotspots, characterised by their high species richness and endemism, and LAC possesses eight of them (see Figure 13).

One is located in the Caribbean Islands, consisting of diverse ecosystems that include montane cloud forests to cactus scrublands and dozens of highly-threatened species. The second hotspot is the Madrean Pine–Oak Woodland, distinguished by rugged mountainous terrain, deep canyons and supporting a quarter of Mexico's plant species (many of them endemic to this area). This hotspot, specifically the pine forests of Michoacán, is extremely important as wintering site for millions of monarch butterflies. Spreading from Central Mexico to the Panama Canal, the Mesoamerican hotspot is the third largest worldwide, with important endemic species and plentiful plant species that offer a corridor for many Neo-tropical migrant bird species. Mesoamerican montane

Figure 13. Biodiversity hotspots in LAC
(Conservation International, 2010)

forests are known for sustaining important amphibians (many endemic). In South America, the Atlantic Forest is home to 20,000 plant species (40% endemic), over two dozen critically-endangered vertebrate species and nearly 950 bird species, including endemic and threatened species. The Atlantic forest is one of the world's 10 most threatened forested hotspots, with a remaining habitat of only 8%. In Brazil, the most extensive woodland savanna in South America — the Cerrado — encompasses 21% of the country and maintains drought- and fire- adapted plant species, as well as an astonishing amount of endemic birds and large mammals. The sixth hotspot is the Chilean winter rainfall — Valdivia's forests supporting endemic flora and fauna, including the national monument: the Araucaria tree. High endemism for reptiles, amphibians and freshwater fishes prevails on this hotspot. The seventh hotspot borders two others: the Tumbes-Choco-Magdalena with endemic species, where the white-winged guan is threatened with extinction. The last biodiversity hotspot region is the richest and most diverse region in the world, as it holds approximately a sixth of all plants in less than 1% of the world's land area. This hotspot is the Tropical

Andes, which supports endemic species and harbours the largest variety of amphibians worldwide, with over 67% threatened species (Conservation International, 2011a). Around one-sixth of the world's endemic plants and vertebrates are threatened by habitat loss in seven regional hotspots (UNEP, 2007, p. 245).

In addition to representing over a third of the biodiversity hotspot regions in the world, six Latin American nations are also classified as mega-diverse countries thanks to their biodiversity richness. These countries are Mexico, Colombia, Ecuador, Peru, Venezuela and Brazil (Conservation International, 2011b). Each of these countries has more species of plants, vertebrates and invertebrates than most of the nations on the planet put together (Rodriguez et al., 2005).

Assessing the main causes of biodiversity and forest loss

Different assessments and studies attempt to identify the main factors contributing to biodiversity loss. The MEA (2005) found habitat change, pollution, over-exploitation of biotic resources, invasive species and climate change; the UNEP considers habitat loss and destruction, alterations in ecosystem composition, invasive alien species, over-exploitation, pollution and global climate change (UNEP, 2010c); IUCN lists habitat loss and degradation, invasive alien species, over-exploitation of natural resources, pollution and diseases, and human-induced climate change (IUCN, 2011); and the Society for Conservation Biology (Austral and Neotropical America)[12] names deforestation and fragmentation, industrial agriculture and extensive ranching, climate change, and lack of capacity for conservation (Ceballos et al., 2009) as the main reasons for biodiversity loss.

The rich biodiversity of the LAC region may have a low-adaptive capacity to climate change, jeopardising the currently threatened

12 The Austral and Neotropical America (ANA) section of the Society for Conservation Biology

Figure 14. Biodiversity as ratio of species abundance before human impacts
(GLOBIO; Alkemade et al., 2009)

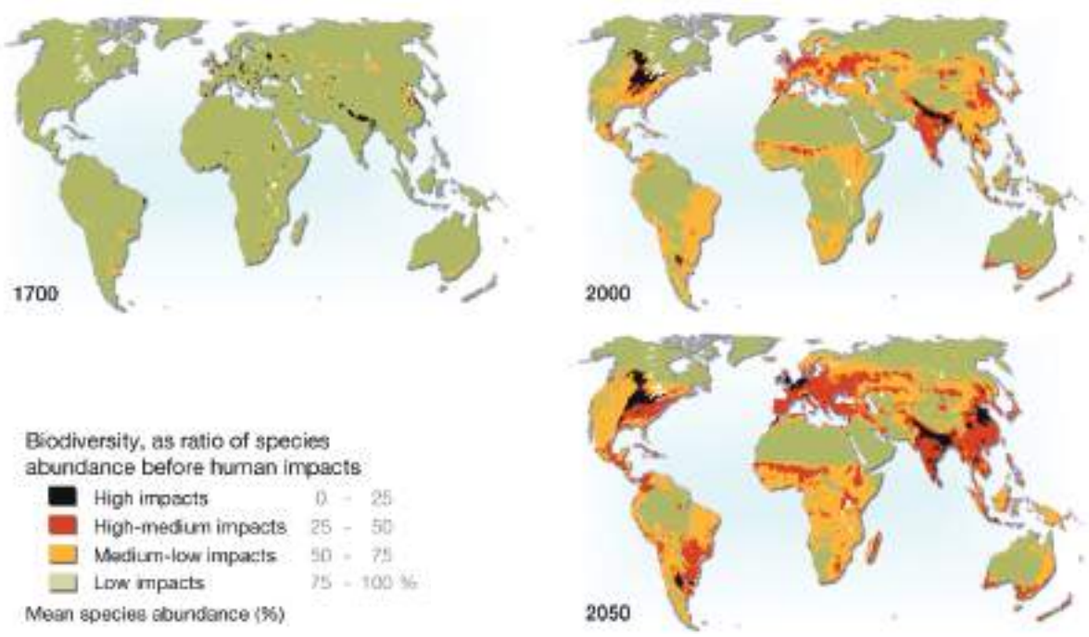


Table 10. Eco-regions, natural resource degradation problems and associated management practices in Latin America

Source: Swinton et al. (2003)

Eco-region	Natural resource problems	Country cases	Management practices
Rainforest	Deforestation	Brazil	Slash and burn farming
		Peru	Building shelters for Brazil nut gatherers
Mountain	Biodiversity loss	Peru	Hunting
	Soil degradation	Colombia, Nicaragua, Peru	Continuous cropping
	Deforestation	Colombia, Peru	Collecting firewood, construction wood
	Biodiversity loss	Colombia, Peru	Hunting, overgrazing
	Pesticide exposure	Nicaragua	Pesticide overuse
Arid coastal	Overgrazing	Chile	Overstocking
	Deforestation		Collecting firewood

taxa found in the tropics, characterised by harbouring the majority of the world's species (Felton et al., 2009).

Disruptions of the Caribbean coral reefs, which serve as fish nurseries for approximately 65% of all species in LAC (De la Torre et al., 2009), lower water levels in the Amazon Basin, the rapid tropical glacier retreats in Bolivia and impacts on montane wetlands in Colombia (Ceballos et al., 2009) are evidence of the menace that climate change poses to biodiversity. The vast deforestation that takes place in the region, cleared for agriculture or cattle grazing, is also an important cause of greenhouse gas emissions. Deforestation in the region is responsible for an estimated 48.3% of the total global CO_2 emissions from land-use change, with nearly half of this coming from deforestation in Brazil, particularly in the Amazon Basin. The synergistic threats of climate change to biodiversity are not to be underestimated, since these can bring high levels of extinction (Stork, 2009).

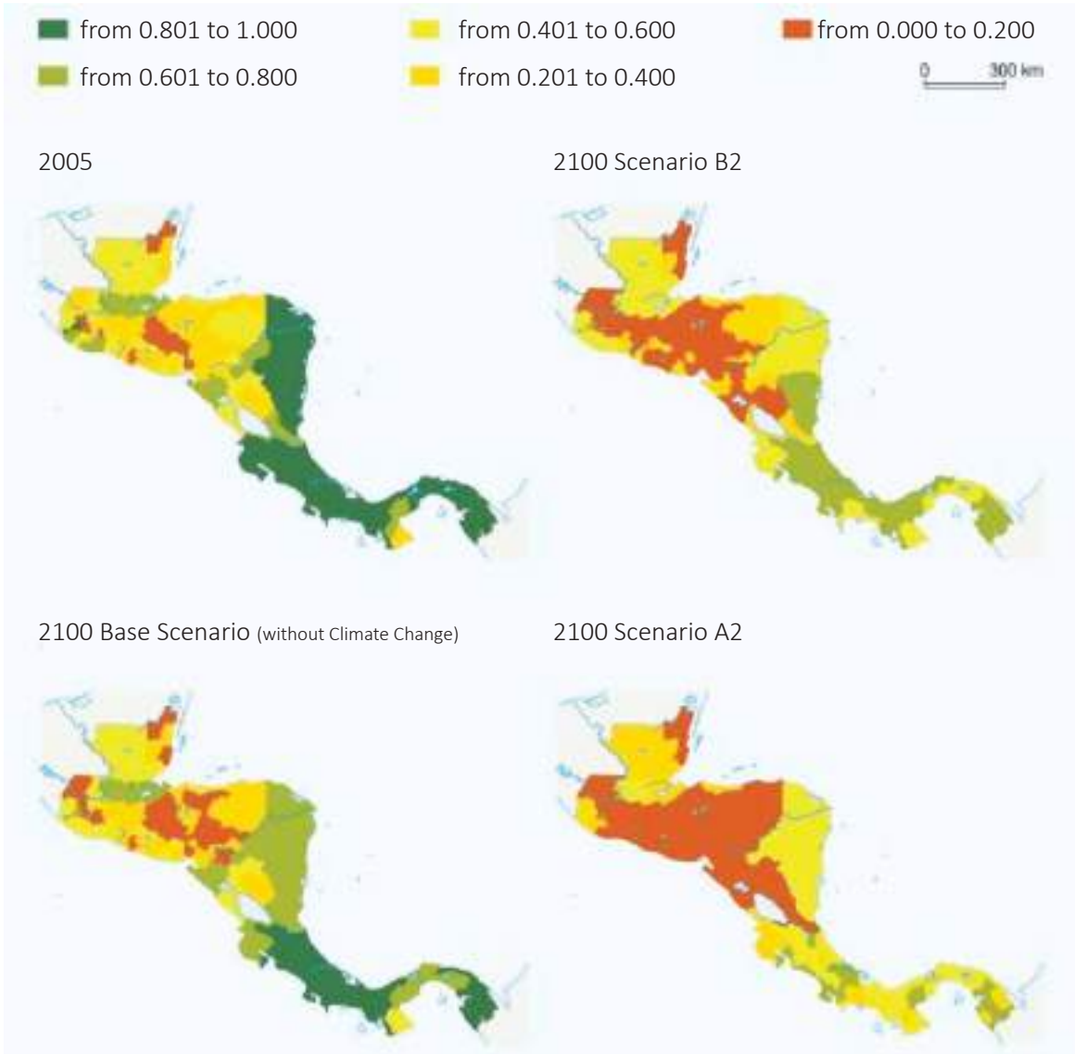
Human activities are driving the decline of biodiversity worldwide due to the disturbance of terrestrial, inland matters and coastal ecosystems (see Figure 14).

In LAC, unsustainable practices have negative impacts on watersheds and aquifers, mangroves and wetlands, coral reefs, fishing (causing over-fishing), agriculture (contributing to eroded soils and drought), and predator-victim relationships (through the introduction of exotic species) (See Table 10). In addition, industries such as energy generation, transportation infrastructure, construction, mining, timber and tourism — to mention a few — disturb species and their habitats, while irreversibly altering the interactions and services provided by ecosystems and biological resources.

Biodiversity and forest loss

Despite the wealth of biodiversity in this part of the world, LAC is experiencing the extensive and rapid effects of the current "sixth mass extinction event." The preceding five events of similar magnitude in the last 600 million years caused the disappearance of 65-95% of marine animals (Stork, 2009). Providing an approximation of the percentage of biodiversity loss proves extremely difficult, as not all species on Earth have been discovered and different methods supply different results. LAC has not escaped large rates of biodiversity loss, especially South America, which

Figure 15. Index of biodiversity potential in Central America
(ECLAC/CCAD/DFID, 2010)



is considered the region with the highest proportion of global species at risk locally (UNEP, 2010a; 2010b).

The Intergovernmental Panel for Climate Change (IPCC) predicts major biodiversity loss in Latin America by the middle of this century (Magrin et al., 2007). Figure 15 (next page) exemplifies estimates of the potential biodiversity index of Central America for 2005, using the baseline scenario (without climate change) and emissions scenarios B2 and A2 (climate change scenario B2) (ECLAC/CCAD/DFID, 2010).

For example, an exhaustive study of 48 Mexican lizard species conducted from 2006-2008 at 200 sites reveals that, since 1975, 12% of local species have gone extinct (Sinervo et al., 2010).

In LAC, the eco-regions together form a huge terrestrial corridor of 20 million square kilometres (UNEP, 2007). Of 178 eco-regions recognised in LAC by the World Wide Fund for Nature (WWF) (Olson et al., 2001), only eight are relatively intact, 27 are relatively stable, 31

are critically endangered, 51 are endangered, 55 are vulnerable and the remaining six are unclassified.

According to the latest State of Biodiversity in LAC, five countries in the region — out of 20 worldwide — hold the highest number of endangered or threatened fauna species (UNEP, 2010b). As Stork has noted, the future regeneration of some key tropical forest plant species are critically affected by the loss of tropical forest megafauna (Stork, 2009). As much as 55% of mangrove forests along the coastline of LAC are now classified as in critical or endangered status (Lemay, 1998, in UNDP, 2010).

Over 400 different indigenous groups are estimated to live in the region — roughly 10% of the total population. They frequently live on the margins of society and have no role in decision-making at the national level. Despite international protection provided by Convention N°169, the American Convention on Human Rights as well as the increasing role of Inter-American Court of Human Rights toward protection of indigenous peoples through substantial prominent cases and the work of the UN Special Rapporteur on the Rights of Indigenous Peoples, many indigenous cultures have already disappeared and others are on their way to extinction (Montenegro and Stephens, 2006). As economics turns towards market homogeneity, both cultural heterogeneity and traditional management knowledge are increasingly threatened. Consequently, the exceptional strategic biodiversity resources and associated traditional knowledge in the region have fallen victim to bio-piracy, with numerous cases arising during free trade negotiations that seek to be prevented through intellectual property rights and by the Convention on Biological Diversity.

On top of these human activities are the effects of rising temperatures caused by climate change, which is considered the major threat for biodiversity loss (Stork, 2009).

Forests in the region are the habitat that experience largely negative impacts from the expansion of human populations, and that support an extremely high abundance of species (Robinson et al., 2004). In the past 20 years, LAC has lost, between 1990 and 2005, 64 million ha (7%) of the total forest cover (FAO, 2010c). The Global Forest Resource Assessment (FAO, 2010b) reports that, in Latin America, four million ha of native forests have been cleared annually between 2005 and 2010, while, in 1990, the forests of this region accounted for 56% of tropical forests (Begossi and Dias de Ávila-Pires, 2003). Currently South America still has the largest percentage of primary forests in the world, with 624 million ha representing 46% of the world total, 35% of which are found in Brazil (FAO, 2010b).

Conversely, in the Caribbean, Haiti ranks as one of the most deforested countries in the world (Than, 2010); and, in Central America, deforestation rates of 1% annually (between 2000 and 2005) represent one of the highest in the world (FAO, 2010c).

Land degradation is another major environmental issue in this region. Some 3.1 million km^2, or 15.7%, is degraded land. The problem is more severe in Meso-America, where it affects 26% of the territory, while 14% of South America is affected (UNEP, 2010b). Over 75% of the land used for livestock production in Latin America is moderately to severely degraded and contributes to elevated rates of deforestation in fragile ecosystems due to the expansion of livestock production (FAO, 2010a).

Desertification affects 25% of the territory due to deforestation, overgrazing and inadequate irrigation (UNEP, 2010b). Salinisation of agricultural soils due to irrigation is particularly significant in Argentina, Cuba, Mexico and Peru, which have extensive dryland areas that are often subject to inappropriate use or protracted droughts (UNEP, 2010b). Furthermore, agricultural intensification is causing nutrient depletion.

Approximately one half of the deforestation in LAC is attributed to the expansion of commercial agriculture for exportation, including biofuels (UNEP, 2010b); and, with climate change and the oil crisis, the conversion of biomass into fuels is on the rise (see Figure 16).

Fortunately, the pace of forest loss reports in Latin America has decreased in recent

Figure 16. Years needed to repay biofuel carbon debt from land conversion
(World Bank, 2009)

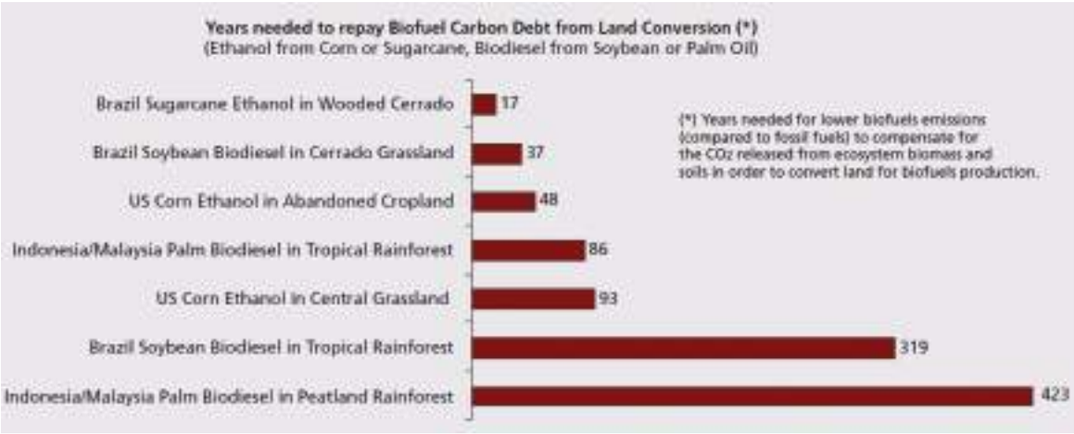
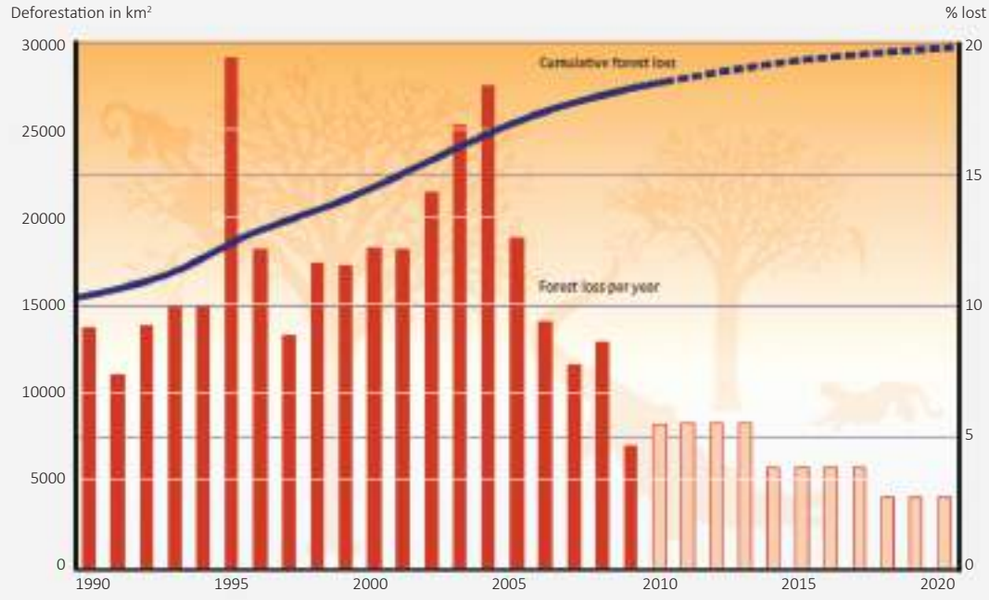


Figure 17. Annual and cumulative deforestation of the Brazilian Amazon region
(Secretariat on the Convention on Biological Diversity, 2010)



The darker bars represent the actual area of the Brazilian portion of the Amazon deforested each year between 1990 and 2009 (figures on the left vertical axis), as observed from satellite images analysed by the National Space Research Agency (INPE). The lighter bars represent the projected average annual rate required to fulfill the Brazilian government target to reduce deforestation by 80% by 2020 (from the average between 1996 and 2005). The solid line shows cumulative total deforestation (figures on right vertical axis) as a percentage of the estimated original extent of the Brazilian Amazon (4.1 million km²).
Source: Brazilian Natonal Space Research Agency (INPE)

Table 11. Area of forest designated for conservation of biodiversity by region and sub-region, 2010
Source: FAO, 2010b

Region/Sub-region	Information Availability		Area designated for conservation of biodiversity	
	Number of countries	% of total forest area	1000 ha	% of forest area
Caribbean	12	53.8	717	19.2
Central America	7	100	9,203	47.2
Total South America	14	100	115,613	13.4

years (FAO, 2010b), with the Brazilian Amazon region rainforest deforestation rates (see Figure 17) decreasing from 2.7 million ha in 2003-2004 to approximately 700,000 ha in 2008-2009. This trend continued over the course of monthly observations during 2009-2010 (Secretaría del Convenio de la Diversidad Biológica, 2010).

The area under protection (both marine and terrestrial IUCN Categories I-VI) almost doubled from 1985 to 2006, and now shields 10.5% of total territory, with greater relative coverage in South America (10.6%) and Meso-America (10.1%) than in the Caribbean (7.8%) (UNEP-WCMC, 2011).

In addition, since the year 2000, three million ha of forest areas have been set aside for biodiversity conservation purposes (Table 11) (FAO, 2011b) and 11% of the region is currently under formal protection (UNEP-WCMC, 2011).

New efforts are being made, such as the creation of the Meso-American Biological Corridor, which extends from southern Mexico to Panama, and the pilot programme to conserve the Brazilian rainforest. In the Amazon Region, seven new conservation areas have been created, totalling about 150,000 km^2 and including the largest (42,500 km^2) strictly-protected area ever created in a tropical forest: the Grão-Pará Ecological Station (Conservation International 2010; PPG7, 2004). In general, biodiversity hot spots are poorly protected throughout the region. Even though many protected areas have been created, an operational challenge is yet to be met, switching from the so-called "paper parks" to the next stage of effective protected areas. Protective actions and continuous efforts are needed in most hot spots as well as in other areas rich in biodiversity.

Acknowledging that protected areas are the main strategy for biological conservation, particularly when these areas are large enough to enable viable populations of many species within their boundaries, more and more protected areas have a small size and are at risk of becoming less effective in biodiversity conservation due to fragmentation and even isolation from other areas of similar habitats (Cantu-Salazar and Gaston, 2010). As a result, biodiversity loss arises as a pressing environmental challenge identified for LAC.

Importance of biodiversity and forests

Biodiversity, with its species, genetic value and ecosystems, supplies our society with immeasurable benefits and services. In terms of ecosystem services, forests, for instance, provide air and water purification, carbon sequestration, soil erosion reduction and species habitat (wildlife, plants and micro-organisms). Mangrove forests are crucial habitats for the productivity of fisheries and represent a natural barrier against flood protection. Species in general play a fundamental role in biodiversity conservation. The connection between the millions of species within the numerous phyla of microbes and invertebrates (Beattie and Ehrlich, 2010, 308) that represent possibly 95% of total species and genetic biodiversity, together with plants, make possible the development of agriculture, forestry and fisheries, as they generate marine food chains and intervene in soil chemistry (Beattie and Ehrlich, 2010). For instance, the Humboldt Stream on the Southeastern Pacific Coast, despite its cold waters, is an important site for

fisheries, as the abundant nutrients and dissolved oxygen allow high biomass production (UNEP, 2010a) with abundant plankton and an extraordinary variety of marine mammals, seabirds and fish (WWF, 2001).

Species are also the subject of pharmaceutical research for conventional and alternative medicine alike, counting significant medical breakthroughs to treat diseases such as cancer (ethno pharmacology using plants), brain tumours and other acute and chronic diseases. There is a whole movement to protect frogs from extinction because of their unique input to medical science (www.savethefrogs.com). In addition, different species provide ecosystem services as they serve as bio-indicators (including frogs) thanks to their sensibility toward environmental stressors, and enable pollution monitoring, which is especially appropriate for areas and regions where technology access is scarce or unaffordable.

Likewise, genetic resources play a vital role in food security, as the decline of biodiversity contributes to the generic erosion of useful crop and forage plants (Peters et al., 2005, 1). The complex inter-relationships that take place in ecosystems still startle scientists today, but with more than 99% of modern species extinction attributed to human activity (Primack, 2004, 66), priceless services and knowledge can be lost forever given the currently sixth mass extinction episode of the Earth.

Environmental policy has changed dramatically in recent years, with an increasing mobilisation of civil society to address issues such as extraction of oil and gas, water access and protection of regional biodiversity. Some recent examples include the geopolitical alert over the Guarani Aquifer (one of the world's largest, encompassing 1.2 million km^2 in Brazil, Paraguay, Uruguay and Argentina) (UNEP, 2007), and the debates over the Pascua-Lama gold mining project in Chile and Argentina, a new law on protected natural areas in the Dominican Republic, and the construction of pulp mills on the Uruguay River that was finally settled by International Court of Justice.

The sustainable use of biodiversity and forests is not only the key to the vitality of ecosystems and economic development, but also of vital importance to human development, if used wisely. The LAC region's natural capital provides the basic social safety net for rural populations across the region and is one of the few factors limiting large-scale urban migration and malnutrition. Indigenous communities are among most vulnerable peoples in the concerned areas for whom only a continued sustainable use of biodiversity and forests can ensure their sources of food, income or habitat in which they have built their lives and traditions over the last millennium.

Risks

The Global Risks 2010 report prepared for the World Economic Forum pictures the manifold risks that biodiversity loss entails for different sectors such as economics, the environment and society (Figure 18).

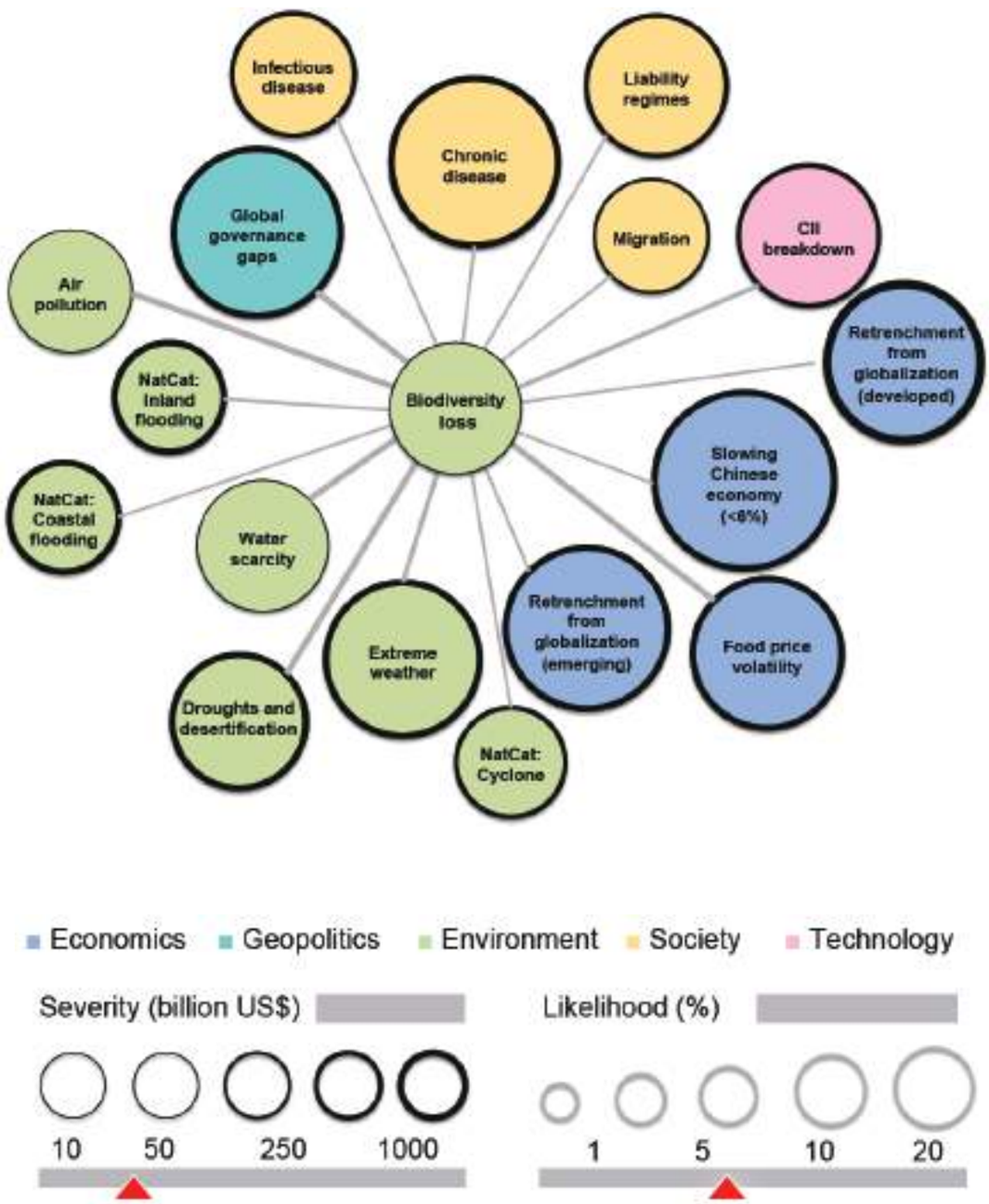
The associated risks posed by biodiversity loss are many-fold, with implications not only for the environment or public health, but also for all sectors of society. In some cases, a risk derived from biodiversity loss can also represent a risk for biodiversity, meaning that a connector can be interpreted in two ways. With current rates of biodiversity loss, the risk of chronic disease is high and bears significant costs to the world economy, illustrated by the size of the circle and its thickness, respectively (Figure 18).

Challenges

Population growth

The rapid population growth of the last 30 years and recent estimates of 540 million inhabitants by 2020 in LAC, of whom 83% will be living in cities (FAO, 2010c), call for the sustainable management of resources to be embedded in society and politics to ensure that biodiversity be preserved, recovered and protected. It should be noted that expanding

Figure 18. Biodiversity loss at the nexus of many risks
(World Economic Forum, 2010)



rural populations in the region threaten the sustainability of the natural resource base (Swinton et al., 2003). According to the Director of the International Food Policy Research Institute, it is a challenge to feed a growing population while still maintaining and preserving the natural resource base (IFPRI, 2010). Life sciences also depend on genetic resources to address food security in the face of high rates of biodiversity loss (Gatti et al., 2011).

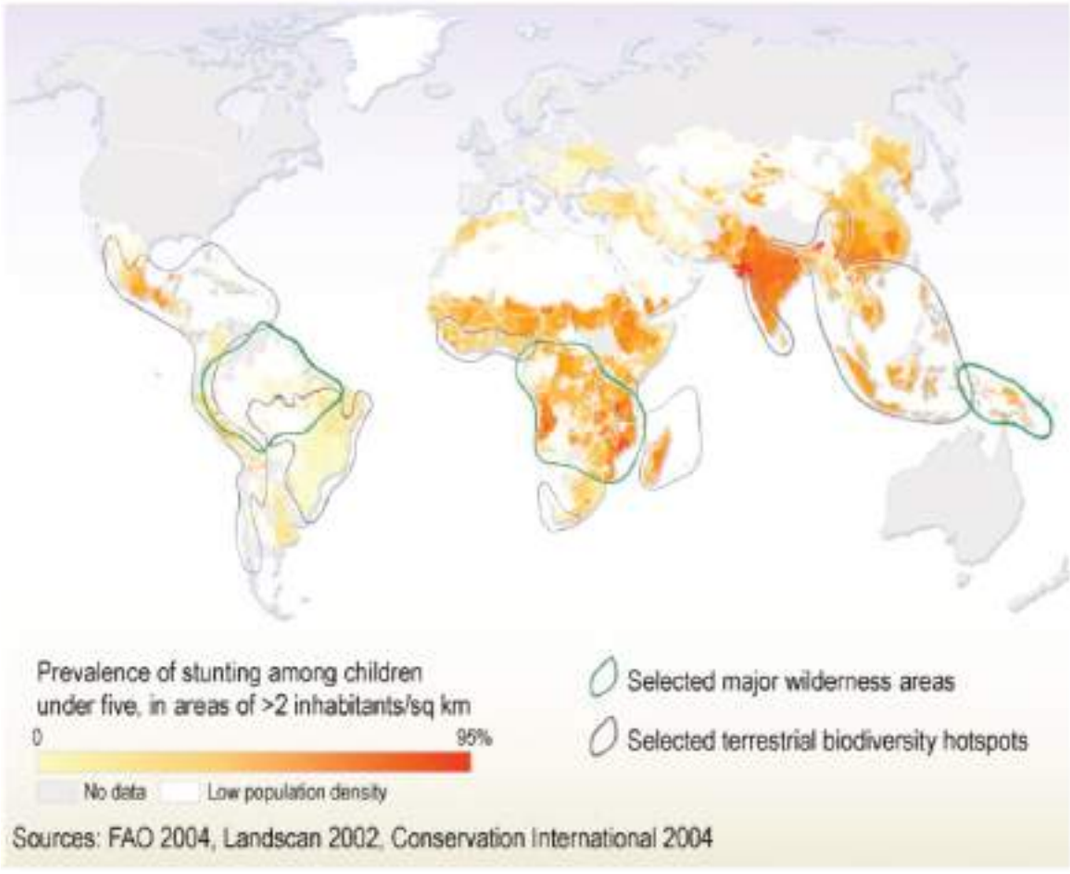
Poverty

In 2008, 33% of the region's population lived in poverty, 13% of which live in extreme poverty (UNDP, 2010). These high percentages continue to impact negatively on the biodiversity of LAC as ecosystem services are increasingly scarce with reduced capacity to provide vital services that generate well-being and that reduce poverty (UNDP, 2010) (Figure 19). Poor inhabitants of coastal regions have a strong reliance on fisheries for their livelihood, whereas rural households depend heavily on agriculture for subsistence, as this sector represents one of their primary sources of income. Agriculture is affected by climate change and natural resource depletion, resulting in increased costs of the basic food basket due to higher food prices that worsen extreme poverty (UNDP, 2010).

Concluding remarks

The causes that contribute to biodiversity loss deserve careful attention, as the region needs a paradigm shift that emphasises the

Figure 19. Global Poverty-Biodiversity
(UNEP/GRID-Arendal, 2005)



protection of resources; a regulatory framework that responds to the most pressing needs; research; and co-ordinated policies that promote the sustainable development of the region and that integrate the richness but also the vulnerability of biodiversity. The gargantuan task to track down the vast biodiversity in LAC and prevent its loss requires innovation in the area of biodiversity management and will need to bring together partnerships of communities, NGOs, businesses and government (Stadel, 2005) at the national, regional and international levels.

Efforts in biodiversity conservation can be critically undermined by the synergistic effects of climate change on biodiversity loss. Conferring protection to biodiversity resources by means of establishing protected areas should consider all aspects involved, as these could also fall short by low governance in remote areas that includes illegal loggers and drug traffickers (Richards, 2007), as well as by migrating species. Conservation planning will need to consider "the areas where they may occur in the future and the intervening areas through which they will move" (Lee and Jetz, 2008 in Peres et al., 2010, 2324). Biodiversity conservation and the effective enforcement of environmental laws remain policy challenges in the protection of biological resources. Current policies can impose restrictions for conservation efforts, and they should be revised at the local, national and regional levels. Local institutions and common property approaches should be considered in planning for conservation and sustainable management, while adequate funding and revenue strategies are still needed. Payment for environmental services (Millennium Ecosystem Assessment, 2005) may be a crucial instrument for effectively protecting biodiversity (CONABIO, 2006). Promising examples are underway in several countries, such as Natura (in Brazil), Maya Nut Institute (Central America) and the Chalalan Ecolodge (Bolivia). (See Chapter 5.)

Again, biodiversity conservation needs to understand what drives environmental

degradation across all decision-makers, since the motivation of the poor differs completely from that of the rich. A "one size fits all" approach proves ineffective, but tackling these motivations through environmental policies with the right incentives could contribute to SRM in LAC (Swinton et al., 2003).

The impacts on economic activities of biodiversity loss should be integrated into decision-making processes that foster sustainable economic development endorsed by all sectors from private companies to national authorities. Swinton et al. (2003) offer six cross-cutting policy lessons to address poverty and natural resource management, e.g. tailoring policies to the problem and targetting decision–makers; intensification (such as agricultural intensification) to exit poverty and relieve pressure on natural resources; diversification away from land-based economic activities; incentives for SRM; well-defined property rights; and cost-effective policy designs (Swinton et al., 2003).

In a more populated world, fostering the sustainable use of resources — including the management of natural habitats and ecosystems — faces the massive challenge of avoiding the loss of the priceless knowledge of endangered biodiversity which can disappear forever, given the currently sixth mass extinction episode of the Earth. The resilience of ecosystems on the planet, including in LAC, is seriously hindered in its ability to return an ecosystem systematically to its original state following a perturbation, as reduced biodiversity leaves less availability of alternative structures and functions that can replace those weakened or distressed (UNDP, 2010).

Education and capacity-building at all levels can change the perception that natural resources are infinite, and discourage unsustainable resource management practices through schemes that foster SRM to reduce poverty and embrace a sustainable exploitation of natural resources in balance with biodiversity conservation.

Taking into account the dissimilar skill levels in conservation capacity and limited opportunities to build this competence (Ceballos et al., 2009), combined with low adaptive capacity due to low per capita income and again due to large population growth rates, biodiversity conservation needs to pay attention to socio-economic, political and environmental factors in order to address biodiversity loss in LAC comprehensively.

The interdependence that the world has in regard to natural resources is vital for sustaining life locally, including ecosystem services at the local, regional and global level. Understanding the rationale behind biodiversity conservation and benefits for society in general is key for changing the business-as-usual scenario and moving toward the sustainable management of our natural resources.

3.2 Economic, social and environmental aspects of three sectors linked to critical natural resources in Latin America and the Caribbean

This chapter provides an overview of the socio-economic and environmental challenges and opportunities for decision-makers in relation to three selected sectors linked to critical natural resource use in LAC: mining linked to minerals and metals, fisheries linked to fishing resources and tourism linked to natural landscapes. The description of each sector is divided into two sections. The first section deals with the socio-economic aspects of critical natural resource use in the region. The second section focuses on the environmental concerns, with particular attention to resource depletion and scarcity.

Increased population, better living standards, changes in eating habits and increased global demand for food are factors that put pressure on natural resources available in many emerging economies of LAC. The economic success of LAC has become a determining factor in explaining the current pressures on natural resources in areas ranging from mining and hydrocarbons to the expansion of the agricultural frontier and deforestation (UNEP, 2010d).

For most of the LAC countries, except for Haiti and Paraguay, agriculture accounts for less than 20% of the GDP in 2007 (Annex 2). Nevertheless, this sector represents an important part of the labour force in many countries, rising above 50% in El Salvador and Panama. In other countries such as Chile, Peru, Mexico or Ecuador, the labour force working in resources management sectors is around 30% (Annex 2).

Latin America opened itself up to foreign investment, thereby resulting in large tracts of forests in the Amazon region basin being cleared for cattle and crops, even though many people, especially indigenous or tribal groups, have not benefited from economic growth and have been forced to occupy small parcels of unproductive lands.

Unlike agriculture, on average mining accounts for a small percentage of South America´s GDP and employment, while industrial activity, much of which is oil related, accounts for over 30% of GDP in Argentina, Venezuela, Brazil, Bolivia, Chile, Peru and Ecuador. In a few countries, the mining sector accounts for more than 8% of GDP (e.g. Chile with 8.5%, Bolivia with 10% and Peru with 15%). The oil boom led to significant economic development, but also became one of the main causes of environmental degradation in the region.

The unemployment data in Annex 2, show, in general, a downward trend except for the final year of study (2009). Cuba is the country with the lowest unemployment rate. Those with high unemployment include Martinique, Dominican Republic, Netherlands Antilles, Colombia and Argentina.

In summary, the introductory text of Chapter 3.2 highlights that, in addition to the traditional sectors of agriculture and energy, mining, fishing and tourism are extremely relevant with respect to their role in the Latin American economies and their consumption of "critical" natural resources.

3.2.1 Mining and mineral sector

3.2.1.1 Mineral production in the LAC region

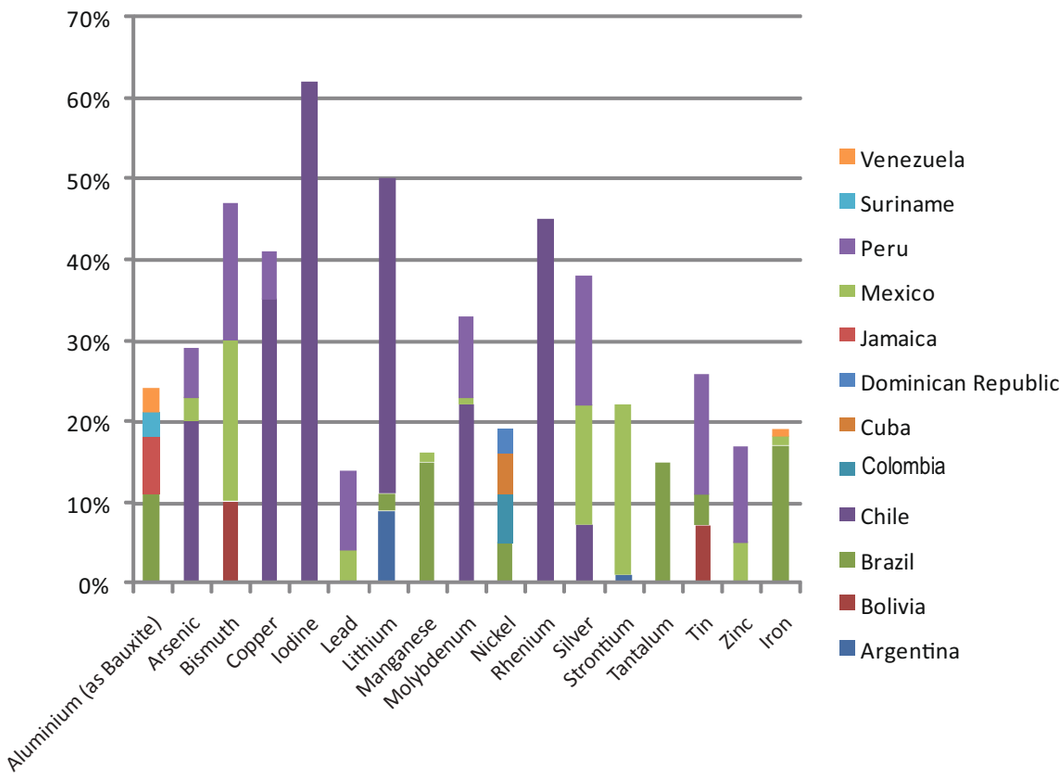
The LAC region plays an important role in supplying key material resources to the world market. Table 12 shows the major producers of material resources in the LAC region, calculated from United States Geological Survey (USGS) data on mine production volume between 2006 and 2008 (except for Indium, where the calculation is based on primary ingot production).

Table 12. Major producers of material resources in Latin America and the Caribbean*

Name	Major LAC producers			
Lithium	Chile, 39%	Argentina, 9%	Brazil, 2%	
Aluminum (as Bauxite)	Brazil, 11%	Jamaica, 7%	Venezuela, 3%	Suriname, 3%
Manganese	Brazil, 15%	Mexico, 1%		
Iron	Brazil, 18%			
Cobalt	Cuba, 7%	Brazil, 2%		
Nickel	Colombia, 6%	Brazil, 5%	Cuba, 5%	Dominican Republic, 3%
Copper	Chile, 35%	Peru, 7%		
Zinc	Peru, 12%	Mexico, 5%		
Arsenic	Chile, 20%	Peru, 6%	Mexico, 3%	
Selenium	Chile, 5%	Peru, 3%		
Strontium	Mexico, 21%	Argentina, 1%		
Molybdenum	Chile, 22%	Peru, 10%	Mexico, 1%	
Silver	Peru, 16%	Mexico, 15%	Chile, 7%	
Tin	Peru, 15%	Bolivia, 7%	Brazil, 4%	
Antimony	Bolivia, 5%	Guatemala, 1%		
Iodine	Chile, 62%			
Tantalum	Brazil, 15%			
Rhenium	Chile, 45%	Peru, 11%		
Gold	Peru, 8%			
Lead	Peru, 10%	Mexico, 4%		
Bismuth	Mexico, 20%	Peru, 17%	Bolivia, 1%	

* Calculation is based on USGS data for 2006-2008. Not all material resources are covered due to data gap. Production figures for some countries are unknown or withheld by USGS and they are excluded in the global total production figures. Therefore, some market share figures shown here may be over-estimated. For instance, the US produces a substantial amount of iodine, but US iodine production information is not disclosed by USGS. If US production volume is considered, Chile's actual market share of iodine may be reduced to 40-50%.

Figure 20. Mine production of material resources of which LAC's market share is greater than 10%*



* Because Mexico is an OECD country, it is not considered in a number of official statistics for developing countries..

Overall, the LAC region is a dominant supplier of lithium, iodine and rhenium. It also produces substantial amounts of global bauxite, copper, arsenic, strontium, molybdenum, silver, tin and bismuth. Nevertheless, LAC countries should rely on foreign production of some material resources such as magnesium due to the limited production volume within the region. Even within it, there is significant inhomogeneity in the production of material resources between countries.

Figure 20 illustrates the content of Table 12 for the material resources of which LAC's market share is greater than 10%.

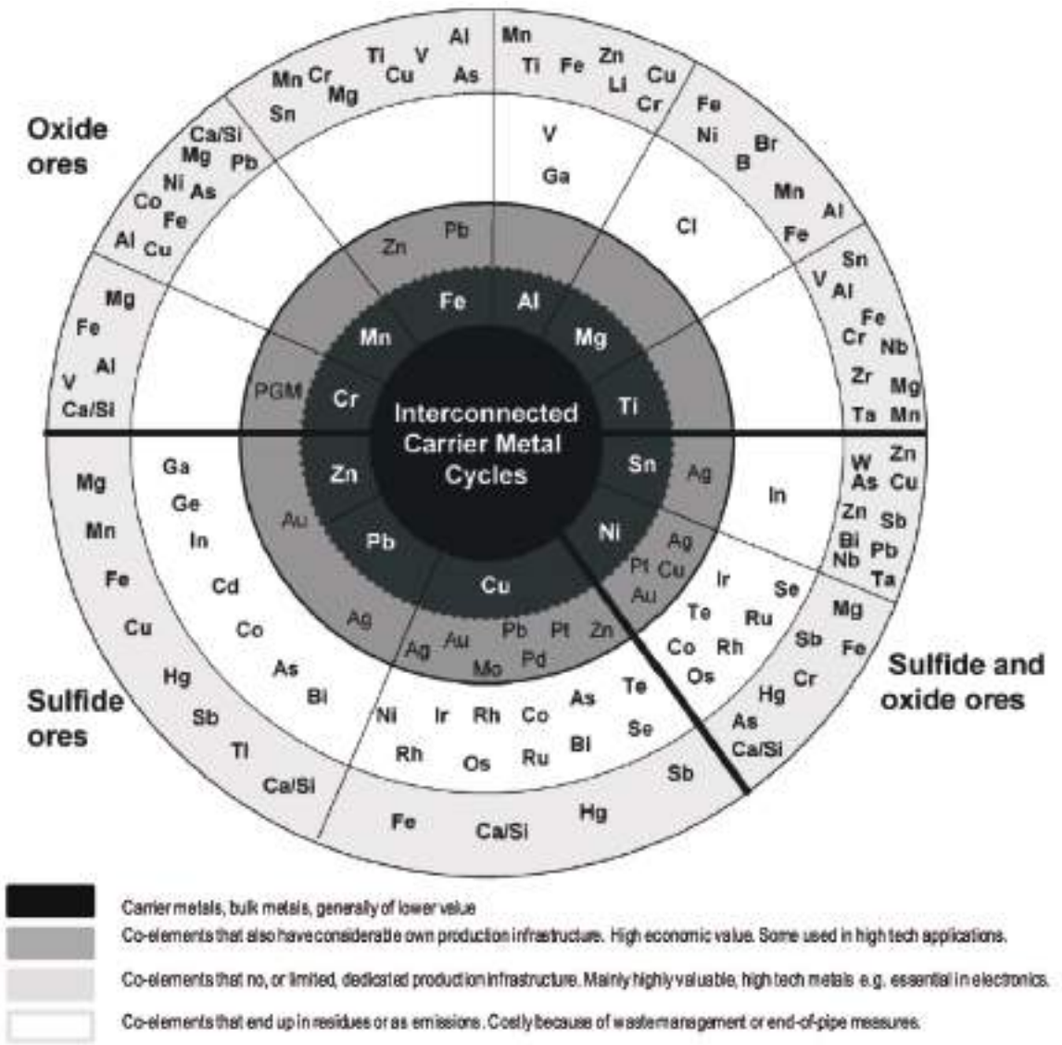
As shown in Figure 20, Chile stands out as a major producer of copper, iodine, lithium and rhenium. It also supplies a substantial portion of LAC's arsenic, molybdenum and silver.

Interestingly, Mexico and Peru serve similar markets, where the two are recognised as important suppliers of arsenic, bismuth, lead, silver and zinc. In addition to these material resources, Peru supplies significant quantities of molybdenum, while Mexico provides significant amounts of strontium.

Brazil is another leading supplier of material resources and the market that it serves overlaps only marginally with other major resource suppliers in the region. Brazil shares a significant part of the global aluminum (as bauxite), manganese and tantalum markets.

Jamaica, Suriname and Venezuela share the aluminum (as bauxite) market, while, Colombia, Cuba and the Dominican Republic share the nickel market. Argentina produces a fair portion of lithium yet remains far behind Chile.

Figure 21. Carrier metals and common co-elements
(Verhoef et al., 2004)



The materials in which the LAC region shares large portions of the global market deserve special attention when framing SRM policies.

While reliable data are scarce, the LAC region's significant production of aluminum, magnesium, tin, nickel, lead, zinc and manganese suggests that there might be good potential of producing other metals. Metal ores consist of various elements that commonly co-exist. In the course of refining major elements, or "carrier metals," from an ore, other elements may be separated further as long as the value of the co-elements outweighs the cost (Figure 21).

Given the list of frequently-found co-elements in carrier metals shown in Figure 21, the LAC region may have the potential to produce platinum, palladium, gold, gallium and vanadium. High-tech metals such as tellurium, ruthenium, rhodium, osmium, iridium and indium may be further separated during the refining process, where economic conditions allow.

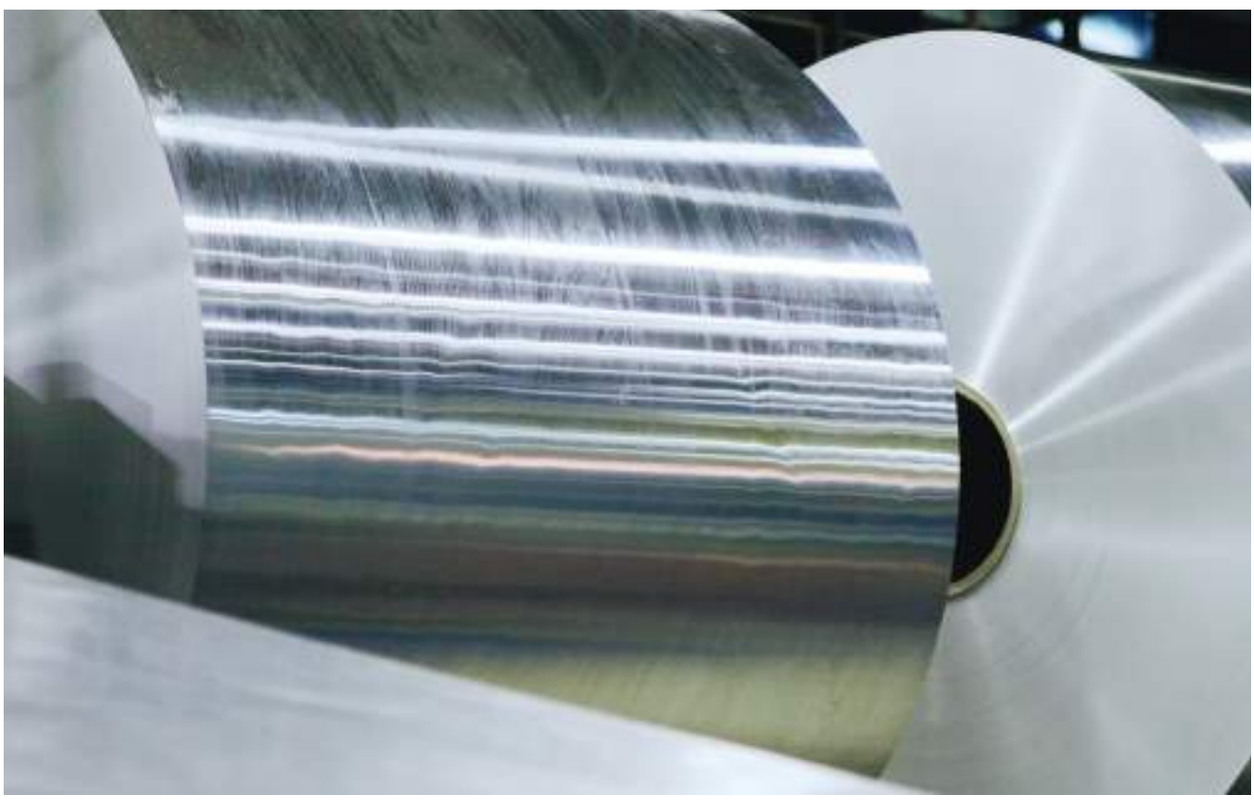
3.2.1.2 Material resource-related industries in LAC's economy

Detailed data on GDP share by material resource related industries in the LAC region are scarce and fragmented. Economic performance of mining sectors is dynamic and is affected by various factors such as new discoveries of deposits, price and changes in technology. International raw material markets for the last five years have been particularly volatile, making it hard to determine representative prices of material resources. Furthermore, the LAC region's mining industry is undergoing a rapid restructuring in the course of the global economic recession. Bauxite and aluminum production in Jamaica, for instance, once provided 4-9% of the country's GDP and about half of the country's total exports. However, Jamaica's bauxite and aluminum production, and its contribution to the nation's GDP, have rapidly shrunk since 2009, followed by the recent closures of Alumina Partners of Jamaica and Windalco, the country's two major producers of bauxite and aluminum.

Therefore, accurately portraying the role of material resource-related sectors in the LAC region's economy, based on limited datasets, is difficult. Nevertheless, an attempt is made here to assemble available data on material resource contribution to the regional economy as a reference for future in-depth research.

The total market value of material resources produced by the LAC region in 2006 is estimated to be about US$ 260 billion in 2006 price[13]. Figure 25 shows the share of the estimated $260 billion, by type of material resource, produced in LAC. According to the results, aluminum has the largest economic value of LAC's material resources production (→50%), followed by tin (20%) and copper (17%).

13 Available price data between 2006 and 2008 are used, and only the list of materials shown in Annex 1 (Table A1-4) are considered.



In addition, nickel, zinc, molybdenum and silver share each 1-3% of the total market value of LAC's material resource production. The rest of the materials considered, including arsenic, bismuth, iodine, lead, lithium, manganese, rhenium, strontium and tantalum, together did not contribute with more than 1% of the total.

Again, it should be remembered that the rapid dynamics behind the results is, and will be, quickly changing the overall picture, and such changes should be considered when interpreting this figure.

Table A1-4 summarises the market value of LAC-produced material resources in 2006 prices. According to the table, Brazil's material resource production has the largest economic value, followed by those of Peru, Chile and Jamaica (see Figure 23).

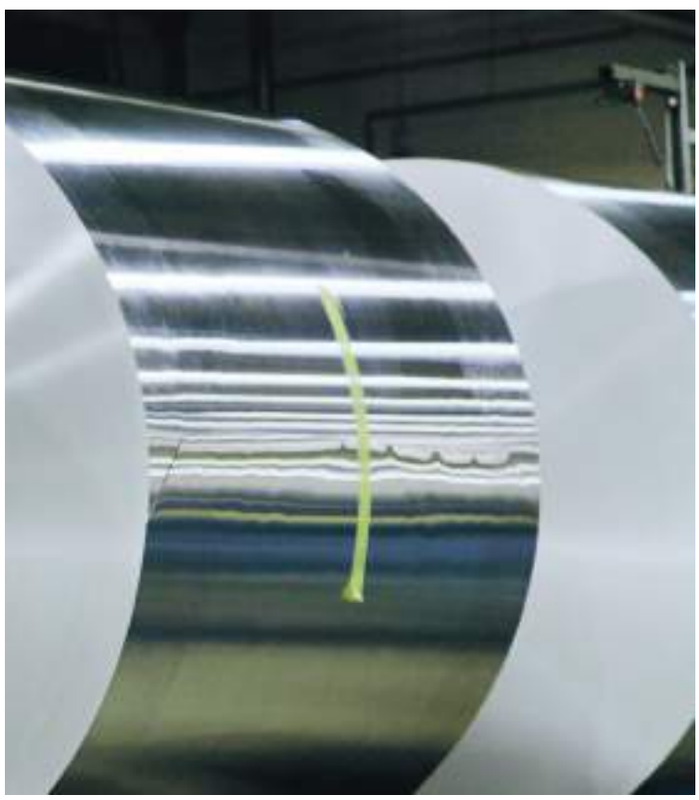


Figure 22. Market value of material resources produced in Latin America and the Caribbean by type

Note: The values are based on 17 metallic resources and are subject to changes in the price of materials and production volume, as well as accessibility of data.

(Suh, Valdivia, Aldaya, Sandoval, Tonda, 2013)

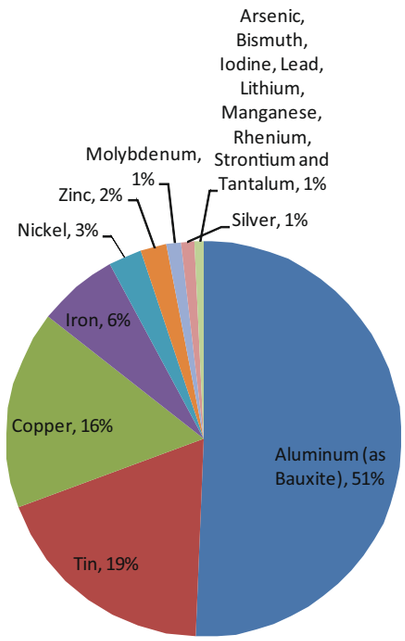
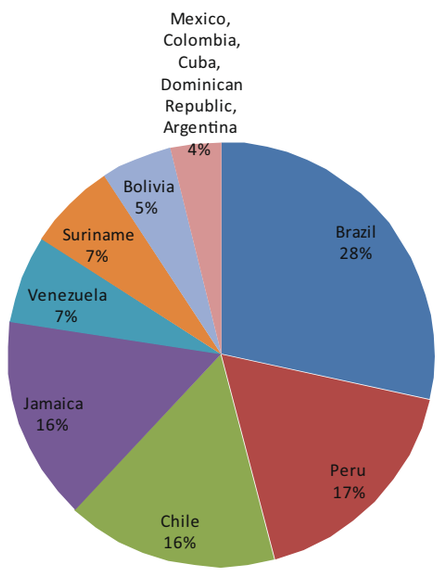


Figure 23. Share of total market value of annual material resources produced in Latin America and the Caribbean by country

(Suh, Valdivia, Aldaya, Sandoval, Tonda, 2013)



By way of comparison, total GDP for the LAC region in 2006 was 3,120 billion USD (in 2006 prices). The share of metallic resources of 260 billion USD places it at about 8% of the total GDP. Additionally, the region's total fishery exports in 2007 were about 11 billion USD, and that of hardwood in 2008 was 240 million USD.

The economic significance of resources is subject to their price and production volume, which are also subject to various socio-economic and technological variables. For instance, lithium represented only about 0.1% of the total metallic resource production in 2006 in monetary terms. However, demand for lithium is expected to rise, and some projections estimate that, by 2020, lithium demand will become 14 times higher than it is at present. If this rapid increase in demand is coupled with price increases, lithium can potentially become one of the most economically significant metallic resources in the LAC region. Nevertheless, even with a 14 fold production increase coupled with a 10 fold price increase, total annual production of lithium in monetary terms will be less than that of copper or tin. The price prospect of lithium is subject to various factors including scarcity, geo-political stability, short-term supply-demand imbalance, technological development and substitutability. These factors are highly uncertain or unpredictable by their nature.

3.2.1.3 Scarcity aspects of resources in Latin America

Resource scarcity is a measure of the current and future supply need of a resource that cannot be met because of the limited availability of the resource. In a perfect market, the price of a resource reflects its scarcity. In practice, however, the natural resources market is often imperfect or not clearly defined and therefore, price alone cannot be used as a measure for resource scarcity.

Scarcity is easier to conceptualise for non-renewable material resources such as metals and minerals, although current quantification of scarcity is still a challenge, as discussed later in this section. Determining scarcity for some of the non-material resources and renewable resources such as natural landscapes and biomass is even more challenging.

This section analyses existing data for non-renewable material resources and water in terms of their scarcity. For other natural resource categories, the authors have used survey results to cover their scarcity aspects.

Scarcity of material resources influences accessibility and cost of these materials for future use. SRM should address the use of highly-scarce materials by identifying possible substitutes of less-scarce material and by improving resource efficiency.

A commonly-used measure of resource scarcity of a non-renewable resource is the reserve life index, which is derived by dividing the reserve or reserve base[14] of a resource by the annual production volume. The ratio shows the number of years that the resources can be extracted under the current economic and technological conditions, which is commonly called reserve life.

14 Following the USGS definition, the reserve base is defined here as embracing those resources of which extraction is currently economic (reserves), marginally economic (marginal reserves) and some of those that are currently sub-economic (sub-economic resources). Reserve is a part of reserve base of which extraction is economic.

Table 13. Reserve life-years of selected resources

Rank	Atomic Number	Symbol	Name	Reserve life-year *
1	38	Sr	Strontium	21
2	47	Ag	Silver	29
3	51	Sb	Antimony	32
4	79	Au	Gold	36
5	24	Cr	Chromium	39
6	50	Sn	Tin	40
7	82	Pb	Lead	42
8	30	Zn	Zinc	46
9	-	-	Crude Oil	49
10	29	Cu	Copper	61
11	81	Tl	Thallium	65
12	-	-	Natural Gas	69
13	48	Cd	Cadmium	77
14	40	Zr	Zirconium	78
15	74	W	Tungsten	85
16	28	Ni	Nickel	90
17	42	Mo	Molybdenum	106
18	83	Bi	Bismuth	121
19	-	-	Coal	154
20	80	Hg	Mercury	162
21	26	Fe	Iron	219
22	75	Re	Rhenium	224
23	22	Ti	Titanium	225
24	27	Co	Cobalt	226
25	25	Mn	Manganese	473
26	3	Li	Lithium	521
27	23	V	Vanadium	609
28	13	Al	Aluminum	967
29	53	I	Iodine	1080

* Calculated using 2007 reserve base and annual production. Data source: USGS

In principle, low reserve life indicates high resource scarcity. In practice, however, there is generally more to consider when characterising the scarcity of a resource. Table 13 shows the reserve life of 29 resources. According to the reserve life, strontium should be the scarcest resource, leaving only 21 years to mine. However, the reserve life figure might be misleading in this case as it ignores the complexity and dynamics behind it. For example, strontium demand is expected to decline due to the market shift from Cathode Ray Tube (CRT) television. (One of the largest strontium applications —, flat panel displays — uses substantially less strontium.) Furthermore, reserve or reserve base figures are not static, but change over time depending on the market conditions and technological development. Another aspect to consider is the uncertainty in reserve information. Definition of reserve is subject to technological and economic conditions.

Development of exploration, mining and refinery technologies or emergence of new markets may significantly increase reserves. In addition, tactical behaviour in reporting reserves may also influence the uncertainty of reserve data: they are often compiled using company-supplied information, and companies may find it advantageous not to disclose the full extent of their knowledge. Therefore, addressing resources scarcity within a SRM

framework requires assembling additional information beyond reserve life to be able to characterise the scarcity of resources properly.

In this section, reserve life information is used as a starting point, keeping in mind the complexity and dynamics of resource scarcity as discussed above.

Given the limitations and uncertainty of using only reserve life information for gauging the scarcity of non-renewable resources, it is also complemented by an expert survey. Experts provide additional insights on the technological and economic dynamics associated with resources extraction, refinery and application that are not apparent from reserve life values.

Among the top ten resources with the lowest reserve life values, as identified in Table 13, the LAC region is a leading supplier of four: strontium, tin, silver and copper (over 20% of global production). On the other hand, lithium, aluminum and iodine, of which global production shares by the LAC region are also significant, are shown to have over 500 years of reserve life. Among these resources with high reserve life values, lithium is expected to go through a rapid production increase. If the reserve is unchanged, a tenfold increase in demand of lithium can easily make it one of the top ten resources with the lowest reserve life. As for the others, demand for bismuth may also increase with its application as a lead-free soldering material. Rhenium's application for high-tech mechanics may also increase its demand in the future.

3.2.1.4 Summary of social and environmental aspects of mining activities in LAC

Material resources also play important roles in creating jobs and generating income for local economies; however, they also represent a risk for vulnerable poor communities where inadequate labour conditions and serious health problems may result from extractive activities.

Mining accounts for about 0.5% of the world's workforce — about 11 million people. Similar to the global trend, in LAC for every mining job there is at least one job that is directly dependent on it. When one takes household units into account, the number of people relying on mining, both large and small, for a living is likely to be over 17 times higher. Nine million people depend on artisanal mining, most of whom are women and children.

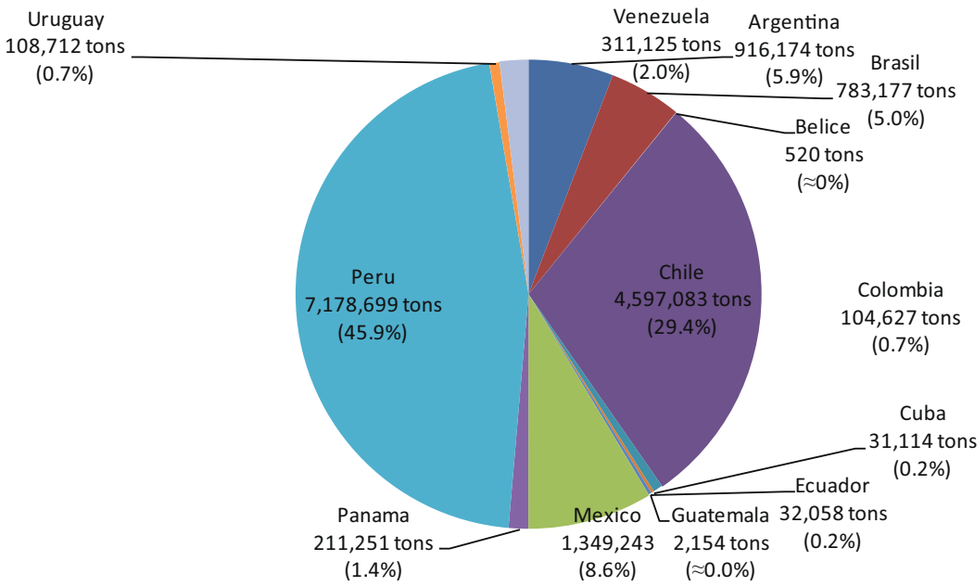
Declining mineral grades, higher treatment costs, privatisation and restructuring are putting pressure on mining companies. The high capital intensity of much of the mining industry encourages mining companies to seek the maximum use of their equipment, calling in turn for more flexible and often more intensive work patterns.

These changes in the industry not only affect mine workers who must find alternative employment; those remaining in the industry have to work in ways that require different skills and more flexibility. Finding the balance between the desire of mining companies to cut costs and the determination of workers to safeguard their jobs is a major issue throughout the world of mining.

While resources are a potential way to improve the well-being of communities, they may also become a reason for potential conflicts. For example, in recent years mineral extraction has increasingly become a source of tension between local communities, extractive companies and governments in Ecuador, Guatemala, Honduras and Peru.

Growth in the LAC mining sector has put pressure on fragile ecosystems and communities that are located in mineral-rich land. Environmental and health impacts of medium- and large-size mining sites and artisanal mining activities without the minimum environmental management systems required by the regulations include: water contaminated with lead, arsenic and other metals; falling water tables due to excessive use by the mining sites; skin problems, excessive headaches, mercury and lead poisoning in the blood; respiratory illnesses caused by excessive dust; and the destruction of

Figure 24. Fisheries: Extraction by main fisheries (tonnes)
Total in 2007: 15,625,937 tonnes.
(ECLAC, 2009).



vegetation due to acid rain. Because of gender relationships and roles, the burden on women is often heavier due to the fact that they are responsible for water provision for the home and for taking care of their family's health.

Mining activities with poor labour practices (i.e. artisanal mining) frequently violate International Labour Organization (ILO) labour standards. Consequences include the aggravation of existing social problems such as alcoholism, drug addiction, delinquency, child labour and prostitution. These socio-economic impacts place a heavy burden on the local communities as they try to improve their well-being.

3.2.2 Fishing sector

Introduction (Global and LAC production)

In 2008, global capture fisheries and aqua-culture supplied approximately 142 million tonnes of fish for human consumption (81%) and non-food uses (19%, for example, fish meal and fish oil). Of that amount, 90 million tonnes came from marine and inland capture (FAO, 2010d).

Seafood consumption in LAC is highest in Peru (20.0 kg/capita/year), followed by Chile (16.5 kg/capita/year), Argentina (6.5 kg/capita/year) and Brazil (6.0 kg/capita/year) (Glitnir, 2007).

The total catch of Latin American nations amounted to 17.1 million tonnes in 2005. Peru and Chile were the main fishing nations, with 82% of the total weight. Total catches by the Peruvian fleet amounted to 9.2 million tonnes and 4.3 million tonnes by the Chilean fleet. In 2007, production decreased by 7% to 15,625,937 tonness, with 46% (7.18 million tonnes) and 29% (4.6 million tonnes) from Peruvian and Chilean fisheries, respectively. (See Figure 24.)

Socio-economic importance

The fishing sector is a source of income and livelihood for millions of people around the world. It is estimated that, in 2008, 44.9 million people were directly engaged in

capture fisheries or in aquaculture, and at least 12% of these were women. It is also estimated that, for each person employed in capture fisheries or in aquaculture production, about three jobs are produced in secondary activities, including post-harvest, for a total of more than 180 million jobs in the entire fish industry. Moreover, on average, each job-holder provides for three dependants or family members. Thus, the primary and secondary sector supports the livelihood of about 540 million people, or 0.8% of the world's population.

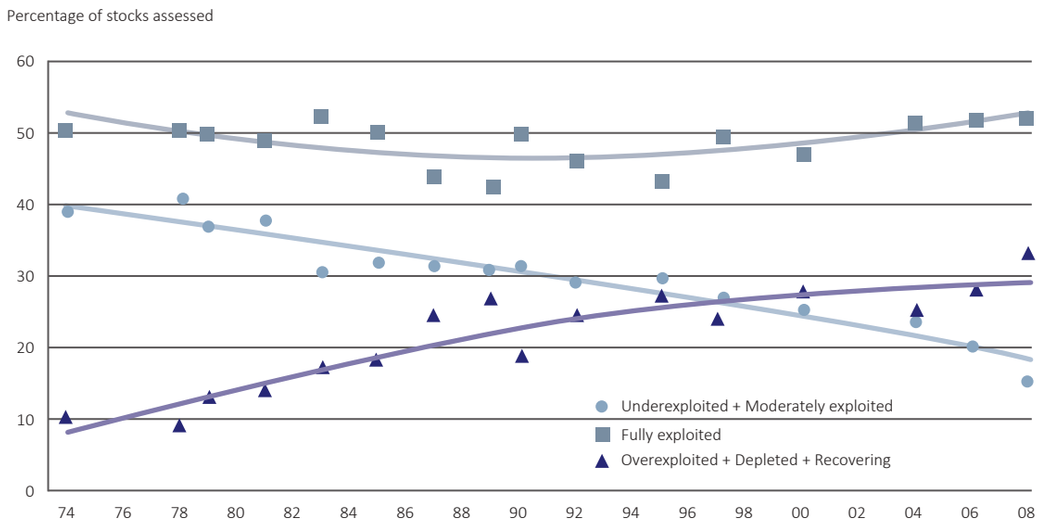
In LAC, 1.29 million people are directly (and 3.9 million indirectly) employed by this sector. Considering the dependency of family holders, about 12 to 15 million people depend from the fishing and aquaculture activities in the region.

Two main producers, Peru and Chile, provide jobs to around 265,000 people in the region. In Peru in 2007, national statistics presented 145,232 direct and indirect workers in this sector, with 58% in the extractive activities, including artisanal fishing, 19.3% in processing activities, 6.2% in aquaculture and 16.6% in support and indirect activities (Alvarado Pereda, 2009). In Chile, the sector generates employment for around 76,000 people in the primary sector, including agricultural workers, artisanal fishermen and industrial ship sailors; and approximately 42,000 people in the secondary sector, which includes industrial operators, 40% of whom are women (FAO, 2004b).

Although capture fisheries continue to provide by far the greater number of jobs in the primary sector, the share of employment in capture fisheries is stagnating or decreasing, and increased opportunities are being provided by aquaculture. Figure 26 shows the level of production by aquaculture, with Chile, Brazil and Mexico as the main producers.

The following countries exemplify the relevance of this sector in their respective economies. Chile is one of the top ten exporters, with 3,931 USD million in 2008 due to aquaculture, while Peru is the world's largest producer of fishmeal, with approximately 1/3 of world´s production (around 3 million tonnes in 2006), with a value of USD 2,632 billion.

Figure 25. Global trends in the state of world marine stocks since 1974
(FAO, 2010d)



Fish stocks (global and LAC production of major species)

The proportion of marine fish stocks estimated to be under-exploited or moderately exploited declined from 40% in the mid-1970s to 15% in 2008, whereas the proportion of over-exploited, depleted or recovering stocks increased from 10% in 1974 to 32% in 2008. Most of the stocks of the top ten species, which accounted for about 30% of the world's marine capture fisheries production in terms of quantity, are fully exploited. Two examples include anchoveta (mainly in Chile and Peru) and jack mackerel (mainly in Chile), which are found in the Southeast Pacific, are considered to be fully exploited (FAO, 2010d). (See Figure 25, the evolution of world marine stocks since 1974.)

Hake is the most important species in Argentina, with total catch reaching 354,000 MT in 2006 (Glitnir, 2007). Sardines and pelagic species (jack mackerel) are the most captured species in Chile and Peru (Glitnir, 2007). While Chile ranks first in the capture of herrings, Peru leads in the capture of hakes.

Aquaculture (production in LAC and major countries)

In 2008 in Latin America, Chile was the leading aquaculture country, with a production of 804,185 tonnes, followed by Brazil at 289,050 tonnes. Both countries produce 72% of the total aquaculture in LAC: 1,525,443 tonnes. (See Figure 26.)

Governance and options for improvement

The entire sector could be improved through two means: 1) fish trade and traceability and 2) governance and management

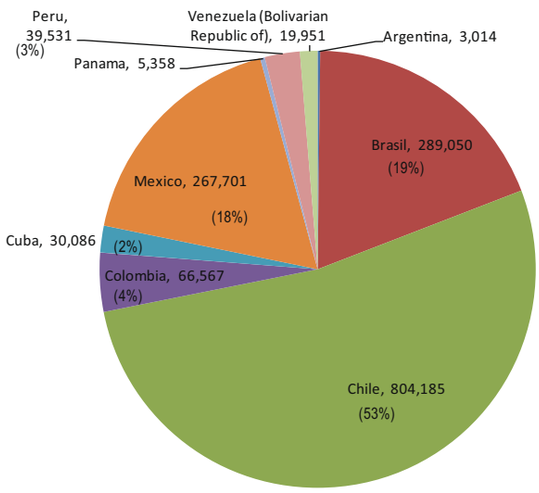
Traceability of fish products is required by importing markets and regional fisheries management organisations that implement documentation systems to verify the origin of the product (i.e. European Union certificates to trace back to the vessels linked to the fishing resources; eco-labelings such as "marine stewardship council" and "friends of the sea"; and certification of products if they come from well-managed fisheries). Some fraudulent practices exist in the fish trade, such as species substitution, which can be intentional and done for tax evasion. More organised and technologically-advanced traceability systems are increasingly being used to mitigate those risks, but it is obvious that there are still system failures and risks of corruption in the supply chain. Traceability is a challenge for developing countries, including those of Latin America that lack the necessary funds to implement them. Several initiatives are emerging to support local producers to move towards traceable products.

In the sector, poverty is caused by insecure fishing rights, poor education services and exclusion from wider development processes. The problem in governance is such that small groups have to be included in the decision-making process in order to see significant efforts to reduce poverty among fishers, which was expressed at the Global Conference on Small-Scale Fishery in Bangkok (2008). Guidelines have been issued by the regional fishery management organisations to help

Figure 26. Aquaculture in LAC (tonnes)

Total in 2007: 1,525,443 tonnes.

(ECLAC, 2009)



implement governance policies and also to help fight poverty and corruption and, thus, promote responsible fisheries that provide economic opportunities while at the same time ensuring the conservation of marine resources. Most limitations on the implementation of the guideline's recommendations are due to a lack of funds. The recommendations include: the promotion of awareness-building programmes to enhance their control capabilities to identify Illegal, Unreported and Unregulated (IUU) catches in the countries; the creation and use of vessel lists; the implementation of catch documentation schemes; the implementation of port state measures; enhanced Monitoring, Control and Surveillance (MCS); increased at-sea vessel inspection; complete fleet observer coverage; and improved exchange of information. It was also proposed to develop criteria and indicators to assess the performance of flag states, and to examine possible actions against vessels that do not meet these criteria and fly the flags of states.

3.2.3 Tourism sector

Introduction: general overview

Over the past decades, tourism has become one of the main economic activities in LAC. In 2006, the Caribbean as well as Central and South America received around 45 million visitors in addition to the 21 million arrivals to Mexico in the same year (UNWTO, 2007). This means that a total of 66 million tourists visited LAC in 2006. The importance of the tourism sector in the region lies in its contribution to the economic development of the touristic areas and the countries in general, in its important job-generating capacity and in its potential to perform as a green industry or sector.

Overall, tourism generated 17.7 million jobs, representing 10.6% of total employment in the region. According to the World Travel and Tourism Council (WTTC), in 2005 tourism in the region generated 6.7 million direct jobs and an estimated 11 million indirect ones (Altés/BID, 2006). Countries where employment from tourism is more representative in terms of percentage employed from the total population are Bahamas (69%), Barbados (55%), Jamaica (32%), Belize (20%) and Dominican Republic (20%). A second group of countries in which the population employed in tourism exceeds 10% of the total number includes Mexico, Costa Rica, Panama, Trinidad and Tobago, and Uruguay. Large countries such as Brazil and Argentina present a small

proportion of the population employed by this sector, but large numbers in absolute terms: 5.8 million jobs in Brazil and 1.3 million in Argentina (Altés/BID, 2006).

LAC is an attractive tourism region due to the specific biodiversity, landscape and cultural characteristics. Addressing the tourism sector and its challenges and opportunities seems fully consistent with the objectives set by the GESRE project. Its ultimate goal embraces the promotion of SRM practices while preserving natural resources with high scarcity risks, reducing environmental impacts and improving resource efficiency and the socio-economic benefits. The tourism sector is directly responsible for the management of one of the six critical resources identified in the region following a series of stakeholder consultations: natural landscapes. A clearer appreciation of the landscape in the normative field became apparent during recent years. For example, the European Landscape Convention (Council of Europe, 2000) defines landscape as a zone or area perceived "by local people or visitors, whose visual features and character are the result of the action of natural and/or cultural factors (...) landscape has an important public interest role in the cultural, ecological, environmental and social fields, and constitutes a resource favorable to economic activity and whose protection, management and planning can contribute to job creation."

Although the definition is from a different region, it is considered a useful contribution for the purposes of this publication and in line with the approach developed for SRM.

As Figure 27 shows, Mexico is the primary tourist destination in Latin America, receiving

Figure 27. Percent of tourists to Latin America and the Caribbean by country
(World Bank, 2007)

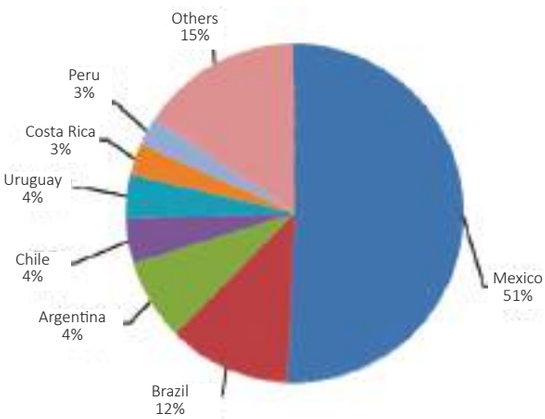
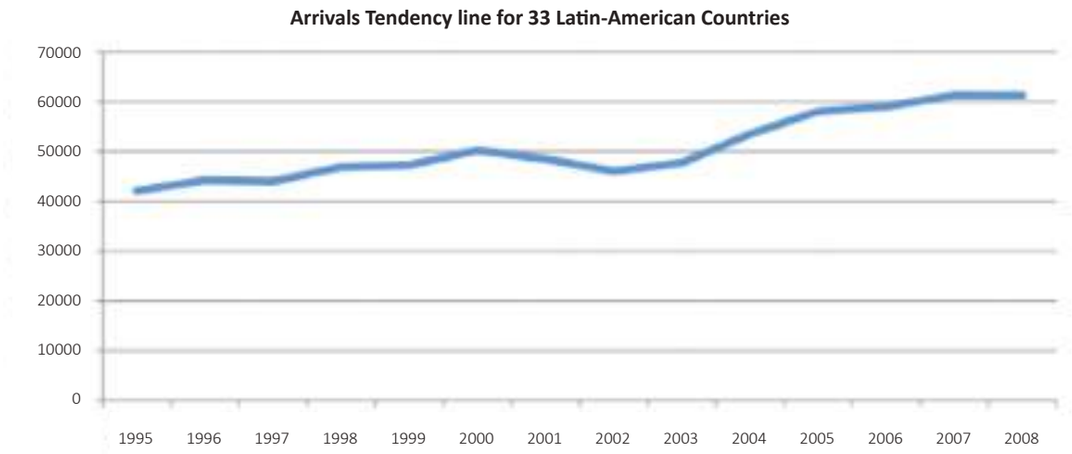


Figure 28. Arrivals tendency line for 33 Latin American and Caribbean countries
(World Tourism Organization (UNWTO)



51% of the total tourist arrivals to the region (World Development Indicator CD, 2007), followed by Brazil with 12%, Argentina with 8%, Chile and Uruguay with 4%. Costa Rica and Peru received each 3% of tourists. As an aggregate, the remaining Latin American countries received 15% of international tourists (Fayissa et al., 2009).

The growth in tourism is shown in Figure 29, based on samples collected in the region.

Tourism in Latin America: highlights

Mexico received 22.6 million visitors in 2008, with an average annual growth rate of 1.02% between 1995 and 2008, and a tourism expenditure in the country (crédit/ INBOUND TOURISM) of 14,647 USD million (UNWTO). Its geographical expanse is an important source of natural and cultural diversity that makes this country one of the most important tourist destinations in the world. However, due to the large size of its economy, this flow of tourism incomes represents only 1.5% of GDP (ECLAC-UNWTO, 2008). Much of the Mexico's tourist attractions are a combination of rich and diverse natural landscapes and biodiversity. Mexico is one of the five most biodiverse countries in the world. With over 200,000 species, Mexico is home to 10-12% of global biodiversity. Additional special cultural and gastronomic features have led this country to become the ninth most popular tourist destination in the world.

As Figure 29 shows, Brazil is the second-largest country in regard to the number of tourist arrivals in the LAC region, with more than five million visitors in 2008 with annual average growth rates of 9.25% between 1995 and 2008. Due to the scale of its economy, income from tourism only represents 0.4% of the national GDP. Brazil is an example of tourism based on natural areas linked to coastal ones or the Amazon region. Argentina presents similar characteristics, with 4.6 million visitors in 2008 (UNWTO) and an average growth rate of 5.86% between 1995 and 2008. The total tourism expenditure in these countries for 2008 is presented in Figure 30.

Small countries and tourism

A different situation is perceived in the Caribbean countries, where tourism revenues are equivalent to 20% and 50% of GDP. These states are mostly small Caribbean islands that rely on the tourism sector as their dominant economic activity. For example, in Anguilla

Figure 29. Tourist arrivals (in thousands)

(UNWTO)

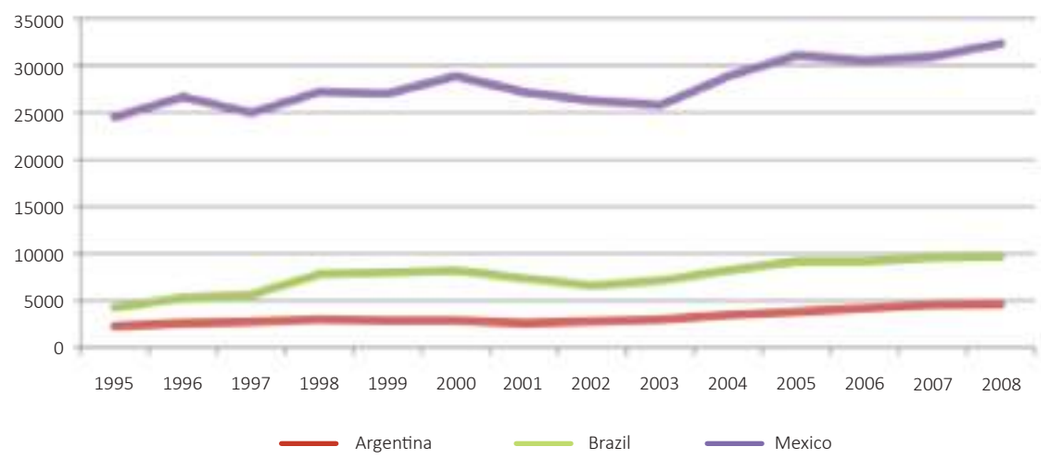
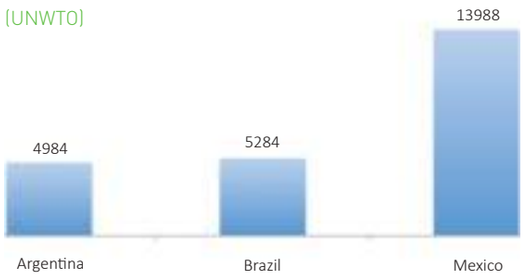


Figure 30. Tourism expenditure in the country (USD Mn)

(UNWTO)



tourist income represented 51% of the GDP in 2005, in Barbados 27% and in Jamaica it was 20%. In Central American countries such as Panama and Costa Rica tourist income represented 9.1% and 8.3% of the GDP in 2005, respectively (ECLAC-UNWTO, 2008).

According to additional statistics, like the World Development Indicator CD for 2007, Costa Rica is the Latin American country with the highest per capita revenue from international tourism, with over USD 350/capita/year. It is followed by Panama with around USD 250/capita/year and Uruguay with over USD 150 /capita/year. Behind them come El Salvador, Chile, Argentina, Guatemala and Honduras, which have international tourist per capita revenue between USD 50 and 100/capita/year. The other countries of the region show marginal revenue of below USD 50/capita/year.

Challenges and directions in the tourism sector in the LAC region

Various authors and studies generally agree on the main critical challenges to meet the growing demand of the tourism sector in a sustainable fashion. The peculiarity of the tourism sector is the fact that the impacts result from a number of actors in the value chain (hotels, restaurants, means of transportation, etc.). These elements causes an intrinsic challenge to defining the life cycle stages of the sector. The same difficulties appear in its quantification through the national accounts, which could provide a better understanding of the socio-economic impacts at national levels. Over-exploited and over-heated tourism areas may cause "destruction of the natural setting by the anarchic, chaotic and careless use of resources, disruption of lifestyles and social structures traditional by providing a standardised and inappropriate culture (...) damages of sites of great fragility exposed may be irreversible" (Lozato-Giotart, 2006).

The main challenges and areas of intervention for policy-makers refer to infrastructure, education and safety, and natural landscape protection.

- While available studies and reports propose infrastructure improvement in any tourism project, including household utilities like water, electricity, telephone and transportation, the GESRE project highlights the need to assess the impacts of the infrastructure to be built in natural areas. This analysis should follow a thorough environmental impact assessment along the life cycle of any tourism project in order to allow for comparison of results of several possible scenarios depending on the level of consideration for completed infrastructure.
- Education is an essential condition for the improvement of employment potential of local people in the tourism activities, and for safeguarding the natural resources they are dealing with. It usually requires knowledge concerning the product itself that is being promoted and that attracts tourists (which are not only cultural, historical, gastronomical or recreational characteristics, but also, and perhaps most notably, natural landscapes). Education also covers general management areas within the sector such as hospitality, transportation and language skills. Any tourism development might take into account the current level of skills and knowledge of the population and the

opportunities to increase its potential. This is relevant in order to design any tourism project without exhausting the existing natural resources and landscape in the community, and to originate substantial socio-economic benefits for the population involved.

- Another aspect is safety, which is usually a required feature in tourism areas. Most tourists are vulnerable to fraudulent or criminal acts. There is a strong correlation between safety levels and per capita GDP, and how it is distributed within the population. Therefore, the socio-economic impacts of any tourism project are essential to identifying the potential risks in this regard.
- The GESRE project highlights a fourth area of attention, which refers to the protection, safeguard and enhancement of natural landscape characteristics and conditions.

To this end, it is worth highlighting the vision and aim of UNEP Global Partnership for Sustainable Tourism,[15] which is in line with the aims of the GESRE project. The Global Partnership seeks to become the leading international tourism partnership uniting the private sector, governments, academia and NGOs to enhance sustainability within the tourism sector. Its aim is to transform the way tourism is done worldwide and will focus on policy, projects, tools and networks for all tourism stakeholders, at all levels, by working on policy frameworks, climate change, environment and biodiversity, poverty alleviation, cultural and natural heritage, private sector sustainability practices, and finance and investment areas.

The Global Partnership bases its work on sustainability principles of the tourism sector endorsed by the GESRE project. The principles refer to the environmental, economic, and socio-cultural aspects of tourism development, and a suitable balance between these three dimensions to guarantee its long-term sustainability. Thus, the Global Partnerships promotes a sustainable tourism that (UNEP, 2011c):

- Makes optimal use of environmental resources maintaining essential ecological processes and helping to conserve natural heritage and biodiversity;
- Respects the socio-cultural authenticity of host communities, conserve their living cultural heritage and traditional values, and contribute to inter-cultural understanding and tolerance; and
- Ensures viable, long-term economic operations providing socio-economic benefits to all stakeholders that are fairly distributed, including stable employment and income-earning opportunities and social services to host communities, and contributing to poverty alleviation.

Sustainable tourism development requires the informed participation of all relevant stakeholders, as well as strong political leadership to ensure wide participation and consensus building. It includes the promotion of practices for SRM, both macro actions related to the harmonisation and development of standard methodologies to produce better national accounts as well as in micro actions dealing with certification processes of the value chain actors (hotels, hostels, operators, etc.).

Achieving sustainable tourism is a continuous process and requires constant monitoring of impacts, introducing the necessary preventive and corrective measures whenever necessary.

Sustainable tourism should also maintain a high level of tourist satisfaction and ensure a meaningful experience for the tourists, raising their awareness about sustainability issues and promoting sustainable tourism practices amongst them.

15 http://www.globalsustainabletourism.com

4. Prioritisation of critical resources in Latin America and the Caribbean: survey results

Given the data limitation of LAC in accurately portraying the current status of resources, the authors sent a questionnaire to experts in the region. Thirty-three surveys were received from 16 countries. An expert survey is designed to gauge their perception of relative socio-economic importance and scarcity of each type of resource. Given the diversity of the metals and minerals category, the authors also used detailed categories to acquire information on the experts' perceived importance of the major metals and minerals in terms of their relative socio-economic and environmental aspects.

The responses from each expert were normalised within each category in order to quantify relative importance between the resources covered. The normalised ratings were then added across experts.

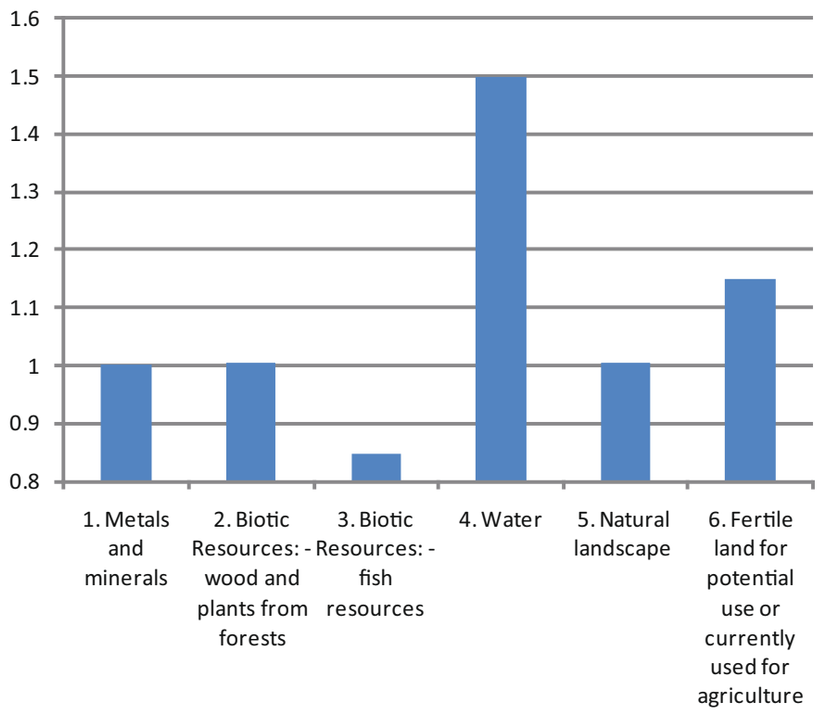
The questionnaire used is shown in Annex 1.

4.1 Socio-economic importance

The survey results showed that experts perceive water resource as the most important resource in LAC based on its socio-economic contribution to the region. Water stands out, followed by fertile land, biotic resources (forests), natural landscapes, metals and minerals, and biotic resources (fishing resources). Figure 31 shows the perceived socio-economic importance of resource categories relative to metals and minerals, which is set to one (1).

Socio-economic importance was surveyed at detailed metals and minerals categories given their diversity. The survey results showed that experts perceive gold and nickel as the most critical metals and minerals from their socio-economic contribution to the region, followed by aluminum, copper, molybdenum and

Figure 31. Expert survey results: perceived, relative socio-economic importance of major resource categories considered in this study (Metals and mineral resources set to 1)



manganese. Figure 32 shows the perceived socio-economic importance of major metals and minerals relative to iron, which is set to one (1). As shown in the figure, perceived importance among metals and minerals exhibit high variability among them.

4.2 Scarcity aspects

According to the results of the survey, experts perceive that provision of biotic resources (forest) is under the greatest risk of discontinuation in the LAC region, followed by water, biotic resources (fishing resources), fertile land, natural landscapes and metals and minerals. Figure 33 shows the perceived scarcity of major resource categories relative to metals and minerals, which is set to one (1).

The detailed survey on metals and mineral categories showed that gold and nickel are perceived to be under risk of supply limitation, followed by copper, manganese and silver. Figure 34 shows perceived scarcity of metals and minerals relative to that of iron, which is set to unity (1). Perceived scarcity varied significantly among different metals and minerals, and corresponds reasonably well with the scarcity indicator based on reserve life values.

4.3 Environmental aspects

According to the results of the survey, experts perceive that provision of gold (mining and refining) causes the largest toxic impacts in the LAC region, followed by those of silver, lead, copper, zinc, arsenic and aluminum. Figure 35 shows the perceived toxic impact caused by metals and minerals relative to that of iron, which is set to one (1).

In terms of the contribution by metals and minerals to climate change impact, aluminum and gold stood out, followed by zinc, copper, silver and nickel. Figure 36 shows the perceived climate change impact by metals and minerals relative to iron, which is set to one

Figure 32. Expert survey results: perceived, relative socio-economic importance of major metals and minerals considered in this study (Iron is set to 1)

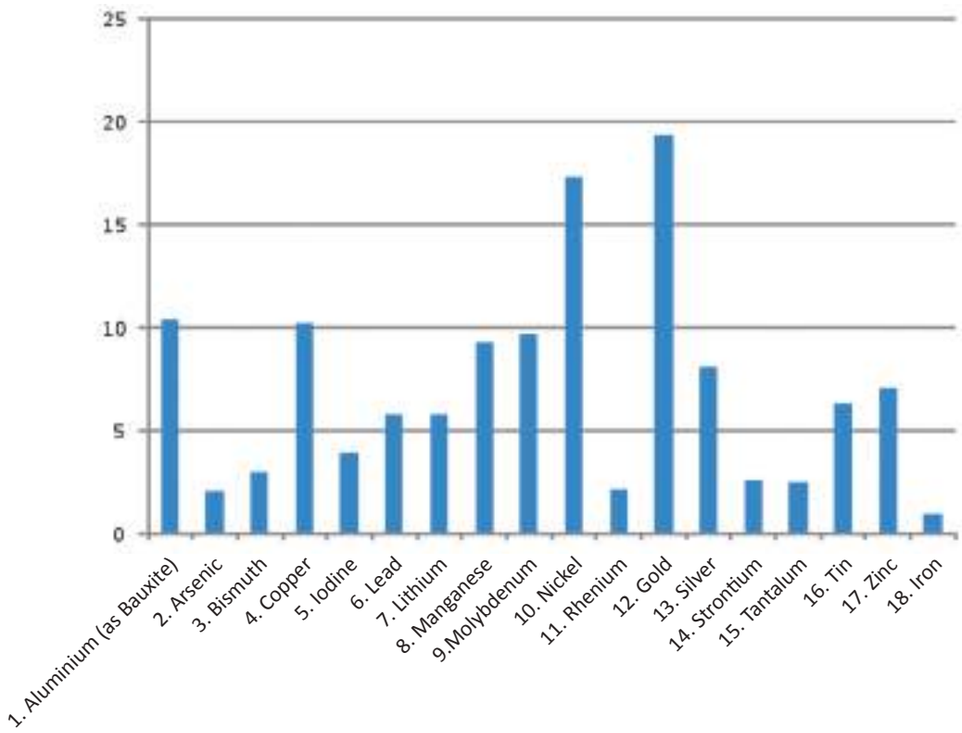


Figure 33. Expert survey results: perceived, relative scarcity of major resource categories considered in this study (Metals and mineral resources set to 1)

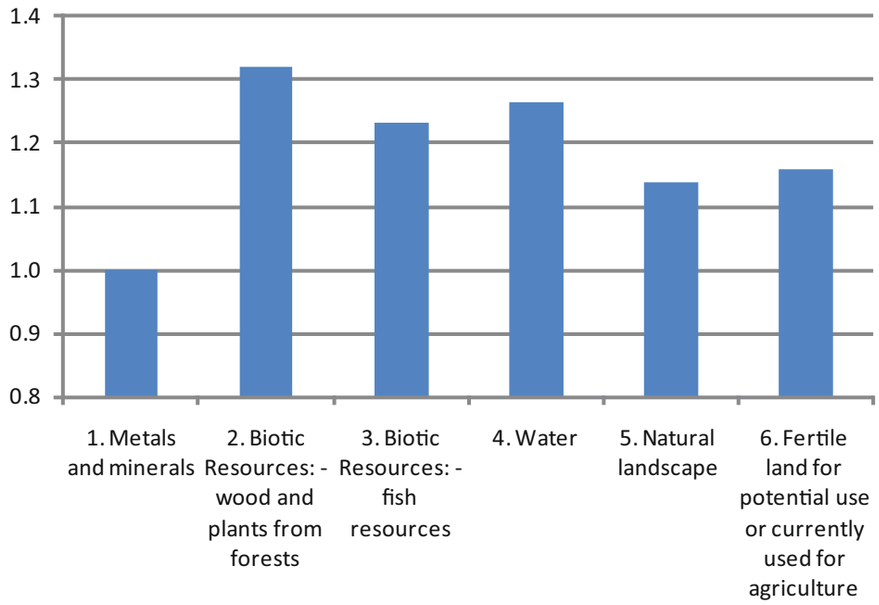
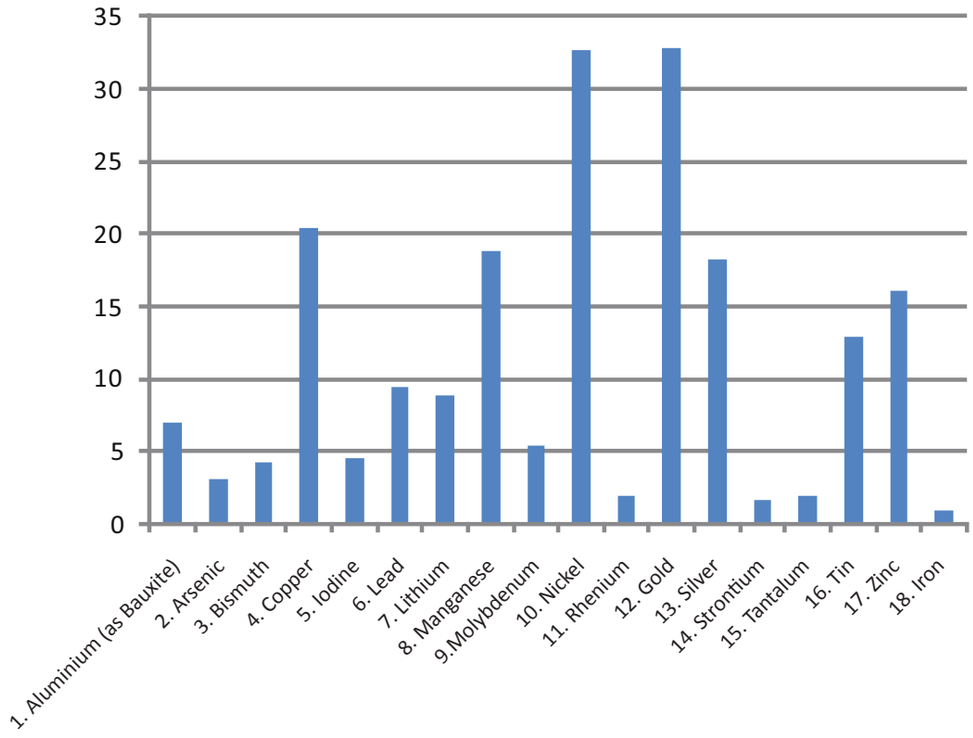


Figure 34. Expert survey results: perceived, relative scarcity of major metals and minerals considered in this study (Iron is set to 1)



(1). In comparison to perception or relative magnitude of toxic impacts (between 3 and 20) (Figure 35), the variation among metals and minerals is relatively moderate (between 0.5 and 3.2) for perceived climate change impact (Figure 36).

4.4 Prioritisation of the most critical resources in the region

The results of the expert survey exhibited significant discrepancies if compared to the available statistics, which are objective indicators of the socio-economic importance of the resources. For example, total tourism receipts of the region, which is an indicator of the value of the region's natural landscapes, amounted to 17 billion USD in 2005, and the total production of metallic resources of the region amounted to 260 billion USD in 2006. According to the perception of the experts, however, the socio-economic importance of natural landscapes outweighed that of metals and minerals. Certainly, using objectively-quantifiable indicators for measuring the value of natural resources has its limitations. For instance, such values do not reflect intrinsic ones associated with natural landscapes. Nevertheless, quantitative data often provide valuable reference points when disparate data are to be compared against each other.

Therefore, the authors used both published data as well as the results of the expert survey in identifying the most critical resources, applying equal weight to them. When published data did not cover a certain criterion that was required for the evaluation, the authors used the survey results instead to compensate the analysis.

Figure 35. Expert survey results: perceived, relative magnitude of toxic impact caused by major metals and minerals considered in this study (Iron is set to 1)

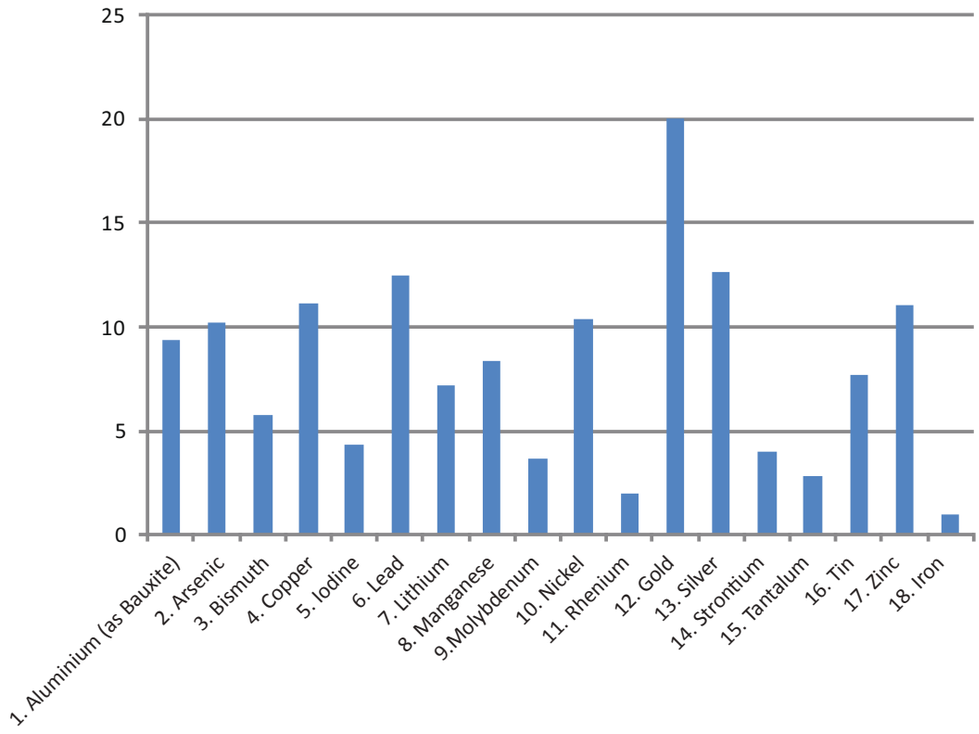


Figure 36. Expert survey results: perceived, relative magnitude of climate change impact caused by major metals and minerals considered in this study (Iron is set to 1)

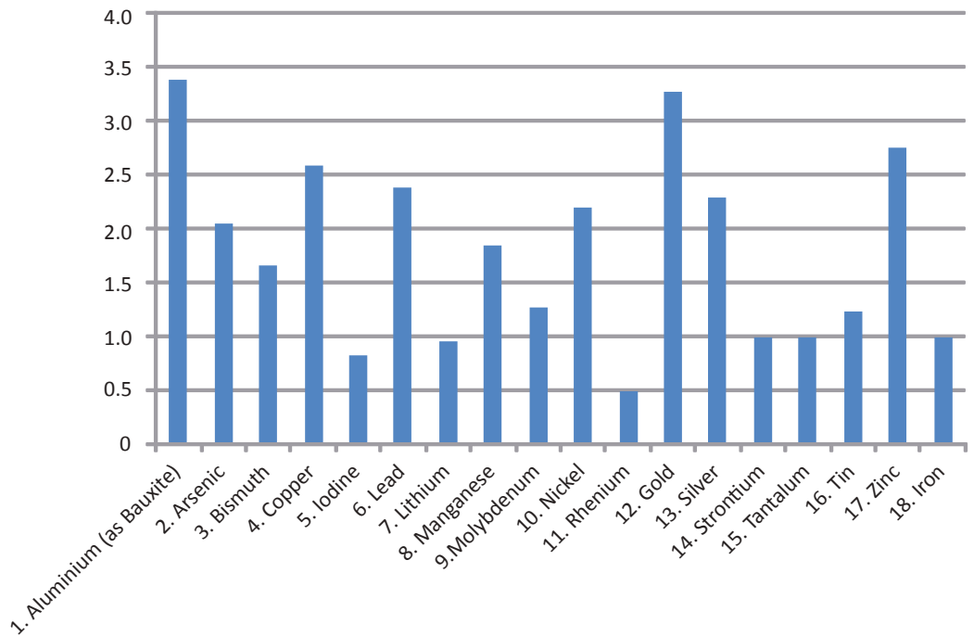


Table 14 shows the summary of the overall evaluation. Criticality of a resource type is defined as a product of socio-economic importance and scarcity (labelled in the table as "Importance X scarcity point"). Both socio-economic importance and scarcity scores are presented relative to metals and minerals, which was set to one (1). The authors used each resource's total production in USD as an indicator of its socio-economic importance. The LAC region's total metal and mineral resource production was estimated to be

Table 14. Overall evaluation of critical resources in Latin America and the Caribbean

	Analysis of published data				Expert survey				Sum
	Socio-economic importance	Scarcity	Importance X Scarcity	Importance X Scarcity normalised by mean (A)	Socio-economic importance	Scarcity	Importance X Scarcity	Importance X Scarcity normalised by mean (B)	A + B
1. Metals and minerals	1.00	1.00	1.00	1.98	1.00	1.00	1.00	0.78	2.75
2. Biotic resources: - wood and plants from forests	0.04	1.32	0.05	0.11	1.00	1.32	1.33	1.03	1.14
3. Biotic resources: - fish resources	0.08	1.23	0.10	0.20	0.85	1.23	1.04	0.81	1.01
4. Water	0.74	1.27	0.94	1.86	1.50	1.27	1.90	1.47	3.33
5. Natural landscapes	0.07	1.14	0.08	0.16	1.01	1.14	1.14	0.89	1.05
6. Fertile land for potential use or currently used for agriculture	0.74	1.16	0.86	1.70	1.15	1.16	1.33	1.03	2.73

Table 15. Overall evaluation of critical resources in Latin America and the Caribbean using equal (50:50) allocation of agricultural production into water and fertile soil

	Analysis of published data				Expert survey				Sum
	Socio-economic importance	Scarcity	Importance X Scarcity	Importance X Scarcity normalised by mean (A)	Socio-economic importance	Scarcity	Importance X Scarcity	Importance X Scarcity normalised by mean (B)	A + B
1. Metals and minerals	1.00	1.00	1.00	2.82	1.00	1.00	1.00	0.78	3.59
2. Biotic resources: - wood and plants from forests	0.04	1.32	0.05	0.15	1.00	1.32	1.33	1.03	1.18
3. Biotic resources: - fish resources	0.08	1.23	0.10	0.28	0.85	1.23	1.04	0.81	1.08
4. Water	0.37	1.27	0.47	1.32	1.50	1.27	1.90	1.47	2.80
5. Natural landscapes	0.07	1.14	0.08	0.22	1.01	1.14	1.14	0.88	1.11
6. Fertile land for potential use or currently used for agriculture	0.37	1.16	0.43	1.21	1.15	1.16	1.33	1.03	2.24

Note: All scores except for those in the "Importance X Scarcity normalised by mean" and "Sum" columns are relative to metals and minerals, which is set to 1.

Table 16. Overall evaluation of critical metals and minerals in Latin America and the Caribbean

	Analysis of published data				Expert survey				Sum
	Socio-economic importance	Scarcity	Importance X Scarcity	Importance X Scarcity normalised by mean (A)	Socio-economic importance	Scarcity	Importance X Scarcity	Importance X Scarcity normalised by mean (B)	A + B
1.Aluminum (as Bauxite)	7.80	0.23	1.76	0.95	10.4	7.0	73	0.59	1.55
2.Arsenic	0.00	0.20	0.00	0.00	2.1	3.0	6	0.05	0.05
3.Bismuth	0.00	1.80	0.00	0.00	3.0	4.3	13	0.11	0.11
4.Copper	2.50	3.56	8.91	4.82	10.3	20.4	209	1.70	6.51
5.Iodine	0.02	0.20	0.00	0.00	3.9	4.6	18	0.15	0.15
6.Lead	0.05	5.25	0.25	0.13	5.9	9.5	55	0.45	0.58
7.Lithium	0.01	0.42	0.01	0.00	5.8	8.9	52	0.42	0.42
8.Manganese	0.04	0.46	0.02	0.01	9.3	18.9	176	1.43	1.44
9.Molybdenum	0.19	2.06	0.39	0.21	9.7	5.4	52	0.43	0.63
10.Nickel	0.42	2.42	1.02	0.55	17.4	32.7	569	4.62	5.17
11.Rhenium	0.00	0.98	0.00	0.00	2.2	2.0	4	0.03	0.04
12.Gold	0.25	6.08	1.49	0.81	19.4	32.8	636	5.16	5.97
13.Silver	0.16	7.49	1.20	0.65	8.1	18.3	148	1.20	1.84
14.Strontium	0.00	10.67	0.01	0.00	2.6	1.7	4	0.04	0.04
15.Tantalum	0.00	1.71	0.00	0.00	2.5	1.9	5	0.04	0.04
16.Tin	2.89	5.43	15.68	8.47	6.3	13.0	82	0.66	9.14
17.Zinc	0.33	4.76	1.57	0.85	7.1	16.1	115	0.93	1.78
18.Iron	1.00	1.00	1.00	0.54	1.0	1.0	1	0.01	0.55

Note: All scores except for those in the "Importance X Scarcity normalised by mean" and "Sum" columns are relative to iron, which is set to 1.

around 260 billion USD in 2006. The region's biotic resource production (wood and plants from forests) was estimated to be less than 10 billion USD for the same period. According to the FAO (2010d), the region's fishery products were estimated to be less than 25 billion USD in 2008. For the economic value of natural landscapes, the authors used as an indicator the tourism revenue of 2005 — 17 billion USD. For both fertile soil and water, the authors used the total agricultural product of the region in 2008, which is 178 billion USD. Given that agricultural production depends on both land and water, the authors allocated the 178 billion USD equally to the two categories. This was a subjective decision, which may lead to a double counting. To check the sensitivity of this decision, the authors also calculated the case of equal allocation over the two categories (50:50), which is shown in Table 15. Economic production of each resource was then normalised relative to that of metals and minerals. The authors used scarcity scores from the survey results. The last column of Table 15 (Sum) shows the overall criticality score, where published data and the results of the expert survey were combined. When adding the results on the column "Importance X Scarcity" from the analysis of published data and from the expert survey, the difference in range of each result can create bias in the overall results. In order to remove such bias, each column of "Importance X scarcity" was normalised again by its mean value so that the sum is not dominated by unwanted weighting between the analysis of published data and the results of the expert survey.

As a result of these procedures, water was identified as the most critical resource, followed by metals and minerals, and then fertile land (Table 15). When the data for total agricultural production (178 billion USD) was shared equally to water and fertile land, metals and minerals came first, followed by water and fertile land (Table 15).

A similar table was built to present the results of the detailed survey on metals and mineral resources (Table 17). In this table, socio-economic importance was measured by annual monetary production from each ore, and scarcity was measured by a reciprocal of reserve life (using reserve base data). The analysis of published data was then juxtaposed with the expert survey results, and the two were added in the last column of Table 16. Note also that all the values in each column were normalised by the value for iron, which was set to one. In order to adjust the range differences of values between the analysis of published data and the expert survey results, the values of the column "Importance X Scarcity" were normalised again by the mean of each column before adding the two in the last column.

The results show that tin is the most critical metal, according to the method and data used in this analysis, followed by copper, gold, and nickel (see Table 16).

For metals and minerals, the perceived toxic and climate change impacts were analysed in addition to socio-economic importance and scarcity (see Table 17). Again, relative toxicity and climate change impacts were normalised by each column's mean value and then added together. The results show gold as the metal with the heaviest environmental impact, followed by aluminum, lead, silver, zinc, and copper.

Overall, water, metals and minerals and fertile soil were identified as the most critical resources in LAC. Among metals and minerals, tin, copper, gold and nickel were identified as critical metals in term of socio-economic importance and from a scarcity point of view. In regard to the environment gold, aluminum, lead, silver, zinc and copper were identified as critical metals based on the toxic and climate change impact.

In conclusion, it remains uncertain how these perceptions are shared by other stakeholders and which have the potential to influence politicies, promote methodologies, approaches or programmes. Since surveyed

experts were academics, governmental officials and practitioners working on the field, an important question arises in terms of the differences of awareness this group can have in relation to the general public, regarding the access to information. It seems evident that the former would be generally better informed than the latter. How this information asymmetry can produce differences on the perception of the importance of natural resources is a subject to be researched. For example, their understanding about "resource scarcity" did not seem to be harmonised and parties consulted limited their replies to their local contexts and not to the regional scenario. The sample of interviewed and consulted stakeholders would need to be expanded in future research.

Table 17. Overall evaluation of critical metals and minerals in Latin America and the Caribbean

	Expert survey				
	Toxic impact	Normalised toxic impact (A)	Climate change impact	Normalised climate change impact (B)	A + B
1.Aluminum (as Bauxite)	9.3	1.2	3.4	1.9	3.1
2.Arsenic	10.2	1.3	2.0	1.1	2.4
3.Bismuth	5.8	0.7	1.7	0.9	1.6
4.Copper	11.2	1.4	2.6	1.4	2.8
5.Iodine	4.3	0.5	0.8	0.5	1.0
6.Lead	12.5	1.6	2.4	1.3	2.9
7.Lithium	7.2	0.9	1.0	0.5	1.4
8.Manganese	8.3	1.0	1.8	1.0	2.1
9.Molybdenum	3.7	0.5	1.3	0.7	1.2
10.Nickel	10.4	1.3	2.2	1.2	2.5
11.Rhenium	2.0	0.2	0.5	0.3	0.5
12.Gold	20.0	2.5	3.3	1.8	4.3
13.Silver	12.7	1.6	2.3	1.3	2.9
14.Strontium	4.0	0.5	1.0	0.6	1.1
15.Tantalum	2.8	0.4	1.0	0.6	0.9
16.Tin	7.7	1.0	1.2	0.7	1.6
17.Zinc	11.1	1.4	2.8	1.5	2.9
18.Iron	1.0	0.1	1.0	0.6	0.7

Note: All scores except for those in the "Importance X Scarcity normalised by mean" and "Sum" columns are relative to iron, which is set to 1

5. Best practices

5.1 Water management activities

Protection of micro-watersheds in Michino (Southeast Haiti)

Within a century, the native tree cover has shrunk from 60% to just over 1% of the territory due to deforestation. This is due to a history of logging (for the sugar industry) and of energy demand by the poor, especially for burning wood and making charcoal for their domestic needs. This has also affected the few remaining coastal mangroves. Technical studies have estimated that 70% of the country's energy consumption comes from wood sources. However, there is a growing presence of forestry products, mainly mangoes and avocadoes for export.

In any case, the devastation of the forest cover has been dramatic, involving the upper part of the basins, in a mountainous country with steep slopes. This has caused degradation of waterways, with the result that the water drains downstream without encountering obstacles, dragging not only soils but also silting of river beds and pushing the rock material to agricultural valleys and villages. The result is that the channels are filled with limestone; consequently, the rainwater overflows and destroys the banks and everything around it, in particular crops, housing and infrastructure.

This situation occurs in the seven major basins in the country, where important crop areas are irrigated. Haiti is thus unable to form a barely sustainable development policy with such a degraded environmental situation. It's a dramatically vicious cycle. In any case, broad valleys for agriculture (Artibonite, Plaine des Cayes, Plateau Central) have the capacity to meet food requirements, but with low productivity, which is affected by the increasingly serious processes of erosion, deforestation, desertification, water runoff and siltation of rivers.

Micro-watersheds are the basis of support for poor farmers in the countryside, not only for their economic livelihood, but also for domestic uses (drinking, washing, treating waste and recreation), within the context of a notable lack of health infrastructure. The processes of deforestation have severely damaged these micro-watersheds, often as a result of the degradation of large rivers. As a result, there is a need to implement projects such as the one documented, which is one of hundreds that are being developed in Haiti.

The objective of this activity is the restoration of the micro-watersheds of Fond Melon in the river Gosseline, damaged due to deforestation and flooding. The goal is to achieve rational and sustainable use of soils. This means support for the vulnerable economies of the producers who make use of these micro-watersheds and whose annual incomes do not exceed 392 euros[16].

With respect to gender issues in Haiti, 52.7% of the population is female and, although there are no legal restrictions on a woman's right to own and manage land, in practice it is very difficult for them to do so, since few have the money to buy it. This results in many women living in unregistered consensual unions without the legal right to claim ownership of property accumulated jointly while the couple was together, in the event of separation, or her partner's death (CEDAW, 2009). As of 2008, the CEDAW report notes that about 10% of women in rural areas work on their own farms. Many female agricultural workers are not paid for their labour, as it is seen as "auxiliary" labour supplementing that performed by the male head of the family (CEDAW, 2009).

There are, however, significant limitations to the development of such projects, including:

- Structural uncertainty
- Shortage of capital
- Impoverishment of farms
- Lack of incentives for the establishment of forested areas
- Uncontrolled livestock
- Weak state presence in rural areas

16 UNEP exchange rate 1 USD = 0.769 EUR

- Limited role of women, as few have the financial resources to own land

The action plan of this activity includes:

- Raising awareness in communities about the causes and consequences of degradation of micro-watersheds.
- Negotiation with communities to ensure their voluntary participation in the project.
- Selection of entrepreneurs who are willing to provide reforestation plots.
- Development of a memorandum of understanding to be signed between the public, international co-operation agencies and the beneficiaries of the reforestation plots.

The achieved and expected results are as follows:

- 630 farmers have received the first delivery of this grant for the creation of the reforestation plots.
- Creation of reforestation plots of over 65 hectares of degraded land with forest trees (cedars, oaks, acajús and eucalyptus) and fruit trees (avocados, mangoes and citrus).
- The grant received per year per hectare of reforested plots is larger (7.1 Haitian Gourdes (HTG)) than the 4.780 HTG taken on average of crops in greenhouses installed on degraded land.
- Source of wealth creation for families including women: the expected values per hectare in 10 years are estimated at 635,196 HTG. If an assertive programme for women empowerment is introduced, the overall social benefits will substantially increase.
- Over a period of 10 years, the 630 beneficiaries of the programme, will receive a total grant of 4,615,000 HTG, and from the sale of trees they can generate an income of 41,285,014 HTG.

Lessons learnt from the past experiences are described thusly:

- Need to strengthen the involvement of farmers in defining the means of constituting the reforestation plots.
- Need to negotiate with those responsible for income-generating activities that must be implemented.
- Need for involvement of representatives of the Haitian state in the entire process until the signing of the protocol in order to ensure the sustainability and perpetuation of reforestation plots.
- Need to strengthen the willingness of farmers to support the creation of the reforestation plots through clear negotiation as well as the existence of subsidies and support for income-generating activities to allow them to meet their short-term requirements.

Sources: Alezi (2011), ECLAC (2011a), Agronomes et Vétérinaires sans Frontières (2006)

Network for Co-operation in Integrated Water Resource Management for Sustainable Development in Latin America and the Caribbean

The objective of the Network is to document progress and promote good practice developed in Latin America and the Caribbean for the sustainable management of water resources from a public policy perspective. Courses and lectures are also conducted within the framework of the Network to discuss the challenges of the sector. A newsletter is circulated on the Internet to inform members.

Good practice 1: On 15 October 2010, the Water Code of the Province of La Pampa, Argentina was adopted by way of Law No. 2581. According to this code, water policy formulated by the provincial government and the activities developed in its pursuance are the master instruments of the integrated management of water resources and will be based on the following principles:

- Unified management, comprehensive treatment, water economy, decentralisation, functionality and user participation that considers gender perspectives.

- Unit of watershed and water region in its various manifestations: basin, hydraulic and hydrological.
- Compatibility of public water management with management and planning, the use and development of provincial natural resources, conservation and environmental protection, and restoration of nature.
- Consideration of joint use, alternative or unique surface water, groundwater and atmospheric water as appropriate to the circumstances of location, type and nature.
- Treat water as a scarce resource, valuable and vital to the socio-economic and cultural development of the province and the general welfare of its inhabitants.
- Priority for drinking water use that will enhance the living conditions of women and children at home.
- Periodic determination of the value of the royalty to be paid to the provincial state depending on the nature of different uses, based on the consideration that water is a scarce resource and therefore valuable and vital to the socio-economic-cultural development of the province and the general welfare of its inhabitants.
- Ensure the equitable, rational, efficient and multiple water resource use to achieve integrated and sustainable management of these and associated resources.
- To safeguard and preserve the ecological and environmental balance as soon as their involvement may depend on the use of water.
- Plan and execute the necessary actions to ensure optimal knowledge, conservation, regulation, preservation and use of them.
- Encourage citizen participation to achieve effective governance of the water sector by also taking into account gender aspects when designing citizen participation schemes.
- Promote education, awareness and training as a fundamental tool for the achievement of integrated and participatory management of water resources by taking into consideration the diverse groups in the communities and a gender perspective.

Good practice 2: National Water Resources Policy of El Salvador. The process of drafting the National Water Resources Policy was led by the Ministry of Environment and Natural Resources (MARN). This policy will be the framework for the definition of instruments that will address and resolve the current water problems in its different uses. These instruments include the National Strategy and the General Water Law, and the Policy of the Subsector Water Supply and Sanitation, its strategy, national plan and the Law of Water and Sanitation. The National Water Resources Policy is based on equality, precautionary principle, responsibility, legal safeguards, efficient use, polluter pays principle, public participation and a water conservation culture, the economic and social value of water, and the public interest.

Its overall objective is to ensure the protection and efficient use of water through the institutionalisation of the approach of integrated water resources management. It pursues the following objectives:

- Strengthen state institutions for integrated water resources management.
- To make possible the integrated management of water resources with river basins as the planning unit that would enable coordination of different activities and uses.
- Improve the knowledge of the state and evolution of water resources by strengthening the institutional capacity to generate timely and accessible information for decision-making.
- Incorporate integrated management of water resources in the sector plans, optimising the hydraulic structures that enable use for multiple purposes.
- Incorporate risk management of water resource, considering the effects of climate change by protecting areas vulnerable to natural and anthropogenic threats.
- Preserve the quality of water resources

to protect the health of the population (and thus improving the living conditions of children and women who register the lowest level of income) and natural ecosystems.

Good practice 3: Water Resources Sector Fund (CTHidro) in Brazil. The implementation of integrated management of water resources requires several actions, professionals with appropriate training, extensive research and, in particular, the development of new technologies for water use. In Brazil, in order to address some of these demands, CTHidro was created in 2000 as part of the Ministry of Science and Technology. This fund seeks to train human resources and process development and equipment to optimise water use through actions in areas of water resources management, water conservation in cities, sustainability of ecosystems and integrated and efficient use of water. CT-Hidro operates with funding from electricity sector transfers done by flooding of lands for hydroelectric purposes and payment for the use of water resources. These resources are used to support graduate studies and scientific and technological development. The process is led by a management committee comprising representatives of the Ministries of Science and Technology, Environment and Energy as well as the National Water Agency (ANA), academia and the private sector.

Good practice 4: In Nicaragua, the Special Law of Committees of Water and Sanitation (No 722), of 14 June 2010 aims to establish rules for the organisation, constitution, legalisation and functioning of the Committees on Water and Sanitation (CAPS), which are defined as non-profit organizations with voluntary and democratically–elected members who are responsible for ensuring, with the support of all users, the management, operation and maintenance of drinking water and sanitation in the community, who also held accountable for their management and activities.

Source: ECLAC (2011b)

5.2 Forest and/or agriculture activities

Natural cosmetic producer: NATURA (Brazil)

NATURA is the largest natural cosmetic producer in Latin America, with its beginnings dating back to the 1970s. Its commitment to conservation and sustainable management of natural resources is embedded in its business identity. Their environmental management practices consider carbon-neutral operations, promotion of refills to reduce packaging, use of recycled and recyclable materials, and innovation in sustainable extraction (NATURA, 2011).

The following case study is based on the document "Study and development of a sustainable production basis for the supply of plant oils from the Amazon region" (Castellani et al., 2011).

With the launch of one of their "Ekos" product line in 2000, NATURA consolidated its commitment to the sustainable management of Brazilian biodiversity resources, including the share of benefits obtained from innovative products whose development was due to traditional knowledge and genetic resources. From that point on, sustainable practices were formally incorporated into the processes of research projects.

An important milestone is represented by the study of oilseed plants from the Amazon region to ensure a sustainable supply chain for oils and butters intended for cosmetic use. In 2006, an industrial plant was built in the state of Pará and an extraction unit in Saboaria for plant oils in 2007.

To accomplish a sustainable supply chain of Amazonian oils, complex technological, socio-economic and cultural diversity challenges were involved.

The first step was to map oilseed plant species with potential for industrial use and with occurrence in the study area around Belem in Pará. This demanding undertaking, which

was carried out from 2005 to 2007, collected relevant species data, with a characterisation of plant cover in 27 cities and a detailed forestry inventory of 278 areas in 17 selected cities. Moreover, it delivered a map of areas with the potential for sustainable management of oilseed plants, including the identification of co-operatives and associations in the region, and the harvesting season for each oilseed species. These data assisted in determining production potentials, as well as defining proposals targeting sustainable management, while allowing biodiversity conservation in harmony with local culture and practices. Other parameters such as oil yield and post-harvest data, production coefficients, harvesting, processing, drying and good storage practices were useful in developing the supply strategy for the Saboaria unit.

The comprehensive research work was possible with support from research and extension institutions, NGOs, civil society organisations such as Unions, and private suppliers, including rural ones and companies dealing with extraction machinery and manufacturers. At last count, nine rural producers were identified to set up the supply chain for biodiversity products. This case study sheds light on the various benefits arising from the sustainable supply chain of oilseed plants. NATURA has gained valuable knowledge about Amazonian oilseed species and the development of machinery and equipment that produce new oils and butters on an industrial scale. In addition, valuing the forest and non-timber products raised awareness of the importance of biodiversity conservation and cultural diversity. Furthermore, NATURA favours benefit sharing and fosters the social inclusion of producers (including women producers) that embrace sustainable production practices while supporting their socio-economic conditions, since the supply of oilseeds is a new source of income for communities. Finally, the integration of an expertise network with capacity to embark on research and development of new ingredients, including products and processes improvement, is profitable for the economy and proves effective for the adoption of sustainable management practices thanks to the acknowledgement of the invaluable biodiversity resources of Brazil.

Maya Nut Institute

The Maya Nut Institute is a North American charity with offices in several latin american countries founded in 2001[17]. Its mission is to "find balance between people, food and forests" by teaching rural communities about the value of Maya nut for food, fodder, ecosystem services and income.

They maintain an "open access" policy with their documents, materials, photos, manuals and other information. This is in keeping with their goal of sharing any and all knowledge about Maya nut with as many people as possible as quickly as possible.

The organisation works as a horizontal hierarchy, with individual country programmes having as much autonomy as possible regarding programme planning, partners, administration, spending and staff. The goal for each country staff, participants and/or partners is eventually to spin off and to form an organisation that can continue the work the founders started together. This is the best way to ensure programme continuity and empowers them with a powerful tool to solve their own problems.

So far it has been successful:

- Guatemalans have formed two national organisations, one NGO, (National Maya Nut Association) and one Association, CODEMUR (Committee for Rural Women's Development);
- El Salvador is in the process of forming a national coperative. These are major milestones for Maya Nut Institute and serve as a legacy for the programme;
- A Nicaraguan partner organisation, Masangni, has adopted the Healthy Kids, Healthy Forests Maya nut school lunch programme as a part of its programme

17 Maya Nut Institute http://mayanutinstitute.org/

strategy to meet its conservation and rural development goals in Miskito indigenous communities.

This activity has an impact on women empowerment. Since it started work in 2001, more than 400 rural and indigenous women have formed 20 different autonomous businesses to produce and market Maya nut products and to conduct workshops for other women.

Women are the primary beneficiaries of the programmes. They are a critical link between the family and the environment, and they are responsible for the health of the family.

These women enjoy improved incomes and an opportunity to contribute to the family economy. More important, however, is the impact on their self-esteem and status in the family and the community. These are the changes that the Maya Nut Institute seeks. The empowerment of women means that lasting change is happening and that these women can now take charge of their lives and work productively and effectively to improve the wellbeing, health and incomes of their families.

Women business owners and their families are much more concerned with rainforest conservation and reforestation of available land with Maya nut. In late 2010, they began to form an Alternative Trade Organisation (ATO) to protect the rights of Maya nut producers and the forests that sustain them. The Maya Nut Institute provides a new paradigm of community-based conservation that focuses on women as the caretakers of the family and the environment. The programme is unique because it addresses key factors for sustainable livelihoods in one programme: Sociocultural, Environmental and Economic.

The methodology is based on the principles of active learning and suitable technology. Through one-day workshops in rural communities, women are trained about the recipes for and the nutrition, processing and marketing of the Maya nut. In these workshops, women gather to cook together and exchange stories and experiences about the Maya nut, and listen to short presentations on its health content, including how it compares to common food sources such as beans and corn. Some of the delicious foods they learn to prepare with the Maya nut in these workshops include tamales, tortillas, salad, cakes, cookies, tortas, ice cream and beverages. This knowledge of the Maya nut as a free and nutritious food source motivates them to conserve rainforests, plant Maya nut trees and organise to produce and market Maya nut products so that they can earn income.

Children also benefit directly from the programmes. The institute works in some of the most acutely malnourished communities in the world, where developmental delays are distressingly common. It works to educate parents about the nutritional value of Maya nut so they can include it in the family diet. It also works in schools and are implementing the Healthy Kids, Healthy Forests, Maya nut school lunch programme in several schools in Guatemala, El Salvador, Nicaragua, Honduras and Mexico.

The Maya nut programme has demonstrated positive and lasting impacts on rainforest conservation, reforestation, health and nutrition, food security, women's incomes, self-esteem and status, maternal health and infant birth weights.

Since 2002 the Institute has trained over 15000 women from 900 communities about Maya nut for food and income.

5.3 Mining sector

Green Gold (Colombia)

The Oro Verde (Green Gold)[18] programme began in Chocó, an important bio-region of Colombia in 1999 (Oro Verde, 2011). Mining families of this region have been living from artisanal mining activities and have inherited this knowledge, including sustainable techniques for the extraction of gold and platinum, from their ancestors. The programme is grounded on the alliance between Amigos del Chocó

18 http://www.greengold-oroverde.org

Foundation (AMICHOCO), the community council of Tadó (ASOCASAN), the Community Council of Condoto (CONDOMACOIRO) and Las Mojarras Foundation (FUNDAMOJARRAS), with the support of the IIAP (Environmental Research Institute of the Pacific (Oro Verde, s.f.). These organisations perform supervision, guidance and coordination of activities at the community level, thus reducing illegal resource extraction and use. The organisations also get involved with capacity-building through technical assistance to miner groups that have obtained the Fair Trade certification of artisanal gold. These organisations are also responsible for ensuring compliance with certification criteria.

The green mining techniques do not employ chemicals such as cyanide or mercury. Similarily, the array of techniques utilised by miners have specific methods that take advantage of the abundance of water during the rainy season, explaining Oro Verde's reduced water footprint.

The families own the land collectively and sell their products to the world´s market, whose buyers pay a premium, which is reinvested in local development projects. Investment decisions for these projects are taken collectively by the Chocó mining families, underscoring the widespread community engagement. Women participation in decision-making is of particular note. The fair price paid for sustainable gold provides a decent living to the mining communities, who are incentivised to continue extracting their resources in a sustainable fashion. The economic aspect can be an important driver to encourage the replication of this experience in other mineral and metal producing countries.

As awareness levels of sustainability in the mining sector grow, consumers and retailers demand more information about the origin of their precious metals, and Oro Verde has been a pioneer in developing the first model for a metal supply chain that enables the tracing of metals sold by the Oro Verde mining community.

5.4 Fisheries

Artisanal fisheries co-management system of governance in Latin American countries[19] (Chile)

Introduction

In concordance with the objectives of the GESRE programme, an interesting approach has gained strength in recent decades at the continental level regarding the management and governance of natural resources: participatory governance systems, or co-management systems. The fisheries sector, particularly the craft sector, is one of the main beneficiaries of the application of different formulas of a co-management system. The fishing sector is important in relation to its employment-generating capacity. More than 95% of fishers are males; however, incomes generated by their activities have a positive impact on their families. It is estimated that artisanal or small scale fisheries in Latin America and the Caribbean involve more than two million fishermen with a level of increased production of 2.5 million tonnes, and production values of approximately USD three billion every year[20]. Some studies refer to an over-exploitation syndrome, especially in industrial fisheries. Almost half of fishery resources subject to industrial fisheries in the world are being taken to the limit of their capacity and the remaining quarter are over-exploited or already collapsed (FAO, 2009). As is the case with industrial fisheries, a growing number of Latin American artisanal fisheries are fully exploited or over-exploited (Castilla and Defeo, 2001; Carranza et al., 2009).

The co-management system: an interesting governance tool

One solution to the problems of over-exploitation of fisheries resources has been participatory governance. The co-management of artisanal fisheries has been advocated

19 Based on Defeo O., Castilla J., Castrejón M. 2009. Pesquerías artesanales de invertebrados en América Latina: paradigmas emergentes de manejo y gobernanza. Foro Iberoam. Rec. Mar. Acui. II: 89-117

20 http://www.oldepesca.com/node/89

as a governance structure that provides potential solutions to reverse the trend of over-exploitation and inadequate management of artisanal fisheries. In Latin America, there are examples of co-management of artisanal fisheries. Each co-management implementation is different from the other, although each one sets its own rules due to the peculiarities of each area, the resource itself, stakeholders, etc. The co-management is an institutional and formalised management by which effective co-operation is established between the government and fishing communities, who share the rights in the exercise of resource management. Through this strategy the fishermen are included in decision-making processes and in the control and monitoring of fishery resources (Wilson and Jacobsen, 2009), a co-responsibility that is institutionalised in the respective legal framework (Armitage et al., 2007). Indeed, there is no one simple definition of co-management, but rather a continuum of possible co-management arrangements that differ according to the degree of power allocated to the communities in their relationship with the government (Armitage et al., 2007).

Co-management systems: successful cases in LAC

Chile: el loco (Concholepas concholepas)

The well-known Chilean loco (Concholepas concholepas), also called "Chilean abalone", is a marine gastropod mollusk used in Chilean cuisine and marketed worldwide as a delicacy. Its economic value and ecological importance as a top predator have made the loco the most studied marine invertebrate species in Chile. Due to over-fishing, the harvesting of this species has been limited by Chilean law since 1989.

In this context, a co-operative co-management system has been established in which the responsibility for the design and implementation of management plans correspond to pre-determined areas as well as resource evaluation systems of control, monitoring, surveillance and management measures, which are shared between the government authority and the fishing communities.

Available information shows that the implementation of these areas (zoning), along with other operational management measures, have brought the following benefits (Defeo and Castilla, 2005; Castilla et al., 2007): 1) The Catch per Unit Effort (CPUE) and size of individual loco have increased over time during the implementation of the management areas (1993-2001) with respect to the phase of open access to the fishery (1982-1992) and compared to existing open access areas in this new phase 2) the total catch made during the management areas throughout Chile is low and sustainable, presenting levels that are similar to those made in the initial development phase of the fishery and 3) the unit price (P) paid by the product increased significantly during this phase with respect to the fishing phase prior to the implementation of the zoning.

5.5 Sustainable tourism

The Chalalán effect and community-based SEM (Bolivia)

Chalalán Ecolodge is a community business offering a wide array of programmes and activities for enjoyment and in-depth learning about the rainforest, under the guidance of local indigenous people. The Chalalán Company comprises 74 families, 42 of whom are direct beneficiaries of the company's earnings. Located inside the Madidi National Park and having a 28-bed capacity, the lodge represents a new community business model that, since inception, has integrated environmental issues into design and operation. Adopting the indigenous building style with use of locally-available materials, the hotel has a sewage management system that uses natural processes. In addition, a large portion of electricity used is generated by solar panels, minimising the use of fossil fuels. Trails and supporting facilities have been carefully designed, based on studies of the biota in the area. Trips are conducted in groups of up to

six people, with guides monitoring the status of biodiversity in the area.

The company makes transfers to the community amounting to an annual average of US$20,000, about 55% of its operational expenses. Apart from direct transfers made by Chalalán as donations, contributions and/or dividends, the community profits from the sale of goods and services to the hotel. Among the main income-generating items for the community are the sale of crafts, supplies and building materials for the lodge, and services provided to the company, estimated to total US$28,860 annually. Women are very active in the provision of the services and production of the goods supplied.

Protection of biota — the company's keystone — has lowered the pressure on the region's forest. This can be noted in the end of extraction of commercially-valuable tree species (mahogany and cedars) from the area. The high level of conservation achieved in the lodge's sphere of influence is linked to the socio-economic impact exerted by the company on the community's population, and to the level of environmental awareness reached by those directly or indirectly benefiting from Chalalán-generated economic flows. This awareness is reflected in actions such as regular monitoring of flora and fauna by local guides. Thanks to such conservation initiatives, re-introduction of such species as the black spider monkey, the white lipped peccary and other threatened mammals has been possible.

The community business makes other kinds of contributions. For example, business played a key role in attaining recognition of community land rights and plays a leading role in economic planning for the territory. Among its other inputs, Chalalán achieved regular water supply in the community, helped construct health posts, granted health loans, facilitated the building of a school, boosted English language training and helped implement inter-institutional agreements beneficial to the community. Given the social nature of the company, the community considers that Chalalán enabled improvements in living standards as a whole and, consequently, many families that had migrated to other places returned. Improvements in health, education and access to basic services entail significant economic value because they improve the learning and productive capacities of inhabitants and they ease the integration of economic agents into regional and national markets, all under improved conditions. It was also shown that the living conditions of women and children improved during the implementation of the project. Chalalán's economic success is attributable to three main factors: availability of financial capital helped support the company on the technical and financial fronts, develop adequate local self-management capabilities and fill several gaps that limited access to the market; existing social capital in the community helped assimilate a business vision without losing local identity; and natural capital was provided by the Madidi National Park.

Source: Latin America and the Caribbean, a Biodiversity Super Power, UNDP, 2010

6. Conclusion and outlook

SRM in the LAC region is imperative, as national, regional and global economies depend highly on their availability and productivity.

The current report has been developed within the GESRE project[21], which aims to (1) pinpoint the needs of the region; (2) increase coordination and understanding of SRM among key stakeholders in the scientific community and government administrations; (3) improve their skills on these topics by providing them with tools to improve coordination and develop consistent cross-cutting policies for SRM of their resources; and (4) launch national action plans and identify opportunities for SRM in the LAC region. This project emphasises the use of the life cycle approach in dealing with SRM and encourages activities that foster education, inclusion and empowerment of key players tackling SRM in LAC through pilot projects that aim to introduce sustainable, more equitable and fair management procedures.

According to the UNDP, for the period 2000-2007, agriculture contributed an average of 9.6% to LAC's GDP and exports of agricultural commodities accounted for 44% of total export value in 2007. For the same year, in countries such as Panama, Paraguay and Nicaragua, agricultural exports represented over 80% of total commodity exports. This sector provides employment to around 9% of LAC's population (UNDP, 2010).

In 2004, Chile, Mexico, Colombia and Brazil each received over US$2 billion from fisheries, while Venezuela, Panama, Argentina, Guyana and Peru each received over US$100 million (Catarci, 2004, in UNDP, 2010). In at least 10 countries, fisheries contribute to more than 1% of GDP (UNDP, 2010).

Tourism in the Caribbean would not be as high as 20% of GDP without its coral reefs, which attract tourists from all over the world and employ 5% to 19% of the workforce (Table 2). In several South American countries, the contribution to GDP from tourism is 2% (UNDP, 2010).

This region, which includes six mega-biodiverse countries, provides specialised niches for tropical species (Felton et al., 2009); and, as resources are becoming scarce, planing the use and conservation of resources in areas with a high concentration of biodiversity (Peter et al., 2005) its crucial to halt its decline.

The current assessment has identified six critical resources for their scarcity as well as socio-economic, environmental and cultural significance for the region: water, fertile land, forests, fishing resources, natural landscapes, and metals and minerals. The latter three resources are directly linked to the following sectors: fisheries, tourism and mining. Moreover, water and fertile land are resources used in a cross-cutting way in a number of sectors, according with the UNEP report Resource Efficiency: Economics and Outlook for Latin America. Case studies Mercosur, Chile and Mexico (UNEP, 2011b).

Scarcity of natural resources in LAC poses several challenges when considering population growth, globalisation and competitiveness, technological advances and the threat of climate change. For example, fishing resources, fertile land and natural landscapes face greater risks than others. A high percentage of the population directly relies on the availability of these resources, which constitute the fundamentals for food security at a national — or larger — scale for their subsistence.

Natural resources are receiving increasing attention regionally and internationally as their scarcity results in higher prices, limited supply and over-exploitation that lead to a decline in quality.

Unfortunately, most countries are still planning the growth of their economies based on

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over-exploitation of natural resources instead of leapfrogging toward sustainable development. The sustainable use of these resources is still marginal in the Latin American economies, as described in Chapter 5.

There is growing awareness among countries acknowledging the importance of conserving their natural resources. Even if some of them do not produce direct economic benefits (e.g. water and natural landscapes), this is evident from the experts' perceptions captured by the survey and a number of stakeholders' consultations facilitated by UNEP in 2010 and 2011 in Panama, Florianopolis and Santa Fe. It remains uncertain how these perceptions are shared by other stakeholders and their potential to influence policies, promote methodologies, approaches or programmes due to the heterogeneity and limited sample of stakeholders surveyed.

The sustainable management of natural resources can serve as a vehicle to move toward sustainable development and, thus, help to:

- Reduce poverty and inequality and thereby also improve the living conditions of women and children in line with the spirit of the objectives of the UN Conference on Sustainable Development 2012 (Rio+20).
- Share the benefits and cost of conserving, maintaining and ensuring the provision of resources and ecosystem services among all actors along the value chain.
- Safeguard the resources for the needs of future generations.
- Protect one of the most varied and richest ecosystems of the world.

The life cycle approach is a cornerstone of dealing with SRM. This comprehensive analysis considers all process stages and can assist in forecasting impacts that could not be foreseen otherwise, enabling the assessment/identification of alternatives, as well as changing national strategies and even shifting policy approaches to protect/preserve ecosystem services on which economic activities rely. GESRE aims to make Life Cycle Assessments (LCA) available to sectors with a high environmental impact, while unfolding a new management scheme and analysis tool with the end goal of reducing impacts throughout the life cycle of a process or a product. Moreover, the identification of hotspots along the life cycle of critical resources allows the prioritisation of technological solutions, policy interventions and capacity-building approaches with the highest potential for success and prevents the region from becoming the recipient of obsolete technologies that are currently banned in other countries.

Each of the six priority sectors and resources — fisheries, mining, tourism, water, forests and land management — might require a specific management approach. However, when focusing on individual resources, there is an imminent risk of disregarding the measureless linkages that exist between resources. For instance, natural areas are linked to landscape and fertile land. In case of water, which is the cornerstone for agriculture, forestry and fisheries, it should not be isolated when trying to address the related sectors. The sustainable management of resources bundles cross-sectoral guidelines, methodologies and tools, and their implementation requires adaptation to countries' needs, development levels and economic activities, resulting in socio-economic, environmental and economic benefits for the communities. Improvement of the socio-economic conditions of women and children seemed to be more evident and visible through tourism, water, forest and land management activities. Indirect benefits for women and children were observed through fishery and mining activities, as these are male-dominant sectors in LAC countries.

The pilot projects reveal numerous management options that bring together isolated approaches into a toolkit to guide the learning process and exchange of experiences for other interested countries seeking to adopt SRM practices. The pilot projects demonstrate that SRM approaches have the

potential to enhance competitiveness as well as the environmental and economic sustainability of resources. The involvement of governments strengthens the political will to improve current resource management, as it becomes clearer that economic goals cannot be achieved when disregarding environmental resilience. Still, it remains a challenge to attain a concerted effort toward SRM across all critical sectors in LAC.

Through the proposed SRM framework, this report supports the implementation of the recommendations of the International Resource Panel reports (e.g., decoupling) and confirms the importance of the life cycle guiding principles promoted by the UNEP/SETAC Life Cycle Initiative.

This document reveals that more and better data on the situation of natural resources develop a better understanding of the requirements to protect natural resources and their dependent communities, strengthen national and regional economies and increase regional co-operation among LAC countries to halt unsustainable exploitation.

It cannot be ignored that LAC faces several problems that hinder appropriate decisions in the SRM realm. These include the vulnerability of the region to climate change (with the devastating consequences of droughts, floods and climate alterations), the struggle to overcome weak institutionalism high demographic density, elevated poverty rates and limited resources. For these reasons, a stronger awareness and the empowerment of human resources (with knowledge and education), as well as the use of effective tools to address SRM challenges, are an opportunity for the region to handle its natural resources in a sustainable fashion so that future generations can benefit from them and from their services. Therefore, SRM should not be seen as a barrier to the development of a country, but rather as the way to develop and grow as a region.

7. Recommendations

The following recommendations result from discussions among the core group of authors and are based on a thorough literature research as well as ideas and suggestions provided by a number of stakeholders and decision-makers involved in the GESRE project. The following suggestions are an initial set of recommendations and the authors call on the key LAC stakeholders for their analysis and implementation.

For the purposes of this study, the authors understand that concern over the consumption of natural resources might be relevant from a life cycle perspective. However, due to the focus of this study on natural resources management, they explicitly delimited its scope and recommend additional research on the consumption cluster in the future.

Over-arching topics on policies, partnerships and information generation

Each sector might require a specific approach that could include, but not be limited to, the following:

- Producing reliable and accessible information and statistics on the use of resources and its economic and environmental implications. This can be achieved by bringing regional experts together, and obtaining their input and feedback for developing statistics and indicators on the critical resources sets a starting point for addressing challenges in the sectors identified.
- Creating alliances to generate a critical mass and a supra-regional governing body, with the ability to link science with policy development for the sustainable management of natural resources, should also be a priority for the region. It includes the promotion of regional co-operation strategies in areas such as environmental impact assessment in the primary sector and water regulations.
- Defining and strengthening national public policies focused on resource efficiency can play a significant role in boosting economic and social development in LAC. Such measures should include the requirement to carry out comprehensive territorial planning and effective implementation of land-use regulations.
- Establishing public-private co-operation strategies at local, sub-national and national levels.

Capability development and gender issues

To understand the complex interactions between critical resources management and societal well-being, where economic development plays a central part, capacity strengthening of human resources working within public and private institutions deserves further consideration. At the same time, the region needs to raise the education level in fields that investigate the challenges posed by decoupling and environmental sustainability. The increased number of local, qualified decision-makers and people in general will contribute to creating the conditions for implementing policies aimed at environmental sustainability and natural resources conservation.

A network with key stakeholders could serve this vision with special consideration and empowerment of women as crucial players in the field of sustainable resource management according to the experiences and cases presented in the current report. Moreover, the current centres of excellence, universities, cleaner production centres and leading organisations should lead this process.

Scientific knowledge

Overcoming the inefficient use of critical natural resources in LAC requires tackling their drivers while embracing development that generates wealth, but not at the expense of biodiversity destruction (Ceballos et al., 2009) or of environmental degradation. To achieve this, the region has to generate substantial and well-focused scientific knowledge that

makes available up-to date information on its natural resources and their condition so that informed decisions can guide the sustainable development of individual countries. For instance, extinction threats vary for diverse groups of organisms and different species of fauna and flora; hence, conclusions on global extinction rates for all organisms should not be drawn based on particular studies of seriously-threatened groups (Stork, 2009). The lack of scientific knowledge in LAC is explained by the low availability, and yet the high concentration (Mexico, Brazil, Argentina, Colombia, and Chile), of academic conservation programmes in the region, which is six times lower compared to the United States of America (Mendez et al., 2007 in Ceballos et al., 2009). Furthermore, the weak transfer of this valuable information to decision-makers, communities and society in general is a factor that keeps awareness levels low, preventing proactive demands from the population and slow responses from governments.

Water

Transparent water accounting that considers the environment.

Putting in place a transparent water accounting system, including economic analyses, is essential to inform and enhance policy decisions that can lead to more SRM (e.g. for water allocation or pollution control). This should include not only an assessment to robustly measure and minimise environmental impacts of the different socio-economic sectors, but it also would account for the environmental services. There is a need to use indicators and approaches that account for water not only from the production but also from the consumption perspective, such as the life cycle analysis or water footprint. This has the potential to point at ways that would enable rising resource efficiency and decouple GDP growth from environmental degradation. Such an approach offers not only economic gains, but addresses poverty, inequality and maintains the region's natural capital. Currently, transparent and comprehensive accounting systems are in their infancy in the LAC region.

Water pricing.

Implementing water-pricing policies could provide adequate incentives to use water resources efficiently and ultimately achieve a more sustainable use of water in all sectors. To optimise the incentives for efficient use of water, pricing must be tied to the volume of water consumed. In this respect, metering plays a key role and should be implemented across all sectors. This is a need not only in Latin America and the Caribbean, but also in the rest of the world.

Integration of good agricultural practices.

Agriculture carries significant responsibility for the management of water resources in quantitative and qualitative terms, while also playing an important social and economic role in LAC societies. Careful management of water resources and efficient use of water for rainfed crop and pasture production, for irrigation where applicable, and for livestock are therefore crucial. Efficient irrigation technologies and management will minimise waste and avoid excessive leaching and salinisation. Finally, non-point source pollution could be reduced by moving from conventional to a more integrated or organic farming, which applies less or no chemicals (such as artificial fertilizers and pesticides).

Point-source pollution.

One of the most serious problems in LAC is the pollution and quality degradation of water supplies of downstream users resulting from untreated discharges of upstream parties. To reduce the pollution due to untreated discharges, adequate legislation and/or monitoring, and incentives for improved technologies is required.

More integrated water resources management.

Water is a shared resource and therefore a shared risk and opportunity for governments, businesses and populations across many river basins in the region. Cross-stakeholder and

cross-sector engagement and co-ordination are increasingly needed to achieve solutions. In particular, in the LAC region the successful management and efficient use of water resources require a proper and sound institutional framework, including adequate water laws and stakeholder participation.

Biodiversity

(Bio-)Policies.

To ensure that biodiversity as a natural and unique resource is available for future generations, comprehensive policies that embrace sustainable development are needed. Policies not only steer the development of planning instruments, such as strategies and master and action plans, they also set the framework for the enactment of regulations that establish the legal base for dealing with natural resources and, more specifically with biodiversity at the international, regional, national and local levels. Wide-ranging policies should recognise the social, environmental and economic values of biodiversity and its ecosystem services by including them in the decision-making processes and eliciting the development of suitable mechanisms. The aim of setting an economic value to these services is to ensure that resources will not considered an infinite source of goods and services, but rather managed sustainably.

Action plans.

Although policies do not specify activities on the ground, but guide on a broader scale, diverse measures and national action plans need to detail activities targeting biodiversity conservation, especially in areas already identified as threatened, such as the biodiversity hotspots. Biodiversity conservation action plans should be framed as site-specific and consider the corresponding financial and human resources needed to undertake the implementation of the envisioned activities with the involvement of communities that live within these areas. In addition, action plans should integrate mitigation and adaptation strategies for climate change, as this type of threat is prevalent for regional biodiversity.

Research.

More research in biodiversity conservation is needed to reduce vulnerabilities, to slow down species extinction rates and to enhance the region's capacity to conserve its unique and still abundant biodiversity. Research can set the framework for multi-country collaboration and specialisation in biodiversity studies while fostering interest of future and current professionals and qualified researchers — especially those coming from the LAC region — to get more involved and committed to reverse the existing biodiversity loss in Latin America and the Caribbean. A greater demand for studies and specialisation in this field can increase the number of academic institutions offering programmes in natural sciences.

Mining and metals

Resource efficiency, recycling and materials substitution.

One of the main concerns of SRM is to find sustainable solutions for scarce and non-renewable resources such as minerals and metals. There are three challenges in addressing this problem: to increase the efficiency in the use of such resources, to encourage recycling and to identify renewable materials that can substitute the scarce resources. This will require significant public and private investment in research and development, production and systematisation of accurate information, and the implementation of the life cycle approach in the production process.

Accessible information, international regulation and political will.

Related to the previous actions are the production of accessible information and the regulation of the mining sector locally and globally. Mining is an important economic input for several countries in LAC. It provides a considerable share of the minerals and metals consumed by the global market. According to the available data presented in this report, the market value of LAC mining production

represents about 8% of regional GDP (in 2006) — the biggest economic share among the six critical resources identified. Global economic development, particularly the growing Asian economies, are increasing the demand for minerals and metals, and pressure on LAC reserves, therefore heightening the risk of environmental, social and health damages. Without an international regulation that provides incentives to slow down the demand from industrialised countries, and to reduce speculation on mineral and metal prices and reserves, there will be a growing need to develop mining activities on a large scale in environmentally- and socially-fragile zones in the region. The production of accessible and reliable data on the real reserves of existing minerals and metals in LAC, as well as the LCA of those materials, will provide the basis for such a regulation and help stakeholders make better-informed decisions. The reduction of information asymmetry will also help to reduce the incertitude on prices and the volatility of the sector.

Democratic decision-making process, local regulation and control.

Due to its economic performance, mining plays an important role in job and income creation for local economies. However, it has also been associated with poor labour conditions and severe environmental and health risks. In fact, the majority of the employment in this sector comes from artisanal mining, which is burdened with poor labour and environmental practices that violate minimum standards. On the other hand, industrial mining is driven by global economic changes that are pushing for more flexible and intensive work patterns, as well as weak health and environmental risk management systems, directly affecting mineworkers and their families. Water contamination is undoubtedly the main driver of health and environmental problems, but also the source of tension and conflict between local communities, extractive companies and governments. This complex scenario calls for a democratisation of the decision-making process that takes into account the will of the local communities in the concession, regulation and control of mining activities. Even if environmental and health regulations need specialised tools and scientific knowledge, the experience of the families and communities affected by mining is an invaluable source of information and factual knowledge. In the same way, control instruments should guarantee a balance of power between companies, communities and interest groups in power in order to guarantee the common interest of leaving a good place to live for future generations.

Fisheries

Transparent supply chains.

To inform consumers better and to avoid over-exploitation, the traceability of fish products is key and increasingly required by importing markets and regional fisheries management organisations (responsible for managing fish stocks on the high seas and fish stocks that migrate through the waters of more than just a single state) that are implementing documentation systems to verify the origin of the products and increase transparency in the supply chains. It is thus becoming more relevant to produce well-documented products in the major fishing countries of the region (i.e. Peru, Chile, Argentina and Brazil) for both wild and farmed origin species. More investment on efficient, organised and technologically-advanced, traceability systems is a clear requirement.

Integrated management.

Such practices alone will be insufficient until an effective integration with other actions can be reached, such as with reduced by-catch, co-management systems of governance and ecosystem-based approaches devised to reduce over-exploitation of fish resources. Along these lines, investment should be provided to implement the recommendations of the guidelines issued by the regional fishery management organisations. Finding incentives to encourage good governance through accountability and simple, clear systems

to facilitate anti-corruption measures will help to implement policies and fight against poverty and corruption and, thus, promote responsible fisheries that provide economic opportunities while ensuring the conservation of marine resources. Those mesures should cover the control of yield on fisheries stocks. Among others, the recommendations include awareness-building programmes, the creation and use of vessel lists, implementation of catch documentation schemes and port state measures, enhanced Monitoring, Control and Surveillance (MCS), increased at-sea vessel inspection, complete fleet observer coverage and improved exchange of information.

Inter-regional and international co-operation.

Strong emphasis should be given to further strengthening inter-regional and international co-operation, and the role of regional fishery organisations, NGOs (including private sector, environmental and social interests) and other stakeholders concerned with fisheries and aquatic environments. This is particularly relevant in the fields of safety, quality and trade, which require a harmonised sectoral approach.

Tourism

Research, information and accounting.

During the last decades, tourism has become an important economic activity in LAC, but little or no accurate information is available to understand and measure its real contribution to the economy and its tendencies. From the available data, this report has showed that the activity has grown 50% in the last 15 years and employs around 10% of total employment in the region. However, there is a very asymmetric distribution of the tourist flows between two different economic structures. For most of the Caribbean countries, tourism is the main source of economic revenue (between 20 and 50% of GDP) and employment (20 to 70%); however, these destinations receive a marginal proportion the tourism flows to LAC. On the other hand, continental tourism (receiving the biggest part of the touristic flow, at 70%) goes mainly to three countries (Mexico, Brazil and Argentina) where its relative economic importance is very low compared to other economic activities (less than 1.50% of the GDP). However, it employs around 10% of the workforce. Even if these facts could downplay the role of the tourism sector as an economic alternative for LAC economies, it is necessary to understand that the importance of this sector lies in its potential to develop the tourism areas, to create jobs and to perform as a green industry or sector. LAC is an attractive tourism region, basically due to the specific biodiversity, landscape and cultural characteristics. This factor contributes to the development of a sustainable tourism industry, which is directly responsible for the management of one of the six critical resources: natural landscapes. In order to address these challenges, accurate information and knowledge about the tourism value chain is fundamental. In that sense, a definition of the life cycle stages of the sector and specific economic accounting systems are needed.

Infrastructure.

Several reports and studies point to the necessity of improving and developing tourism infrastructure (water, electricity, telecommunications and transportation). However, the SRM approach asks first for the assessment of the possible impact of that infrastructure, which determines if such infrastructure is truly needed. Such analysis should carry out an environmental impact assessment along the life cycle of any tourism project in order to allow comparison of results of several possible scenarios depending on the level of existing infrastructure considered.

Education.

Human capital accumulation has also been highlighted as an essential condition for the sustainable management of tourism activities and the improvement of employment conditions. Important efforts need to be made

in this area to enhance the skills of people from local communities in tourism-specific areas as management, hospitality, transportation and languages. Additionally, an inter-cultural approach within education programmes would lead to matching traditional costumes and knowledge of culture, history, gastronomy, etc. with the tourists' demands and expectations. Of course, these processes should be carried out with a deep respect for the social and cultural self-reproduction of local communities, their autonomy and the environment.

Safety.

As this report has pointed out, safety is a main concern among tourists and therefore a cornerstone for the success of any tourism-centred project. To combat fraudulent and criminal acts is a big challenge for national and local authorities who seek to create a friendly social environment for the development of sustainable tourism.

Natural landscape protection.

The permanent pressure on natural resources coming from other economic activities endangers one of the main resources of sustainable tourism in LAC. This fact calls for rapid and effective actions and regulations at the national and local levels in order to protect, safeguard and enhance natural landscape characteristics and conditions. International partnerships can also help in reducing pressure on natural resources by mobilising global public opinion. The UNEP Global Partnership for Sustainable Tourism, described in this report, is a very ambitious and comprehensive initiative that can make an important contribution to address these challenges.

8. Glossary

Abiotic resources	Abiotic resources are non-living resources that cannot regenerate by themselves. They include fossil fuels, metals and minerals. Therefore, they are often called non-renewable resources (UNEP, 2010e).
Absolute decoupling	Promoting absolute decoupling is the ultimate goal of the International Resource Panel. It means that the environmental and economic performances of an economy are no longer co-dependent. For resource decoupling, it means an overall reduction in resource use, irrespective of the growth rate of the economy. See also: decoupling, relative decoupling and double decoupling
Acidification (soil)	Acidification of soils refers to the reduction of soil pH. It can occur naturally and soils have different levels of susceptibility, but it is also exacerbated as a result of continual removal of crops (which remove alkalinity from the soil in order to compensate carbon dioxide assimilation). Farmers control acidification by application of lime or other alkaline minerals.
Agricultural productivity	Generally, productivity is a comparison of inputs to outputs. Agricultural productivity often describes yield rates (i.e. harvest per hectare).
Biodiversity	The Millennium Ecosystem Assessment (MEA, 2005) defines biodiversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems." Biodiversity forms the foundation for ecosystem services.
Bioenergy	Bioenergy describes all types of biomass used to convert its energy content into useful energy (heat and power). It includes crops and trees grown specifically for energetic purposes as well as agricultural residues, forest product waste and municipal waste that can be used to provide heat and power for households and industrial processing.
Biofuels	Biofuels are combustible materials directly or indirectly derived from biomass, commonly produced from plants, animals and micro-organisms but also from organic wastes. The term biofuel covers all uses of biomass for energetic purposes, meaning that biofuels may take solid, liquid or gaseous form. When the terms first-, second- or third-generation biofuels are used, they typically refer to biofuels used in the transportation sector. See also: first-generation biofuels, second-generation biofuels, third-generation biofuels

Biogas	Biogas is a type of biofuel typically produced by fermentation of biomass and slurry to a gas (comprising mostly methane and carbon dioxide). While biogas from residues, waste and manure seem to mostly provide benefits, land use may be a relevant concern when facilities are fed with energy crops such as maize.
Blue water	Fresh surface and groundwater, i.e. the water in freshwater lakes, rivers and aquifers.
Bottom-up approach	Bottom-up approaches analyse a system by first gathering information about its components and then aggregating to generate data on the sub-systems and system itself. It is the opposite of a top-down strategy. In anthropogenic metal stock estimation, a bottom-up approach is used to gather information on stock variables in a system in order to estimate in-use stock, and (if desired) infer the behaviour of flows.
Burden shifting	Burden shifting occurs when consumption and production happen in different places. It means that the impacts driven by consumption are translocated to countries where production takes place. It typically occurs between developed and developing countries. Related terms: Problem shifting
Carbon debt	The carbon debt is the time necessary to counterbalance CO_2 emissions resulting from the conversion of native ecosystems to cropland. It calculates how much carbon is released by mobilising the carbon stocked in the vegetation and organic matter above and below ground. In the case of biofuels, the carbon debt is used to indicate how long biofuels produced on that land area must be driven to compensate for the emissions caused by land use change. Determining the carbon debt depends critically on the assumptions made and parameters considered.
Carbon footprint	A carbon footprint is "the total set of greenhouse gas (GHG) emissions caused by an organisation, event, product or person." Greenhouse gases can be emitted through transport, land clearance, and the production and consumption of food, fuels, manufactured goods, materials, wood, roads, buildings, and services. For simplicity of reporting, it is often expressed in terms of the amount of carbon dioxide, or its equivalent of other GHGs, emitted.
Cascading use	Cascading use in general means a sequence of use phases with declining product value. Cascading allows the use of materials to be extended. For instance, using biomass as a production material first, then recycling it (several times) before finally recovering the energy content from the resulting waste at the end of its lifecycle. Such cascading systems may provide general advantages for climate change mitigation and ease land use pressure.

Clean production	Clean production refers to manufacturing processes that minimise environmental impacts (e.g. through low use of energy and raw materials, low emissions and waste) through changes in production processes (OECD, 2002).
Cleaner production	Cleaner production refers to the continuous application of an integrated preventive environmental strategy to processes, goods, and services with the aim of increasing overall efficiency and reducing risks to humans and the environment (UNEP, 2009b).
Climate change	According to the UNFCCC (2012) "climate change means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods."
Consumption	The use of products and services for (domestic) final demand, i.e. for households, government and investments. The consumption of resources can be calculated by attributing the life-cycle-wide resource requirements to those products and services (e.g. by input-output calculation).
Cropland	Cropland is arable land plus permanent crops.
Decarbonisation	Decarbonisation is a metaphor that describes an envisioned decrease in the use of fossil fuels and thereby carbon dioxide (CO_2) emissions. It occurs when the CO_2 emission-intensity of a product, service or economy is reduced. The metaphor may be misleading when interpreted as a goal to reduce the use of carbon in production and consumption irrespective of its source, as carbon can be recycled.
Decoupling	In general, decoupling means removing the link between two variables. Resource decoupling (the delinking of economic growth and resource use) and impact decoupling (the delinking of economic growth and negative environmental impacts). The term double decoupling refers to delinking economic growth from resource use and from environmental impacts. Moreover, decoupling can be relative (e.g. the rate of resource use increase is lower than the rate of economic growth) or absolute (e.g. resource use declines while the economy grows).
Deforestation	Deforestation refers to the clear-cutting of a forest. The FAO (2010b) define it as a "change in land cover with depletion of the tree crown cover to less than 10%."

Degradation	Degradation refers to deterioration of environmental quality, often triggered by a combination of causes. In agriculture, degradation may include erosion, compaction, acidification, declining soil organic matter, nutrient depletion, water scarcity, salinity, biological degradation and soil pollution, among others. In forestry, degradation can be caused by selective logging or by the replacement of a natural forest rich in biodiversity with a monoculture plantation.
Degraded land	Degraded land has been cultivated before and become marginal due to soil degradation or other impacts resulting from inappropriate management or external factors (e.g. climate change). See also: abandoned land, marginal land
Dematerialisation	Dematerialisation ultimately describes decreasing the material requirements of whole economies. It requires (a) reducing the material-intensity of products and services, i.e. by increasing material efficiency, and (b) especially reducing the use of primary material resources (such as ores, coal, minerals, metals, etc.) by improving recycling and re-use of secondary materials (i.e. shifting to a circular economy). It is frequently regarded as a necessary condition for the sustainable development of economies and is synonymous with absolute resource decoupling.
Depletion	Depletion of renewable resources refers to the part of the harvest, logging or catch above the sustainable level of use of that resource stock (i.e. removal above levels which can be renewed). Depletion of non-renewable resources refers to the quantity of resources extracted (OECD, 2002).
Domestic Material Consumption (DMC)	DMC is an indicator derived from economy-wide material flow analysis. It measures the mass (weight) of the materials that are physically used in the consumption activities of the domestic economic system (i.e. the direct apparent consumption of materials). It excludes indirect flows, making it a less comprehensive indicator of consumption than Total Material Consumption. DMC equals Direct Material Input (DMI) minus exports, i.e. domestic use extraction plus imports minus exports (OECD, 2002).
Double decoupling	Double decoupling is when economic development is decoupled from resource use and resource use is decoupled from the generation of environmental impacts. See also: decoupling

Eco-innovation	Eco-innovation is the introduction of any new or significantly improved product (good or service), process, organisational change or marketing solution that reduces the use of natural resources (including materials, energy, water and land) and decreases the release of harmful substances across the whole life-cycle (EIO, 2012).
Ecological Footprint	The ecological footprint represents society's burden on the planet in theoretical global ha. It expresses how much land humanity requires to produce all the resources it consumes and to absorb all the waste it generates under the assumption that those would come from and be recycled by biotic resources (Wackernagel et al., 2002).
Economic efficiency	Economic efficiency is the process of achieving maximum benefit for minimum cost for the satisfaction of human needs and wants (Bartelmus, 2010).
Economic growth	Economic growth is measured by indicators like Gross Domestic Product (GDP). GDP is the aggregate value of all goods purchased and used by final consumers. (UNEP, 2010d)
Ecosystem services	Ecosystem services are those functions and processes that ecosystems provide and that affect human well-being. They include (a) provisioning services such as food, water, timber and fibre; (b) regulating services such as the regulation of climate, floods, disease, wastes and water quality; (c) cultural services such as recreation, aesthetic enjoyment and spiritual fulfilment; and (d) supporting services such as soil formation, photosynthesis and nutrient cycling (MEA, 2005).
Efficiency	Efficiency is a broad concept that compares the inputs to a system with its outputs; it essentially means achieving "more with less". This report often refers to resource, material, energy and water efficiency across all levels of society, i.e. the system can refer to a production process (producing more with less) or an entire economy (achieving more usefulness with total input). Efficiency includes activities to improve productivity (value added / input) and minimise intensity (input / value added). See also: material efficiency, resource efficiency, water efficiency
Emissions	All material releases to air and water, including gases, effluents and radioactivity, as well as noise, heat and light pollution.
Endangered	According to the 2008 IUCN Red List categories, endangered species have a high risk of extinction in the wild.

Eutrophication	Eutrophication happens when substances such as nitrates or phosphates pollute soils or water bodies. It changes the growth of soil organisms and plants, and thus affects species composition and, in extreme forms, may cause hypoxia (the depletion of oxygen) in water bodies, which negatively impacts fish and animal populations. Increased eutrophication may result from uncontrolled intensification of agricultural production.
Extensive farming	Extensive farming is a type of agricultural production system that uses small (or 'low') inputs of fertilizer, labour and capital in relation to the size of the land area being farmed. It is the opposite of intensive farming. Whereas intensive farming may require less land extension to produce more harvest, extensive farming is usually associated with lower impacts, such as eutrophication, and higher levels of biodiversity.
Externalities	Externalities are by-products of economic activities that are not reflected in market prices. They affect the well-being of people or damage the environment, and are often associated with production processes (e.g. in developing countries) that are far apart from consumption (e.g. in developed countries).
Extinct	According to the 2008 IUCN Red List categories, extinct species have no individuals remaining.
First-generation biofuels	First-generation biofuels are biofuels in the first phase of development; they are the biofuels commercially produced today using conventional technology. The basic feedstocks include seeds, grains or whole plants from crops that are otherwise used for food and feed such as corn, sugar cane, rapeseed, wheat, sunflower or oil palm. The most common first-generation biofuels are bioethanol, followed by biodiesel, vegetable oil and biogas. See also: biofuels
Food security	"Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food for a healthy and active life. This involves 4 conditions: adequacy of food supply or availability; stability of supply, without fluctuations or shortages from season to season or from year to year; accessibility to food or affordability; and quality and safety of food." - FAO (2011a)
Functional unit	Quantified performance of a product system for use as a reference unit in a LCA study. (ISO 14040, 2006).
Geological stocks	Geological stocks are natural or virgin stocks of metals or other minerals deposited by geological processes in concentrations suitable for being extracted and processed, now and in the future (UNEP, 2010e).

GHG balance (of biofuels)	The GHG balance of biofuels is a comparison of the GHG emissions associated with biofuel production and use compared to fossil fuel production and use. If it is positive, biofuels emit fewer GHG emissions than fossil fuels. It is calculated using LCA methodology, but results depend critically on the feedstock, technology considered and boundary conditions assumed (especially land use change).
Global Warming Potential (GWP)	Global warming potential (GWP) is an indicator of how much heat a greenhouse gas (GHG) traps in the atmosphere (usually over 100 years), contributing to the greenhouse effect. Carbon dioxide (CO_2) is used as the baseline (meaning it has a GWP of 1) so that GWP expresses the contribution of different GHGs (there are over 60) to climate change in relation to CO_2. For instance CH4 has a GWP of 25—meaning it is 25 times more effective at trapping heat than CO_2--and N2O has a GWP of 298.
Green economy initiative	The UNEP-led Green Economy Initiative (GEI) consists of "several components whose collective overall objective is to make a macroeconomic case for, and provide guidance on, investing in green sectors and in greening brown sectors. The initiative is to demonstrate that investing in sectors such as renewable energies, clean and efficient technologies, water services, and sustainable agriculture can contribute to economic growth, creation of decent jobs, social equity, and poverty reduction while addressing climate and other ecological challenges" (UNEP, 2009b).
Green water	The precipitation on land that does not run off or recharge the groundwater, but is stored in the soil or temporarily stays on top of the soil or vegetation. Eventually, this part of precipitation evaporates or transpires through plants. Green water can be made productive for crop growth (but not all green water can be taken up by crops, because there will always be evaporation from the soil and because not all periods of the year or areas are suitable for crop growth) (Falkenmark and Rockström, 2004).
Grey water	The grey water of a product refers to the freshwater pollution that can be associated with the production of a product over its full supply chain.
Gross value added	It is the value of goods and services produced in an economy at different stages of the productive process (million €). The gross value added at market prices is equal to the gross output (value of production) minus the intermediate consumption.
Impact decoupling	Impact decoupling refers to the delinking of economic output and/or resource use from negative environmental impacts. See also: decoupling, impacts

Impacts	The term impact is used to refer to negative environmental impacts. These are the unwanted side-effects of economic activities and can take the form of a loss of nature or biodiversity, as well as diminished human health, welfare or well-being. Impacts can be intentional (e.g. land conversion impacts habitat change and biodiversity) or unintentional (e.g. humans may inadvertently alter environmental conditions such as the acidity of soils, the nutrient content of surface water, the radiation balance of the atmosphere and the concentrations of trace materials in food chains). Impacts occur across all stage of the life cycle, from extraction (i.e. groundwater pollution) to disposal (i.e. emissions). "Impacts" in an LCA-context correspond to "pressures" in the DPSIR framework. See also: pressures
In-use stocks (metals)	The metal portion of in-use stock can be defined in two ways. If an individual element is specified, it refers to the total mass of that element, regardless of its chemical form, being used in a given system at a given time. If a metal alloy is specified, in-use stocks refer to the total mass of that alloy (including all its constituent elements). Most studies use a time-scale of one year and a system boundary corresponding to an industrial sector or to a geopolitical boundary (i.e. city, region or country).
Indicator	Indicators are measurable and directionally reliable quantitative parameters that reduce and reflect the complexity of facts and situations. Environmental indicators point to, provide information about and/or describe the state or performance characteristics of an observed system (e.g. on environmental pressures, conditions and responses) (OECD, 2007). Every indicator answers certain target question(s).
Indirect (material) flows	Indirect (material) flows encompass the upstream material requirements needed to produce an imported product, but which are not physically embodied in the product itself. As such, indirect flows reflect the life-cycle dimension of the production chain and are also called hidden flows or ecological rucksacks. See also: material flows
Indirect land use change (iLUC)	Indirect land use change is land conversion caused by the displacement of agricultural production. It occurs, for example, when land used for growing a certain food crop or for animal grazing is used for biofuel production, causing cropland expansion elsewhere to grow that food crop or to feed those animals.

Industrial metabolism	Societies exchange materials and energy with the surrounding natural systems and use them internally for various functions (building structures, providing energy, etc.) in a similar way to the metabolism of plants, animals or humans. The inputs in industrial metabolism include resources such as raw materials (including fossil fuels), water and air. These resource inputs are transformed into products (goods and services) and are finally disposed back to the natural system in the form of outputs — mainly solid wastes, waste water and air emissions (Schütz and Bringezu, 2008). The term "industrial metabolism" was coined by Ayres (Ayres and Warr, 2009).
Input-output (I-O) method	Input-output tables describe the interdependence of all production and consumption activities in an economy. In an input-output model, the economy is represented by industry sectors (including resource extraction, processing, manufacturing and service sectors) and final demand categories (including households, government, investment, export and stock changes). Integrating information on emissions and resource use caused by sectors and final demand allows "environmentally extended IO tables (eeIOT)" to be provided; these can be used to calculate environmental pressures induced by production sectors or final demand categories in a way a similar to value-added or labour (UNEP, 2010d).
Intensity	Intensity describes the amount of inputs needed to obtain a unit of output. In the context of resource use, inputs refer to the "use of nature" (e.g. materials / energy / pollution) and outputs refer either to value added (e.g. GDP) or physical variables (e.g., mass). Intensity is the inverse of efficiency or productivity. See also: efficiency, resource intensity, material intensity
Intensive farming	Intensive farming is a type of agricultural production system that uses high inputs of fertiliser, pesticides, labour and capital in relation to the size of the land area being farmed. It is the opposite of extensive farming. Intensification may be associated with rising impacts and externalities such as biodiversity loss, salinisation, soil erosion, eutrophication and agrochemical contamination, resulting in both environmental and health effects.
Land grabbing	Land grabbing is a somewhat controversial term that describes large-scale land acquisition — be it purchased or leased — for agricultural production by foreign investors. It received much media attention in the first decade of the 21st century through cases where land grabbing was accompanied by violations of human rights and exacerbated environmental consequences.

Land use change (LUC)	Land use change is a term to describe conversion between various types of land use, for instance, the expansion of built-up land at the expense of agricultural land or the expansion of agricultural land at the expense of grasslands, savannahs and forests. Land use change is often associated with a profound alteration of land cover. It may result in a deprivation of natural capital such as shrinking natural ecosystems, loss of biodiversity and GHG emissions, and degraded functions in the form of fertile soils. See also: indirect land use change
Life Cycle	Consecutive and inter-linked stages of a product system, from raw material acquisition or generation from natural resources to final disposal ISO 14044 (2006).
Life-Cycle Assessment (LCA)	Life-Cycle Assessment (LCA) is the assessment of impacts associated with all life stages of a product or service, i.e. from the cradle to the grave. It focuses on individual product and service systems (distinguishing it from Input-Output analysis) and, as such, is often used for comparing competing goods. It involves the quantification of all relevant inputs and outputs, so that, wherever the system boundary is drawn, it may cause differences in the aggregation of total environmental burden and cause controversy, for instance, with the quantification of biofuels (i.e. whether or not to include indirect land use changes).
Life-Cycle Impact Assessment	Life-cycle impact assessment is defined as the "phase of Life-Cycle Assessment aimed at understanding and evaluating the magnitude and significance of the potential environmental impacts of a product system" -ISO 14044 (2006).
Life Cycle Thinking	Going beyond the traditional focus on production site and manufacturing processes so as to include the environmental, social and economic impact of a product over its entire life cycle. The main goals of life cycle thinking are to reduce a product´s resource use and emissions to the environment as well as improve its socio-economic performance throughout its life cycle (UNEP, 2009c).
Marginal land	Marginal land encompasses all non-cultivated areas where actual primary production is too low to allow for competitive agriculture. This type of land classification only refers to marginality in terms of agricultural production capacity; it says nothing toward the potential socio-cultural value of the land. Some marginal areas may also harbour high levels of biodiversity. See also: abandoned land, degraded land

Material efficiency	Material efficiency describes the relationship between the desired output of a process to the corresponding material requirement or input. If the output is an economic measure (e.g. value added or GDP) the term material productivity is used. Material efficiency may be achieved, for example, through improved product design, reduced production waste or process innovation. See also: material productivity (companies), material productivity (economies), resource efficiency
Material flow	In material flow analysis, flows refer to inflows (inputs) and outflows (outputs) of materials that physically cross the boundary of a given system within a certain period of time (= direct flows) or are related to the production or consumption of a certain (group of) products (= indirect flows). Flows are a rate variable (i.e. kg per unit of time, kg per kg), in contrast to stocks. See also: indirect flows
Material flow analysis (MFA)	Material flow analysis (MFA) comprises a group of methods to analyse the physical flows of materials into, through and out of a given system. It can be applied at different levels of scale, i.e. products, firms, sectors, regions and whole economies. The analysis may be targeted to individual substance or material flows or to aggregated flows, e.g. of resource groups (fossil fuels, metals, minerals). Economy-wide MFA (ewMFA) is applied to whole economies and provides the basis for the derivation of indicators on the metabolic performance of countries in terms of material inputs and consumption (such as DMI, DMC, TMR, TMC).
Material input per unit of service (MIPS)	MIPS is the life cycle-wide input of natural material (MI), which is employed in order to fulfil a human desire or need (S) by technical means. It is used to compare the material and energy requirements of functionally comparable goods or services. MIPS accounts for five primary material input categories: (a) abiotic materials (b) biotic materials (c) earth movements (d) water and (e) air. Categories (a-c) are aggregated to provide the total material requirement (TMR), i.e. all primary material extractions besides water and air.
Material intensity	Material intensity describes either (a) the amount of materials needed to produce a certain amount of economic value (e.g. material-input / GDP, or the inverse of MIPS) or (b) the material-input related to a physical unit of measure (e.g. material-input / weight). See also: intensity, resource intensity

Material productivity (companies)	At the company level, material productivity expresses the amount of economic value generated by a unit of material input or material requirement. See also: material efficiency
Material productivity (economies)	On the scale of economies, material productivity is an indicator calculated as economic growth per material input. Material productivity is measured by GDP/DMI or GDP/DMC (OECD, 2002). See also: resource productivity
Material resources	Material resources are natural assets deliberately extracted and modified by human activity for their utility to create economic value (UNEP, 2010e).
Material security	Material security refers both to the availability and access to the material resources on which economies depend, as well as the ability to cope with volatility, increasing scarcity and rising prices (EIO, 2012).
Material stock	The material stock describes the material resources contained within the built environment of an economy (in other words, the in-use stock).
Materials	Materials are substances or compounds. They are used as inputs to production or manufacturing because of their properties. A material can be defined at different stages of its life cycle: unprocessed (or raw) materials, intermediate materials and finished materials. For example, iron ore is mined and processed into crude iron, which in turn is refined and processed into steel. Each of these can be called materials. Steel is then used as an input in many other industries to make finished products (UNEP, 2010e).
Metals	Metals are elements (or mixtures of elements) characterised by specific properties, i.e. conductivity of electricity. Major engineering metals include aluminium, copper, iron, lead, steel and zinc. Precious metals include gold, palladium, platinum, rhodium and silver, while specialty metals include antimony, cadmium, chromium, cobalt, magnesium, manganese, mercury, molybdenum, nickel, tin, titanium, and tungsten. Because metals are elements they are not degradable and cannot be depleted in an absolute sense. Once in the environment they do not disappear, but some, like heavy metals, may accumulate in soils, sediments and organisms with impacts on human and ecosystem health. See also: critical metals

Minerals	Minerals are solid substances with a characteristic chemical composition (normally crystalline) that are formed as a result of geological processes; they can range from pure elements to salts and to complex silicates. Minerals comprise construction minerals (sand, gravel, etc.) and industrial minerals (comprising phosphate, clays but also gems like diamonds). In a chemical sense, metal ores are also minerals; however, due to their special applications, they are often considered as a separate category.
Modern bioenergy	Modern bioenergy describes biomass that is processed, either to biofuels for transport or to biomass for heat and electricity production. These are modern applications of biomass in contrast with traditional bioenergy (biomass used only for heat, mainly combustion of wood and dung).
Net Primary Production (NPP)	Net Primary Production is a measure used to describe the amount of energy produced by plants through photosynthesis after respiration. It is a useful parameter for quantifying the potential of biotic resources that could be extracted at maximum.
Non-renewable resources	Non-renewable resources are exhaustible natural resources whose natural stocks cannot be regenerated after exploitation or that can only be regenerated or replenished by natural cycles that are relatively slow at human scales. Examples include metals, minerals and fossil energy carriers (OECD, 2002).
Nutrient pollution	Nutrient pollution is the contamination of soil or water bodies by too much nutrient input (i.e. nitrogen and phosphorous), for instance, from fertilizer run-off. Eutrophication is a form of nutrient pollution.
Precautionary principle	The precautionary principle can be seen as an extension of the basic principle of "do no harm." It allows policy-makers to make discretionary decisions in the absence of extensive scientific consensus or insufficient information for comprehensive assessment when there is a risk of causing harm to the public or environment.
Pressure	The report uses the term pressure to describe environmental pressures. These are pressures evoked by human activities (commonly tied to the extraction and transformation of materials and energy) that are changing the state of the environment and leading to negative environmental impacts. Priority environmental pressures identified by the Millennium Ecosystem Assessment are habitat change, pollution with nitrogen and phosphorus, over-exploitation of biotic resources such as fisheries and forests, climate change, and invasive species.

Problem shifting	Problem shifting is the displacement or transfer of problems between different environmental pressures, product groups, countries or over time. See also: burden shifting
Production	The manufacturing of products and provision of services by industries which use raw materials and semi-manufactures (from domestic resources or imports) and convert them to products for final domestic consumption and export.
Production-consumption chain	The term production-consumption chain is often used to describe the linear system of extract, produce and consume, and the impacts that occur across these stages.
Productivity	Productivity describes how much economic value can be achieved per unit of input. It is thus a type of efficiency improvement (value added / input), although more attributed to whole economic sectors and national economies rather than to single processes and technologies. This refers to resource, material and water productivity. Productivity is the inverse of intensity. See also: efficiency, resource productivity, material productivity, water productivity
Rebound effect	The rebound effect is when a positive eco-innovation on the micro level actually leads to negative impacts on the meso/macro level. This can happen due to a change in consumer behaviour, i.e. consumers using more of an efficient product, which — at least partly — outweighs the efficiency improvements per unit of that product.
Relative decoupling	In relative decoupling, the growth rate of the environmentally-relevant parameter (e.g. resources used or environmental impact) is lower than the growth rate of the relevant economic indicator (for example GDP). See also: decoupling
Renewable resources	Renewable resources stem from renewable natural stocks that, after exploitation, can return to their previous stock levels by natural processes of growth or replenishment. Conditionally, renewable resources are those whose exploitation eventually reaches a level beyond which regeneration will become impossible. Such is the case with the clear-cutting of tropical forests (OECD, 2002).
Resource access	Resource access has to do with the ability to retrieve or use existing reserves. Because the geographic distribution of minerals is uneven throughout the world, resource access is politically sensitive and security of supply is a concern. See also: scarcity

Resource availability	Resource availability has to do with the amount of resources existing in reserves compared to the (typically growing) demands of society. See also: scarcity
Resource decoupling	Resource decoupling means delinking the rate of use of primary resources from economic activity. Absolute resource decoupling would mean that the Total Material Requirement of a country decreases while the economy grows. It follows the same principle as dematerialisation, i.e. implying the use of less material, energy, water and land to achieve the same (or better) economic output. See also: decoupling, absolute decoupling, relative decoupling
Resource efficiency	Resource efficiency is an over-arching term describing the relationship between a valuable outcome and the input of natural resources required to achieve that outcome. It is the general concept of using less resource inputs to achieve the same or improved output (resource input/output). It indicates the effectiveness with which resources are used by individuals, companies, sectors or economies. Resource efficiency can be achieved by increasing resource productivity (value added / resource use) or reducing resource intensity (resource use / value added). See also: efficiency, material efficiency
Resource extraction	Resource extraction is the removal of primary (virgin or native) resources or harvest from the natural environment for landscape modelling and for extracting valuable raw materials (used and unused extraction) for subsequent processing.
Resource intensity	Resource intensity depicts the amount of natural resources used to produce a certain amount of value or physical output. It is calculated as resource use / value added or as resource use / physical output. Resource intensity is the inverse of resource productivity. See also: intensity, material intensity
Resource productivity	Resource productivity describes the economic gains achieved through resource efficiency. It depicts the value obtained from a certain amount of natural resources. As an indicator on the macro-economic level, total resource productivity is calculated as GDP/TMR (OECD, 2002). It may be presented together with indicators of labour or capital productivity. Resource productivity is the inverse of resource intensity. See also: productivity, material productivity
Resource Use	Resource use of a country comprises resources used in production (both for domestic consumption and for exports).

Resources	Resources refer to the natural resources used by economies. They include abiotic materials (fossil fuels, metals and minerals), biomass, water and land. In general, resources can be seen as "gifts" of the natural system that can be used in the economic system, but which are not part of the economic system. See also: abiotic resources, biotic resources and renewable resources
Scarcity	Scarcity involves limitations to the availability and/or access to natural resources. Scarcities of material resources (e.g. critical metals) on which economies or industries depend represent threats to material security of those economies or industries. Academic literature disagrees on whether resource scarcity or competition for scarce resources presents a fundamental problem or is easily solved by the market (e.g. evoking innovation) (UNEP, 2010d).
Second-generation biofuels	Second-generation biofuels are produced from non-food sources, commonly from waste biomass, the stalks of wheat, corn stover, wood and special energy or biomass crops. They are processed using bio-mass-to-liquid (BtL) technology, thermochemical conversion (mainly to produce biodiesel) or fermentation (e.g. to produce cellulosic ethanol). See also: biofuels
Socio-economic	Involving a combination of social and economic factors or conditions (UNEP, 2009c).
Soil erosion	Soil erosion is the process of soil removal and displacement caused naturally (wind or water) and/or by man, e.g. industrial agriculture, which has contributed to high rates of erosion. Erosion is one of the key issues that mines soils and contributes to desertification; it results in a redistribution of nutrients and a depreciation of land and soil quality.
Stakeholder	Individual or group that has an interest in any activities or decisions of an organisation (ISO/CD 26000, 2008).
Stationary use of biofuels	Stationary use of biofuels means using biomass to generate power and heat. Generally, stationary use is generally more energy efficient than conversion to transport fuels (UNEP, 2009a).
Stocks	A stock is the quantity (e.g. mass) of a chosen material that exists within a given system boundary at a specific time. In terms of mea-surement units, stock is a level variable (i.e. it is measured in kg) as opposed to material flows (which are rate variables). See also: anthropogenic stocks, hibernating stocks, in-use stocks, material stocks

Substance flow Analysis (SFA)	SFA is aimed at specifying the flows of specific substances or groups of substances (like metals) in a system. It operates in the same way as (bulk) material flow analysis, only that it is focused more on identifying element flows.
Substitution	Substitution is used to mean the replacement of certain materials for other materials.
Supply-chain	A supply-chain, or logistics network, is the system of organisations, people, technology, activities, information and resources involved in moving a product or service from supplier to customer. Supply chain activities transform natural resource, raw materials and component into a finished product that is delivered to the end customer. In sophisticated supply chain systems, used products may re-enter the supply chain at any point where residual value is recyclable. Supply chains link value chains (Nagurney, 2006).
Sustainable agriculture	Sustainable agriculture is the practice of farming using principles of ecology and the study of relationships between organisms and their environment. It has been defined as "an integrated system of plant and animal production practices having a site-specific application that will last over the long term".
Sustainable consumption and production (SCP)	The Norwegian Ministry of Environment defined sustainable consumption and production at the Oslo Symposium in 1994 as the "use of services and related products, which respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generations".
Sustainable fishing	Sustainability in fisheries combines theoretical disciplines, such as the population dynamics of fisheries, with practical strategies like avoiding over-fishing through techniques such as individual fishing quotas, curtailing destructive and illegal fishing practices by lobbying for appropriate law and policy, setting up protected areas, restoring collapsed fisheries, incorporating all externalities involved in harvesting marine ecosystems into fishery economics, educating stakeholders and the wider public, and developing independent certification programmes. The primary concern around sustainability is that heavy fishing pressures, such as over-exploitation and growth or recruitment over-fishing, will result in the loss of significant potential yield; that stock structure will erode to the point where it loses diversity and resilience to environmental fluctuations; that ecosystems and their economic infrastructures will cycle between collapse and recovery, with each cycle less productive than its predecessor; and that changes will occur in the trophic balance.

Sustainable levels (of resource consumption)	Sustainable levels refer to the amount of resources that can be consumed before the threshold of a safe operating space is surpassed. Sustainable levels of consumption require (a) globally acceptable resource extraction and (b) fair distribution. While sustainable levels typically refer to the consumption side of the picture, sustainable supply refers to the production side. See also: sustainable consumption and production (SCP)
Sustainable Resource Management	Sustainable resource management (SRM) is a set of coordinated actions that aim to accommodate sustained provision of resources to meet the needs of the present without compromising the capacity to meet the needs of future generations. SRM take a systems perspective minimising problem-shifting among regions, environmental impacts and supply-chain processes.
Sustainable mining	Sustainable mining is a mining that contributes to the socio-economic development while protecting the environment, meeting the needs of the present without compromising the ability of future generations to meet their own needs.
Sustainable supply	Sustainable supply refers to the amount of resources that can be extracted and used for production and consumption before the threshold of a safe operating space is surpassed. At a global scale, (sustainable) levels of production equal (sustainable) levels of consumption. At a local scale, sustainable supply is aimed at by safe operating practises. See also: sustainable levels
Sustainable tourism	Sustainable tourism is tourism attempting to make a low impact on the environment and local culture, while helping to generate future employment for local people. The aim of sustainable tourism is to ensure that development brings a positive experience for local people, tourism companies and the tourists themselves (UNEP, 2011c).
Third-generation biofuel	Third-generation biofuels typically refer to algae fuel. Algae are feedstocks from aquatic cultivation for production of triglycerides (from algal oil) to produce biodiesel. The processing technology is basically the same as for biodiesel from second-generation feedstocks. Other third-generation biofuels include alcohols like bio-propanol or bio-butanol, which, due to lack of production experience, are not usually considered to be relevant as fuels on the market before 2050. See also: biofuels

Top-down approach	A top-down approach gathers data at a systems level in order to break it down to gain insights into the sub-system or components. It is the opposite of a bottom-up approach. In anthropogenic stock estimation, top-down estimations take information regarding flows and infer metal stocks in society by computing the cumulative difference between inflow and outflow.
Total Material Consumption (TMC)	TMC measures all primary material resources (besides water and air) used for domestic consumption. It is an indicator derived from economy-wide material flow analysis. TMC equals TMR minus exports and their indirect (=used and unused) flows.
Total Material Requirement (TMR)	TMR measures all primary material resources (besides water and air) used for domestic production. It is an indicator derived from economy-wide material flow analysis. It refers to the total material base of an economic system as it measures the total mass (weight) of all materials required to support that system, including unused domestic extraction and indirect flows. As such, TMR is more comprehensive than DMI.
Trade-off	Trade-off describes a situation where one option occurs at the expense of another. This can be trade-offs between environmental impacts (e.g. renewable energy technology and critical metal consumption) as well as social, ecological and economic objectives (e.g. cropland expansion and biodiversity loss).
Traditional biomass	Traditional biomass is a term that refers to the unprocessed use of biomass, including agricultural waste, forest products waste, collected fuel wood and animal dung. It is burned in stoves or furnaces to provide heat energy for cooking, heating or agricultural and industrial processing, especially in rural areas.
Unused extraction	Unused extraction is a term emerging from material flow analysis that describes the excavation of natural material in order to get access to more precious materials (e.g. overburden from mining activities), for infrastructure-building and maintenance (e.g. soil and earth movements, dredging), and harvest losses in agriculture, forestry and fisheries (e.g. by-catch). While unused extraction is not considered in the indicator Direct Material Input, it is included in the Total Material Requirement.
Virtual-water trade	The virtual-water trade or flow between two areas (e.g. two nations) is the volume of virtual water that is being transferred from one to the other area as a result of product trade.
Vulnerable	According to the 2008 IUCN Red List categories, vulnerable species have a high risk of endangerment in the wild.

Water accounting	Water accounting is the application of a consistent and structured approach to identifying, measuring, recording and reporting information about water.
Water efficiency	Water efficiency is described by the ratio of useful water outputs to inputs of a given system or activity. It implies using less water to achieve more goods and services, and entails finding ways to maximise the value of water use and allocation decisions within and between uses and sectors (Global Water Partnership, 2006). See also: efficiency
Water footprint	Metric(s) that quantify(ies) the potential environmental impacts related to water (ISO 14046, in press)
Water harvesting	Rainwater harvesting refers to the collection of rain that otherwise would become run-off. Various sorts of rainwater harvesting techniques exist to provide drinking water, water for livestock or water for irrigating crops or gardens (FAO, 2011a).
Water productivity	Water productivity measures how a system converts water into goods and services. It refers to the ratio of net benefits derived from, for example, crop, forestry, fisheries, livestock and industrial systems to the amount of water used in the production process (product units/m^3). Generally, increased productivity of water means increasing the volume of benefit, i.e. output, service or satisfaction from a unit of water used. When water productivity is measured in monetary output instead of physical output, we speak about "economic water productivity." See also: productivity
Water recycling	Water recycling is the re-use of water from one economic activity for the same or another activity after significant treatment. It requires the treatment and disinfection of municipal wastewater to provide a water supply suitable for non-potable reuse, i.e. for non-drinking purposes such as landscape irrigation, toilet flushing, ornamental fountains, industrial cooling, creating ponds, and dust control at irrigation sites.

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Annex 1: Form used for the consultation process to prioritise the critical natural resources in the region

About this Survey

In this survey, the following types of natural resources are identified:

- Metals and minerals
- Biotic resources (fish resources and forests)
- Water
- Natural landscapes
- Fertile land

Note: For the purpose and scope of this survey, natural resources are understood as natural assets (raw materials) occurring in nature that enhances the quality of human life. For the purpose of this survey, fossil fuel and energy resources are intentionally omitted. Biotic resources exclude wildlife and animal products. These resources provide essential services for human well-being. For instance, metals and minerals (which make up things we use in daily life, like electronic devices); biotic resources (harvested as fish catches) and timber (food, fiber and wood products); natural landscapes (aesthetic appeal and tourism); and fertile land (food and feed).

SRM is an effort to ensure that essential services are not only available to the current generation but also to future ones for human well-being. With this survey, we would like to understand the perception in Latin America and the Caribbean of the importance of these resources and the risk that they may be depleted by 2050, if current trends continue.

You have been identified as an important stakeholder and we would like to hear your opinion on SRM issues. We would like to invite you to provide best estimates and answers on Tables 1 and 2 regarding an "overall evaluation" and "detailed evaluation of metals and minerals," respectively, for your country.

Table A1-1. Essential information to respond to the survey, including definitions

Natural resource types	Definitions used in the survey	Examples	Goods and services* provided by the resource	Essential information of the resource in the LAC region
Metals and minerals	A mineral resource is a concentration or occurrence of natural solid inorganic material, or natural solid fossilised organic material including base and precious metals, and industrial minerals in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction.	Gold, Copper, Iron, Nickel, Aluminum, Silver, Tin, Lead, Zinc, Chrome, Molybdenum	Basic materials such as Aluminum, Iron, Zinc, etc. for variety of products and services. Provision of basic materials.	LAC region is an important supplier of metals and minerals to global society. LAC shares around 50-60% of global iodine lithium production, around 20-40% of zinc, silver, molybdenum, aluminum, copper, silver and tin. It is estimated that primary metals and minerals contribute at least about USD 250 billion in 2006 price to the region. Among them, aluminum (as bauxite) shares the largest portion providing at least USD 140 billion of revenue to the region. There are some signs of declining metals and mineral production in the region, while the prices have been generally increasing for the last decade.

Natural resource types	Definitions used in the survey	Examples	Goods and services* provided by the resource	Essential information of the resource in the LAC region
Biotic Resources	Biotic resources are biomass such as forestry products, fish catches. Biomass is the material produced by the growth of microorganisms, plants or animals. The biomass could be divided in forests and fisheries as follow: Forests biomass refers to any biomass found in forests useful for product chains. Fish biomass refers to the total weight of living organisms or total weight of a fish resource or stock	Timber harvest, herbs Fish catches (e.g. tuna)	Provision of materials and food	The LAC region has both the world's largest unfragmented tropical forests (in Amazon region) and some of the most fragmented and most endangered tropical forests. At the end of 1990, some 28 per cent of the world's total forested area and 52 per cent of its tropical forest were in Latin America and the Caribbean. In 1990, these forests covered 968 million hectares, or 48 per cent of the land in the region (FAO, 1993). According to FAO, total export of fishery production from LAC region in 2007 amounts to 11 billion USD. Industrial round wood export by LAC region is estimated to be 0.23 billion USD in 2008 price. Domestic markets for fishery and forestry products are considered to be much larger than their export values. Forest cover in the region declined from 992 million hectares in 1980 to 918 million hectares in 1990, yielding an annual deforestation rate of 0.8 per cent over this period. Average annual deforestation rose from 5.4 million hectares in 1970 to 7.4 million hectares in 1990 (FAO, 1993). Overfishing, the catch of commercial species such as shrimp, grouper, Caribbean lobster, and bass in semi-tropical areas is diminishing (Winograd, 1995)
Water resources	Water resources are any of the entire range of natural waters that occur on the Earth and that are of potential use to humans. These resources include the waters of the oceans, rivers, and lakes; groundwater and deep subsurface waters; and glaciers and permanent snowfields. Continuing increase in water use has led to growing concern over the availability and quality of water supplies	Ground water, surface water	Provision of water for human consumption (ex. drinking), irrigation and industrial uses.	LAC as a whole is relatively water abundant but the distribution within the region is highly variable. Renewable water per capita of LAC region amounts to 27,673 m^3, whereas that of the world is only 6,984 m^3 Many areas have great difficulties meeting their water needs, including northern Mexico, north-eastern Brazil, and southern Chile Water quality problems that are common to the whole region include toxic contamination from industry, waste disposal, and eutrophication from human sewage (UNEP, 1991) In the wider Caribbean, many coastal aquifers are contaminated by pollutants or salt-water intrusions due to over extraction of ground-water reserves. In Venezuela, for example, the overuse of aquifers has already resulted in widespread salt-water intrusion (UNEP/SCOPE, 1993).

Natural resource types	Definitions used in the survey	Examples	Goods and services* provided by the resource	Essential information of the resource in the LAC region
Natural landscapes	It refers to refers to landscape under minimum human intervention	Marshes, rainforests, naturally flowing rivers, deserts, lakes. Example: Galapagos island	Provision of natural habitat, aesthetic, leisure and recreation values; attraction of tourists.	The region's biota, in addition to being enormously diversified, provides important opportunities for economic development. This heritage, which has medicinal, industrial, and food potential, can generate sustainable benefits for the local population now and into the future (LAC CDE, 1992). Tourism industry is growing in LAC region but the rate of growth is slower than the global rate of growth in tourism industry. The LAC region's share for the world tourism receipt accounted for 5.3% in 2007.Tourist receipts in LAC region amount to 46.1 billion USD in 2007, a 49% increase from 1995. Touristic places relate to natural landscapes which are, on the other hand, being damaged at high rates (e.g. deforestation rates of rainforests) the in LAC region. Damaging natural landscapes is putting in risk the tourism industry. . Not only has Latin America lost more than 7 per cent of its tropical forests during the 1980s, but its savannah-grasslands are also under continuous threat (FAO, 1993).
Fertile land	It refers to the land that can be used for growing crops. It includes all land where soil and climate is suitable for agriculture	Pampas	Agricultural production (provision of crop) for food	The LAC region includes 23% of the world's potential arable land, 12% of current cropland and 17% of all pastures (Gallopin et al., 1991) Crop production in LAC region amounts to 121 billion USD in 2007. Some 306 million hectares (72.7 per cent) of the agriculturally used drylands in South America (that is, irrigated lands, rainfed cropland, and range-lands) suffer from moderate to extreme degradation (UNEP, 1991). And some 47 per cent of the soils in grazing lands have lost their fertility (LAC CDE, 1992). The potential consequence of the expansion of agricultural land is that forests in the region will diminish and more of the marginal lands will become degraded.

* Goods refer to tangible personal property, while services refer to any benefit, right (e.g., right in relation to, and an interest in, real or personal property), privilege or facility. An example of goods is food and an example of services is tourism.

General source: http://www.unep.org/geo/geo1/ch/ch2_9.htm

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Table 1: Overall evaluation

Name of your country:.....

Please fill in the column B and C based on your perceptions as stakeholder or on your expertise on SRM in your country.

Please explain if assumptions were used or clarify your answer if needed.

- Column A: Resources identified for the scope of the study. Fossil fuel and energy resources are intentionally omitted. Biotic resources exclude wildlife and animal products.
- Column B: Provide a rank from 1 (less important) to 6 (most important) to the importance given of the services provided by the resource listed Provide a percentage of importance of the productive sector listed based on the resource extracted services regarding the employment share provided by the resource
- Column C: Provide a percent from 0% (sufficiency) to 100% (require) of future need of the service that is under risk of discontinuation in the 2050.
  Discontinuation of services can occur not only because of absolute scarcity of resources in question due to partial depletion but also because of relative scarcity due to high price or lack of accessibility. For instance, 30% = provision or 30% services may be under risk of discontinuation in 2050.

** Please annex information you might have regarding your country's forecasting and projections for 2050

Table A1-2. Overall evaluation

A	B	C	D
Natural Resource in your country	Relative importance of the services provided by the resource [0-6]	Percentage of future need of the service that is under risk of discontinuation in 2050[%]	Rationale for your answers in B and C
1. Metals and minerals		Not applicable here but in Table 2	Not applicable here but in Table 2
2. Biotic Resources: - wood and plants from forests			
3. Biotic Resources: - fish resources			
4. Water			
5. Natural landscapes			
6. Fertile land for potential use or currently used for agriculture			

Table 2: Detailed evaluation of metals and minerals

The following applies to countries that are producers of minerals and metals based on the economic value produced of listed metals. Economic value for the LAC region has been provided based on USGS data for 2006-2008. Not all material resources are covered due to data gaps.

Please fill in columns C, D, E and F based on your perceptions as a stakeholder or on your expertise on SRM in your country.

The following qualitative questions should be answered taking into account the country tendency. Please explain if assumptions were used or clarify your answer if needed.

- Column C: Provide a rank from 1 (less important ones) to 6 (most important ones) to the importance given of the services provided by the mineral and metal resources listed. There could be several metals listed with 1 or with 5.
- Column D: Provide a percent from 0% (sufficiency) to 100% (require) of future need of the service that is under risk of discontinuation in the 2050.
  Discontinuation of services can occur not only because of absolute scarcity of resources in question due to partial depletion but also because of relative scarcity due to high price or lack of accessibility. For instance, 30% = provision or 30% services may be under risk of discontinuation in 2050
- Column E: Provide a rank from 0, medium, high to very high to the Magnitude of environmental impact related to Toxic Substance Releases and Climate Change

Table A1-3. Detailed evaluation of metals and minerals

A	B	C	D	E		
Metals and Minerals	Economic Value of produced metals in Latin America (millions of USD in 2004 price) *	Relative importance of the services provided by the metal resource listed in A	Percentage of future need of the service that is under risk of discontinuation in 2050 [%]	Magnitude of environmental impact		
				Toxic substance releases [0, medium, high, very high]	Climate Change [0, medium, high, very high]	Rationale for your answers in the previous columns
1.Aluminum (as Bauxite)	130,159					
2.Arsenic	34					
3.Bismuth	26					
4.Copper	41,765					
5.Iodine	290					
6.Lead	793					
7.Lithium	229					
8.Manganese	618					
9.Molybdenum	3,137					
10.Nickel	7,030					
11.Rhenium	23					
12.Gold	4,095					
13.Silver	2,668					
14.Strontium	8					
15.Tantalum	13					
16.Tin	48,195					
17.Zinc	5,511					
18.Other metal your country may produce	No data for the LAC region					
19.Other metal your country may produce	No data for the LAC region					
20.Other metal your country may produce	No data for the LAC region					
21.Other metal your country may produce	No data for the LAC region					
Total						

* Market value of selected material resources produced by LAC region (unit Million USD in 2006 price). USGS, Mineral Resources Program

Table A1-4. Complementary information: Market value of selected material resources produced by 12 major producers in the LAC region (unit million USD in 2004 prices)

	Argentina	Bolivia	Brazil	Chile	Colombia	Cuba	
Aluminum (as Bauxite)			59,656				
Arsenic				23			
Bismuth		5					
Copper				35,653			
Iodine				290			
Lead							
Lithium	41		9	178			
Manganese			579				
Molybdenum				2,091			
Nickel			1,850		2,220	1,850	
Rhenium				23			
Gold*	375	92		527	461	7	
Silver				492			
Strontium							
Tantalum			13				
Tin		12,976	7,415				
Zinc							
Sum	416	13,073	69,522	39,277	2,681	1,857	

* 2004 price

	Dominican Republic	Jamaica	Mexico	Peru	Suriname	Venezuela	Sum
		37,963			16,270	16,270	130,159
			3	7			34
			11	9			26
				6,112			41,765
							290
			227	567			793
							229
			39				618
			95	950			3,137
	1,110						7,030
							23
			288	2,218		127	4,095
			1,053	1,123			2,668
			8				8
							13
				27,805			48,195
			1,621	3,890			5,511
	1,110	37,963	3,345	42,681	16,270	16,397	244,594

Annex 2: Main economic, social and environmental aspects of the sectors linked to critical natural resources in Latin America and the Caribbean

Figure A2-1. Percentage of the gross domestic product (GDP) per sector for the year 2007

Data across sectors may not add up to 100 per cent because workers are not classified by sectors.

(World Bank, 2009)

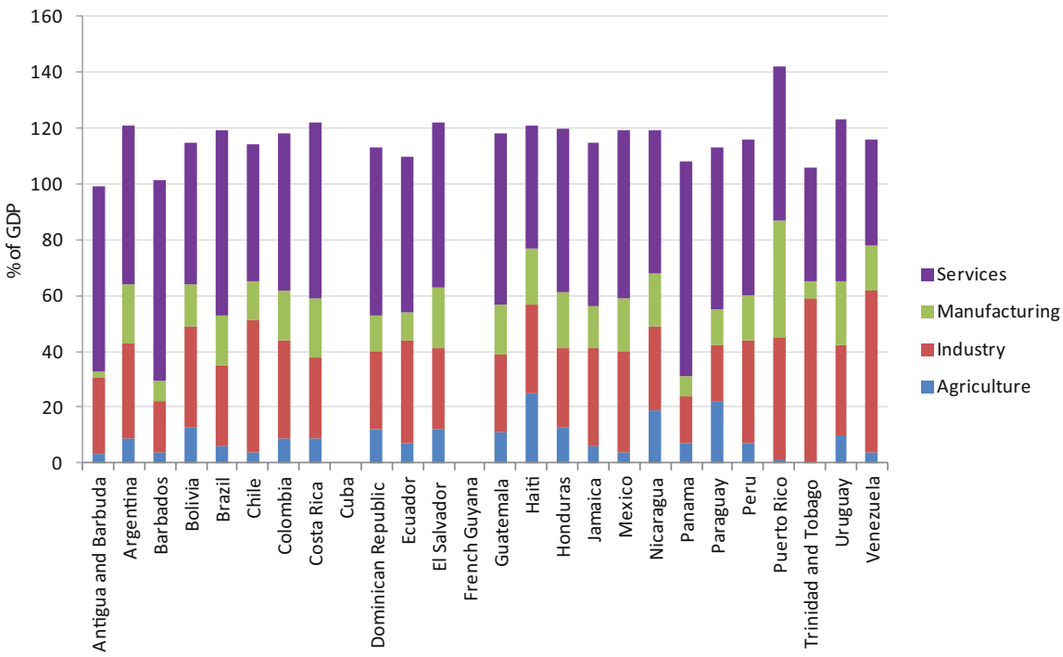


Figure A2-2. Percentage of employment per sector and gender for 2007

Data across sectors may not add up to 100 per cent because workers are not classified by sectors

(World Bank, 2009).

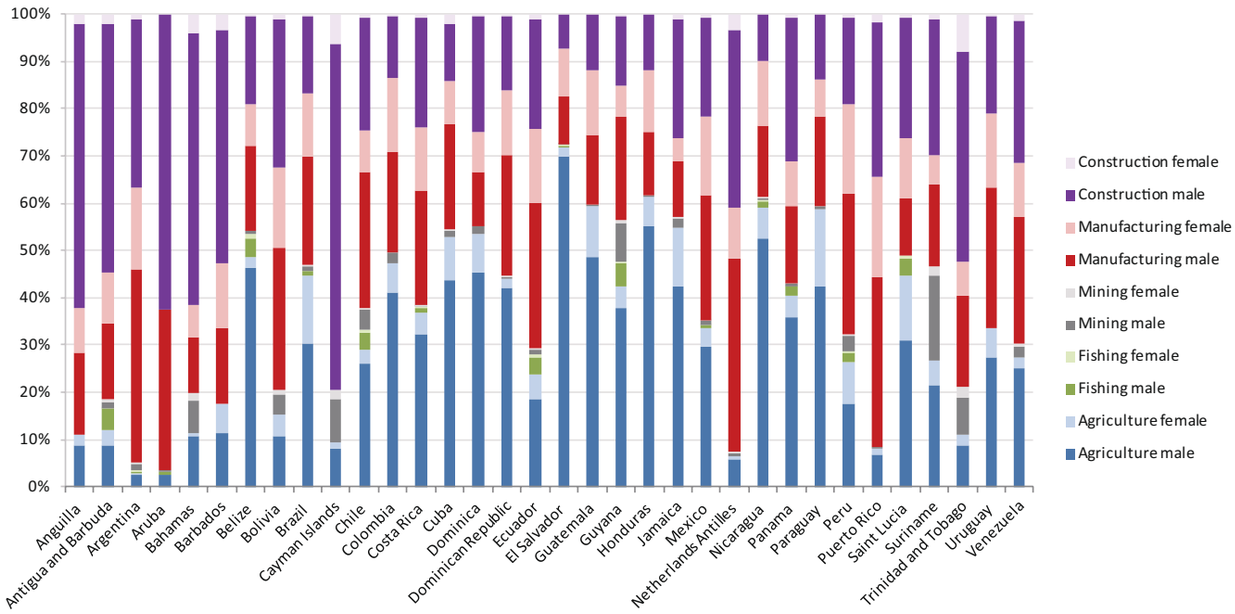
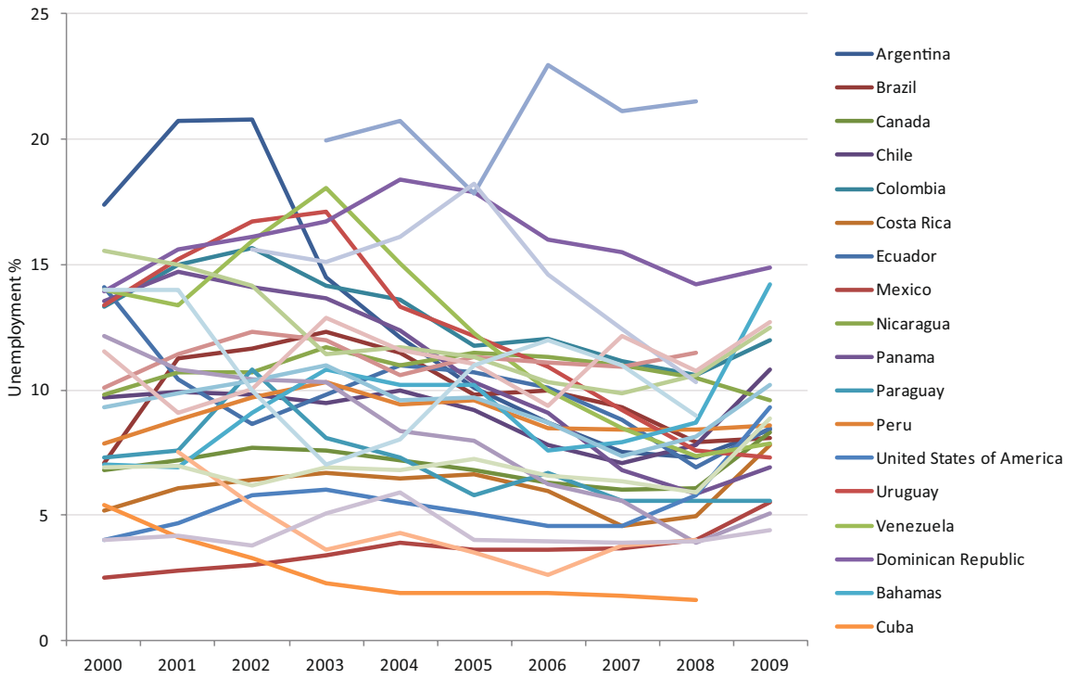


Figure A2-3. Percentage of unemployment from 2000-2009

(ILO, 2011; IMF, 2012; and OECD, 2011)



Annex 3: Natural forest area, proportion of land area and proportion of forested area

Table A3-1. Natural forest area, proportion of land area and proportion of forested area (thousands of ha, percentage and rate of variation)

Source: ECLAC, 2011c Environmental statistics

Country	Natural forest area (thousands of hectares)				Proportion of land area (percentages)				P a
	1990	2000	2005	2010	1990	2000	2005	2010	1990
Argentina	34027	30785	29396	28006	12.4	11.2	10.7	10.2	97.8
Bahamas	515	515	515	515	51.4	51.4	51.4	51.4	100.0
Barbados	8	8	8	8	18.6	18.6	18.6	18.6	100.0
Belize	1584	1487	1439	1391	69.4	65.2	63.1	61.0	99.9
Bolivia	62775	60071	58714	57176	57.9	55.4	54.1	52.7	100.0
Brazil	569855	540767	524729	512104	68.5	65.0	63.0	61.5	99.1
Chile	13556	13898	13980	13847	18.1	18.6	18.7	18.5	88.8
Colombia	62382	61254	60674	60094	56.2	55.2	54.7	54.2	99.8
Costa Rica	2269	2173	2269	2364	44.4	42.6	44.4	46.3	88.5
Cuba	1711	2093	2309	2384	15.6	19.1	21.0	21.7	83.1
Dominica	50	47	46	45	66.7	62.7	61.3	60.0	100.0
Ecuador	...	11680	10688	9698	...	42.2	38.6	35.0	...
El Salvador	367	319	295	272	17.7	15.4	14.2	13.1	97.3
Grenada	17	17	17	17	50.0	50.0	50.0	50.0	100.0
Guatemala	4697	4115	3837	3484	43.3	38.0	35.4	32.1	98.9
Guyana	...	15205	15205	15205	...	77.2	77.2	77.2	...
Haiti	104	89	81	73	3.8	3.2	2.9	2.6	89.7
Honduras	...	...	5792	5192	...	...	51.8	46.4	...
Jamaica	336	333	331	330	31.0	30.7	30.6	30.5	97.4
Mexico	70291	65693	63184	61599	36.2	33.8	32.5	31.7	100.0
Nicaragua	...	...	3390	3040	...	...	27.9	25.0	...
Panama	3779	3325	3248	3172	50.8	44.7	43.6	42.6	99.7
Paraguay	21134	19332	18432	17534	53.2	48.7	46.4	44.1	99.9
Peru	69893	68498	67988	66999	54.6	53.5	53.1	52.3	99.6
Saint Vincent and the Grenadines	...	26	26	27	...	66.7	66.7	69.2	...
Saint Lucia	43	46	46	46	70.5	75.4	75.4	75.4	97.7
Suriname	14763	14763	14763	14745	94.6	94.6	94.6	94.5	99.9
Trinidad and Tobago	226	218	213	208	44.1	42.5	41.5	40.5	93.8
Uruguay	719	743	754	766	4.1	4.2	4.3	4.4	78.2

Proportion of forest area (percentages)				Accumulated variation in natural forest area (rate of variation)			Average annual variation in natural forest area (rate of variation)		
'0	2000	2005	2010	1990-2000	2000-2010	1990-2010	1990-2000	2000-2010	1990-2010
8	96.6	96.1	95.3	-9.5	-9.0	-17.7	-1.0	-0.9	-0.9
.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
9	99.9	99.9	99.9	-6.1	-6.5	-12.2	-0.6	-0.6	-0.6
.0	100.0	100.0	100.0	-4.3	-4.8	-8.9	-0.4	-0.5	-0.4
1	99.1	98.9	98.6	-5.1	-5.3	-10.1	-0.5	-0.5	-0.5
8	87.8	87.1	85.3	2.5	-0.4	2.1	0.3	0.0	0.1
8	99.6	99.5	99.3	-1.8	-1.9	-3.7	-0.2	-0.2	-0.2
5	91.5	91.1	90.7	-4.2	8.8	4.2	-0.4	0.9	0.2
1	86.0	85.6	83.1	22.3	13.9	39.3	2.2	1.4	2.0
.0	100.0	100.0	100.0	-6.0	-4.3	-10.0	-0.6	-0.4	-0.5
	98.6	98.5	98.3	...	-17.0	...	...	-1.7	...
3	96.1	95.5	94.8	-13.1	-14.7	-25.9	-1.3	-1.5	-1.3
.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
9	97.8	97.4	95.3	-12.4	-15.3	-25.8	-1.2	-1.5	-1.3
	100.0	100.0	100.0	...	0.0	...	...	0.0	...
7	81.7	77.1	72.3	-14.4	-18.0	-29.8	-1.4	-1.8	-1.5
	...	100.0	100.0	...	...	...	...	...	...
4	97.7	97.6	97.9	-0.9	-0.9	-1.8	-0.1	-0.1	-0.1
.0	98.4	96.3	95.1	-6.5	-6.2	-12.4	-0.7	-0.6	-0.6
	...	97.9	97.6	...	...	...	...	...	...
7	98.7	98.1	97.6	-12.0	-4.6	-16.1	-1.2	-0.5	-0.8
9	99.8	99.8	99.7	-8.5	-9.3	-17.0	-0.9	-0.9	-0.9
6	99.0	98.9	98.5	-2.0	-2.2	-4.1	-0.2	-0.2	-0.2
	100.0	100.0	100.0	...	3.8	...	...	0.4	...
7	97.9	97.9	97.9	7.0	0.0	7.0	0.7	0.0	0.3
9	99.9	99.9	99.9	0.0	-0.1	-0.1	0.0	0.0	0.0
8	93.2	92.6	92.0	-3.5	-4.6	-8.0	-0.4	-0.5	-0.4
2	52.6	49.6	43.9	3.3	3.1	6.5	0.3	0.3	0.3

Annex 4: Understanding the report process: Stakeholder participation in the consultation and review process

This report combined information obtained from two approaches: (a) analysing existing information and statistical data and (b) stakeholder consultation.

A wide stakeholder consultation process was carried out, including an expert survey questionnaire, face-to-face stakeholder consultations (in Panama, Mexico, Brazil and Argentina) and report review process as summarized below:

Expert survey questionnaire

The survey was based on the information collected from 33 organizations (16 countries) through a questionnaire sent to more than 150 experts in the region. The ROLAC and UNEP DTIE databases were used for this task. The results of this process can be found in Annex 6.

Face-to-face stakeholder consultations

Additionally four face-to-face stakeholder consultations were facilitated by UNEP in 2010 and 2011 in Panama, Coatzacoalcos-Mexico, Florianopolis and Santa Fe with additional 80-100 participants who contributed to shaping the report. Please find the complete list of participants in Annex 5.

Report review process

Finally, about 20 national/regional/international reviewers contributed to the report revision process (please see the complete list of peer reviewers in the acknowledgements section).

Annex 5: Face-to-face stakeholder consultations: Participant list

Panama City, Panama, April 13, 2010

Strengthening national capacities for sustainable resource management in the Latin America and the Caribbean, Launching meeting

Participant	Organization	Country
Leopoldo Sahores	Environmental Division Ministry of Foreign Affairs	Argentina
Dwayne Curtis	Dept. of Environmental Health Services Ministry of Environment	Bahamas
Philip Pile	Environmental Protection Department	Barbados
Manuela Mata Zuñiga	Investigación y Desarrollo Ministerio del Ambiente, Energía y Telecomunicaciones	Costa Rica
Henry Sanchez	Department of Environment Ministry of Natural Resources and the Environment	Belize
Martha María Senti Darias	Ministerio de Ciencia, Tecnología y Medio Ambiente	Cuba
Elsa Ferreras	Secretaría de Estado de Medio Ambiente y Recursos Naturales	Dominican Republic
Paul Phillip	Ministry of Environment, Foreign Trade & Export Development	Grenada
Miguel Araujo	Centro Regional del Convenio de Basilea Para Centroamérica y México	El Salvador
Marie Alice Limage	Ministry of Environment	Haiti
Fausto Leovel Cano Tello	Ministerio de Ambiente y Recursos Naturales	Guatemala
Indira Katania Sierra Molina	Centro de Estudios y Control de Contaminantes, CESCCO-SERNA	Honduras
Princess Osbourne	Ministry of Health	Jamaica
Julio A. Castillo	Autoridad Nacional del Ambiente	Panama
Jorge Jimenez Perez	Secretaria del Medio Ambiente y Recursos Naturales	Mexico
Araceli Cerrud	Autoridad Nacional del Ambiente	Panama
Maria Ines Esquivel	Centro de Información e Investigación de Medicamentos y Tóxicos, Universidad de Panamá, Ministerio de Salud	Panama
Gloria Beatriz León Araujo	Secretaría del Ambiente	Paraguay
Vilma Morales Quillama	Dirección General de Salvo Ambiental	Peru
Marcus Richards	Ministry of Agriculture, Forestry and Fisheries	Saint Vincent and the Grenadines
Hiram Williams	Bureau of Standards /Multi purpose Laboratory	St. Kitts and Nevis
Juan Fernando Lugris	Embajada del Uruguay en Alemania	Urugua
Yasmin Jude	Ministry of Physical Development and the Environment	Santa Lucia
Judith Torres	Dirección Nacional de Medio Ambiente	Uruguay
Jordi Pon	Amphos 21	Panama
Lilian Corra	Asociación Argentina de Médicos por el Medio Ambiente (AAMMA)	Argentina
Zuleika Nycz	ACPO/APROMAC	Brazil
Jorge Conte Burrell	Alianza Contaminación Zero	Panama

Florianopolis, Brazil, November 23, 2010

'Workshop on the development of pilot projects towards sustainable resource management in Latin America and the Caribbean'

Participant	Organization	Country
Rafael Porto Tupinambá	Pepsi	Brasil
Andreza Araujo	Pepsi	Brasil
Cassia Maria Lie Ugaya	Universidade Tecnologica Federal do Parana	Brasil
Tiago Barreto Rocha	Universidade Tecnologica Federal do Parana	Brasil
Liliane Sessi	Universidade Tecnologica Federal do Parana	Brasil
Joao Paulo Stadler	Universidade Tecnologica Federal do Parana	Brasil
Liliane Klemann	Universidade Tecnologica Federal do Parana	Brasil
Joao Paulo Stadler	Universidade Tecnologica Federal do Parana	Brasil
Sabrina Sousa	Universidade de Sao Paulo	Brasil
Alexandra Lichtenberg	Ecohouse	
Camile Helpa	Universidade Federal de Santa Catarina	Brasil
Francieli Tatiana Olszensvski	Universidade Federal de Santa Catarina	Brasil
Franciele Fedrizzi	Universidade Federal de Santa Catarina	Brasil
Pablo Arena	Univeridad de Mendoza	Argentina
Donna King Braithwaite	Ministry of Energy and Environment	Barbados
Carmen Silva	Colombia	Colombia
Zacarias Navarro	Ministry of Environment and Natural Resources	Dominican Republic
Giovanni Tobar	Ministry of Environment and Natural Resources	Guatemala
Cecilia Aburto Schweitzer	Chile	Chile
Fabien Brones	Natura	Brasil
Claudia Pena	Research Centre for Mining and Metallurgy	Chile
Marcela Perez	Colombia	Colombia
Paulo Egler	Instituto Brasileiro de Informaçao em Ciencia e Tecnologia	Brasil
Felipe Lion Motta	ACV Brasil	Brasil
Maite Aldaya	Water Footprint Network	Spain
Sonia Valdivia	United Nations Environment Programme	Peru
Jose Leal	Economic Commission for Latin America and the Caribbean	Chile

Coatzacoalcos, México, April, 7 and 8, 2011

Training on Water Life Cycle Impact Assessment, Footprint and Neutrality

Workshop on the development of pilot projects towards sustainable resource management in Latin America and the Caribbean

Participant	Organization	Country
Matina Prox	IFU Hamburg	Germany
Cecilia Makishi Colodel	PE International AG	Germany

Participant	Organization	Country
Bárbara Civit	UTN-FRM	Germany
Rafael Porto Tupinambá	PesiCo	Brazil
Ines Cristina M. Francke	Natura	Brazil
Cassia María Lie Ugaya	UTFPR/ABCV	Brazil
Rita Monteiro	IEE/USP	Brazil
María Amelia Enriquez	ECOECO/IRP	Brazil
Sueli Aparecida de Oliveira	Fundacao Espaco Eco - BASF	Brazil
Alfredo Iriarte	Univ. De Talca	Chile
Juan Pablo Cárdenas Ramírez	Univ. De la Frontera	Chile
Claudio Zaror	Univ. De Concepción	Chile
Mabel Vega	Universidad de Concepción	Chile
Carolina Jaramillo	Fundación Chile	Chile
Carlos Toro	Centro Nacional de Producción Más Limpia	Colombia
Oscar O.Ortiz R.	Univ. De Pamplona	Colombia
Ana Quiroz Lara	EcoGlobal/Alcala y Red Iberoamericana Ciclo de vida	Costa Rica
Darío Proaño Leroux	Río Muchacho Organic Farm	Ecuador
Clarice Sandoval	Consultant, PNUMA	El Salvador
José Mario Sorto	UPADI	El Salvador
Ramón Llamas	Fundación Botín	Spain
Sonia Valdivia	UNEP	France
Giovanni Tobar Guzmán	Ministerio de Ambiente y Recursos Naturales de Guatemala	Guatemala
Nydia Suppen	CADIS	Mexico
Mireya González	CADIS	Mexico
Patricia Phumpiu	TEC de Monterrey	Mexico
Pedro Salvador Rosas	HESCO	Mexico
Monserrat Coatl Popoca	AgraQuest de México S.A. de C.V.	Mexico
Moisés Magdaleno Molina	Instituto Méxicano del Petróleo	Mexico
Elisa Tonda	UNEP-ORPALC	Panama
Jorge G Conte	Alianza Contaminación Cero	Panama
María Luisa Espinosa	Centro de Eficiencia y Responsabilidad Social Grupo GEA/CER	Peru
Marcos Alegre Chang	CER/Grupo GEA	Peru
José Martín Polo	Univ. Católica San Pablo	Peru
Isabel Quispe	Pontíficia Univ. De Católica del Perú	Peru
Llorenç Milà i Canals	Unilever	UK
Zacarías Navarro	Ministerio Ambiente y Recursos Naturales	Dominican Republic
Sebastien Humbert	Quantis/UNEP	Switzerland
Emilia Moreno Ruiz	The Ecoinvent Centre	Switzerland
Gladys Zerquera B.	IIM- SE- Ambiental	Mexico
Carlos Naranjo M.	GAIA+Politécnico JIC	Colombia
Elena Rosa		Cuba

Santa Fe, Argentina, September 14 and 15, 2011

'Taller Gestión Sostenible de Recursos (GESRE)'

Participant	Organization	Country
Ana Quirós Lara	EcoGlobal/Alcala y Red Iberoamericana Ciclo de vida	Costa Rica
Rita Monteiro	IEE/USP	Brasil
Carolina Jaramillo	Fundación Chile	Chile
Claudio Zaror	Univ. de Concepción	Chile
Roberto Villablanca	Ministerio del Medio Ambiente	Chile
Luis Javier Arango	GAIA+Politécnico JIC	Colombia
Carlos Toro	Centro Nacional de Producción Más Limpia	Colombia
Maria Cristina Urrutia	Ministerio del Ambiente	Ecuador
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Alejandro Rossi	UNOPS	Peru
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Monica Borrero	Consultant, PNUMA	Panama
Maite Aldaya	Consultant, PNUMA	Francia
Elisa Tonda	PNUMA	Panama
Alicia Anschau	Candidata a Doctorado de Argentina	Argentina
Carlos A. Ruggerio	Candidato a Doctorado de Argentina	Argentina
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Guillermo Vicente	Estación Experimental Agropecuaria Paraná y Departamento Socioeconomico FCAUNER	Argentina
Silvia Yudith Acuña	UNIMET	Venezuela
Vladimir Valera		Venezuela
Maria Alejandra Sorolla		Argentina

Participant	Organization	Country
Ignacio Narbondo		Argentina
Nora León	Instituto Estudios Ambientales (Universidad Nacional de Colombia)	Colombia
Risiga Amilcar Hugo		Argentina
David Montesdeoca	Organisacion Proyecto Ecologico Macoris Verde	Rep. Dominicana
Rolpan Muradian	MAW	Venezuela
Ma. Agustina Iwan		Argentina
Zuberman Federico	UNGS	Argentina

Annex 6: Participants and answers to the expert survey questionnaire

Participant	Organization	Country	Motivation	
Adriana Marcela Parra	Fundacion Agraria de Colombia	Colombia	La gran preocupacion por el deterioro del medio ambiente, y siendo Colombia un pais con mucha naturaleza puede ayudar con un monton de herramientas para mejorarla calidad de vida y estudios de aspectos como costos e impactos ambientales que generen conciencia a la sociedad y por ende nos beneficiemos todos	
Agustin Noriega	Fundación Gran Chaco	Argentina	Estamos trabajando con las poblaciones indigenas y criollas del chaco semiarido, en el desarrollo de estrategias productivas de organización, con relativo exito y nos gustaria estar en contacto con iniciativas parecidas, participamos de diferentes redes que trabajan en el mismo sentido, pero consideramos que estamos muy lejos de tener una propuesta lo suficientemente afinada.	
Alejandro Pablo Arena	Universidad Tecnologica Nacional - Facultad Regional Mendoza	Argentina	Dirijo un grupo de Investigación y desarrollo orientado al desarrollo y transferencia de tecnologías para el aprovechamiento de las energías renovables y el análisis de ciclo de vida	
Carlos Alberto Palacio	Fundacion T.E.A. (TRABAJO - EDUCACION - AMBIENTE)	Argentina	La FUNDACION T.E.A. Trabajo - Educación - Ambiente es una organización no gubernamental sin fines de lucro (Personería Jurídica N° 1767180 - Inspección General de Justicia), que se ha propuesto mejorar la calidad del trabajo, propiciar una mayor equidad educativa y colaborar en la efectiva protección del medio ambiente. Para ello asesora, planifica, proyecta, gestiona y audita actividades que resulten necesarias y sean requeridas por distintos actores y sectores sociales, de los ámbitos público y privado Institucional: El desarrollo sustentable es un tópico abordado en la mayoría de los proyectos elaborados e implementados desde 1990 a la fecha por los ahora miembros de la Fundación T.E.A. (TRABAJO - EDUCACION - AMBIENTE). Otra razón es porque es transversal al objeto de la Fundación cuyo objeto reza: ¨promover la democratización de la sociedad y la equidad social, para mejorar la calidad de vida, en los ámbitos del trabajo, la educación y el medio ambiente, desempeñándose en el ámbito público y privado. Recursos Humanos: El desempeño de miembros de T.E.A. en proyectos de organismos internacionales . Se participó en EL PROGRAMA DE EDUCACION AMBIENTAL PARA LA CUENCA DEL RIO BERMEJO. El mismo se cumplió en el marco del PEA Nº 129 PARA LA CUENCA DEL RIO BERMEJO - código PNUMA 2227 que contó con la financiación del FMAM y cuyos organismos de implementación fueron la OEA y el PNUMA. Los PROGRAMAS Y PROYECTOS del 2010, dentro de las tres AREAS SUSTANTIVAS de la fundación y en cada uno de los EJES DE TRABAJO ver (www.tea.org.ar) apartado quienes somos	

	Policies or regulations	Practices	Priority sectors
	Regimen Legal del Medio Ambiente	en general en sectores se esta realizando el ahorro de agua, energia y gas, por ejemplo desde los hogares se tienen campañas de implementacion de reciclaje y grupos que limpian las ciudades	En lugares de botaderos de! basura en donde ya no da lugar para mas desechos y el impactos es de gran importancia que afecta tanto a los recursos naturales como a la sociedad.
	La ley mas importante que existe a la fecha es la ley de presupuestos mínimos para la defenza del bosque nativo.	Nosotros realizamos gestión sustentable de recursos en todas las actividades productivas que participamos: Recursos Forestales, Recursos Forestales no maderables. Apicultura Artesania Ganaderia	Cadena forestal Cadena ganadera
	En Argentina se creó la Unidad de Producción Limpia y Consumo Sustentable en el año 2004 bajo la orbita de la Secretaria de Ambiente y Desarrollo Sustentable. Tambien se aprobo la Politica Nacional de Produccion Limpia. La Secretaría de Ambiente y Desarrollo Sustentable convoco, a través de creada Unidad de Producción Limpia y Consumo Sustentable, a diversas instituciones gubernamentales, empresarias, no gubernamentales y universidades, a confor! mar el Consejo Asesor de Producción Limpia y Consumo Sustentable (Resolución Nº 725 del día 4 de octubre del 2004), luego denominado Consejo Asesor de Producción y Consumo Sustentables (CAPyCS), que posee un comite operativo conformado por representantes de los distintos sectores. Por otra parte, la Ciudad de Buenos Aires ha creado el Programa Buenos Aires Produce más Limpio, donde se brinda capacitación a empresas que adhieren al Programa, seguido de acciones de produccion mas limpia con asistencia en la implementacion y posterior seguimiento y monitoreo.	Se han realizado actividades de capacitacion en distintos sectores, como el metalmecanico, bodeguero, en gestion de residuos, compras públicas sustentables y sobre eficiencia energetica en terminos generales. Se estan haciendo acciones de difusion para lograr la penetracion en los distintos sectores. Por ejemplo, la Universidad Tecnológica Nacional ha creado un Centro Tecnológico para la Sustentabilidad con este fin. Al Programa Buenos Aires Produce más Limpio han adherido distintas empresas, varias de ellas frigoríficas (algunas con planes de mejora), otras de la industria metalera, ganadera, láctea, etc.	sector minero, sector publico, sector energetico
	Según Ley general del ambiente. Ley N° 25.675 en su articulo 2º la política ambiental nacional deberá cumplir los siguientes objetivos: a) Asegurar la preservación, conservación, recuperación y mejoramiento de la calidad de los recursos ambientales, tanto naturales como culturales, en la realización de las diferentes actividades antrópicas; b) Promover el mejoramiento de la calidad de vida de las generaciones presentes y futuras, en forma prioritaria; c) Fomentar la participación social en los procesos de toma de decisión; d) Promover el uso racional y sustentable de los recursos naturales; e) Mantener el equilibrio y dinámica de los sistemas ecológicos; f) Asegurar la conservación de la diversidad biológica; g) Prevenir los efectos nocivos o peligrosos que las actividades antrópicas generan sobre el ambiente para posibilitar la sustentabilidad ecológica, económica y social del desarrollo; h) Promover cambios en los valores y conductas sociales que posibiliten el desarrollo sustentable, a través de una educación ambiental, tanto en el sistema formal como en el no formal; i) Organizar e integrar la información ambiental y asegurar el libre acceso de la población a la misma; j) Establecer un sistema federal de coordinación interjurisdiccional, para la implementación de políticas ambientales de escala nacional y regional k) Establecer procedimientos y mecanismos adecuados para la minimización de riesgos ambientales, para la prevención y mitigación de emergencias ambientales y para la recomposición de los daños causados por la contaminación ambiental.	Los programas , proyectos y planes desarrollados por la Secretaría de Ambiente y Desarrollo Sustentable de la Nación de la Republica Argentina : Programa Municipios Sustentables (2007) Su objetivo es generar políticas ambientales en las comunas de todo el país. Se llevo a cabo en más de 200 municipios. Programa Estrategia Nacional de Educación Ambiental (2007) La Educación Ambiental es hoy una de las respuestas mas generalizadas a la emergente crisis ambiental , crisis que se manifiesta en una gran diversidad de problemáticas y por ende de desafíos , que van de lo local a lo nacional y global. Observatorio Nacional para la Gestión de Residuos Sólidos Urbanos (2009) Observatorio Nacional para la Gestión de Residuos Sólidos Urbanos . iniciativa que busca centralizar información estadística e indicadores de todo el país, y que permite socializar y promover el trabajo en red entre distintos sectores para encontrarle una solución conjunta a la problemática de los residuos en Argentina. En la memoria de T.E.A (www.tea.org.ar) en el botón institucional , están registrados las actividades. Destacamoslas vinculadas al desarrollo sustentable : - Cuenca del Río Bermejo , un aporte para su tratamiento en la educación general básica (Biblioteca) - Plan de desarrollo de la localidad de Corcovado provincia de Chubut . Todos los proyectos y actividades mencionadas se relacionan directa e indirectamente con el desarrollo sustentable ya que vincula las 3 áreas sustantivas de T.E.A. que son TRABAJO, EDUCACION Y AMBIENTE.	Desde la Fundación T.E.A. creemos prioritario introducir práctica de gestión sustentable en cinco temáticas que se complementan, integran y colman: ellas son Las energías, administración del Agua, tratamiento de residuos, planificación estratégica urbana y fortalecimiento de la gestión pública local. T.E.A. ha confeccionado en general y con campo de aplicación y presentado ante organismos nacionales e internacionales los siguientes proyectos: ? "La Agrumadora. Un emprendimiento para reciclar residuos" en la Ciudad de Luján - provincia de Buenos Aires ? "Planificación Estratégica Urbana" - en la Ciudad de Mar del Plata - provincia de Buenos Aires ? "La radioactividad, la gente y el ambiente" Libro gratuito - Campaña de concientización Nacional ? "Educación. Una solución para el tratamiento de la basura en la Ciudad Autónoma de Buenos Aires" Proyecto de sensibilización y concientización en la Ciudad de Buenos Aires - Capital Federal. ? "Fortalecimiento de la Gestión Pública Local" en la Ciudad de Luján provincia de Buenos Aires ? "Cuencas Hidrográficas: Río Salado" campaña de concientización en varios Municipios de la provincia de Buenos Aires ? "Más y mejores playas para Villa Gesell". Un nuevo Balneario. Estudio de impacto ambiental; modelo de parador y soluciones para el agua dulce. ? Proyecto "Aguas SXXI" Red de actores vinculados a la administración, gestión y uso del agua. ? "Energías Alternativas. Hoy" Campaña de concientización a nivel Nacional ? Programa "Agua potable para hoy y mañana. En nuestro Municipio" Concientización del binomio AGUA POTABLE - TRATAMIENTO DE RESIDUOS De ser necesario estos Programas y Proyectos pueden ser presentados.

Participant	Organization	Country	Motivation	
Carlos Arturo Puente Burgos	Pontificia Universidad Javeriana - Centro de Proyectos para el Desarrollo, Cendex	Colombia	El Cendex, Centro de Proyectos para el Desarrollo, es una unidad académica con carácter interdisciplinario de la Pontificia Universidad Javeriana, que genera y aplica conocimiento y desarrolla tecnología de la más alta calidad, con carácter interdisciplinario, para contribuir al desarrollo social e institucional, de acuerdo con sus prioridades y los requerimientos de organizaciones externas, nacionales e internacionales Con la participación en la iniciativa de la Red de Información en Consumo y Producción Sustentables para América Latina, el Cendex busca aportar, desde su experiencia en políticas sociales y en el conocimiento y análisis de las distintas formas de recursos propios de los territorios y de los actores vinculados a él, el diseño de metodologías y estrategias que permitan integrar la dimensión ambiental en los procesos encaminados al desarrollo de los territorios, buscando que se promuevan mejores condiciones para la producción con criterios de sustentabilidad, acordes con las políticas de producción más limpias que son promovidas por el Ministerio de Ambiente, Vivienda y Desarrollo Territorial.	
Carlos Perera Heinrich	Centro Nacional de Producción más Limpia	Costa Rica	Promover la gestión sustentable de los recursos materiales en las pequeñas y medianas empresas de Costa Rica.	
Carmen Cristina Terry Berro		Cuba	Soy la coordinadora del Grupo Nacional para la Producción y Consumo Sostenibles y del Programa Nacional sobre el tema y tenemos mucho que aprender sobre el tema de gestión sustentable de los recursos..	

	Policies or regulations	Practices	Priority sectors
	Una Gestión Ambiental y del Riesgo que Promueva el Desarrollo Sostenible. Plan Nacional de Desarrollo 2006-2010. - Política nacional de producción más limpia y consumo sostenible.	Se citan las estrategias que desarrolla el Ministerio de Ambiente, Vivienda y Desarrollo Territorial, como forma de promover prácticas de gestión sustentable de recursos para el sector productivo del país, considerando la diversidad territorial existente en el país: - Guías ambientales, proyectos piloto, consolidación de una red de nodos y ventanillas regionales de producción limpia y espacios de intercambio de experiencias. - Fortalecimiento de la capacidad regional consolidada con una red de producción más limpia. - Financiación de gran número de iniciativas que son ejecutadas por las Autoridades Ambientales regionales y urbanas y sus actores productivos. - Promoción de prácticas empresariales de autogestión y autorregulación. - Convenios, algunos de ellos nacionales, como los del sector eléctrico, plaguicidas y azucarero; regionales con participación del Ministerio como signatario, con los subsectores porcícola, avícola, cafetero, de puertos marítimos, industrial del oriente antioqueño, cluster de la construcción, entre otros, y regionales firmados entre la Autoridad Ambiental y el sector interesado. - Beneficios tributarios para la inversión ambiental, dentro de los cuales los objetivos de la producción limpia tienen un papel preponderante, otorgando incentivos tributarios en renta y en IVA, lo que permite inversiones ambientales.	Producción de vivienda - Producción de suelo urbano - Procesos de producción, rural y urbana, de pequeñas empresas - Procesos de desarrollo económico local
	Propuesta de \\\"Ley de produccion y consumo sostenible\\\" Propuesta de \\\"Ley de Gestión Integrada de Residuos\\\"	Implementacion de Produccion mas Limpia en mas de 200 empresas de Costa Rica. Implementación de sistemas de gestión ambiental en empresas de Costa Rica Desarrollo de planes municipales de gestión integrada de residuos.	Las pequeñas y medianas industrias de diferentes sectores industriales necesitan conocer e introducir prácticas de gestión sustantablede recursos en sus operaciones diarias.
	`- El Programa Nacional de Consumo y Producción Sostenibles se encuentra actualmente en fase de consulta y aprobación. Su implementación debe comenzar en el segundo semestre de 2010. - Ley 81 "Del Medio Ambiente" (artículo 3), establece que es deber del Estado, los ciudadanos y la sociedad en general proteger el medio ambiente mediante su conservación y uso racional; la lucha sistemática contra las causas que originan su deterioro y la reducción y eliminación de las modalidades de producción y consumo ambientalmente insostenibles. - Resolución No. 40/2007 del Ministerio de Ciencia, Tecnología y Medio Ambiente (CITMA). Pone en vigor la Estrategia Ambiental Nacional 2007 - 2010 y establece que los Organismos de la Administración Central del Estado (OACEs), sus empresas y otros entes empresariales, nacionales o extranjeros deben acompañar a las autoridades ambientales en el diseño de medidas globales de su competencia para el medio ambiente y la protección de los recursos naturales, que incluyen la lucha sistemática contra las causas y condiciones que originan la contaminación, la aplicación de medidas preventivas y la aplicación de estrategias de producción más limpia. - Decreto No. 281 de 2007. Reglamento para la implantación y consolidación del Sistema de Dirección y Gestión Empresarial Estatal, establece en su artículo 478, que las empresas deben aplicar adecuadamente los principios de producción más limpia y consumo sostenible.	- Sector petrolero: En el país se ha desarrollado aceleradamente la producción petrolera utilizando sistemas herméticos de recolección del petróleo y gas. El crudo extraído de los pozos se somete a un proceso de separación del gas y el petróleo. El gas acompañante, que años atrás se quemaba en flares, en la actualidad se envía por gasoducto hacia otra empresa, que produce energía eléctrica y obtiene subproductos como azufre, nafta y otros.Con este sistema hermético de recolección y transportación del crudo y el gas a través de oleoductos y gasoductos, se aprovecha el gas que antes se emitía a la atmósfera, se minimizan los escapes a la atmósfera y las posibles afectaciones al medio. La generacíón de energía eléctrica utilizando el gas acompañante se incrementó en 1 237 GW.h en el período 2000 - 2008. - Sector eléctrico: La aplicación de un sistema de generación distribuida ha posibilitado redicir los índices de consumo de combustibles en la generación eléctrica, reducir las pérdidas de transmisión y subtransmisión, brindar mayores facilidades y menor gasto de reparaciones, aportar al sistema electroenergético nacional en caso de necesidad y la generación en microsistemas aislados ante casos de catástrofes u otras necesidades. - Sector sideromecánico: Recuperación de unas 100 mil toneladas de materias primas contenidas en los equipos electrodomésticos sustituidos por otros más eficientes (86 mil toneladas de acero, seis mil toneladas de aluminio y cuatro mil toneladas de cobre). La chatarra obtenida se emplea en la producción de barras de acero, conductores eléctricos, utensilios de cocina, tuberías plásticas, suelas de calzados, entre otros artículos de vital importancia para la economía del país.	Energía Contruccion Produccion de alimentos

Participant	Organization	Country	Motivation	
Cássia Maria Lie Ugaya	UTFPR/ABCV	Brasil	A motivação para participar na iniciativa consiste em atualizar-me, contribuir na discussão e disseminar o conhecimento adquirido na região.	
Catalina María López Martínez	Universidad Nacional de Colombia	Colombia	Mi principal motivación es el deseo de contribuir con las iniciativas que permitan ayudar a mejorar el futuro del mundo pues, aunque generalmente el futuro de éste es incierto, en nuestras manos estara siempre la posibilidad de cambiarlo.	
Cecilia Anita Häsner Domjan	Instituto de Desenvolvimento Integrado para Ações Sociais - IDEIAS	Brasil	La principal motivación en participar de esta Iniciativa con el Proyecto "Plano Estratégico de Negócios Ambientais Amigáveis com o Clima no Espírito Santo" consiste en la oportunidad de intercambiar experiencias con otros Proyectos de diferentes países de la Región, estimulando y diseminando el conocimiento sobre el consumo y producción sustentable, con el foco en una economía de bajo carbono. Otra motivación es contribuir a través de una gestión integrada con los diversos actores que actúan en el ECOMERCADO (oferta y demanda, o productores y consumidores), bien como con otros programas y foros afines internacionales o en el Estado del Espírito Santo, Brasil, tales como el "Fórum Capixaba de Mudanças Climáticas" (FCMC), el "Fórum Estadual de Produção e Consumo Sustentável" y el "Programa Capixaba de Materiais Reaproveitáveis" (PCMR).	

	Policies or regulations	Practices	Priority sectors
	Política Nacional de Recursos Hídricos (LEI Nº 9.433, DE 8 DE JANEIRO DE 1997) Áreas de Proteção Naturais	Gestão de recursos hídricos no setor elétrico e na mineração Gestão do uso do solo no setor agrícola Manejo sustentável no setor florestal	Setores pesqueiro, agrícola, florestal, mineração
	En Colombia la normatividad ambiental ha tenido un importante desarrollo en las últimas tres décadas, en especial, a partir de la Convención de Estocolmo de 1972, cuyos principios se acogieron en el Código de recursos naturales renovables y de protección al medio ambiente (Decreto Ley 2811 de 1974). Éste se constituyó en uno de los primeros esfuerzos en Iberoamérica para expedir una normatividad integral sobre el medio ambiente. Luego, en 1991, como fruto de la nueva Constitución Política colombiana, se redimensionó la protección medio ambiental, elevándola a la categoría de derecho colectivo y dotándola de mecanismos de protección por parte de los ciudadanos, en particular, a través de las acciones populares o de grupo y, excepcionalmente, del uso de las acciones de tutela y de cumplimiento. En desarrollo de los nuevos preceptos constitucionales, y de acuerdo con la Conferencia de las Naciones Unidas sobre medio ambiente y desarrollo, de Río de Janeiro en 1992, se expidió la Ley 99 de 1993, que conformó el Sistema Nacional Ambiental (Sina) y creó el Ministerio de Ambiente como su ente rector.	Manejo integrado de cuencas, agricultura y uso sostenible de recursos naturales.(MIC). un programa de InWEnt para los paises andinos. El objetivo del programa es que a través del desarrollo de capacidades, éste contribuye a fortalecer la competencia técnica, metodológica y de acción de los intermediarios y actores en las cuencas hidrográficas seleccionadas. Contribuye así al establecimiento de procesos participativos y consensuados en la planificación y manejo integrado entre las organizaciones de apoyo fomentadas y la población en la cuenca como grupo meta. Planes de ordenamiento territorial o POT\'s que responderían al intento de integrar la planificación socioeconómica con la física, procurando la consecución de la estructura espacial adecuada para un desarrollo eficaz y equitativo de la política económica, social, cultural y ambiental de la sociedad. En el archipielago de San Andres se esta realizando un proyecto de Sostenibilidad de ecosistemas marinos. Plan de gestión para protección ecológica y uso económico de la rica biodiversidad en islas colombianas en el Caribe.	Lo ideal es que todos los procesos productivos y extractivos de un pais se realizaran de manera sostenible, sin embargo aun falta mucho para alcanzar esta situacion ideal. Cosidero que sectores como la pesca comercial, produccion de biocombustibles, extracciones petroleras, la explotacion de los bosques, el manejo de aguas subterraneas, cuencas y humedales, entre otros, necesitan con urgencia regulaciones para una gestion sustentable de recursos.
	Existen diferentes políticas para el manejo sustentable de los recursos, sean leyes o decretos nacionales: 1) Decreto 4.339/2002 - Princípios e Diretrizes para Implementar la "Politica Nacional de Biodiversidade". 2) Decreto 3.945/2001 – Composición del Consejo de la Gestión Del Patrimonio Genético, y establece las normas para su funcionamiento, mediante a reglamentación de los arts. 10, 11, 12, 14, 15, 16, 18 e 19 de la Medida Provisoria no 2.186-16, de 23 de agosto de 2001. 3) Medida Provisoria no 2.186-16/2001 - Dispone sobre el acceso al patrimonio genetico, la protección y el acceso al conocimiento tradicional asociado, la repartición de beneficios y el acceso a tecnologia y transferencia de tecnologia para su conservación y utilización, y dispone otras providencias 4) Decreto 4.871/2003 - Planos de Areas para el Combate a polución por Oleo, en áreas bajo jurisdicción nacional y da otras providencias. 5) Lei 7.661/1998 – Instituye el "Plano Nacional de Gerenciamento Costeiro". dispone de reglas de uso y ocupación de la zona costera y establece criterios de gestión de la orla marina, y da otras providencias. 6) Lei 9.966/2000 – "Prevenção, Controle e Fiscalização da Poluição Causada por Lançamento de Óleo e outras Substancias Nocivas ou Perigosas". Dispone sobre la prevención, control y la fiscalización de la poluición causada por lanzamiento de oleo y otras substancias nocivas o perigrosas en aguas bajo jurisdicción nacional y da otras providencias. 7) Decreto nº 4.340/2002 – Reglamentación del "Sistema Nacional de Unidades de Conservação da Natureza – SNUC". 8) Decreto nº 5.092/2004. Define regras para identificação de áreas prioritárias para a conservação, utilização sustentável e repartição dos benefícios da biodiversidade, no âmbito das atribuições do Ministério do Meio Ambiente. 9) Decreto nº 6.660/2008 – Reglamentación de la "Lei da Mata Atlântica". 10) Lei Nº 4.771/1965 - Código Florestal. 11) Lei Nº 9.433/ (8/01/ 1997). Instituye la "Política Nacional de Recursos Hídricos", crea el Sistema Nacional de Gerenciamento de Recursos Hídricos, entre otras providencias. 12) LEI N o 10.295, DE 17 DE OUTUBRO DE 2001. Dispone sobre la "Política Nacional de Conservação e Uso Racional de Energia", y da otras providencias.	Los ejemplos don relativos al "agroextravismo", tales como el caucho de las Siringueiras y cacao.	El sector prioritario es la cadena productiva de Rocas Ornamentales (Mármol y Granito), pues es una actividad intensiva en recursos naturales, altamente impactante y degradadora del medio ambiente, en el cual se tiene pocas medidas para Producción Sustentable. Además, el Estado de Espírito Santo es responsable por 68% de las exportaciones de rocas brasileras, en dólares, y más de 89% de las exportaciones nacionales de manufacturados de mármol y granitos (chapas ye revestimientos).

Participant	Organization	Country	Motivation	
Claudia Peña	Centro de Investigación Minera y Metalúrgica (CIMM)	Chile	Nuestra institución trabaja en la sustentabilidad de la minería y los metales. Por lo cual, desde años se desarrollamos programas de análisis de ciclo de vida para la minería en el país, asimismo como el impulso a recientes iniciativas de determinación de huella de agua y de ecología industrial y simbiosis industrial para el sector minero y metálico, a través de el análisis de flujo de materiales dentro del mismo sector y su intercambio con otros sectores productivos.	
Claudio Zaror	Universidad de Concepcion	Chile	Evaluación de Ciclo de Vida	
Cristian Vinicio Otavalo Alba	Federación de Organizaciones Populares de Ayora-Cayambe, UNOPAC	Ecuador	Somos una organización involucrada en todos los procesos que interviene dentro de este proyeto desde la gestión de nuestros recurso hasta la transformación de todos los potenciales e involucramiento de la participación activa de los actore. Por que somos una organización vinculadas con la producción sustentable desde la producción agrícola hasta el procesamiento para dar un valor agregado dentro de nuestros territorio.	
Daniel Bravo Acosta	Grupo FARO	Ecuador	Grupo FARO es un centro de políticas públicas que viene trabajando en la consolidación del desarrollo basado en la generación de políticas públicas innovadoras, que sean sostenibles técnica y políticamente. Para lograr este objetivo hemos visto prioritario desarrollar las capacidades de los gobiernos locales en la gestión ambiental urbana de sus ciudades, en sectores prioritarios como el manejo de residuos sólidos y movilidad sustentable, a través de un trabajo conjunto entre la sociedad civil, las instancias públicas y sector empresarial.	

	Policies or regulations	Practices	Priority sectors
	Las políticas ambientales hasta ahora se han enfocado en definir normativas de emisiones y/o niveles máximos de tóxicos aceptable en aguas de regadío, aguas superficiales y aire. Au! n no hay una tendencia hacia gestionar integral y estratégicamente el movimiento de flujos de materiales y energía.	La captación de gases de fundicón de refinerías de concentrados de cobre, que son transformados posteriormente en ácido sulfúrico, el cual puede ser consumido totalmente en la línea hidrometalúrgica de producción de cobre a partir de mineral oxidado.	Sector minero y metalúrgico y también forestal y la celulosa.
	Incipientes para areas silvestres protegidas	Manejo sustentable de plantaciones forestales	Forestal
	Principalmente en estos últimos 5 años se empoderado principalmente en la gestión y administración de los recursos naturales principalmente del agua, no renovables y la reactivación agropecuaria mediante la regulación de la tenencia de las tierras y su respectivo uso por parte de los propietarios y a la vez favoreciendo esta política a los campesinos que están directamente involucrado con todos estos recursos bajo un enfoque ecológico Dentro de las políticas sobre el manejo de nuestros recursos a nivel nacional de nuestro País Ecuador se tiene un enfoque de reacctivación agropecuaria a tráves del Ministerio de Agricultura y Ganadería y otros proyectos con el Ministerio del Ambiente en coordinación con otros ministerios para el uso y manejo equitativos delos recursos naturales renovables y no renovables	En nuestra organización se sigue luchando por la situación de tierra, agua y páramos para que sea equitativamente beneficiarios todos los actores de cada una de las familias. Con ! la fundaciónes realacionadas directamente en este trabajo, que esta trabajando a nivel de todo el país dentro lo que la economía solidaria tiene un proyecto desde la visión de conservación y producción tanto agrícola como agroindustrial relacionado con el manejo de los recursos como agua. manglares, paramos y reservas ecológicas	En la producción y nos interesaría estar en el proceso de transformación y comercialización de nuestros preoductos Estamos dentro del sector de la serranía ecuatoriana donde se tiene una visión a largo plazo de introducir la producción agroecológica y luego tener una comercialización local y posteriormente a nievl nacinal se convierta en una de las políticas de estado y relacionar con la soberanía alimentaría que es uno de los procesos o guías para el manejo sustentable de los recursos principalmente del agua y páramos dentro de nuestro territoro donde estoy involucrado en este proceso.
	En el Ecuador existe la Ley de Gestión Ambiental, que es una ley orgánica de la cual se desprenden una serie de normativas y regulaciones! que rigen y reglamentan la gestión de los recursos.	La encuesta de percepción ciudadana es una experiencia que busca fortalecer la capacidad de gestión de los gobiernos locales para responder con eficacia a las expectativas de su población y que esta línea base permita ajustar sus metas e inversiones. Grupo FARO, conjuntamente con el Gobierno Municipal de Orellana deciden hacer un levantamiento con el fin de contar con una radiografía sobre la visión ciudadana en torno a la problemática ambiental. A pesar que esto no entra dentro de un sector productivo o extractivo, incentiva incidir en la gestión sustentable de los recursos, en si de los que son uso de la ciudad. Otra experiencia que impulsada por Grupo FARO ha sido el manejo sostenible de desechos sólidos, que busca generar información o evidencia sobre la problemática de los desechos sólidos, la que permita iniciar un proceso de discusión sobre las posibilidades de generar una participación en la solución de la problemática por parte de los gobiernos locales. A través de la aplicación de un sistema de monitoreo de la basura generada en la playa y en las calles de El Palma(Santa Elena – Ecuador) se pudo determinar la cantidad de desechos orgánicos e inorgánicos generados, información que ayuda a la generación de evidencia que contribuya en la toma de decisiones para solucionar los problemas en el manejo de desechos sólidos en la Península de Santa Elena y como hacer de esto una actividad productiva. También existen experiencias en las cuales no ha participado directamente Grupo FARO, pero servirán de experiencia para las iniciativas planteadas por nuestra organización. Sectores de Prioridad: El manejo de los residuos sólidos en todas las ciudades se ha convertido en una problemática en la gestión de los municipios, especialmente en aquellos que han tenido un crecimiento sin planificación ni ordenamiento. Una de las opciones para superar esta problemática ha sido el incorporar una cadena productiva alrededor del manejo de residuos sólidos, con prácticas como el reciclaje dirigido al uso de materiales con valor agregado para ser incorporados en cadena de mercado. Otro de los sectores en donde es necesario introducir una gestión sustentable de los recursos es la agricultura, ya que con las técnicas usuales como el uso de agroquímicos provoca que recursos como el suelo y el agua sean contaminados en detrimento del medio ambiente.	

Participant	Organization	Country	Motivation	
Daniel Gómez	Fundación Universitaria Monserrate	Colombia	Soy docente de Gestión Integral de Residuos Sólidos y mi visión de la gestión integral de residuos se enfoca en el tema del consumo y producción sostenible (desde la perspectiva del Análisis de Ciclo de Vida).	
Daniel Tabaré González López	No tengo institución, estoy planeando forma un grupo de trabajo conjunto.	Uruguay	En mi país se está intentando introducir la energía solar y mi preocupación son las normas y reglamentos que habrán de regular dicha utilización, Pienso de que falta capacitación, asimismo estoy intentando realizar un curso a distancia, cuyo costo es elevado para mis posibilidades. Me preocupa que no hayan becas de estudio subvencionadas por el gobierno.	
David Falcon Adasme	Deloitte	Chile	El desarrollo sostenible es de vital importancia para el desarrollo comercial de las economías emergentes, donde el uso de recursos naturales tanto en la industria extractiva como en otro tipo de industria ha pasado a ser uno de los puntos claves para lograr el equilibrio entre desarrollo y gestión sustentable. Dado lo anterior, mi principal motivación es que los países y las empresas consideren y apliquen medidas orientadas a generar mejores prácticas relacionadas con el desarrollo sostenible. Esta mezcla del sector público y privado genera un fortalecimiento de las objetivos estratégicos en términos sostenibles, por lo tanto colaborar en este proyecto es un incentivo a colaborar con el equilibrio social, ambiental y económico de los países.	
Delfo Mercado Veliz	Universidad Alas Peruanas	Perú	Tener idea de como se tener un desarrollo sustentable protegiendo nuestro ecosistema intacto para la futuras generaciones	
Efrain Augusto Acevedo	ONG La Nueva Argentina	Argentina	Nuestra ONG. La Nueva Argentina, es una ONG. que lucha contra la pobreza atravez del Microcrèdito en la Regiòn Norte de la Provincia de Còrdoba, Repùblica Argentina,. Nuestra Sede esta en la ciudad de Deàn Funes y el lugar de trabajo es la localidad de Lucio V. Mansilla, a 750 kms. de la ciudad de Buenos Aires, capital de Argentina, esta localidad esta es parte del Ecocistema de las Salinas Grandes, ecocistema que comprende cuatro Provincias Argentinas. Es una de las Regiones menos desarrolladas de Argentina. Nuestra misiòn es el apoyo a los emprendedores, artesanales, rurales, para que lleven adelante sus emprendimientos productivos, cuidando el Mediohambiente. nuestro trabajo esta en YouTube.com de! ben ingresar en el buscador \"ONG. La Nueva Argentina-Microcredito\" o en nuestra pagina web www.nuevaargentina.org y en el buscador poner la palabra \"videos\"	

	Policies or regulations	Practices	Priority sectors
	Decreto 1608 de 1979 - Código nacional de recursos naturales. Guias Ambientales Sectoriales	Existen prácticas que se han empleado en la industria metalmecánica, en la industria de recubrimientos, hoteles, hospitales, en sector porcícola, entre otras.	En las Pequeñas y Medianas Industrias.
	Ya existe una ventana abierta a las importaciones de materiales para la generación de recursos de energías alternativas. Se han bajados los costos de importación y se promueve la colocación en obras arquitectónicas de recursos alternativos de energía.	Si ya se han instalado equipos de calentamiento de agua a través de energía solar en Sanatorios y Hospitales, lo cual significa un gran avance en este sentido. Es un ejemplo de gestión sostenible de recursos-	El sector en el cual me interesaría desarrollar mi tarea, junto al grupo de gente que me acompañaría, sería el desarrollo de gestión de recursos sostenibles en los hogares, Intentando que la generación de energía solar sea completa, fotovoltaica y fototérmica, liberando los sectores de mayor generación (Represas Hidroeléctricas), la cual debe cubrir mayoritariamente los sectores productivos (de mayor demanda energética), a los cuales en momentos de falta de agua (sequía) se les complica el abastecimiento. En pocas palabras, comenzar a trabajar en los sectores domésticos.
	En Chile está fortaleciendo sus regulaciones asociadas a la gestión sostenible de recursos, pero en la actualidad existe un listado de políticas y regulaciones relacionadas: - Ley 19:300, Ley Base del Medio Ambiente - Plan de Acción Nacional de Cambio Climático, desarrollados por la Comisión Nacional de Medio Ambiente (CONAMA) - Planes de Cierre de Faenas Mineras (SERNAGEOMIN) - DS 148: Gestión de Residuos Peligrosos, Ministerio de Salud - Normas de emisiones de Material Particulado, que hoy está cambiando desde PM10, a PM 2.5 - Normas de emisiones de Descargas de Residuos Industriales Líquidos, como el Decreto Supremo 90 - Entre otras, cabe destacar que en Chile hoy se está en proceso de cambios asociados a una Nuevas Institucionalidad Ambiental, (adjunto mayor descripción en archivo adjunto)	Dada mi experiencia en la industria minera, considero que la gran minería chilena está aplicando cada vez mas mejores estándares asociados a sostenibilidad. Por lo general las empresas extrajeras en Chile, debe cumplir con los estándares de su país original que son superiores a los nacionales, por lo tanto la gestión de sostenibilidad en la gran minería chilena se ha transformado en un caso de éxito a nivel mundial. Entre las políticas aplicadas se encuentran básicamente: - Plan de Gestión Sostenible en la Extracción - Plan de gestión de Residuos - Normas de emisiones de PMx - Plan de Extracción y Manejo de Agua - Descarga de Riles - Abatimiento de emisiones de CO2, básicamente asociadas al cambio climático - Plan de Cierre de Faenas	En el sector minero, el punto clave hoy es introducir practicas de gestión sostenible de recursos sobre los contratistas y cadena de proveedores, debido a que la sustentabilidad debe realizarse a lo largo del ciclo de vida del producto para que esta gestión de sostenibilidad sea completa.
	bueno la politica de nuestro pais tien mucho que desear pero se basa en lo basico si contaminas tienes que dar dinero a manera de respaldo pero hasta el momento no se da una verdadera solucion	en las minas se esta logrando concentrar la idea de gestion de calidad total	en la indutrial y minera
	Las politicas de regulaciòn en la materia las lleva adelante la Secretaria de Mediohambiente y Desarrollo Susrentable del Gobierno Argentino.	En la Microempresa atravez del Programa de Microcrèditos Banco Popular de la Buena Fe, financiado por el Ministerio de Desarrollo Social de Argentina.	En el sector de la Micro y Mediana Empresa.

Participant	Organization	Country	Motivation	
Efraín Molina	Instituto de Economía y Administración - Universidad Nacional de La Rioja - Argentina	Argentina	Desde mi formación profesional en Economía, considero que el desarrollo conceptual de los objetivos, de los criterios, de los indicadores, y de medios/mediciones iniciales para un desarrollo de un sistema de gestión sustentable de recursos, debe de ser abordado por un equipo multidisciplinario. En la práctica desde el Instituto de Economía y Administración de la Universidad Nacional de La Rioja, estamos trabajando en conjunto con el Instituto Superior de Investigación en Desarrollo Humano en un proyecto plurianual de la aplicación de las recomendación del LADA para nuestra provincia y analizando el impacto socio económico de degradación de tierras en todo el territorio de la Rioja. En forma complementaria, junto al Instituto Nacional de Tecnología Agropecuaria (INTA), trabajaremos en un relevamiento socio económico ambiental para las provincias de La Rioja y Catamarca durante el trienio 2010-2013 con financiamiento del mismo organismo nacional. Es indudable, que la participación en el seno de una Red Latinoamericana que trabaja en manejo/gestión de recursos sustentables, que permita la interacción con otros profesionales y su vez permita obtener capacitación actualizada en estos temas; contribuirá de una manera decidida a fortificar el desarrollo de los proyectos regionales en los cuáles nos encontramos plenamente comprometidos. Además de la importancia que adquiere para nuestra provincia, la cual por su ubicación pertenece a la regiòn semiárida de la Argentina y necesita imperiosamente fortificar pràctica de manejo y gestión sustentable de recursos.	
Elena Rosa	Universidad Central de Las Villas	Cuba	Desde el ano 2004 nuestra Universidad se encuentra a la vanguardia del tema de ACV en Cuba y desde esta posición se han realizado estudios que han favorecido una estrategia de desarrollo sostenible integrado con énfasis en la industria azucarera y la energética. En estos momentos Cuba cuenta con una base de datos ambientales de la Industria azucarera cubana que puede ser extendida a los países de America Latina	

	Policies or regulations	Practices	Priority sectors
	Desde la aceptación por los gobiernos de la Agenda 21 en la conferencia de Naciones Unidas sobre el Desarrollo Económico (UNCED) en 1992 y el Principio 10 de la Declaración de la Cumbre, numerosas iniciativas han sido planteadas para tratar el concepto de qué constituye un manejo participativo y sustentable de los ecosistemas. Sin embargo, hasta ahora, los esfuerzos en desarrollar principios, criterios, indicadores, y estándares –lo que significan definir, medir, supervisar y explicar el manejo forestal sostenible- han sido escasos en los ámbitos internacionales, regionales, nacionales y locales. Algunos ejemplos de regulaciones en Argentina: Constitución de la Nación Argentina Artículo 41 "[...] Las autoridades proveerán a la protección de este derecho, a la utilización racional de los recursos naturales, a la preservación del patrimonio natural y cultural y de la diversidad biológica, y a la información y educación ambientales. [...]" Protección de la Riqueza Forestal Nacional (leyes nacionales 25.675 y 13. 273) y las legislaciones provinciales en su caso. FARN. Manual de Participación Pública y Autonomía Municipal. (Octubre 2001). Buenos Aires: http://www.farn.org.ar/docs/p23/capa1_4.html. Pcia. de Mendoza, Ley Nº 5961 de Preservación, Conservación, Defensa y Mejoramiento del Ambiente (B.O. 25/02/93) y Resolución Nº 109/96 del Ministerio de Ambiente y Obras Públicas (B.O. 18/04/96); Pcia. de Chubut: Ley de Evaluación de Impacto Ambiental Nº 4032 (B.O. 30/11/94), Decreto Reglamentario Nº 1153, (B.O. 28/08/95); Pcia. de Neuquén: Ley 2.267 de Preservación, Conservación, Defensa y Mejoramiento del Ambiente (B.O. 23/12/98); Pcia. de Río Negro: Ley 3.266 de Evaluación de Impacto Ambiental (B.O. 14/01/99); Pcia. de Tierra del Fuego: Ley Nº 55 de Medio Ambiente (B.O. 30/12/92); Pcia de Buenos Aires: Código de Aguas, Ley 12.257 (B.O. 9/02/99).	El 17 de junio de 2009, se realizó en la ciudad de Santa Fe el "Taller de especialistas sobre manejo de pesquerías fluviales de la Cuenca del Plata, con énfasis en el análisis de vedas pesqueras y repoblamiento", participaron científicos, funcionarios provinciales y nacionales, representantes de comunidades de pescadores y ONGs, provenientes de Argentina, Brasil y Uruguay, se debatieron las medidas de manejo actuales y otras a futuro para la gestión de las pesquerías de grandes ríos. Proyecto de Gestión Sustentable de Lana Fina Diferenciada Lana Camarones, Producción Primaria hacia el Procesamiento Industrial. El proyecto surgió como una respuesta a demandas genuinas de productores del área de Camarones, Chubut, frente a la necesidad de diferenciar la producción de lana fina y rescatar la referencia y prestigio en el mercado de las lanas merino de la zona. Con una visión integradora de la cadena agroindustrial de la lana fina, El Programa de Manejo Integrado de la Cuenca del Río Iruya Las actividades en ejecución consideran: i) definición participativa de un sistema de alerta temprano, ii) obras de control estructural del cauce principal para evitar erosiones localizadas, iii) programa de manejo de los recursos naturales con vistas al desarrollo productivo bajo condiciones de sustentabilidad con comunidades indígenas,	A nivel provincial (La Rioja –Argentina) actividad agrícola-ganadera y Economía Doméstica de subsistencia
	En Cuba el gobierno mantiene una política basada en la gestión sustentable de recursos , para lo cual ha implementado el Sistema de Reconocimiento Ambiental nacional , que solo se logra si a las empresas o entidades cumplen con el tema de manejo/gestión sustentable. Por otro lado se están implementando las Normas ISO sobre gestión ambiental y Análisis de Ciclo de Vida en muchas empresas. La normativa existente sobre descargas de aguas residuales y emisiones atmosférica se exige por las autoridades del Ministerio de Ciencia tecnología y Medio Ambiente. Existe un fondo de medio ambiente que financia investigaciones relacionadas con el tema a través de proyectos.	En la Industria azucarera se han realizado Análisis de Ciclo de vida y a partir de la identificación de los puntos rojos se han propuesto medidas de P+L que han posibilitado una disminución de la carga ambiental del producto. En la empresa eléctrica cubana se han desarrollado trabajos relacionados con el impacto generado por los grupos electrógenos y se ha favorecido la toma de decisiones. Otros sectores en los que se ha trabajado en al búsqueda de productos sustentable es la producción de alimentos	Industria azucarera y de derivados Sector de generación de energía eléctrica

Participant	Organization	Country	Motivation	
Elizabeth Arroyo L.	DRET-CFN-CAF.	Ecuador	El Ecuador es un país de grandes oportunidades, y considerado por algunos analistas, como el de mayor biodiversidad mundial, lo cual requeriría esfuerzos, como los siguientes: • Identificar instrumentos financieros idóneos, que permita la movilización de los flujos futuros, dentro del mercado de capitales y financiero ecuatoriano. • Contribuir en la generación de alternativas de comercialización, financiamiento, aseguramiento e inversión, para apoyar el desarrollo y aprovechamiento sostenible de los recursos naturales, las plantaciones comerciales y del procesamiento y mercadeo de los bienes y servicios forestales y ambientales • Impulsar el desarrollo de actividades productivas y medio ambientales, y de otra parte, la credibilidad internacional necesaria para construir nuevos mercados • Liderar y servir de hilo conductor con actores fundamentales en esta temática.	
Elsa Ferreras de Sanchez	Ministerio de Ambiente y Recursos Naturales	Republica Dominicana	Republica Dominicana esta inmersa en el Tratade de libre comercio con los E.U.A. y los paises de Centro America y este tema del manejo sostenible de los recursos naturales, es parte de la politica nacional	
Fausto Cano	Ministerio de Ambiente y Recursos Naturales	Guatemala	Existen muchos sectores productivos importantes los cuales no toman en cuenta la gestion sostenible y es necesario para garantizar los recursos a futuro	
Federico Buanerghes Conteras Espinoza	Sociedad Peruana de Derecho Ambiental	Perú	El interes de velar por el desarrollo sustentable de la Amazonía Peruana, pues esta organización tiene objetivos y fundamentos relacionados a la gestion sostenible de recursos, teniendo en cuanta que implementando este sistema se evita el traslado de impactos de una cadena productiva a otra, de una categoria de impacto a otra y de una region a otra; augurando el desarrollo de nuestro territorio tenemos una estructura explicita de conservación del Medio natural que nos rodea, contribuir con el uso sostenible de los recursos y velar! por la organización de la explotación de los mismos conjugados con las normas es nuestro interes.	
Florencia Lopez Serrot	Dignidad Asociación Civil	Argentina	Me interesaria participar de esta iniciativa ya que dentro de los objetivos institucionales se encuentra trabajar en la sustentabilidad de recursos y el manejo de los mismos. Estamos llevando adelante, en conjunto con el Fondo Nido Nesst, un proyecto productivo (coopertiva textil). Considero que la sustentabilidad y el correcto manejo de recursos son asepctos basicos para mejorar el impacto de la mision organizacional.	

	Policies or regulations	Practices	Priority sectors
	• Constitución de la República (Derechos de la naturaleza) • Ley de Gestión Ambiental • Ley Forestal y de Conservación de Áreas Naturales y Vida Silvestre • Ley Especial de la Provincia de Galápagos • Ley de la Prevención y Control de la Contaminación • Plan Nacional de Desarrollo	• Socio Bosque consiste en la entrega de un incentivo económico a campesinos y comunidades indígenas que se comprometen voluntariamente a la conservación y protección de sus bosques nativos, páramos u otra vegetación nativa • Sistema de Información de Pasivos Ambientales y Sociales (SIPAS), que consiste en un conjunto de indicadores para identificar y valorar las pérdidas ambientales y sociales que permitan sustentar la política pública y la toma de decisiones acerca de las intervenciones de reparación de pasivos ambientales y sociales • Plan de Reparación Social y Ambiental del Ministerio de Ambiente, promueve la gestión integral de reversión de los daños sociales y ambientales. • Instrumentación de operaciones del mercado de capitales para pagos por servicios ambientales. • Proyecto Yasuní-ITT es una iniciativa del Gobierno ecuatoriano que consiste en mantener el crudo bajo tierra indefinidamente siempre que, en un esfuerzo conjunto con la comunidad internacional, se compense al Ecuador al menos con el cincuenta por ciento de los ingresos que se recibirían en el caso de que el campo petrolero fuera explotado • Certificación de turismo sostenible, de Rainforest Alliance y Miniserio de Turismo	Algunas de las áreas, en las cuales he participado directamente: • CONSERVACIÓN, que busca combatir el cambio climático, mantener la biodiversidad y reducir la pobreza e inequidad, a través de iniciativas que promueven el desarrollo sustentable; bien podría ser a través del mercado de carbono, del tipo proyectos MDL o voluntario. • FORESTACIÓN, REFORESTACIÓN Y AFORESTACIÓN, debido al potencial del país y a las iniciativas gubernamentales, privadas y de apoyo del tercer sector, que es significativo • PRODUCCIÓN, con iniciativas como de negocios sostenibles, proyectos público - privados, promoción de exportaciones, que cuentan o prevén contar con certificaciones de calidad para mercado internacionales. • ACTIVIDADES COMUNITARIAS, de orden empresarial. • TURISMO SOSTENIBLE, difundido a empresas ecuatorianas que se orienten hacia calidad y observancia de la sostenibilidad económica, social y ambiental.
	El pais tiene un compromiso internacionalcon el desarrollo de politicas y acciones para el cumplimiento de los temas del desarrollo sostenible del milenio y sus objetivos.	En la Republica Dominicana se esta trabajando sobre sobre una nueva legislacion sobre el uso sostenible del recurso agua, varios proyectos en desarrollo sobre biodiversidad. La industria junto con el Ministerio del Medio Ambiente, se trabaja sobre produccion mas limpia y uno de los temas sobre la mesa es la produccion de energias de fuentes renovable.	En las areas mas sensibles que tenemos esta la pesca, la mineria, muy de manera especial la produccion de oro y niquel y la produccion de cemento , donde se utiliza el recurso del suelo y los temas sobre seguridad quimica
	Produccion mas limpia	No conozco hasta ahora	Energia y minas
	La política nacional ambiental esta regulado expresamente por el ejecutivo, existen amplias regulaciones en la gestión sustentables de los recursos naturales, llevandolos a un modo sustentable en las explotaciones de los mismos, estas regulaciones son las normas de caracter ambiental que regulan el ambito de sostenibilidad de los recursos naturales, por lo expuesto una de las políticas existente es la creación de Áreas Naturales protegidas.	Los ejemplos de practicas de gestión sustentable de recursos es en el sector flora, fauna e hidrocarburos, como primer punto tenemos a la flora en la extracción de productos maderables, y la producción de adornos de palmeras regionales como la chambira y el aguje, que son exportados a paises europeos, teniendo en cuenta que todos las extracciones son producto de las gestiones sustentables de los recursos naturales, pues en fauna tenem! os la sostenibilidad de los recursos paiche, huangana, sajino, etc, en hidrocarburos tenemos al petroleo que muchos problemas socioambientales esta causando a nuestro terriotorio peruano.	En la tala de recursos maderables en el aspecto de recursos maderables y no maderables, el manejo de la piel de sajino huangana, el aprovechamiento del fruto de hungurahui para el uso de aceites o cosmeticos, Semilla de taguas para adornos ancestrales como los botones, y utensilios, y por supuesto los biocombustibles.
	En lo que respecta a las acciones de sustentabilidad llevadas a cabo por organizaciones no gubernamentales, en el país, hay un vacio juridico e impositivo importante, razon por la cual se hace imprescindible llevar adelante acciones de incidenc! ia para poner en la agenda publica estos temas	Mis conocimientos se basan fudnamentalmente en el ambito del tercer sector ya que desde hace 17 años me desempeño dentro del mismo. Las practicas que pudeo citar estan relacionadas a actividades cooperativistas incipientes, programas de marcas colectivas (ministerio de desarrollo social de la Nacion Argentina), actividades empresarias sociales, entre otras. Todas estas actividades tienen un eje en comun que es facilitar, formalizar y llevar adelante acciones de inclusion laboral dentro de un marco de igualdad de oportunidades y seguridad social.	Considero que en el tercer sector es un tema fundamental y prioritario.

Participant	Organization	Country	Motivation	
Geni Satiko Sato	Instituto de Economia Agrícola (IEA)	Brasil	Trabajo con proyectos relacionados com territorios, desenvolvimiento local, indicações geográficas y gustaría de participar em proyectos de ámbito latino americano para cambiar experiencias.. SERIA MUITO ENRIQUECEDOR TRABALHAR EM CONJUNTO COM TECNICOS DE AMERICA LATINA E CARIBE PARA BUSCAR SOLUÇÕES SUSTENTAVEIS PARA A AGRICULTURA.	
Gerardo Garibaldi	Autoridad Nacional del Ambiente	Panamá	Crecimiento profesional, adquisición de nuevas experiencias para el desarrollo del país	
Gilberto Batista Barros	ICOMEQ	Brasil	ICOMEQ es una pequeña empresa del interior de la provincia de Ceará, Brasil, una de las regiones más carenciadas de Brasil. Trabaja con asociaciones comunitarias (quebraderas de coco) y ONGs de la zona para el mejor aprovechamiento de diferentes productos naturales (frutos) de la region. A pesar de que está haciendo un trabajo muy importante, su alcance es muy pequeño y uno de los obstáculos es el acceso a la información. Por ello, es muy importante su participación en esa iniciativa, que permitirá no solo su contacto con órganos gubernamentales, sino con instituciones pares de otros países para el intercambio de experiencias, y la busqueda constante de mejores prácticas en el uso sustentable de recursos naturales!	
Gustavo Seminario Paredes	RADES (Red Alumni de Economía Sostenible)	Perú	Trabajo desde hace un par de años en temas de economía, inclusión social y pertenezco a la Red de alumnia de la Cooperación técnica Alemana en Perú , RADES (Red Alumni de economía Sostenible), en la actualidad soy el Vice Coordinador del Nodo Perú, estamos en 4 países cada uno es un nodo: Perú, Chile, Ecuador y Colombia. También participo como representante de la Municipalidad de El Porvenir ante el FONAM (Fondo Nacional del Ambiente) en Perú y escribo todos los jueves en el dos de los diarios (La industria de Trujillo y La Industria de Chimbote) diario de mayor circulación en el Norte del Perú. He desarrollado proyectos para la mejora de calidad de vida en sectores de extrema pobreza vía forestación urbana. Actualmente soy Consultor de PriceWaterHouse Coopers y de la Presidencia del Consejo de Ministros en la región La Libertad para el Programa de desarrollo de Capacidades Regionales.	
Héctor Leiva S.	Centro de Investigación Minera y Metalúrgica	Chile	La institucion que presido aboca su trabajo de investigación, desarrollo e innovación a la sustentabilidad de la minería que incluye en forma prioritaria el manejo sustentable de recursos.	
Indira Katania Sierra Molina	Centro estudios y control de contaminantes Secretario de recursos naturales y ambiente	Honduras	Por nuestra Institucion considerar ser organismo tecnico cientifico del estado con capacidad para el abordaje de la problematica ambiental	
Irma Suarez	Ministerio del Medio Ambiente	Ecuador	El Ecuador es un país en vias de desarrollo, que aun no ha asumido formalmente procesos de Producción y Consumo Sostenible. por lo que abrir un nuevo frente como es la Gestión Sustentable de Recursos, otorgará mas caminos que permitan concienciar en la importancia de actuar en la prevención en el ciclo de vida de los productos y en materiales en general. Con lo que se aportará a posicionar mas proceos de PCS. así como se fortalecerá mecanismos como de transferencia de tecnología que apoyara efectivamente este proyecto.	

	Policies or regulations	Practices	Priority sectors
	No Brasil a Lei 9279, de 1996, Lei de Propriedade Industrial, nos seus artigos de 172 a 182 define a INDICAÇAO GEOGRAFICA e as regras para a denominação de uma INDICAÇAO DE PROCEDENCIA e uma DENOMIÇÃO DE ORIGEM, como um bem intangível, de natureza coletiva e de direito. O Ministerio da Agricultura é orgão responsável pelo fomento e o INPI, Instituto Nacional de Propriedade Industrial, no Rio de Janeiro, responsável pelo registro.	NO BRASIL AINDA É RECENTE MAS A LEGISLAÇAO! SOBRE INDICAÇÕES GEOGRAFICAS TEM SIDO FOMENTADO COMO INSTRUMENTO DE DESENVOLVIMENTO LOCAL SUSTENTAVEL, POIS BUSCA A VALORIZAÇÃO DO TERRITORIO, PELA VALORIZAÇÃO DO PRODUTO LOCAL E MANUTENÇÃO DAS FAMILIAS NA AREA RURAL.	En actividades que envolvem la agricultura familiar. EM AREAS DE PRESERVAÇÃO AMBIENTAL, POR EXEMPLO, REGIAO ALTOS DA MANTIQUEIRA, ONDE ESTAO VARIOS PRODUTORES DE TRUTAS COM POTENCIAL PARA INDICAÇÃO GEOGRAFICA. NO MOMENTO ESTA EM DESENVOLVIMENTO UM DIAGNOSTICO PARA AS TRUTAS DA REGIAO DE CAMPOS DO JORDAO.
	Ley General de Ambiente de Panamá, Politica de Manejo de Desechos, Politica de P +L; etc.	Prácticas de compostaje	Sector Industrial, Porcino y Avicola
	Conozco proyectos de financiamiento para actividades en desarrollo sustentable en la zona del Cariri, Ceará solamente.	Aprovechamiento del coco babaçu: una actividad extractivista, que en tiempos de cosecha puede ser almacenado y aprovechado en su totalidad. El exocarpo sirve para adobo de plantas, el mesocarpo como combustible de alto rendimiento o bien como materia prima para artesanias y del endorcapo se extrae el aceite en frio (usos multiples) y la pasta sobrante de almendras es utilizada como alimento animal por ser altamente nutritiva. Aprovechamiento del pequi: fruta tipica del norte y nordeste de Brrasil, es pequi se utiliza para extraer aceite utilizado en productos medicinales, alimentos y comestica. Es otro sector en donde hay aprovechamiento casi integral del fruto.	En los sectores extractivistas y en los sectores intensivos en el uso de la tierra, como la caña de azucar y la soja.
	Son muy pocas en realidad la principal es el FONAM(Fondo Nacional del Ambiente), el recien creado Ministerio del ambiente y ultimamente aunque de manera bastante timida se han creado a nivel de Gobiernos regionales sub gerencias para la Conservacion de Recursos naturales y la sostenibilidad. Debiera , segun la ley, cada gobierno local tener su propio departamento para los mismos fines.	Por supuesto , el caso de cervecerias Backus en Peru, http://www.backus.com.pe/WB.WebSite/index.aspx, yo he visitado esta planta es muy moderna y justamente nos explicaron las politicas como Gestion Sostenible dentro de la empresa, ellos han avanzado mucho tienen una gerencia de gestion sostenible. En mi region, existe una empresa Tableros Peruano la cual esta refosrtestando los andes de mi region , forestando en donde no existe y esto es su materia prima, manejada adecuadamente la empresa hace sostenible su produccin, se generean puestos de trabajo y se mejora la captura de CO2.	En el tema de los bosques madereros, en la selva peruana. En las grandes esprragueras que existen en mi region (Danper, TALSA, Agro Viru, Green Peru y Camposol)
	Aún no hay ninguna política definida ni regulación.	Recuperación de metales valiosos de pasivos ambientales de minas en desuso.	Minería, energía y forestal
	Ley general de ambiente Borrador plan naciional calidad del aire Reglamento regulacion de gases contaminantes	Agricultura (agroforesteria) Cria de cerdos - cria de peces	En la academia en la industria a nivel general
	En la Constitución del Estado Art (14, 15, 284, 408, 413)- en la Ley de Gestión Ambiental, Art 2,35. Linemientos de Política del Buen Vivir(obj4,obj11!), Políticas Ambientales Nacionales (Polit. 1)- Políticas en Producción y Consumo Sustentable -Políticas y Estrategias de Biodiversidad - Ley Forestal-Políticas y Estrategias del Manejo de Sustancias Químicas.	Sistema Único de Manejo Ambiental (SUMA) se refiere al otorgamiento de Licencias y Fichas ambientales -aporte del programa EP3, Programa para la promoción de Procesos de Producción mas Limpia con el CEPL,Programa de REducción de Emisiones REDEMI-Swiscontact- Programa APROQUE - Programa de Manejo Adecuado de Productos químicos y Desechos Especiales - Proyecto Ciudadanía Ambiental-Programa de Educación para el Consumo Tribuna Ecuatoriana del Consumidor- Programa y políticas en COPs - Programa para el manejo del Mercurio - Programa para mejorar la matriz energética con energía renovable - Programa de Biocombustibles - Porgramas de ahorro energético - Programas de certificación orgánica -Premios a Buenas Pr! cticas Ambientales.	En el sector extractivo Petroleo, minerales. En sector agrícola, manufacturero (textil, alimentos) -

Participant	Organization	Country	Motivation	
Isabel Quispe	Pontificia Universidad Católica	Perú	contar con herramientas que me ayude a gestionar de una forma responsable y sostenible los recursos, poder difundirlo a través de la enseñanza ya que soy docente universitaria y aplicarlos en los trabajos desarrollados en empresas.	
Ivette Torlosa	Ministerio de Ciencia Tecnologia y Medio Ambiente (Direccion de medio ambiente)	Cuba	Por ser de interes nacional promover una gestion sostenible de recursos que conlleve al ahorro de recursos, conservacion de los recursos narurales y a la disminucion de la contaminacion	
Jaime Alberto Romero	Universidad del Bosque	Colombia	El motivo para participar es que venimos haciendo parte de las reuniones del grupo de expertos de Consumo y Producción sustentable desde 2007 presentando varios productos y aportes e inclusive asistiendo a reuniones dentro del Proceso de Marrakech en París con Nis Christensen y María Solis como director del Grupo de Investigación en Producción limpia choc Izone categorizado en Colciencias y que entrega anualmente producción importante sobre el tema a parte de crear varios cursos universitarios y programas de Gestión Ambiental Empresarial en la Universidad El Bosque	
Jaime Echeverria	Economia Ambiental Echeverria	Costa Rica	Tengo mucho interes en participar en esta iniciativa debido a que esta muy relacionada con diversos aspectos de mi practica profesional y creo que puedo hacer un buen aporte.	
Javier Marcos Luna	Consultor Pyme en Desarrollo sustentable	Argentina	Soy apasionado por construir un futuro sustentable. Trabajo en el tema. Tango experiencia en la implementacion de sistemas de produccion limpia. Ademas soy consultor de RSE en un programa de cadena de valor.	
Jhonny Valverde	CINCADER	Perú	Compartir expriencias en el Desarrollo de Capacidades para la Gestion Sustentable de Recursos.	
Jordi Pon	Catedra en Desarrollo sostenible/ Universidad Politica de Cataluna	Espana	Intercambio informativo Aportacion de ideas Colaboracion proyectos	
Jorge Carpio	Inpade FOCO Foro Ciudadano de Participación por la Justicia y los Derechos Humanos	Argentina	Son temáticas prioritarias dentro del programa de trabajo de nuestra organización Sumar esfuerzos y experiencias en la lucha por el desarrollo sustentable	
Jorge David Lema Auquilla	MESSE (movimiento de economia social y solidaria del ecuador)	Ecuador	el trabajo que se viene realizando en zonas del ecuador es interesante y a mas el compartir exeriencias de economia solidaria y nuevas alternativas de comercializacion como tambien la incidencia de politicas, justas solidarias de una sociedad	

	Policies or regulations	Practices	Priority sectors
	Hace poco se ha creado el Ministerio del Ambiente, recién se está elaborando reglamentos de varias leyes. Se está formando el Comité de Trabajo de Criterios de Sostenibilidad pero en el Ministerio de Agricultura. Por otro lado el Ministerio de Energía y Minas está con un proyecto de Universidades Sostenibles. Falta un poco de Articulación.	Hay experiencias aisladas, como el sector Agricultura, donde pequeñas asociaciones con apoyo de ONG están gestionando sus residuos sólidos para la fertilización de sus tierras.	Sector agricultura, curtiembre, alimentos.
	Estrategia ambiental nacional 2007 - 2010 Ley 81 de medio ambiente Programa de lucha contra la contaminacion Programa nacional de produccion y consumo sustentable (proximo a aprobarse)	Experiencia de introduccion de practicas de produccion mas limpia en el sector azucarero y alimenticio, enfocada al ahorro de materiales y de portadores energeticos, reuso, reciclaje.	En el sector energetico, minero , quimico
	Las políticas que promueven entre otras la gestión sustentable de recursos en Colombia en los últimos años entre otras se remiten a la política de producción mas limpia que tiene varios años y a la política de mercados verdes mas reciente. En la ultima reunión de expertos en Cartagena de Marrakech regional LAC se presento el borrador de la política de Produccion y consumo responsable que el gobierno nacional esta promoviendo y que esta aun en tramite	En Colombia existen sistemas de producción de biocombustibles que están comenzando a implementar gestión ambiental empresarial y en particular las empresas que producen azúcar llamadas en Colombia los ingenios tiene ejemplares sistemas de gestión ambiental. Asi mismo algunas industrias del sector cerámica y metalmecánico han hecho algunos avances pequeños en líneas de producción y en gestión de emisiones hídricas. El sector textil también ha hecho algunos esfuerzos en la parte de las tintorerías pero falta apoyo y gestión en esta ultima area que es la responsable en bogota de la mayor parte del consumo de agua industrial	En el sector de biocombustibles, caucho y en las tintorerías principalmente. El sector alimenticio en especial el lácteo también es necesario intervenir
	En mi pais hay varias politicas y regulaciones que promueven la gestion sostenible de recursos. Una es la relacionada con el Pago de Servicios Ambientales (PSA) a quienes protejan los bosques, que es financiada parcialmente a traves de un "canon de aprovechamiento de aguas". Este canon induce a una mejor utilizacion de los recursos hidricos y ademas financia el programa de PSA. Otra fuente de financiamiento para el programa incluye un impuesto a los combustibles. Otras politicas estan relacionadas con el concepto de "carbono neutral" que el Gobierno esta apoyando fuertemente ya que quiere convertir esa idea en parte de la "marca pais". Otras incluyen temas de produccion mas limpia, un canon de vertidos y programas de certificacion y premiacion ambiental.	La industria de papel, y especificamente Kimberly Clark se han embarcado en un proceso de reduccion drastica en el consumo de agua, igualmente Florida Bebidas, empresa lider en el sector de bebidas, y a quien he asesorado, tiene un proceso de gestion ambiental que incluye reducciones en el consumo de agua, generacion de desechos solidos y liquidos. Otros incluyen programas para la sustitucion de luces incandescentes en el sector turismo y el uso racional del aire acondicionado.	Desde mi punto de vista considero que es muy importante trabajar con CONSUMIDORES en general para que poco a poco exijan una conducta ambiental mas responsable de parte de los productores. Hasta ahora los productores han estado motivados a hacer cambios motivados por presiones externas (por ejemplo por politicas de las transnacionales) o gubernamentales PERO no por los mismos consumidores. Otro tema importante seria las politias de compras del Estado, que carecen de criterios de sostenibilidad en la actualidad. Seria muy impactante que el mismo Estado incluya parametros de sostenibilidad ambiental en todas sus licitaciones y compras.
	Constitucion Nacional art 41/43 Ley General del Ambiente 25675, Ley de Aguas 25688, Ley Tratamiento de Residuos 25916, Ley 26331 Proteccion de Bosques Nativos Ley 25612 Residuos Peligrosos	Produccion de Azucar, tratamiento de aguas y bagazo Industria del Pescado, Olores y Residuos Pymes Provincia de Buenos Aires, Residuos y Eficiencia Energetica	En la agricultura, ganaderia, industria extractiva, industria quimica. Las que generen mayor contaminacion y deterioro de la calidad de vida
	La Gestion sustentable de recursos esta en proceso de reglamentacion, especialmente orientado a la preservacion de los recursos naturales en la Amazonia Peruana.	Gestion Integrada de Manejo de cuencas hidrográficas en Peru.	En todos los sectores productivos y de servicios.
			Pesca / Agricultura silvicultura mineria
	No existen Especificamente nos preocupan las leyes de mineria y de pesca por el caracter depredatorio.	No existen	Mineriae industrias extractivas en general. La explotación agricola por los agro negocios dedicados a la produccion de soja en remplazo de la produccion de alimentos.
	eisten normativas de trabajo en desarrollo de areas	Ferias ciudadanas: son espacios de comercializacion directa de productores a los consumidores a un precio justo, consumo responsable: los coproductores son parte activa de la cadena de produccion y se dan cuenta el verdadero valor de un producto (verduras, frutas etc.)etc	al productor (proveer las herramientas necesarias ejemplo el compartir de sabiduria ancestral aplicado a la agricultura) al consumidor (concienciacion y valorizacion a los productores, saber que es lo que se consume, si verdaderamente nutritivo etc

Participant	Organization	Country	Motivation
Jorge Eduardo Cabrera Gomez	Consultor	Perú	Mi expresión de interés para participar en el proyecto de gestión sostenible de recursos naturales, proviene de mi compromiso con el desarrollo sostenible y mi deseo de participar en una importante, necesaria y pertinente iniciativa, que podría, si es bien desarrollada, tener un gran impacto en la generación de modelos o metodologías replicables, para concertar el crecimiento económico, con las inversiones y aprovechamiento de los recursos que este crecimiento implica, con el principio generacional de sostenibilidad. Mi interés va también por el lado de aportar con experiencia y conocimientos a este tema tan álgido y generador de conflictos ambientales permanentes.

	Policies or regulations	Practices	Priority sectors
	• La Constitución Política del Perú, en el capítulo II, Del ambiente y los recursos naturales, Artículo 67º señala: "El Estado determina la Política Nacional del Ambiente. Promueve el uso sostenible de sus recursos naturales". • La Decimonovena Política de Estado del Acuerdo Nacional establece los lineamientos del Perú en materia de Desarrollo Sostenible y Gestión Ambiental al 2021 y contribuye de manera directa y principal con el Objetivo de Competitividad del País. Por su carácter sistémico, estos lineamientos se vinculan y contribuyen con los objetivos: Democracia y Estado de Derecho; Equidad y Justicia Social; Estado Eficiente, Transparente y Descentralizado, de este Acuerdo. • El Acuerdo señala que la Política Nacional del Ambiente se integra con "las políticas económicas, sociales, culturales y de ordenamiento territorial, para contribuir a superar la pobreza y lograr el desarrollo sostenible del Perú", además de, "institucionalizar la gestión ambiental pública y privada para proteger la diversidad biológica, facilitar el aprovechamiento sostenible de los recursos naturales, asegurar la protección ambiental y promover centros poblados y ciudades sostenibles, lo cual ayudará a mejorar la calidad de vida, especialmente de la población más vulnerable del país". • "La Política Nacional del Ambiente constituye el conjunto de lineamientos, objetivos, estrategias, metas, programas e instrumentos de carácter público, que tiene como propósito definir y orientar el accionar de las entidades del gobierno nacional, regional y local; y del sector privado y de la sociedad civil, en materia ambiental" ( ). • La séptima Política Pública establecida por el DS 027-2007-PCM:"De extensión tecnológica, medio ambiente y competitividad", establece como lineamientos relacionados con el ambiente: i. Apoyar las estrategias nacionales, regionales y locales de lucha contra la contaminación del medio ambiente; ii. Implementar las medidas de prevención de riesgos y daños ambientales que sean necesarias; iii. Promover el uso de tecnologías, métodos, procesos y prácticas de producción, comercialización y disposición final más limpias. • La Política Nacional del Ambiente se desarrolla en el marco del Desarrollo Sostenible, definido como "un desarrollo que satisfaga las necesidades del presente sin poner en peligro la capacidad de las generaciones futuras para atender sus propias necesidades" ( ). • La Política Nacional del Ambiente, constituye el cimiento del planeamiento estratégico del desarrollo, la seguridad y la defensa nacional en los dominios no militares del país. Sobre la base de este instrumento se formularán los documentos complementarios que harán viable la ejecución de decisiones por parte de los diferentes actores involucrados. • La Política Nacional del Ambiente es un instrumento fundamental para promover la inversión ampliada en activos ambientales relacionados con la biodiversidad, suelo y agua, generando rentabilidades para la estrategia de reducción de la pobreza y acelerar el logro de los Objetivos de Desarrollo del Milenio.	Existen ejemplos aislados relacionados con el desarrollo turístico en zonas de la amazonia, departamentos de Madre de Dios, San Martín, o zonas de "ceja de selva" en Lambayeque y Piura, donde empresas privadas han establecido convenios y concertaciones económicas y de trabajo con poblaciones locales, indígenas por las cuales se construyen alberges ecológicos en zonas de atractivos turísticos, que aprovechando los recursos naturales de la zona, se desarrollan con mecanismos de gestión sostenible. Hay, parece, no conozco en detalle, algunas explotaciones mineras y petroleras que han llegado a acuerdos con las poblaciones locales y operan proyectos con una gestión sostenible, por lo menos del agua y el suelo. En la mayoría de los casos las explotaciones mineras y de hidrocarburos no tienen un manejo sostenible de los recursos naturales, generando importantes conflictos ambientales, por lo que establecer elementos base para generar o por lo menos orientaciones para una gestión sostenible de los recursos naturales en este sector, merece un apoyo total.	En que sector o cadena productiva encuentra usted que es prioritario introducir practicas de "gestión sostenible de recursos". Creo que en la explotación minera y de hidrocarburos, aunque es el sector más difícil y complicado de enfrentar y se necesitarían importantes recursos, más aún si entramos en el sector de la minería informal que está depredando y contaminando zonas muy importantes en el sur del país. El sector de la explotación maderera y de tala indiscriminada de árboles, en Madre de Dios, podría ser un sector de mucha importancia para el desarrollo sostenible y además algo que podría realizarse con menos dificultada y enormes beneficios para la zona.

Participant	Organization	Country	Motivation	
Jorge Elgegren	no	Perú	Formado en economía ambiental y de recursos naturales, mi motivación ha sido desde mis días como estudiante hacer que las fuerzas del mercado generen beneficios basados en el uso sostenible de recursos, fomentando la eficiencia en el proceso productivo y generando, a la vez, beneficios para los inversionistas y para las poblaciones localizadas en las zonas de aprovechamiento de los recursos o en sus zonas aledañas. Esta motivación no ha cambiado; por el contrario, se ha incrementado con el paso de los años y la experiencia me ha mostrado que, así como se requiere mecanismos severos y consistentes de regulación (command-and-control), también se requiere señales de mercado (sean sanciones o incentivos) para que el verdadero valor del ambiente y de los recursos sea internalizado por los tomadores de decisiones que afecten el ambiente y el patrimonio natural (sea el Estado o el sector privado). Ser parte de la iniciativa contribuirá a reforzar mis argumentos a favor de la gestión sostenible de recursos. Considero, además, que gracias a mi trabajo como consultor y docente a tiempo parcial, puedo servir de medio para replicar los principios de gestión sostenible de recursos entre los tomadores de decisiones en mi país y en aquellos que pueda visitar como parte de mi trabajo y promover y aplicar proyectos específicos de gestión sostenible de recursos en la región.	
Jose Adolfo Castañeda Ramirez	Fundacion Universitaria Monserrate	Colombia	Somos un equipo de profesionales que trabajamos desde la academia y la proyección social, en procesos de generación de saberes y herramientas que garanticen una sociedad sustentable y sostenible	
José Alberto Miglio	Asociación Civil Cooperar	Argentina	Desde el comienzo de la gestión en la Asociación Civil Cooperar la temática de producción y consumo sustentable fue un pilar que construyó las posteriores actividades y proyectos propuestos, con la aplicación en varios sectores privados y entes del estado	
Juan Carlos Javier Almonte	Ministerio de Medio Ambiente y Recursos Naturales	Republica Dominicana	Me intereza ya que tengo una esperiencia de 9 a;os en el Ministerio, y tengo unos 12 meses en el area de Produccion mas Limpia y Consumos Sustentable de Recursos	

	Policies or regulations	Practices	Priority sectors
	En primer lugar, hay que mencionar la Política Nacional del Ambiente, que tiene a la gestión sostenible de recursos como uno de sus principios y que está reflejada en el Eje 1 (de los cuatro ejes) de la Política Nacional del Ambiente: Conservación y aprovechamiento sostenible de los recursos naturales y de la diversidad biológica. También, hay que mencionar la Ley del Sistema Nacional de Evaluación de Impactos Ambientales y su Reglamento (recientemente promulgado – diciembre de 2009), que regulan y fomentan la conservación de los recursos y del ambiente en torno a obras que puedan tener impactos directos o indirectos sobre el ambiente natural y socio-económico. Existe una ley de mediados de la década pasada que regula el Aprovechamiento Sostenible de los Recursos Naturales. El Perú cuenta con una Estrategia Nacional de la Diversidad Biológica y con una ley y un reglamento bastante progresistas sobre los recursos forestales (Ley Forestal y su Reglamento). A pesar de todos los esfuerzos en el plano de la política ambiental y la legislación, aún subsisten problemas que afectan seriamente al ambiente y, por ende, impactan sobre la calidad de vida de la población nacional. Esto demuestra que hay que seguir apoyando los esfuerzos a través de iniciativas como la que promueve UNEP.	La Ley Forestal y su Reglamento promueven el manejo forestal sostenible e introdujeron incentivos a través del descuento de hasta 60% del pago por derecho de aprovechamiento (harvest fee) en aquellas operaciones que consigan la certificación forestal y que realicen transformación (value-added) en el bosque. El lado positivo de este marco regulatorio es que en el Perú hay una extensión superior a las 7 millones de hectáreas con planes de manejo (un buen proxy del manejo forestal sostenible) y cerca de 700,000 hectáreas de bosques certificados (datos a julio de 2009 – no los he actualizado, sorry). Además, en los dos primeros años de producción de madera proveniente de bosques con planes de manejo (concesiones forestales), entre 2003 y 2004, se materializó una venta estimada en más de 10 millones de dólares. Una prueba o indicio adicional de que el esquema de manejo forestal sostenible introducido por la ley forestal y su reglamento han sido relativamente exitosos es que el mercado de concesiones está bastante activo, sobre todo, en regiones como Madre de Dios, donde empresarios coreanos y brasileños han invertido sumas millonarias, según funcionarios del Gobierno Regional de esa región, en la compra de grandes extensiones de bosques concesionados (al menos 250,000 hectáreas). Sin embargo, aún persisten denuncias de tala y tráfico ilegal de maderas valiosas (sobre todo, caoba y cedro) y denuncias sobre aprovechamiento de especies cuya dinámica natural no era conocida cuando de dictó la ley y su reglamento (eg, Shihuahuaco - Dipteryx micrantha Harms -cuyo ciclo natural está estimado en unos 200 años!). Prueba de que los problemas existen es la severidad con que el Tratado de Libre Comercio con los Estados Unidos ha abordado el tema de la tala y comercio ilegal de maderas cuyo destino es ese país, a través de un Anexo Forestal del Capítulo Ambiental de dicho tratado, algo que no tiene precedentes en la historia de los tratados comerciales de ese país.	Por lo expuesto anteriormente, yo sugeriría el sector forestal. Además, es un sector que puede generar puestos de trabajo, dinamizar las economías regionales y locales, contribuir al fisco. Y todo eso es posible de perpetuarse ad infinitum por la naturaleza renovable del recurso. Otros sectores que deberían incluirse son las manufacturas, sobre todo aquellas que usan el recurso agua como insumo o como cuerpo receptor de residuos. El sector turismo es uno que es fácil de abordar y que, a la vez, tiene efectos multiplicadores significativos en términos de dinamizar el empleo y las economías locales, y por esa razón debería ser considerado desde el inicio. El sector pesca es otro en donde hay una cierta responsabilidad corporativa, pero que requiere muchísimo trabajo y habilidades de negociación, así como el sector de energía e hidrocarburos. Energía parece ser un poco más difícil por sus prácticas anteriores de altísimos impactos sobre el entorno y las poblaciones locales; pero no debería descartarse de plano.
	Ley 23 de 1973 Decreto 2811 de 1974 Artículo 80 de la constitución Leyes 52 y 152 del 84 ley 188 del 95 Ley 99 de 1993 Ley 152 de 1994 Ley 119 de 1989 Resolución 2309/1986 almacenamiento de residuos Decreto 456 de 2008 Decreto ley 2811/1974 codigo nacional de recursos naturales Ley 430 de 1998 Manejo y disposición de residuos Decreto 400 de 2004 Aprovechamiento eficiente de recursos Entre otras	Implementación de proyectos de gestión ambiental en las organizaciones y universidades. Integración de estos actores. Formación de gestores y profesionales que impacten la participación social ambiental	Educativa y Productiva
	En nuestro país (Argentina) existen políticas sobre manejo sustentable de recursos dictado por la Secretaría de Ambiente y Desarrollo Sustentable de La Nación que rige desde ese organismo ambiental los distintos programas que se aplican en todo el territo	Actualmente se desarrollan proyectos de gestión sustentable de recursos en Casa de Piedra (Pcia de La Pampa), obteniendo a partir del recurso de la presa embalse Casa de Piedra, poner bajo riego 10 mil hectáreas. Completa uno de los ejes de gestión del de	Los sectores productivos más afectados por la cadena de producción en la región pampeana a la cual pertenecemos son las tierras destinadas a cultivo intensivo de cereales y granos, entre otros la producción masiva de soja ha deteriorado el recurso y deben
	Ahora nos encontramos en las partes de Discusion del Borrador de la Politica Nacional de Produccion Mas Limpia y Consumo Sostenible de la Republica Dominicana Con la participacion del Sr. Carlos Perera, Director de Centro de Produccion Mas Limpia de Costa Rica	La empresa AMBEV Dominicana, fue la ganadora en nuestro pais y a nivel Regional dando muestra de una produccion efectiva con el nivel mas alto a la calidad y un consumo sus! tentable.	En nuestro pais, como productor de carnes, contamos con muchas granjas Porcinas y Avicolas e Industrias Cafetaleras. En estas industrias, el desarrollo de biodigestores, para la produccion de Bio gas, con los desechos es de alta prioridad.

Participant	Organization	Country	Motivation	
Juan Manuel Diaz Hernandez	Centro Internacional de Física	Colombia	He participado en reuniones de expertos y estoy involucrado en el proceso de Marrakech desde el ao 2007; he trabajado en el ministerio federal de medio ambientes de Almania con la Task Force de cooperacin con frica y es mi inters continuar aportando y participando al desarrollo del proceso desde la academia y la sociedad civil. Por otro lado, dada mi formacin acadmica (Ing. Ambeintal, op. MBA en gestin sostenible), encuentro la posibilidad de mejorar mis competencias y experticias en los temas: ciclo de vida de preoductos, ecoeficiencia y eficiencia de recursos. Adems pertenezco a grupos de investigaciones en produc-cin limpia (Univeresidad el Bosque) y Biotecnologa Ambiental (Centro Internacional de Fsica - CIF). El CIF es un centro colombiano para la investigacin y el desarrollo en ciencias bsicas y aplicadas. La mayora de trabajos del CIF se hacen bajo alianzas estratgicas con empresas Colombianas; por lo tanto se tiene acceso a diferentes sectores productivos a los que se les puede trasnferir las nuevas tendencias en manejo sustentable de recursos. Profesionalmente mis experticias son en gestión sostenible, he participado en reuniones de expertos (Estocolmo 2007) del pro-ceso de Marrakech sobre consumo y producción sostenible y he realizado práctica empresarial con la Task Force en cooperación con Africa en el ministerio federal de ambiente de Alemania en la dependencia: normatividad, compras verdes y eficiencia de recursos.	
Leonardo Ortiz Garrido	Corporación de Desarrollo y Paz del Huila y Piedemonte Amazónico Huipaz	Colombia	desarrollar y fortalecer las capacidades de los agricultores de la región	
Lidia Isabel Gonzalez	Universidad Nacional de Panama Facultad de Economia	Panamá	Mi motivacion es por que estoy en el ultimo anio de la carrera de Lic.en Economia con enfasis en economia ambiental y me he dado cuenta de la importancia del desarrollo sustentable para la proteccion del medio ambiente tambien me motiva el echo de que tengo una hija de diez anios a la cual deceo que en el futuro pueda gozar de un medio ambiente sano igual que nosotros. Creo firmemente en que las personas de las areas rurales solo necesitan motivacion y acesoramiento para concientizarlos y que podemos combiar!	
Lilian Corra	Asociacion Argentina de medicos por el medio ambiente AAMMA International Society of Doctors for Environment, ISDE	Argentina	Antecedentes de intervencion multisectoriales exitosas repli-cables	
Luciana Díaz Frers	CIPPEC	Argentina	CIPPEC cuenta con un valioso equipo interdisciplinario que investiga y propone mejores políticas públicas en diversas temáticas, lo que le permite hoy ocupar un lugar de privilegio en discusiones relevantes. Pero aún no ha desarrollado capaci-dades para discutir e incidir en la agenda de temas de medio ambiente y desarrollo sustentable.	
Lucio R. Malizia	Fundación Proyungas	Argentina	Mejorar las practicas de aprovechamiento forestal en el noroeste de argentina en particular y en argentina en general. Venimos trabajando hace 5 años en el desarrollo de protocolos de planes de manejo forestal sustentables con el sector guber-namental y empresarial, e implementándolo en forma piloto en una propiedad de 10.000 ha a partir del 2008. En este momento estamos buscando apoyo para expandir este trabajo a otras propiedades boscosas, e intervenir en la red de comercialización de los productos forestales, a través del desarrollo de un sello de promoción de mejoras continuas en las prácticas de aprove-chamiento forestal y producción de bienes (pisos, muebles, etc.)	

	Policies or regulations	Practices	Priority sectors
	Actualmente se est formulando una poltica nacional en consumo y produccin sustentable en Colombia. Otras resoluciones obligan a las empresas a crear departamentos de gestin ambiental y hasta ahora est entrando plenamente en rigor. Existe otra normativa encaminada al uso eficiente de la energa y a las construcciones sostenibles que incluyen criterios energticos de diseo y operacin. Desde el año 1976 existe en Colombia un código de recursos naturales que regulaba algunas generalidades sobre poseción y uso de los recursos; actualmente el plan nacional de desarrollo de Colombia, incluye s de desarrollo, apareción el decreto 1299 de 2008 que ordena la conformaci! ón de departamentos de gestión ambiental en todas las empresas en el territorio colombiano. Recientemente se formuló la política nacional de consumo y producción sostenible que abarca temas de producción limpia y ofrece algunos incentivos tributarios a las empresas con buenas prácticas de producción, por otra parte muestra un sondeo de los patrones de consumo en algunas ciudades de Colombia en busca de conformar estrategias para direccionar las tendencias en consumo hacia la sosteniblidad.	No conzco ningn caso relevante. En todos los sectores productivos en Colombia se está considerando el uso eficiente de agua y energía; Colombia durante el último semestre afrontó una sequía a causa del fenómeno del niño. Esta situación facilitó la educación entre los usuarios e hizo evidente la necesidad de usar mejor y eficientemente los recursos naturales. En los últimos años se han multiplicado los grupos de investigación en gestión sostenible y prod! ucción más limpia entre las instituciones académicas del pa! ís, en consecuencia las publicaciones y los proyectos de trasnferencia de conocimientos y experiencias también han aumentado.Entre los casos exitosos que conozco, sobresales los de algunas empresas de lácteos, bancos, empresas de comunicación, cementeras,algunas de producción de alimentos, clínicas y ONG que trabajan a favor del medio ambiente (Ver adjunto). Vale la pena aclarar que en Colombia no se ha establecido la diferencia entre gestión sostenible y RSE u aún se mezclan conceptos y se integran ideas. Considero que la tendencia en Colombia, está dirigida a incluir la gestión sustentable de recursos entre las estrategias de responsabilidad social empresarial.	En la industria qumica en general y en el sector de PYMES que poca capacidad tcnica; adems existen varios sectores con procesos rudimentarios que generan graves impactos ambientales como las curtidoras de cuero que conservan tcnicas artesanales con el uso de metales pesados y otros residuos peligroros que son masl dispuestos. Dado que Colombia es un país con una vocación agrícola sobresaliente; el sector agropecuario necesita administrar mejor los recursos naturales pues es evidente que existen malas prácticas que degradan aceleradamente los suelos, las aguas entre otros. Por o! tra parte, considero que los sectores que tienen alta participación en la informalidad, como la miniería, requieren de regulaciones y programas de educación estrictos del gobierno para el manejo de los recursos naturales.
	decreto 1200 de 2004 planificacion ambiental ISO 14000 decreto 1299 de 2008, min ambiente colombia	oro verde buenas practicas agricolas	en la cadena productiva y la cadena de tranformacion
	En Panama existen diversas politicas en el tema de gestion sustentable de los recursos, como la de que tiene que ver con la ! protccion de los humedales, la de la creacion y conservacion de parques naturales y areas protegidas, la que tiene que ver con los recursos hidrico, la de la proteccion de las areas forestales entre otras	Un ejemplo de practicas de gestion sustentable lo es las autorizaciones que da la autoridad nacional del ambiente para la extracion de arboles maderables en la provincia de darien, al obtener el permiso al ANAM le indica a la empresa la cantidad de arboles que debe reforestar por cada arbol que se extrae.	En el sector primario ya que es el que mas afecta al medio ambiente, es el sector mas descuidado y el mas importante para los demas sectores ya que de este obtienen los diversos productos necesarios para producir.
	No conozco	No conozco	Manejo de tierra Manejo de quimicos
	Hay pactos internacionales suscritos, algunas pocas leyes nacionales (26.562, 26.331, 26.093, 26.022, 26.011 y 25.916 entre otras) y algunas regulaciones a nivel provincial que son las responsables de la administración de los recursos naturales según la Constitución Nacional. Ello genera dificultades para la coordinación de las políticas en esta temáti! ca.	Uno de los recursos sobre los cuales se está avanzando en tema regulatorio es el de bosques nativos. .	Dada la falta de información detallada y organizada, aún es temprano para conocer cuáles sectores necesitan de manera más apremiante una gestión más sustentable.
	En el ámbito forestal, las policticas provinciales y nacionales son aán muy vagas. La gestión sostenible esta liderada por las empresas que adhieren a certificaciones internacionales de gestión sostenible, como el FSC (Forest Stewardship Council) para el caso de la madera.	Existen buenos ejemplos del sector privado, aunque escasos. Yo destacaría los de aquellas empresas que han logrado la certificación FSC a sus prácticas de manejo forestal, demostrado que son sustentables en términos ambientales, sociales y económicos. Sin embargo, estas iniciativas son costosas y no se adaptan necesariamente a la situación nacional de pequeño ye mediano productor maderero, que son las mayoría del sector. Por ello es que nos interesa impulsar una certificación mas accesible, basada en el concepto de mejor continua, que empuje a un amplio espectro del sector hacia operaciones y estrategias más sustentables. Hoy dejan mucho que desear, pero ya existe una demanda explicita de soluciones técnicas y de certificaciones nacionales para el sector.	Para el sector forestal, desde el aprovechamiento de los arboles en el bosque, pasando por el aserrado (madera a tablas u otras formas), llegando a la industrialización primaria (carpintería de construcción, pisos, muebles).

Participant	Organization	Country	Motivation	
Manuel Antonio Martinez Guzman	Fundación Hondureña de Ambiente y Desarrollo/ MAM	Honduras	Interés y dedicación profesional a temas ambientales y manejo sostenible de los recursos en poblaciones marginadas con énfasis en servicios ambientales. Necesidad de creación de capacidades nacionales y locales en la Gestión sustentable de recursos.	
Manuela Mata Zuniga	Direccion de gestion de la calidad ambiental del Ministerio de Ambiente, Energia y Telecomunicaciones	Costa Rica	Desarrollar capacidades para la gestion sustentable de recursos para complementar las demas iniciativas	
Maria Luisa Espinosa Talavera	Centro de Ecoeficiencia y responsabilidad Social del Grupo GEA	Perú	Las actividades que realiza mi insitución y en las que yo paticipo directamente están orientadas a la promoción de la producción más limpia (manejo de recursos)y ecoeficiencia en instituciones públicas y privadas. Por otro lado, alentamos la responsabilidad social de las empresas, en donde los aspectos vinculados a la gestión sustentable de recursos son básicas.	
Marie Alice Limage	Ministerio del Medio Ambiente	Haiti	Los problemas actuales del pais despues del terremoto	
Matías P. Córdoba	Universidad Nacional de Córdoba (Argentina) Universidad del País Vasco (España)	Argentina	La incorporación de criterios de sostenibilidad se está convirtiendo en la razón de modernización de la sociedad, y hacia futuro será tal vez la principal condicionante. La economía, la política, la energía y los recursos naturales están fuertemente relacionadas con la construcción, la urbanización y la vivienda urbana, mi principal tema de trabajo e investigación.	
Miriam Giambuzzi	Inforum-Nivel medio tecnico	Argentina	Me interesa apoyar y trabajar en la aplicación de programas nacionales o en las estrategias nacionales de desarrollo sostenible. Dado que a mi entender la aplicación de políticas resulta fundamental para seguir hablando de desarrollo sustentable para incorporarlo en los diferentes ámbitos socio culturales. Se puede pensar en sociedades sustentables, lo único que se necesita es iniciar acciones y gestionar en función de ello.	
Mónica Gabay	Secretaria de Ambiente y Desarrollo Sustentable	Argentina	Desde el Programa Nacional de Bosques Modelo, que coordino, procuramos contribuir al desarrollo sustentable local mediante el fomento del manejo sostenible de los paisajes forestales, atendiendo a la equidad social, las necesidades locales y las preocupac	

	Policies or regulations	Practices	Priority sectors
	- Ley del Ambiente - Ley Forestal y de las aéreas protegidas - Ley General del Agua - Ley de la Visión de país (2010- 2038)	˙ - Uso de fuentes de agua y reservas hídricas en proyectos productivos y consumo de las poblaciones urbanas - Uso de los recursos forestales con un enfoque integral de manejo sostenible y desarrollo de las comunidades rurales - Intervención de la industria turística con participación local y mitigación de impactos en el mediano y largo plazo.	- En la gestión de los recursos hídricos y su aporte al consumo humano y las actividades socio productivas.
	Los acuerdos voluntarios de produccion mas limpia, son instrumentos de politica ambiental que incide en aspectos ambientales, economicas y sociales. Se plantea como alternativa para meorar la gestion de las empresas que voluntariamente se acogen a un mecanismo de autorregulacion mediante el establecimiento de metas claras y compromisos de mutuo acuerdo con las autoridades competentes Planes de gestion ambiental (sector publico) establecidos por decreto	Reducir residuos, consumo de energia, consumo de agua en las granjas porcinas y mataderos	1- Sector de agricultura, debido a que nuestro pais, hay problemas d e salud por el uso de agroquimicos 2 - Mineria artesanal 3 - Sector industrial, pequena y mediana empresa
	D.S 009-2009 MINAM - Incorporación de medidas ecoeficientes en instituciones del estado.	El CER ha realizado diagnósticos y planes enfocados a la producción más limpia (gestión sustentabl! e de recursos) en sectores como: Fundiciones: ahorro de energía y de materias primas como arena y aditivos. Curtiembres: ahorro de agua, disminución de efluentes contaminados y disminución de aditivos químicos. Textiles: ahorro de energía, agua y dsimunción del uso de aditivos químicos y tintes. Papeleras: Disminución de uso de agua.	Existen varias cadenas, se puede mencionar: Cadena de beneficio de ganado -curtiembre. Cadenas vinculadas al sector agroindustrial. Cadenas vinculadas con sectores extractivos, principalmente minería.
	No las hay. Las leyes existentes son obsoletas pues las xxx no llaman la atencion de las autoridades	Ninguno / no tenemos sector extractivo ademas en el pais.	En todos los sectores en Haiti. Hay que re-hacer este pais, es un pais totalmente destruido (dicen las autoridades que no saben por donde empezar) se deberia dar una mano a todo.
	Existe una secretaría de ambiente y desarrollo sustentable del gobierno de la nación que no tiene presencia relevante en el marco nacional. Y gran can! tidad de acciones aisladas sin coordinación común.	Parte de la producción maderera de las Sierras de Calamuchita, en Córdoba (de pino elliotis, sobre todo)producida en regiones donde casi no crecen árboles de forma natural. El manejo del recurso hídrico de la ciudad de Río Ceballos, Córdoba por parte de la cooperativa(Condicionados por graves problemas de provisión)Propuesta de actualización de la red de transporte de la Ciudad de Córdoba (Incluida recuperacion ferroviaria ciudadana y regional)por parte del TIPU (Colaboración entre gobierno municipal y la universidad)Propuesta de realización de la reserva natural del oeste en los terrenos militares para evitar el crecimiento especulativo de esa zona de la ciudad, disminuir el desequilibrio de verde público urbano y evitar las inundaciones.	En la industria de la construcción y en la planificación urbana. En Argentina ! no está considerada como condicionante de relevancia, sino m! s bien como una actitud lujosa de países más desarrollados.
	Si, existen políticas ambientales, con regulaciones, ordenanzas y normas.	Agroquímicos La problemática de los agroquímicos y sus envases, su incidencia en la salud de los trabajadores, la población expuesta y el ambiente. Efluentes Líquidos Tratamiento de Aguas: Aprovechamiento del cromo presente en efluentes líquidos contaminados procedentes de curtido de pieles como agente de intercalación de Bentonitas.	A) En el sector de recursos naturales, seriamente cumpliendo las reglamentaciones vigentes y efectuando los monitoreos que se requieran según los casos. B) En el sector secundario de la econmía, logrando incorporar herramientas para una economía secundaria sustentable
	En materia forestal, existe la Ley Nacional Nº 26.331 de ¨Presupuestos Mínimos de Protección de los Bosques Nativos¨, que establece un régimen de fomento al manejo sustentable y la conservación de los bosques nativos.	Existen casos de buenas prácticas de manejo forestal en bosques nativos, correspondientes a fincas individuales, algunas de las cuales cuentan con certificación del Forest Stewardship Council (FSC). Sin embargo, hay mucho trabajo por hacer.	Desde mi experiencia y perspectiva, considero que el sector forestoindustrial debería incorporar prácticas de gestión sostenible.

Participant	Organization	Country	Motivation	
Mónica Grobel	AFIP Administración Federal de Ingresos Públicos.	Argentina	Me interesan los temas de gestión pública, dado que integro una organización pública en la actualidad y en más de la mitad de mi carrera profesional. Hasta el presente no he incursionado en la temática de gestión de recursos sustentables pero es un área que está despertando interés para mí.	
Nicolás Marcelo Perrone	Centro de Estudios Interdisciplinarios de Derecho Industrial y Económico (UBA, Argentina)	Argentina	En la actualidad estoy realizando mi investigación de doctorado sobre la regulación de la inversión extranjera. Dentro del área de la gestión de las inversiones extranjeras, el gobierno de los proyectos sobre recursos naturales genera el mayor nivel de dificultades. Se trata de relaciones de larga duración en las que los gobiernos suelen obligar a sus países por extensos períodos de tiempo con poca o escasa información. Ello genera un problema de inconsistencia temporal que tiene importantes implicancias. Al respecto es interesante el trabajo realizado por Paul Collier (2009) tanto para el World Trade ! Report (OMC) como en el ámbito de la Universidad de Oxford.	
Nydia Suppen Reynaga	Centro de Análisis de Ciclo de Vida y Diseño Sustentable	México	Dado que este proyecto se vincula fuertemente con los esfuerzos que estoy coordinando personalmente de implementar un esquema de ecoetiquetado y gestión de ciclo de vida en México, junto con otras entidades de gobierno y sociedad civil.	
Olga E. Luciano Lopez	Consultor	Republica Dominicana	contribuir a que la República Dominicana y la región de ALC puedan aprovechar las oportunidades para mejorar su competitividad en el marco de una gestión sostenible de sus recursos materiales.	
Osmer Castillo	Fondo de Reconversión Industrial Fondoin	Venezuela	Ser parte de una comunidad internacional de expertos e interesados en los temas que nos permita aglutinar esfuerzos, promover iniciativas y crear matrices de opinión favorable a los cambios de hábito, de actitud e incoporación de prácticas de producción y socnsumo amigables con el ambiente; así como fomentar el diseño e implantación de políticas públicas cónsona con los retos de desarrollo sustentable que han de plantearse gobiernos y sociedades en su conjunto.	
Paul E. Phillip	Ministry Environment, Foreign Trade & export development	Grenada	I am a marine biologist by training and presently a senior environmental officer responsible for among other things, costal zone management	
Raul Enrique Llobeta	CIPSI - Universidad Nacional de Jujuy	Argentina	Me motiva participar pues soy coordinador local del proyecto amaranto de CIPSI (http://www.cipsi.it/cipsi/master/visualizza.asp?FRFX=0&ID=46&spot=ArgentAmar&tabella=Tab04&attivo=4&Wscreen=1259). El proyecto opera en el noroeste argentino . Comparto la idea de que una forma potente para realizar es trabajar sobre el consumo y produccion sustentable. Estoy trabajando en un proyecto de desarrollo de la cooperacion italiana de promocion del amaranto. Soy profesor de la catedra de extension rural de la carrera de ingenieria agronomica en la universidad nacional de jujuy	

	Policies or regulations	Practices	Priority sectors
	No conozco aún.	Racionalización del recurso hídrico, Políticas tendientes al reemplazo de energía no renovable hacia fuentes alternativas de energía: eólica o solar, que no resultan costosas ni impactan negativamente en el ecosistema. Fundamentalmente debe darse cabida a esta temática para promover una amplia y permanente divulgación y formación ciudadana.	En el ámbito de la producción primaria, (industrias extractivas, agrícolas), pero también en la cadena productiva, respecto a las políticas de canalización de desechos industriales en todas sus etapas. En todos los ámbitos de formación educacionales en todas las regiones, a fin de promover la difusión e instrumentación de nuevas prácticas
	En la Argentina no existe una política adecuada de control de las inversiones extranjeras en el sector de recursos naturales, lo que sumado a las obligaciones que tiene el país con los inversores por los tratados bilaterales de inversión dificulta la gestión de los recursos que son explotados por emprendimientos extranjeros. De esta forma, es necesario generar mecanismos que permitan sentar las bases del emprendimiento cuando comienza y continuar su monitoreo a lo largo de la inversión. En concreto, no existen controles especiales para otorgar licencias o concesiones a extranjeros, aunque su régimen es diferente y el Estado tiene menos poder regulatorio hacia el futuro en esos casos.	En la Argentina existen algunas políticas pero dirigidas a la conservación del ambiente. Lamentablemente, los controles o regulacio! nes sobre la explotación, su cantidad o calidad son escasos o! inexistentes. Esto tiene consecuencias que van más allá del recurso en sí mismo, dado que la explotación podría o debería ser considerada al ritmo de la actividad productiva y necesidades del país a fines de garantizar a los habitantes el disfrute de los resultados de esa explotación, en consonancia con los principios establecidos por las Naciones Unidas sobre soberanía de los recursos naturales.	El sector extractivo brinda para los países menos desarrollados una oportunidad de ingreso de divisas y de inserción en la economía mundial. No obstante, los problemas son importantes. Si no existe una administración inteligente y un uso adecuado de esos recursos: a) generaciones presentes consumen los recursos de generaciones futuras, b) los recursos son limitados y es importante hacer una explotación moderada a tono con las necesidades del país y no sólo de los inversores, c) el destino de las regalías es la única s! alida que estos países tienen de la pobreza, o se trata sólo de la explotación de los recursos.
	Existe principalmente la Ley General de Protección del Equilibrio Ecológico, y dos leyes especifícas para la gestión integral de residuos y de edificación sustentable.	Actualmente nuestro Centro de Análisis de Ciclo de Vida está participando en la implementación de la gestión de ciclo de vida de dos empresas federales en este sector: La Comisión Federal de Electricidad y Petróleos Mexicanos.	En nuestro país es imperante trabajar con el sector agrícola, además del extractivo.
	La ley 64-00 (ley general de medio ambiente y recursos naturales) y las normas y reglamentos que la complementan, contienen principios y mandatos que promueven la gestión sostenible de los recursos.	En la República Dominicana se han desarrollado con éxito la producción de banano orgánico, que se exporta principalmente hacia la Unión Europea, así como la producción de café y de cacao orgánicos, orientados hacia la exportación. Esta actividad es creciente. En el sector de la minería, a partir del año 2000 se ha hecho un esfuerzo bajo la ley 64-00 de enmarcar la producción dentro de la gestión sostenible, este proceso tiene algunos éxitos notables, pero es un proceso en desarrollo en la actualidad. En el sector forestal, es creciente la incorporación de la producción sostenible, por parte de productores asociados, bajo la orientación de programas y proyectos público-privados, algunos de ellos con financiamiento externo.	Importante: En el sector de la minería no metálica y en el sector turismo.
	En Venezuela existen algunos basamentos juridicos que promueven tal concepto, fundamentalmente: a) Ley Penal del Ambiente b) Ley Sobre Manejo de Desechos y Sustancias Peligrosas c) Decreto-Ley sobre el Uso, Consumo y Producción de las Sustancias que AGotan la Capa de Ozono	Hay algunas experiencias en el sector porcino y arroz, orientadas al uso adecuado y aprovechamiento del gas metano; algunas cadenas de supermercados han introducido el conepto de "Compras Verdes", que se caracteriza, basicamente, por la clasificación y composteo de desechos orgánicos, así como reciclaje de material plástico y cartón, entre otros.	Metalmecánico, hierro y aluminio, minería, petroquímica, turismo y recreación
	Ban on sand mining Establishment & MPAs Setting environmental standards (water, soil,etc)	In the XXX for example, "Sustainable Use" implies the use of 1. Size limits, 2- Closed scason 3- banned fueling methods	Tourism Development (hotels, etc)
	No hay politicas en la region donde trabajo sobre gestion sostenibles de recursos No conozco	No conozco	En la producción agricola En los alimentos con proteinas

Participant	Organization	Country	Motivation	
Raúl Marcelo Paz Soldán Ávila	Consultor	Bolivia	El Lic. Marcelo Paz Soldán es un economista con diecisiete años de experiencia. Inició sus labores en 1993 en la Fundación Bolinvest, financiada por USAID/Bolivia, encargándose de impulsar la inserción de algunos productos agrícolas en el mercado internacional, habiendo colaborado de manera directa en la promoción de la quinua, castaña, cacao, café productos que en la actualidad son referentes del sector exportador boliviano. Asimismo, en 1995, se le encomendó el apoyo a la Asociación de Organizaciones de Productores Ecológicos de Bolivia (AOPEB) en la certificación orgánica de algunos productos agrícolas y en la participación de misiones, foros y debates en torno a las posibilidades concretas de incorporar a Bolivia como tercer país en la certificación orgánica. Los primeros productos exportados en Bolivia con certificación orgánica contaban con el apoyo de Bolinvest, apoyo que fue gestionado gracias al Lic. Paz Soldán. Años más tarde, en 1998, apoya en la incorporación de productores, cooperativas, asociaciones de productores en temas de certificación de comercio justo a través de la Fairtrade Labelling Organization (FLO). En el 2008 el SNV/Bolivia le encomienda explorar el estado del arte de la certificación forestal en Bolivia y asimismo dar los lineamientos para una probable doble certificación del Forest Stewardship Council (FSC) y FLO lo que es cumplido a cabalidad. Finalmente, el Lic. Paz Soldán ha trabajado con las más importantes agencias de cooperación internacional que operan en el país como USAID/Bolivia, SNV/Bolivia, la Embajada del Reino de los Países Bajos en Bolivia, PNUD, FAN, GTZ, Cosude y con la FAO en Roma, que le encomendó un trabajo sobre procesos de certificación de la nuez de la amazonía en el que se destaca su análisis de los procesos de certificación actuales en Bolivia como comercio justo, orgánico, IBNORCA, ISO.	
Rosana Cotes	BSD	Colombia	I am a consultant at BSD Consulting in Colombia . BSD is a consulting group specialized in Corporate Social Responsibility, fair trade and sustainable development, and I am seeking others possibilities in the field, maybe in others countries for project developments.	
Mónica Grobel	AFIP Administración Federal de Ingresos Públicos.	Argentina	Me interesan los temas de gestión pública, dado que integro una organización pública en la actualidad y en más de la mitad de mi carrera profesional. Hasta el presente no he incursionado en la temática de gestión de recursos sustentables pero es un área que está despertando interés para mí.	

	Policies or regulations	Practices	Priority sectors
	El sector forestal boliviano en general ha estado exento de una mayor participación de las comunidades que habitan en el bosque en el negocio mismo de la madera. Si bien su rol ha sido fundamental, especialmente en la recolección de árboles, no han podido lograr mayores impactos en la generación de recursos económicos que les haya permitido reducir sus niveles de pobreza. Por otro lado, el comercio interno de madera ha sido dominado por los grandes aserraderos y por las empresas manufactureras privadas, así como el comercio exterior, del que casi un cien por ciento son responsables. De acuerdo a Javier Bejarano del SNV, está exclusión se debe al uso intensivo de tecnología y capital requerido en la industria forestal. No siempre estos procesos se han realizado tomando en cuenta el tema de la sustentabilidad ambiental y social del aprovechamiento comercial del recurso, lo cual es una de las grandes limitaciones que es necesario superar para mejorar la inserción en los mercados de las comunidades que habitan en el bosque. Por otro lado, muchas de las Tierras Comunitarias de Origen (TCO's) han saneado y titulado cerca a 31,1 millones de hectáreas entre el 2006 – 2009 en la gestión del Gobierno de Evo Morales Ayma a través del Instituto de Reforma Agraria (INRA) lo que está reconfigurando el escenario forestal por lo que el bosque, y por tanto el recurso madera, pertenece cada vez más a las comunidades que habitan en él. Por su parte, las empresas forestales privadas bolivianas han logrado el liderazgo en certificación de bosques tropicales amazónicos con cerca a 1.729.736 hectáreas el 2009 en 17 operaciones, lo que se constituye como un logro nacional valorado a nivel internacional. El Forest Stewardship Council (http://www.fsc.org) y FLO (http://www.fairtrade.net), ambas con sede en Alemania, han firmado un acuerdo para desarrollar un proyecto para que empresas forestales comunitarias puedan obtener la doble certificación con la finalidad de distinguir sus productos en el mercado trayéndoles de esta forma beneficios adicionales[1]. De acuerdo a Duncan Macqueen mucha de la madera que se comercializa en el mundo proviene de comunidades de base campesina, aunque esta no se diferencia una vez ésta llega al mercado. [1] http://www.fsc.org/376. html?&L=vgzpqwwxsgtribu	Las comunidades originarias y colonos en Bolivia realizan muchos esfuerzos, a veces con apoyo del Estado y otras de la cooperación internacional, para llevar a cabo actividades económicas o comerciales en los lugares en los que se encuentran. Tal el caso de la Cooperativa Agrícola Integral Campesina (CAIC) compuesta por recolectores de castaña en Riberalta, Beni que cuentan con sus propias instalaciones para el beneficiado de la nuez de la amazonía u otras como COINACAPA, localizada en Porvenir, Pando, que si bien no tienen una planta de beneficiado, su estructura orgánica está compuesta netamente de recolectores, muchos de ellos colonos que llegaron a la zona años atrás. En el caso de los productores de café han formado cooperativas como Alto Sajama, Asocafé, AECAR, Aprocafé, Celccar, etc. Son cerca a veinticinco organizaciones de productores campesinos que cuentan con certificación orgánica y de esas mismas veinte poseen el certificado de comercio justo (FLO) todas ellas asociadas a la Federación de Caficultores Exportadores de Bolivia (FECAFEB). En quinua está la Asociación Nacional de Productores de Quinua (Anapqui) localizada en Challapata, Oruro, Saite y CECAOT y en cacao los productores de Alto Beni, La Paz han conformado la Cooperativa El Ceibo, líder en el sector. En todos los ámbitos ya existen actores de base campesina o comunitaria que se han incorporado al negocio donde se encuentran localizados y desarrollado nuevas oportunidades comerciales tanto en el mercado local como en el internacional. Es importante destacar el hecho de que la zona de producción está relacionada con el producto y la empresa/cooperativa/asociación. Por ejemplo, la región andina boliviana es la zona de mayor producción mundial de Quinua Real, por tanto, las cooperativas de productores se encuentran en el altiplano boliviano o al menos su planta de procesamiento y los productores son principalmente de origen andino habiendo, en muchos casos, mantenido una tradición ancestral y, en el mejor de los casos, la han mejorado. Por tanto no es de extrañarse que el proceso de desaponificado haya perfeccionado con los años, especialmente en el manejo del agua para el lavado ya que ésta zona es escasa en este recurso.	Forestal
	n.n.	Sustainable Tourism and Ecotourism: In Latin America have implemented sustainable tourism practices in nature reserves and in areas with large potential for exploitation of natural resources in order to promote their protection and development of the communities that inhabit them. There are specific examples in the Colombian Pacific (Chocó), Colombia's Atlantic coast with the Arhuaca community, in coastal areas of Ecuador, the Amazon reserves and desert areas of Chile.	The three critical resources in Latin America are: 1. Drinking water: pollution of water sources by the unsustainable mining, pollution of groundwater by pesticides, pollution of water sources by industries and lack of proper sanitation especially in disadvantaged areas and rural areas . 2. Land for agriculture: Modern agriculture in large commercial farms, monoculture and erosion. 3. Biodiversity: Removing extended: Irrational use of biodiversity resources (animal and plant), creation of relict forest by expansion of road infrastructure and housing, exploitation of forest genetic resources and genetic material.
	No conozco aún.	Racionalización del recurso hídrico, Políticas tendientes al reemplazo de energía no renovable hacia fuentes alternativas de energía: eólica o solar, que no resultan costosas ni impactan negativamente en el ecosistema. Fundamentalmente debe darse cabida a esta temática para promover una amplia y permanente divulgación y formación ciudadana.	En el ámbito de la producción primaria, (industrias extractivas, agrícolas), pero también en la cadena productiva, respecto a las políticas de canalización de desechos industriales en todas sus etapas. En todos los ámbitos de formación educacionales en todas las regiones, a fin de promover la difusión e instrumentación de nuevas prácticas

Participant	Organization	Country	Motivation	
Sonia Elisabeth Gittlein	Universidad Nacional de Lomas de Zamora	Argentina	Ser parte de un equipo interdisciplinario para enriquecimiento mutuo académico y además hacer que las personas se informen y tomen conciencia cuando realizan eventos de la gestión sustentable de los recursos que utilizan.	
Sylvia Elena Aguilar Camacho	CEGESTI	Costa Rica	CEGESTI promueve el desarrollo sostenible como parte de su misión, trabajando con organizaciones tanto del sector privado como del sector público para apoyarlas a definir e implementar sus políticas internas de sostenibilidad. También, tenemos más de 3 años de estar impulsado el tema de compras públicas sostenibles en Centroamérica	
Verenice Sánchez	Asociación de Reforestadotes y Cultivadores de Caucho del Caquetá	Colombia	Los esfuerzos que desde ASOHECA hemos hecho han estado orientados principalmente al fomento de los sistemas agroforestales. La parte ambiental ha sido un componente de todos y cada uno de los proyectos, sin que se dedique un espacio concreto al t	
Víctor Sigfrido Hernández	Facultad de Ciencias de las Ingenierías (FCI), de la Pontificia Universidad Católica Madre y Maestra (PUCMM)	Republica Dominicana	Los conceptos del Consumo y la Producción Sostenibles constituyen, para nosotros, la guía o el norte a seguir en los momentos actuales de la humanidad, como parte de cualquier esfuerzo encaminado a hacer más eficientes los procesos, proteger el Medio Ambiente y los Recursos Naturales y al intentar hacer más rentables los procesos de las empresas industriales y de servicio. Lo mismo sucede con los procesos de Educación Ambiental de la población y los procesos de mejoramiento de la matriz energética de los países como la República Dominicana. Los conceptos de Consumo y Producción Sostenibles deben ser parte integral y transversal de los procesos educativos de las nacionales y de su desempeño energético y ambiental. Durante nuestra carrera profesional hemos ido emigrando desde la aplicación de técnicas que hacen más eficientes los sistemas electromecánicos, desde las etapas de diseño, las Auditorias Energéticas, la Producción Más Limpia, las Auditorías Ambientales y ahora el Consumo y la Producción Sostenibles. Más recientemente hemos estado involucrados en el desarrollo de proyectos de energías renovables, a través del CEEDESMA. Podemos mencionar los siguientes dos casos: Desde el CEEDESMA participamos en un proyecto consorciado con otros cuatro países del área y España, en la convocatoria a fondos de investigación de la unión Europea CYTED-2009. En esa ocasión no fuimos favorecidos con los fondos y estamos participando de nuevo este año 2010. Este año presentamos una propuesta para optar por los fondos "EuropeAid/129-364/C/ACT/ACPTPS ACP-EU Energy Facility II Call for Proposals". Nuestro proyecto "FED/2009/337", consiste en la instalación de un sistema de generación de energía solar para una comunidad aislada de la república Dominicana. La nota conceptual presentada está en proceso de evaluación. Les anexamos el correo que confirma el recibo de nuestro proyecto. Todo este proceso, durante nuestra carrera nos han motivado a ser parte activa de este esfuerzo internacional de desarrollo y divulgación de los conceptos de Consumo Producción Sostenibles.	

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	Ley Orgánica para el aprovechamiento sostenible de los recursos naturales.LEY Nº 26821 En la página http://www.dsostenible.com.ar/leyes/legislacionnacional.html están todas las leyes existentes relacionadas con el tema en general. También en la secretaría de ambiente de la nación hay información relacionada: http://www2.medioambiente.gov.ar/mlegal/tratados/ley25841.htm http://www2.medioambiente.gov.ar/mlegal/marco/ley25675.htm		
	En Costa Rica existe bastante legislación ambiental que regula el comportamiento ambiental de las instituciones. En proceso de aprobación en la Asamblea Legislativa, se encuentra tanto una nueva Ley de Aguas como la nueva Ley para la Gestión integral de los residuos sólidos (la cual incluye aspectos tanto desde la generación hasta el tratamiento de los residuos) También en proceso, el país desea contar con una Política para la Producción y el Consumo Sostenible (de hecho, el país es proyecto piloto de PNUMA en este tema)		
	Programa de mercados verdes		
	En la República Dominicana tenemos, desde el año 2000, la Ley 64-00 que crea la Secretaría de Estado de Medio Ambiente y recursos Naturales (SEMARENA). Esta es la Ley Marco y la institución responsable de la protección del Medio Ambiente y los Recursos Naturales, en la República Dominicana. De esta Ley Marco se desprenden algunas Leyes Sectoriales y Normas que controlan el uso racional de los recursos naturales, las materias primas y la energía. Otras leyes y Políticas importantes son la Ley General de Electricidad y la Política Nacional de Producción Más Limpia y Consumo Sustentable de la República Dominicana, de acuerdo con los lineamientos de los países signatarios del tratado de libre comercio entre los Estados Unidos, Centro América y la República Dominicana (DR-CAFTA). La firma del DR-CAFTA y su Capítulo 17, Medioambiental han dado impulso importante para que el país sea signatario de convenios internacionales de las Cumbres de la Tierra, Protocolos de Protección Ambiental y de la Comisión sobre el Cambio Climático. La República Dominicana está también en el proceso de creación de la Red Nacional de Residuos Sólidos Industriales. Todos estos esfuerzos coadyuvan en el logro de una sociedad más sustentable y amigable con el medio ambiente. En la República Dominicana tenemos, desde el año 2000, la Ley 64-00 que crea la Secretaría de Estado de Medio Ambiente y recursos Naturales (SEMARENA). Esta es la Ley Marco y la institución responsable de la protección del Medio Ambiente y los Recursos Naturales, en la República Dominicana. De esta Ley Marco se desprenden algunas Leyes Sectoriales y Normas que controlan el uso racional de los recursos naturales, las materias primas y la energía. Otras leyes y Políticas importantes son la Ley General de Electricidad y la Política Nacional de Producción Más Limpia y Consumo Sustentable de la República Dominicana, de acuerdo con los lineamientos de los países signatarios del tratado de libre comercio entre los Estados Unidos, Centro América y la República Dominicana (DR-CAFTA). La firma del DR-CAFTA y su Capítulo 17, Medioambiental han dado impulso importante para que el país sea signatario de convenios internacionales de las Cumbres de la Tierra, Protocolos de Protección Ambiental y de la Comisión sobre el Cambio Climático. La República Dominicana está también en el proceso de creación de la Red Nacional de Residuos Sólidos Industriales. Todos estos esfuerzos coadyuvan en el logro de una sociedad más sustentable y amigable con el medio ambiente.		

About the UNEP Division of Technology, Industry and Economics

Set up in 1975, three years after UNEP was created, the Division of Technology, Economics (DTIE) provides solutions to policy-makers and helps change the business environment by offering platforms for dialogue and co-operation, innovative policy options, pilot projects and creative market mechanisms.

DTIE plays a leading role in three of the six UNEP strategic priorities: climate change, harmful substances and hazardous waste, resource efficiency.

DTIE is also actively contributing to the Green Economy Initiative launched by UNEP in 2008. This aims to shift national and world economies on to a new path, in which jobs and output growth are driven by increased investment in green sectors, and by a switch of consumers' preferences towards environmentally friendly goods and services.

Moreover, DTIE is responsible for fulfilling UNEP's mandate as an implementing agency for the Montreal Protocol Multilateral Fund and plays an executing role for a number of UNEP projects financed by the Global Environment Facility.

The Office of the Director, located in Paris, coordinates activities through:

- **The International Environmental Technology Centre** - IETC (Osaka), which implements integrated waste, water and disaster management programmes, focusing in particular on Asia.
- **Sustainable Consumption and Production** (Paris), which promotes sustainable consumption and production patterns as a contribution to human development through global markets.
- **Chemicals** (Geneva), which catalyzes global actions to bring about the sound management of chemicals and the improvement of chemical safety worldwide.
- **Energy** (Paris and Nairobi), which fosters energy and transport policies for sustainable development and encourages investment in renewable energy and energy efficiency.
- **OzonAction** (Paris), which supports the phase-out of ozone depleting substances in developing countries and countries with economies in transition to ensure implementation of the Montreal Protocol.
- **Economics and Trade** (Geneva), which helps countries to integrate environmental considerations into economic and trade policies, and works with the finance sector to incorporate sustainable development policies. This branch is also charged with producing green economy reports.

UNEP DTIE activities focus on raising awareness, improving the transfer of knowledge and information, fostering technological cooperation and partnerships, and implementing international conventions and agreements.

For more information,
see **www.unep.org/dtie**

Sustainable resource management (SRM) in Latin America and the Caribbean (LAC) is imperative, as national, regional and global economies greatly depend on their availability and productivity.

This report has been developed within the project "Strengthening Capacities on Sustainable Resource Management", which aims to (1) pinpoint the needs of the region; (2) increase coordination and understanding of SRM among key stakeholders in the scientific community and government administrations; (3) improve their skills on these topics by providing them with tools to enhance coordination and develop consistent cross-cutting policies for SRM of their resources; and (4) launch national action plans and identify opportunities for SRM in the LAC region. This project emphasises the use of a life cycle approach in dealing with SRM and encourages activities that foster education, inclusion and empowerment of key players tackling SRM in LAC through pilot projects that aim to introduce sustainable, more equitable and fair management procedures.

More specifically, this report seeks to provide (1) an overall context of SRM in the LAC region; (2) a proposed definition of critical resources as perceived by regional stakeholders; (3) an analysis of the current status of the critical natural resources identified; and (4) conclusions and future outlook.

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